

Environmental Hazards

James Kendra
Scott G. Knowles
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Disaster Research and the Second Environmental Crisis

Assessing the Challenges Ahead

 Springer

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Series editor

Thomas A. Birkland

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The goal of the workshop was to reflect on old problems in disaster research while striving to bring forward new methodologies for the disasters we face today and will face tomorrow. This book is for researchers—established scholars and those just starting, alike—and also for a public that demands fresh thinking in this crucial field of research.

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Introduction: The New Environmental Crisis



James Kendra, Scott G. Knowles, and Tricia Wachtendorf

Abstract The genesis of this book was the 50th Anniversary Workshop and Celebration of the Disaster Research Center at the University of Delaware in 2014. In marking that milestone in the history of the center, we wanted a workshop in which participants would reflect on what is known about disaster science—much of which is owed to DRC, to its long lineage of intellectual descendants, and to their scholarly cousins in a variety of fields. We wanted to assess where that knowledge is uncertain, where new or reinforced knowledge is needed, and also to think about the state of practice. For this collection, authors were explicitly encouraged to be provocative; to be iconoclastic; to be speculative; to try as best possible to bring in new ideas or different approaches to familiar themes. In this first chapter, we consider some of today’s pressing environmental challenges and the associated research needs, moving from there to introduce the chapters and their overall contributions to this volume.

Keywords Hazard · Disaster · Environmental change

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Introduction

The genesis of this book was the 50th Anniversary Workshop and Celebration of the Disaster Research Center at the University of Delaware in 2014. In marking that milestone in the history of the center, we wanted a workshop in which participants would reflect on what is known about disaster science—much of which is owed to DRC, to its long lineage of intellectual descendants, and to their scholarly cousins in a variety of fields. We wanted also to reflect on where that knowledge is uncertain, where new or reinforced knowledge is needed, and also to think about the state of practice.

This idea was provoked by a sense that we are living in the midst of a “second environmental crisis,” an unfolding disaster era as compelling, but not as recognized, as the environmental crisis of the 1960s: a complex of seemingly intractable hazards across the intersections of natural, social, and technical systems. Rapid urbanization, growing populations, global economic adjustments, environmental degradation, decaying infrastructure, climate change, and technological failures of every description create a universal risk milieu whose origins and outcomes are hard to identify and for which ameliorative steps are elusive.

What are the characteristics of this new crisis? Let’s compare two eras. The first environmental crisis was formed by pollution incidents and chronic technical hazards (Couch and Kroll-Smith 1985), the awareness of which ignited the ecology/environment movement begun in the 1960s. This movement, implicitly or explicitly, united scientists, advocates, and policy makers in advancing an agenda of social change and regulatory innovation whose purpose was nothing less than remaking the character of human-environment interaction. It was a time of escalating awareness and escalating tension. The prospect of nuclear war was ever-present. Nevil Shute’s *On the Beach* (1957) portrayed the end of the world as a few survivors in Australia waited for radioactive fallout to reach them. While less apocalyptically but no less dramatically, path-breaking works like Rachel Carson’s *Silent Spring* (1962) alerted people to the slow degradation of biological systems under the influence of chemical pollutants. Environmental quality and public health research across disciplines was matched by public concern to yield a raft of policy and bureaucratic interventions in a very short period of time: the Clean Air Act, the Clean Water Act, and the establishment of the Environmental Protection Agency, to name a few. These years were marked by a significant re-imagining of human impacts on the earth, and of institutional and individual roles and responsibilities.

What about today? While environmental quality has improved in many places in the US and internationally, by most assessments other hazards have intensified. Apart from coastal hazards, tens of millions of US residents occupy areas prone to a variety of hazards, including much of the population of California and the Pacific Northwest (seismic hazards); the Midwest (seismic hazards, riverine flooding, drought, depleting drinking water); the Southwest (depleting drinking water); Texas (flooding, drought, depleting drinking water); and Florida (depleting drinking water, seawater infiltration, land subsidence). Areas of the urbanized northern US are

exposed to snow and cold extremes but for the most part are well-adjusted to these events. Sea level rise has already exacerbated seasonal flooding and portends higher insurance and disaster recovery costs on the entire Eastern Seaboard.

The challenge is as great or greater worldwide, as again people crowd into dangerous places, or make places dangerous through the concentration of industry that itself spins off its own reflexive dangers. Megacities across the globe (Mitchell 1999) have pulled vast numbers of people together in environments of dense vulnerability, straining and surpassing infrastructure in every way. In some places, high concentrations of poverty and ongoing social and political turmoil add a human-induced component to the risk milieu. Some places, such as Haiti, continue to live the legacies of 200 years of colonization or post-colonial political and economic manipulation from within and without, creating a perpetual vulnerability to hazard.

Other places, such as Japan, have deployed prodigious economic and technical resources toward hazard management, yet still prove vulnerable to outsized events such as the 2011 Tohoku earthquake and Fukushima nuclear disaster. Some events, such as the Indian Ocean tsunami, have a global reach, spanning 1/6 of the globe, killing some 200 people in coastal Africa along with over 200,000 closer to the epicenter in Indonesian waters. Many places throughout the world are still waiting for “the big one,” whatever that might mean in their local environment. At the same time, a warming climate may shift some hazards further poleward, especially pests, mold, and natural respiratory irritants causing chronic low-level losses to health and property.

Apart from climatic and geophysical hazards, sources of industrial calamity have not just proliferated, but concentrated, prompting a stark warning from Perrow (2007) that this increasing density of, especially, energy and chemical facilities is creating conditions for “the next catastrophe.” And as if that weren’t enough, deferred maintenance and decaying infrastructure—Minneapolis Bridge Collapse (2007), San Bruno Pipeline Explosion (2010)—presents chronic hidden dangers, yet with a cost for detection and repair that seems to be outside of any serious policy dialogue. Calamities such as the Deepwater Horizon spill (2011) or the Lac-Mégantic, Quebec (2013) train derailment point to ongoing technical dangers from the systems we rely on to provide us energy.

A New Environmental Crisis

The idea that world society had entered a Great Climacteric, a global entrance into a “time of unusual danger,” was proposed by Burton and Kates (1986) to denote their sense of gathering and accelerating risks engendered by the Industrial Revolution and wholesale shifts in commerce and habitation. Mitchell (1990: 131) expanded these themes, arguing that hazards “are now recognized as components of a major problematic—a complex web of interactions among peoples, environments, and technologies, characterized by multiple causes and consequences—that calls

forth new types of intellectual and managerial responses.” These threats, said Mitchell, were not “separate from society,” but arose through basic functions of modern life.

We may have entered yet another environmental crisis, yet the difference is that there is a much smaller, much less organized and visible constituency to apprehend it or to develop effective management institutions. The implicit assumption is that existing agencies like Environmental Protection Agency (EPA), the Federal Emergency Management Agency (FEMA), the International Red Cross and Red Crescent Societies, the United Nations Office for Disaster Risk Reduction (UNISDR), and existing environmental and disaster policies will be enough to meet the crisis (with modifications here and there), but this optimism is challenged by the magnitude, complexity, and cost of events like Hurricane Katrina, the Fukushima disaster(s), and Hurricane Sandy. A key feature of the second environmental crisis is, indeed, a stubborn faith that experts and policy makers can meet intensifying hazards with progressive and practical solutions. Whether this faith is warranted plays out in debates and disputes at every scale of politics around the globe.

Recent events bear out the necessity of new approaches to this unfolding crisis, most recently in Hurricane Sandy. The destructiveness of that event had long since been predicted by scientists in every discipline: that there would be perilous coastal erosion; that there would be extensive shoreline flooding; that New York City’s subterranean infrastructure would flood; that there would be long term power failures; that hospitals and other critical facilities would be flooded or cut off from their communities. In fact, except in some operational details of providing disaster response services in an urban area, there are few lessons to be learned from that event; rather, the takeaway is in the value of what is already known and the spotlight on the complexity of the challenge. That challenge is how to unravel the vulnerabilities created by human settlement—even, more broadly, the dangers created by human life. Not only are places prone to natural hazards, but the actions of modernity create their own perils, with technical systems prone to failure, susceptible to attack, or insufficient in design against actual rigors of the planet. This reflexive risk (Beck 1992)—the risk of our own technologies and environmental practices—intersects with the planet’s own forces and creates a scientific challenge for finding “causes” and a policy problem of finding suitable entry points for mitigation, and yet another scientific challenge for understanding the adoption of hazard adjustments.

Challenges at Every Scale

At the same time that scientists and institutional actors grapple with shifts in hazard and often-varying political interests, there is relatively little guidance available to the everyday person in making the choice on where to live, the main kind of decisions that average citizens will make in managing risk. Some people have few choices in where to live—people with limited resources often have to take whatever

housing they can afford, with few options in terms of quality of construction or safety of location. Floodplains, proximity to technological hazards, unstable slopes and other such locales form part of a predictably risky backdrop. Meanwhile, better-off people, the middle class, are often hard-pressed to make good locational decisions because of the diversity of risks that a prudent person has to navigate in a home purchase. Studies such as by the geographer Risa Palm (1981) have showed the kinds of concerns that potential homeowners have, ranging from home amenity to school quality. Instead, people have to weigh a number of possible risks, and research has been singularly unhelpful in providing guidance for the tradeoffs that a sensible person should make.

The State of Texas in the US provides a concrete example of just such challenges. For one thing, it is a vast state, subjected at one extremity to intense heat and tropical storms, and at the other vulnerable to heavy snowfalls and devastating ice storms that can make roads impassable. Some areas of the state are afflicted with an expansive clay soil that is highly moisture-sensitive. In dry periods the ground will shrink and crack, causing interior damages and potentially necessitating costly repairs. To avoid these conditions, homeowners are advised to water their foundations throughout the summer to keep the ground moist—a terrible use of water in a state that is just recovering from a lengthy drought and which will no doubt see further droughts in the future. These are common, low-level losses which don't rise to the level of a disaster, but which nevertheless impact people with sustained, chronic damages. Moreover, according to a report in the New York Times (Murphy 2010), national losses due to foundation failure are increasing, to about \$4 billion per year in 2010, and with oscillations of extreme drought and rainfall, more places are seeing damages that are outside of their experience.

Given the difficulty of navigating these risks, it is not surprising that people generally are not prepared to weigh the various perils to which they are exposed. The Texas example is extreme, but not too extreme: a person deciding to live in that state has to weigh foundation settlement, flooding, ice, dry rot, mold, termites, carpenter ants, tornadoes, and hail as possible natural hazards, not to mention the full panoply of technical hazards that people generate wherever they live, like hydraulic fracturing (“fracking”), or chemical manufacturing.

We have very limited consensus on what places are too dangerous to be inhabited. Certainly we can argue that some places are more dangerous than others, as evidenced by magnitude of losses or repetitive losses, as along beaches, or in the hundred-year floodplain. But beyond that it is more difficult to say what is prudent or imprudent. And moreover, as we have seen from events as diverse as the Dust Bowl to Hurricane Katrina, nobody wants a lot of people moving to *their* apparently safe place. Thus US disaster policy is a kind of fantasy shell game—we want people to move away from danger but are glad that they don't. Even if a lot of the populations could move, either by force or by persuasion, who would it be? Since there is an implicit moral orientation in disaster research, and obviously in policymaking, analysts should be able to state with some precision who is prudent and who is blameworthy.

Complicating the picture is that we need people in dangerous places: 95% of US international trade is carried by ship. Ships need ports. Ports are on the coast. Ports need people. Thus some people are going to have to live there, and these nodes of economic activity will draw commerce and habitation of every description. These aren't choices in any meaningful sense. In the US, East Coast seaport areas are in range of hurricanes. New Orleans sits at the mouth of the Mississippi River and the transport station of the nation's petrochemical empire. On the West Coast, the ports are on the rim of the Ring of Fire, including Los Angeles and Long Beach, the biggest US ports for the handling of container cargoes. None of these places is going to be dismantled, and if everyone who lives in Los Angeles suddenly got appropriately nervous about seismic risks and decided to leave it would provoke a national crisis. Thus it is disingenuous to hector people for their locational choices—and certainly without a firm idea of what is wise and what isn't. All places in the US are prone to some sort of risk—there is no possibility of the “spatial fix” (Harvey 2001) that is the aim of much hazards research. Moreover, a strange blood sport has grown up in the US: blaming people for living in dangerous locations. We saw this clearly after Hurricane Sandy, in which federal assistance for disaster relief and recovery programs was hamstrung by congressional politics. There was sizable posturing especially by Republicans in the southern states who objected to much of the Federal assistance that would be directed to New York and New Jersey.

Research to Policy Challenges

Because of these dilemmas, some of the solutions that have emerged from the research and policy community don't make sense, or cannot be implemented, in the lives of real people. One recent example is the Biggert-Waters Act, which would have modified the US National Flood Insurance Program. This program has provided subsidized flood insurance since the late 1960s for millions of Americans who live in high risk flood zones. It is a system highly dependent on keeping updated floodplain maps in order to accurately assess risk and create reasonable premiums. Over the decades the program chugged along, never making anyone perfectly happy, but reflecting the kind of compromise that is common in the history of American risk management: it is a blended public-private program that leverages government funds and science in the name of private property and business ownership.

Motivated by Hurricane Katrina, the Biggert-Waters legislation would have increased flood insurance premiums on residences and businesses to reflect their actual risk of flooding. It's hard to argue with that justification. Shouldn't people pay for the actual risk they are incurring? While some grandfathering of the provisions would have dulled the immediate impact, over time some people—owners of the so-called “repetitive loss properties”—would have seen their premiums increase. Even the prospect of such increases was interfering with real estate transactions on existing homes. There was substantial political backlash among residents, reflected

through Senators and House members from coastal states, like former Louisiana Senator Mary Landrieu, and the legislation was substantially overhauled. To be sure, there are good reasons for modification of the National Flood Insurance Program. Hurricane Katrina bankrupted it, though the program had run “in the black” prior to then. And Katrina revealed lax enforcement of purchase requirements and other provisions (Knowles 2014). At the same time, the prospect of premiums rising to double or triple or more what policyholders currently pay was not sustainable, and never would be. And arguments about “actuarial risk” fell flat with homeowners whose homes *had never flooded* even, in some cases, in the over 200-year history of the structure. As Knowles (2014) argues, there were many options available to blunt the worst effects of Biggert-Waters; wholesale restructuring was not necessary. However, its inelegant effects hit so many people of different means that its underlying wisdom and indeed justice was lost as collateral damage.

Moreover, peculiar values came into conflict. One feature of modernity that Mitchell (1999) has identified is that of ambiguity: a state of indecision and conflicting choice. Hazards policies can shatter once stable networks and generate conflicts of desirable outcomes. Two examples show this. In India after the 2004 tsunami, initial government mitigation plans called for resettlement of people living near the shoreline. While this might have reduced the tsunami risk, the proposed new locations were vulnerable to monsoon flooding, and distance from the beach would have disrupted social norms in fishing and community activity. As another example, New Castle, Delaware has a well-preserved historic district along the Delaware River. Home prices are high there, but not so high that middle-class people can’t live there who are willing to abide by the strict construction and preservation requirements. What are the choices: high insurance premiums that would drive out these residents in favor of the upper-class? Abandon these 200-year-old structures, part of the US cultural and material heritage, because no one should be living there anyway? Neither of these options seems good, and it is the absence of good options that leads to our present conceptual and policy logjam.

State of Knowledge

The hazards community is one of the most uniquely compassionate and supportive communities in academia: there is a high level of nurturing of junior scholars, and a wonderful absence of rancor even though, as is the nature of academia, we’re often all competing with each other. Somehow, in spite of that competition, there is a mutual celebration of successes owing to two factors. One is the fundamental ethos of service that is at the root of why people enter this field. And the other is that we work in relatively small areas of our respective disciplines. In a multidisciplinary field like disaster, scholars must branch out from their own academic department or agency setting and read other works and interact with people from diverse settings. This eclecticism has been highly productive of creative empirical studies, and work

that finds its way into practitioner communities—but it has also posed a challenge to theory formation.

In spite of research and policy needs at all scales, from fundamental theories of disaster to the quotidian tasks of disaster management, disaster research progress has slowed in recent years, and to some extent has even turned back on itself. While reconsiderations of past ideas are always valuable, the objective should be progress, not merely a banishment of certain ideas while the actual conditions remain. Disaster scientists find themselves in a theoretic brambles today. As an example, Hewitt's classic 1983 edited volume *Interpretations of Calamity* is credited with the “vulnerability turn” in hazards studies. There, Hewitt and his co-authors demonstrated that hazardous conditions stem more from political, social, and economic marginalization, from imbalances of power that shunted people of lesser means to dangerous locations, or systems of production that undercut more adaptive indigenous hazard management approaches. This argument was meant to counterbalance what they saw as the prevailing paradigm in disaster research, focusing on decisions, risk communication, and institutional methods for discouraging certain land uses. Recently though the vulnerability approach has itself been criticized for inappropriately grafting western frames of social systems onto diverse cultural settings. Some scholars, such as Bankoff et al. (2004) have argued that emphasis on vulnerability hides simultaneous coping strategies. In essence, then, the argument is that the vulnerability approach is disparaging. A similar turn is visible now in antagonism to ideas of resilience. At the 2011 Natural Hazards Workshop at Boulder, in a panel on resilience, one panelist commented something along the lines of “even in Haiti” people were able to find means of coping. An audience member criticized the phrase “even in Haiti,” as though we should be at all surprised that people are able to find ways of recovering after a disaster. What the speaker meant was that in Haiti, a place commonly regarded as without capacity, people have developed ways to manage their lives. Yet the audience member thought his line of discussion was disrespectful. This anecdote opens up a much more vexing issue about terminology and research programs in disaster work. The “resilience turn” is now seemingly complete—the term is ubiquitous, and yet its intellectual trajectory from psychology and ecology, through the formation of the UNISDR, reveals a concept that somehow simultaneously enables community-level studies of subsistence farming and studies of interconnected critical infrastructure. At present the field is in discord on these key ideas, yet each contains key ideas about disaster prevention and response.

This Volume

Given these broad challenges, how can we see any way forward? These broad observations lead us to the collection of papers in this book. Naturally they can't solve all the problems, or even all of a single research or policy dilemma. But they have turned attention to some intriguing ideas that can help guide the research trajectory. These tie in to the main areas of challenge that we have identified: what we're studying; what we're managing; who we're doing it with; and how we're studying.

The collection of papers in this volume capture different features of the present challenges that we have identified. If new knowledge of a challenging risk milieu is needed, what should that knowledge look like? How does what we know point us there? The researchers and policymakers have not moved people to action; what options are there in building an interested constituency that can be active participants in creating options for reducing disasters? If there is not a constituency for disaster reduction, why not? What are people seeing in their local settings? Unraveling the interconnections of natural, technical, and social systems that are the basis of hazard (Mitchell 1990), with such interconnections ramifying through the entire space of human experience would, at present, seem an impossible feat of comprehension. Every entry point can be found only by bypassing a different one. Yet for all that, the task is not hopeless. We have seen people moved to action before, on environment and civil rights.

Two chapters bookend the conceptual scope, though we place them together. Thomas Drabek charts the evolution of disaster research from its coalescence as a field of study more than 50 years ago. But his recollections of the trajectory of the field are also his jumping off point for discussing some early successes, and future needs and possibilities. In particular, he argues the emergency management occupation continues to absorb scientific findings, one indicator of ongoing professionalization. Then Wisner takes a different approach. He reminds us to think not just about disaster, and its organizational and institutional features or even about disaster causes, but about the large-scale global systems of economy and politics that generate risks. In his analysis, we hear the echoes of the problematic, the climactic, a complexity of risk that people live in and manage, often alone, but whose genesis is in the dark matter of institutions whose functioning is hidden by secrecy, patents, property rights. It is diffuse and invisible, a kind of spirit world of power and resources whose rules are guessed at, but not understood. These transactions toward concentrations of wealth and industry soak up resources and good land and destroy safe spaces. Wisner, therefore, argues that we should “wear bifocals” to be able to look at disaster phenomena both near their occurrence and further away at their genesis.

Drabek mentioned the enhanced professional development of emergency managers. Nevertheless, they occupy a strange space in the policy network, in that many of the conditions that lead to disaster are conditions they can't affect, assigned to different offices in government and situated in economic and political space outside their ambit. Moreover, they have the burden of a strange expectation: to make the day after a disaster more open, more participatory, more accessible, and more humane than the day before. As this occupation professionalizes, the “vision” of research will be in their hands, and they may yet be strong exponents for operationalizing the findings of disaster science.

Coetzee and colleagues take their argument in a different direction, in their focus on resilience. Resilience is a key idea in present thinking about disaster, and has incited any number of papers and modifications to government policies across the globe. Resilience scholars believe they have identified a set of characteristics that indicate the capacity to forestall, or to manage, disaster. Some critics have emerged, such as Tierney (2015) and Dombrowsky (2010), who argue that resilience is a

dangerous fad that draws attention away from what is already known about disaster. Coetzee et al. go in a different direction, challenging frames of resilience that ignore the dynamism of the complex systems in which risks are generated and managed. Taking the venerable Pressure and Release (PAR) model as an example, they argue that it sets aside a host of interaction effects with the processes it represents, so that a fuller explication of the model would be more detailed in assessing the relative contributions of positive/negative feedbacks within the system stemming from, say, a particular root cause of disaster, such as political ideologies.

The challenge for disaster is its multivalent character. Chaos theory emerged as a popular idea in disaster in the mid-1990s but it didn't really take hold because, although it was an interesting approach for characterizing the disaster milieu, it offered little guidance for interventions. It was a useful concept; however, for showing where in a disaster evolution might be an opportunity for creativity and adaptation (Comfort 1999), an idea that Coetzee et al. run with in an intriguing way. In an interesting theoretical maneuver, they connect complex adaptive systems, chaos, and resilience. Without giving away the ending, they make a provocative argument.

Disaster Management Challenges

One feature of disaster response—and probably the one that is mentioned most—is coordination. Coordination seems to be the thing that emergency management agencies are supposed to do, like FEMA. It would be hard to find a text that doesn't mention coordination, and it would be hard to find a post-disaster assessment that doesn't emphasize the need for better coordination. These common findings, while certainly true, don't really probe into the causes of those breakdowns, or provide an illustration of how these free-floating kinds of failures can be detected in advance. Moreover, officials already know that they have to coordinate and communicate, so a paper that stresses the need for coordination would hardly be useful. But suppose we reversed the polarity of the inquiry. Instead of considering what officials did wrong, suppose we instead asked why it was that responsible and experienced officials, trying to manage through a difficult and confusing situation, were not able to do the things that they themselves know to be necessary? Perhaps we could move our understanding of coordination further forward, or look at coordination differently. In New York City after 9/11 is that there was a lot of coordination, but that coordination often didn't result in work getting done, or getting done only after much conflict. For example, officials from the New York City Department of Health and Mental Hygiene and the Department of Buildings fell into a heated argument over how to handle the washdown of debris being transported from the site. DOHMH wanted an expeditious system that would clean toxic materials before carrying the debris through the city; DOB wanted a well-designed system that would last into the colder weather. By appearances, they were having trouble coordinating. But that description is deceptive. They *were* coordinating; they just couldn't come to a quick agreement on what was the correct technical approach.

Disaster management systems are in need of overhaul as well. Years ago, following catastrophic wildfires in California, emergency officials, policymakers and scholars worked to establish what would be the forerunner of the incident command system. Though built on what was, at the time, current management theory, disaster management has not been updated with regard to new thinking about organization. In fact, a visit to a museum can be instructive. In London, the Churchill War Rooms are preserved as they were at the end of World War II. There, we can see the physical manifestation of crisis management organization: tables arranged in a square; a line of desks covered with telephones; a planning department organizational chart with vertical boxes. That's what emergency management looks like today, in any emergency operations center. The science for coordination has remained oddly static for the last 75 years.

The main task of the Federal Emergency Management Agency is coordination but FEMA is an institution that is designed for blame. As one of the smallest agencies in the Federal government it was originally designed to try to streamline the diverse organizations that had disaster related responsibilities, and to give a focus in coordinating the many disaster assistance programs throughout the government. But from a different perspective, it is intended for failure. Because the fact is there is very little FEMA can actually do. Instead, it acts as a contractor, requesting that other agencies with people or equipment fulfill disaster-management tasks. But more than that, its efforts are principally toward *public* institutions: hospitals, schools, government buildings, infrastructure. Its maximum payout to individuals is enough only for modest home repairs and replacement of personal items. Individuals are primarily expected to cover their losses with their private insurance, or disaster loans through a different agency (the Small Business Administration), or potentially payments through the Department of Housing and Urban Development. This means that people's interactions with FEMA will inevitably be negative: a bureaucratic organization living on paperwork that doesn't even meet their needs. Worse, as a contractor, FEMA must oversee the work of all of its subcontractors: a management task that is challenging throughout government but whose impacts are often remote. And the organizations that FEMA must work with are vastly larger and more powerful, such as the Department of Defense. Moreover, in the end, the thing that most people need after a disaster—after their main requirements for the basics of food, clothing, and shelter have been met—is housing, and this is a thing that FEMA can barely provide. Trailers and manufactured homes are of course a short-term solution (though their use often persists beyond the short term). But the restoration of the apartments and houses that formed the “normal life” of the population is beyond FEMA's scope, mainly left to the private market. Navigating that market is a brutal process, as seen after Hurricane Sandy. FEMA appears responsible, but has neither responsibility nor power.

Johanu Botha fully embraces the iconoclastic stance that we encouraged of the authors. Why even have a coordinating agency at all? Botha suggests that the value of a central coordinating agency may be overstated, and that importance has never been rigorously tested. Some research, especially Kendra and Wachtendorf (2016), makes a very strong argument for decentralized disaster response operations. We

may have to consider the potential usefulness of coordinating agencies as being different in different phases of the disaster cycle. And it may be too, that coordinating agencies are simply limited in the things that they can coordinate. Not only is disaster response decentralized, but in the US system and elsewhere, much of disaster recovery is left to the free market: that is, to insurance companies, banks, private contractors and others. These things cannot really be coordinated in the way that we understand coordination, as when an organization has, not only the responsibility, but also the power to direct performance.

While much is known, many frustrations remain in our understanding of disaster phenomena, from scales of individual or household response to institutional management of risks. For example, while we know a lot about warnings and evacuations, some people continue to resist warnings and exhortations to evacuate, sometimes with tragic results, as seen in Hurricane Sandy when members of one family did not evacuate and perished when their house was washed away. Fearing looters, they preferred to remain behind. Even though a science of risk communication has developed where the goal is to persuade or hector people into evacuating, yet some will not. Are there better messages yet to be developed, with better combinations of words or timing, or have we perhaps reached a practical limit and must accept that some people will stubbornly try to ride out the risks? If that is the case, might research energies and money be better spent in other directions? Beech and Wallace circle around the standard demographic categories that dominate risk and warning communication theories, which they argue are a tangle of contradictions. Instead, they bring in Douglas's grid/group categories to assert the need for a cultural component to hazard information—that is, culture understood by how tendencies toward individualism, hierarchism, egalitarianism, and fatalism line up in these categories, and their implications for message content.

Emergency management is a borderlands occupation, lying at the edges of the natural, social, engineering, and policy sciences. Emergency managers have to make sense of a base of science from several different spheres and then graft that into policy systems that run at different speeds and in different directions. For many years there has been hope that access to more and better information would assist in decisionmaking. But Patrick Roberts and his colleagues caution against the present fascination with “big data.” Indeed, much as been known for many years about disaster risk, but modern society is occasionally swept by optimistic enthusiasm that more information more artfully transformed will solve our problems. Theodore Roszak, in his classic *The Cult of Information*, (1994) raised a different argument: is it really a lack of information that impedes us from solving our social problems? Today's emergency manager has access to data and analytical tools such as GIS that were undreamed of a quarter-century ago. Instead, Roberts argues that emergency managers should focus more on developing sound decisionmaking processes, in order to better make use of what is known.

The disaster management picture becomes even more complicated in the international setting. There, multiple conflicting values overlap. The history of development projects is checkered at best, as seemingly helpful initiatives turn out to be unworkable in one place though they may have been successful elsewhere. Disaster response is replete with potential conflicts. For example, the SPHERE standards for

acceptable disaster response hold that communities that are evacuated should be kept together if possible in the place where they are resettled. But if there are pre-existing conflicts that may not be the best advice, and it may be possible to inadvertently reproduce the conditions for conflict over space. Western standards of gender equality are not appreciated everywhere. Moreover, strong norms toward public participation and local involvement, which are at the heart of Western disaster response philosophy, are out of place in settings with authoritarian power structures, where existing norms of participation are minimal, or where certain populations are suppressed in their economic and political participation, such as women. Thus there is no universal guidance for implementing disaster responses that practitioners can take with them into the global setting. Everything must be local, particular, contingent, and re-learned from place to place. And by now perverse effects of disaster aid have been documented. In Haiti, for example, the post-quake availability of free health care displaced some local providers (King et al. 2011). To send no assistance doesn't seem to be a good answer either. And precisely tuning the arrival, expense, and departure of various forms of aid, such as medical care, is outside of our administrative capacities. Advising prospective donors to send money has long been standard guidance, to avoid undercutting the local economy and to assist the economic sector in recovery, but at the same time, some things are needed in kind, such as doctors to provide direct care.

If Botha's chapter isn't provocative enough, Malka Older provides another iconoclastic view of disaster: of disaster response as a second disaster. Sometimes we hear that convergence of unwanted donations is a "second disaster," but Older goes even further. She points out the conflicts that arise in a setting where decisions are to be made that affect many interests. Often, communities have to do new things (Kendra and Wachtendorf 2007) and often there are no clear guidelines. In the sociopolitical ecology of swirling resources and eddies of power (Peacock and Ragsdale 1997), response and recovery strategies are bound to be uncomfortable for some. Blame, perceptions (or realities!) of inequitable treatment, and subordination of community goals by powerful outsiders can destabilize trust and discredit any choices that have to be made. Older notes that response agencies themselves bring their own challenges, their own uncertainties, as they affect local decision-making. Disaster response, as a combination of activities, can paradoxically have the same effect as a technological disaster; inadequate responses become a source of blame and discord.

Constituency

Scholars and policymakers have long sought to find a constituency for disaster risk reduction, one that is amenable to the changes in land use, building design, policies, and other human-environmental interactions that will be necessary. At present that constituency does not exist. Because risks and responsibilities are so fragmented, the sustained and focused interest groups that are necessary to mobilize policy

action are not able to coalesce. Several writers address this. Experienced allies for engagement could be existing environmental and social justice advocacy groups, but in his contribution Carlos Martin observes that they have not been active in hazard focused policy areas.

Local participation is not so easy. Martin notes that environmental and social justice advocacy groups are less energetic about disaster risk reduction because many of the concerns in their portfolios comprise many more immediate challenges for their populations of concern. In Martin's study, organizations gave a number of reasons, among which—confirming what has long been suspected—is the challenge of bringing environmental hazard to the forefront of attention, and to communicate in communities with other, seemingly more immediate worries. It may well be, as we noted earlier, the lack of good options balanced against daily demands, and the diffuse and often invisible benefits of mitigation. One's risk is reduced, but that is invisible to the senses. The risks are not obvious in many places, and organizations and resources are always stretched thin.

Their limited involvement is a serious deficiency, because they have the resources and organizational prowess to understand where are the strategic pressure points. Indeed, James K. Mitchell (2006) argued that much of US disaster science and policy had been the work of a relatively small group of scholars, officials, and other advocates who had managed to shift attention away from disaster response and in the direction of disaster mitigation. In this volume, Mitchell expands these ideas to look at the need for a larger constituency, and how to kindle the engagement of several possible groups. Similarly, Philip Barnes and Andrea Sarzynski home in on community-based action, in their case study of the Transition Movement. They note that environmental initiatives tended to be dominated by middle-class people—that is, people with both disposable time and disposable income. If that is the case, then it is possible for these movements to simply reproduce the same kinds of political and economic marginalization that exists already. Fortunately, they find the little evidence of this in their study of the Transition Movement.

There is another reason for the lack of a constituency: mitigation is boring, uninteresting, uninspiring. It's not fun and it's usually not beautiful. Flood insurance, retrofitting, and durable construction doesn't yield any particular pleasure, like new paint or new furniture. A resident doesn't even have the benefit of showing off their foresight or good sense to the neighbors, as with solar panels, or enjoying the benefit of a cleaned-up landscape, as we saw with the environmental movement. Cleaning up a park yields a nice view; tying the water heater to the wall, not so much. Other than through the use of regulations—faulty at best in driving social change—what kinds of marketing could persuade adjustments whose benefits are largely hidden and whose main effect is in lowering the risks that most people don't feel anyway? Fausto Marincioni and his colleagues shift the discussion in a different direction: that of good landscape design. To them, mitigation should be artful: it should be beautiful as well as functional.

What else can be the basis of a constituency? Barnes and Sarzynski posit multiple constituencies emerging from localized conditions and needs. The approach is reminiscent of one advocated by Sclove (1995), who advocated small technologies as a way of reducing dependencies on larger systems. Still related to the idea of

building a constituency, Bercht takes a different tack, a psychological look at sense making under environmental change. In building an argument that spans scales, from individual cognition to group and society, Bercht explains how people take risk information and fold it into their repertoires for action.

We think we might be onto something with regard to burgeoning concerns in the research field: quite a number of the submissions emphasized some aspect of bolstering public awareness and interest in hazards. Some were explicit in that; for example, James K. Mitchell titled his chapter “Building a Constituency.” Others approached the question from the flank like Fausto Marincioni and his colleagues. In an elegant essay, Sara Bonati takes a different look at landscape. Extending the classical geographic understanding of landscape as a dual natural and social form (e.g. Tuan 1977), she argues that teaching through landscape can create a sense that people act in a common tableau. Sadly, in many places, especially in the United States, such education is completely off the charts in schools, making it even more difficult to build a constituency for such thinking later in life.

The idea of the constituency is especially significant because it resonates with our own look back on the first environmental crisis of some 50 years ago. We saw such a constituency develop around the environmental movement in the 1960s. In that tumultuous era environmental advocates made enormous progress. The era was marked by change that took both a present perspective and, in the “conservation” and “ecology” rhetorics that emerged, presaged the later shift to “sustainability” as an environmental and—at least for some—moral imperative. This was accomplished by harnessing rhetorics of responsibility and stewardship of the land. One can look back to a well-known public service advertisement of the early 1970s. Setting aside the rather stereotypical portrayal of a Native American, which would be discordant to today’s eyes, there is no denying the influential character of that advertisement in which we see him canoe his way along a pristine waterway and into a dirty and polluted urban center. Even to the non-scientist, the crisis was evident in air pollution, in litter, in rivers that smelled or caught fire. Influential scientists, artists, musicians, organizers, legislators, and others built a policy-moving coalition that generated laws and regulations and, in addition, a moral shift and behavioral change that went far in cleaning up the environment. Good people don’t throw trash out of the car window; good people clean up after themselves. Good people recycle. Yet now potential constituents are disconnected, and there is no galvanizing message, nothing to excite interest, or to call forth an emotional response, or moral resonance.

Ethical Concerns

Two chapters are rather different in their approaches to the same topic: ethics in disaster. For some scholars, concerns arise from a sense that research is disrespectful or harmful to people who have experienced a disaster. The most intense antagonism is directed at quick response research, what Gaillard and Gomez (2015) call a “gold rush.” To them, incidental contacts are a problem. These views are oddly

contradictory in a field that asserts the capacity of disaster survivors. In a forceful chapter, James Kendra and Sarah Gregory rebut these views. But there are other research concerns, concerns that become even more intense the closer the researchers are to people who are affected. For example, Browne and Peek (2014) detail the ethical challenge when researchers, trying to subvert the researcher/object dynamic, become more closely involved in the lives of the people they are writing about. In this vein, Henderson and Liboiron tackle the difficult challenge of disaster field research, especially action research. Away from the controlled conditions of the laboratory, research with actual people in actual places raises ethical dilemmas of disclosure, truth, and local versus wider benefits of science. In a departure from the usual way of thinking about these issues, they build a case study in a faraway place (where the strangeness of the setting concentrates focus) to highlight how scientific habits can lead the action-researcher into ethical traps. Multiple values are at stake, from community wellbeing to scientific fidelity, and missteps can bring unexpected and harmful consequences.

The Moon Shot

We have seen large-scale, sustained research initiatives in other areas, such as exploration of outer space, and exploration of atoms and even smaller particles that tries to discern the essence of space and time. In these studies, at issue is nothing less than understanding the origin and future of the universe. We have, over the course of civilizations around the world, seen massive engineering projects spurred by ambitions of technical prowess and longevity. Of course interest waxes and wanes over time, but discoveries in these areas build on each other so that knowledge and practice for the most part advance. What about disaster research? Surviving, thriving, improving, advancing toward a better life should be the great goal of humanity. Instead we have squabbles about resilience. The closing chapter by Tricia Wachtendorf calls on the disaster research field to think big.

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Part I
Locating Disaster Studies

Launching the DRC: Historical Context and Future Directions



Thomas E. Drabek

Abstract This chapter describes the historical context within which the Disaster Research Center at The Ohio State University began in 1963, both what came before and major issues confronted during the early years. Future directions in disaster research are then described. Key areas for the future research agenda include both basic theoretical issues and specific areas of inquiry reflecting paradigm shifts and emergent cultural and social changes.

Keywords Disaster Research Center · Emergency management · Disaster research theory · Research methods

Historical Context

Prior to the establishment of the Disaster Research Center (DRC) at The Ohio State University in September, 1963, other researchers had examined human responses to a mix of tragedies. Their work, albeit quite limited in scope and number, defined the historical context within which the DRC began. The first section of this chapter highlights the major components of this legacy. Then specific challenges are described that awaited the DRC staff. The second section of this chapter outlines a future research agenda. By building on the rich legacy of that 50 plus years of work since the DRC began, those standing on the shoulders of the pioneers from the past can enrich our understanding of the human side of tragedy.

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Following a brief summary of major research efforts completed prior to 1963, three types of challenges that the initial DRC staff confronted will be discussed. These issues pertained to: (1) method, (2) theory, and (3) ethics.

Early Disaster Studies

While folklore in most societies has contained stories of great floods, earthquakes, famine producing infestations, volcanos, and other such events, Dynes (2000) has argued that the first “modern” disaster was an earthquake that struck Lisbon, Spain in 1755. His analysis of Voltaire’s writings, especially as reflected in responses to Rousseau, indicate that interpretations of this event were different from those of the past. Why? Because it was viewed in naturalist terms rather than supernatural or religious. People died, not because of their sinful behavior that made deities angry, but because of natural forces that had nothing to do with who was sleeping with whom or any other so-called sinful behavior.

Despite such changed paradigms of interpretation, however, it was not until a young priest who had assisted in dealing with some of those who perished when the *Titanic* sank (1912), that the first social scientific study of a disaster was published. Samuel Henry Prince assisted with the relief efforts in Halifax, Nova Scotia, after a French munitioner (the *Mont Blanc*) loaded with trinitrotoluene (TNT) collided with a Belgian relief ship near the docks (December 6, 1917) (Drabek 1986, p. 2). Shortly thereafter, Prince pursued graduate studies at Columbia University which culminated in the publication of his doctoral thesis: *Catastrophe and Social Change* (1920). While other observers of disaster events had documented aspects of the human response, Prince’s work established a new paradigm, one wherein specific cases could be used to develop networks of generalizations that might be tested in subsequent events (Scanlon 1988). Years passed, however, before others would seek to develop systematic study of disaster phenomena resulting from natural events like tornadoes (e.g., Form and Nosow 1958), economic depression (Hill and Boulding 1949) or varied mixes of catastrophic events including war and other human caused events (e.g., Sorokin 1942). What was clear, however, was that response patterns were sequenced across a series of phases, noted early on by Carr (1932). These ranged from warning and evacuation to post-impact behaviors that emerged into complex volunteer and intergovernmental activities related to recovery.

Following World War II, at least three sustained research groups were established to accumulate human response data following disasters. In Quarantelli’s (1987a) summary of these, he pointed out that field work conducted under a sub-contract from the Operations Research Office at John Hopkins University remained classified for years since it was focused on studying the effects of atomic weapons on military troops. Some of this work, like that conducted by a sociologist, Lewis Killian, University of Oklahoma, also included assessments of civilian behavior in extreme situations such as industrial and natural disasters. Secondly, University of

Maryland researchers focused on psychiatric aspects of post-disaster responses with an objective of "... developing methods for the prevention of panic, and for minimizing emotional and psychological failures" (Quarantelli 1987a, p. 291). Thirdly, and most relevant to the emergence of the DRC, were field teams based within the National Opinion Research Center (NORC) at the University of Chicago under the direction of the late Charles E. Fritz (see 1961). Indeed, one of the graduate students who trained under Fritz, E.L. Quarantelli, would become one of the three co-founders of the DRC (the other two were Russell R. Dynes and J. Eugene Haas). During the years that the NORC field teams functioned (1950–1954), numerous surveys were completed in places like Bakersfield, California, following an earthquake, airplane crashes, and tornadoes in Arkansas, Worcester, Massachusetts, and Waco, Texas. Upon completion of this project (see Fritz and Marks 1954), Fritz relocated to Washington, D.C., where he guided work undertaken within the National Academy of Sciences. One of the most visible products of those efforts was a publication series wherein a variety of researchers detailed their study results, e.g., Wallace 1956—*Tornado in Worcester* and Moore, et al. 1963—*Before the Wind: A Study of Response to Hurricane Carla*. Summaries of these and other research studies appeared in two influential books: (1) an edited collection published by Baker and Chapman (1962) *Man and Society in Disaster*, and Barton's (1963) theory construction effort, *Social Organization Under Stress: A Sociological Review of Disaster Studies*.

This then was the context within which I accepted my position at DRC on September 1, 1963. As a full-time Research Associate, my primary duties were to be the Director of the anticipated laboratory studies that were to complement field studies of group and organizational responses to disaster. My counterpart, Dan Yutzy, also was appointed to a full-time Research Associate position with the designation of "field director." Both of us participated in the training and supervision of numerous graduate students who served as Research Assistants. Among these were Elaine Hobart and Tom Cree who were assigned to assist in the lab studies; field researchers included Bill Anderson, John Quast, Jim Hundley, Jim Ross, David Adams, and Jack Brouillette. During our 2nd year, Manny Schegloff, who was completing doctoral studies at UCLA, joined our team as did Joe Cooper.

We immediately were challenged with a multitude of issues. These reflected three general types of concerns: (1) methodological, (2) theoretical and (3) ethical.

Key Methodological Issues

Our initial offices were in a temporary building on the OSU campus that housed the Personnel Research Board (PRB), a long standing multidisciplinary research center. When the simulation laboratory was constructed under the OSU football stadium, it was surrounded by numerous offices that became the home of the DRC in 1964. Five types of activities were identified by the co-directors as immediate tasks.

Literature Review Project

None of us, except for Henry Quarantelli, had read extensively into prior research on disaster responses. Since he had worked with the late Charlie Fritz on the NORC studies at the University of Chicago, he directed us to Fritz's (1961) chapter on disasters in the social problems text by Merton and Nisbet (1961), and the numerous publications within the series published by the National Academy of Sciences, such as the late Harry Moore's study of Hurricane Carla (1963). Then dozens of disaster reports of various types arrived at the Center as did reprints of published articles and a few books like Form and Nosow's (1958) study of the response to a tornado in Flynt-Beecher, Michigan. So it was decided that beyond "basics" like these, research assistants would be assigned reports to summarize using a standardized protocol whereby we could begin to build an inventory that would identify events studied, methods used, organization involved, key findings and conclusions. This not only provided staff training, but also gave a mechanism for a disciplined literature review that many of us used for years. These data sets, all duplicated on blue ditto masters, were helpful to Dynes in his early text that summarized organizational and community responses—a statement that remains most useful yet today (1970).

Field Interview Guide

It was decided that as soon as a disaster occurred, the field team would collect data. The objective was to document the organizations that responded, and to identify their primary roles, operational problems confronted, interagency communication patterns and the like. As these topics and others were being discussed in staff meetings, the Vaiont Dam disaster occurred in Italy (October 9, 1963) and some of our senior staff took off. We all wondered when our chance would come. We didn't have to wait long.

Staff Training

On October 31, 1963, a massive propane gas explosion at the Indianapolis Coliseum left 81 dead and 400 or so injured. As I recall, we were scheduled to discuss a first draft of the field interview schedule the following week, but for training purposes, four of us departed for Indianapolis the morning after the explosion. We discussed key interview question areas while en-route. After completing numerous interviews, a week or so later Hundley, Quast and Anderson conducted additional interviews with emergency responders. Experiences like these gave all of us our first test of the unique opportunities and difficulties post-disaster environments represented, like how to gain access to the disaster scene, means of identification and legitimation

devices such as business cards, and the like. Shortly thereafter, all of us obtained “official identification” papers endorsed by the Office of Civil Defense within the Department of Defense. These even had our individual photograph on them.

Expert Consultations

From time to time funding agency representatives and other researchers visited the DRC. These visits helped all of us gain perspective on prior work, methodological strategy, and difficulties in application of findings. One such visit looms out in my memory for two reasons. The late Harry Moore whose book *Tornadoes Over Texas* (1958) introduced us to the concept of disaster sub-cultures was conducting a DRC seminar on November 22, 1963. We had been in session for a while when the PRB Administrative Assistant came into the conference room with news that President Kennedy had been shot in Dallas. We continued on for a bit, but when she returned with news of his death, none of us really wanted to stay. Memory of our several days of TV watching remains vivid. We had endured the Cuban missile crisis months earlier and many of us had strong views about the ongoing civil right conflicts. Kennedy’s assassination, and the media coverage of it, brought a totally new meaning to the concept of disaster.

But this chance to meet Professor Moore personally, albeit truncated, proved most important two years later. In June, 1965, I conducted DRC interviews following a massive flood in Denver. Quarantelli suggested that I apply for a young scholar grant (NIMH) and juxtapose the DRC organizational analysis with a study of family evacuation behavior. I modeled the proposal after Moore’s (1963) work on Hurricane Carla. Upon receiving the award, I contacted him and was most pleased with his help, including a copy of his family interview schedule which framed my own data collection. In fact, only a few people know that I later assisted Dennis Mileti with his doctoral dissertation study (1974) of the flash flooding in South Dakota that occurred a few years later. Both Dennis and I are forever indebted to Harry Moore for his kindness and expert help. And I note this as a simple illustration of the serendipitous consequences that frequently have flowed from the DRC. These rarely are documented, but their cumulative impacts have been highly important in the emergent disaster research legacy.

Laboratory Studies

How do you study disaster in a small groups laboratory? This question elicited lively debates. As the elaborate OSU laboratory was completed with sophisticated video and audio recording capabilities, Gene Haas and I consulted with numerous researchers including Harold Guetzkow (1962) at Northwestern who was conducting inter-nation simulations and John Kennedy (1964) at Princeton whose business

simulations were receiving high recognition (e.g., Kennedy and Dold 1964). When the lab was completed, we tested the equipment with a small scale experiment in which students participated. But how much stress could we generate for them so as to relate to our problem of disaster behavior? And how could we generalize any such findings to a disaster environment (see Drabek and Haas 1967)?

Eventually, I formulated a proposal that reflected the writing task I was assigned after the field work was completed on the Indianapolis explosion. That report was revised and expanded after a 1 year follow-up field visit that I completed with the help of Bill Anderson (Drabek 1968). Recordings obtained from the police and fire departments proved to be invaluable and stimulated my effort to create a “realistic simulation” of a police communication system under stress (1965). All DRC staff participated in the simulation sessions; I thanked 28 in my dissertation by name. Officers from the Columbus Police Department communications unit were instructed to “just process citizen calls and cruiser radio traffic as you do daily.” “You mean these phones are going to ring?.” “Yes, in about two minutes and you’ll be here to respond for an hour or so.” Designing and implementing this simulation, which after nine “normal” sessions were followed by stress sessions (air crash), established a new level of training for these officers and important new insights into organizational adaptations under stress (e.g., see Drabek 1969a; Drabek and Haas 1969).

Key Theoretical Issues

Let me briefly describe four issues that illustrate the range of challenges we faced during those early days.

What Is an Organization?

We hit this one immediately upon our return from Indianapolis. Clearly, both police and fire units were important responders as were several hospitals, the county coroner and sheriff. Also, because the coliseum was located within the Indiana State Fairgrounds, the State Police eventually assumed overall authority. So, “who was in charge?” changed during the response in a very public transition. While units like the Red Cross and Salvation Army clearly could be viewed as separate, did the police and fire represent two organizations or were they in actuality only departments of Indianapolis city government? What criteria define “an organization”? We debated this for some time, but it was not until I had left that Dynes and Quarantelli codified what has come to be known as the very important and useful “DRC Typology” (e.g., Dynes 1970).

What Is a Disaster?

We all thought we knew what this concept meant. After all Fritz (1961) had given us a clear definition. But things got complicated right off the bat as various case studies were discussed. Frequently, the words were spoken—“that’s really not a disaster, just an emergency or accident or minor crisis.” The issue of scale cropped up first, but then a field team went to Cincinnati after a major flood. When they returned some began talking about a “routine disaster.” Pre-flood planning and the regularity of past flooding had permitted emergency officials to “stay ahead” of the event so there was no sense of urgency, no sense of stress. Dimensions like predictability, scope of impact, frequency, and others were proposed along with key ideas reflective of a “stress-strain” theory which many of us pursued (Drabek et al. 1964). Task demand flows, structural capacities and the gaps between them seemed to add depth to our analyses and generalization power to a broader set of social systems (e.g., Haas and Drabek 1973).

What Is Organizational Stress?

The system stress perspective provided integrative power. Social units could vary in size from a single individual, to families, to organizational sub-systems and multi-layered agencies and entire communities. Hence, as theorists like Parsons et al. (1962), Homans (1950) and Barton (1962) had suggested, micro system analyses could be integrated and contrasted. But the issues of definition continued to be debated as did the procedures for adequate measurement. The only thing that was clear was the difficulty and complexity of the task ahead.

How Can Organizational Emergence and Improvisation Best Be Identified and Analyzed?

As I dug into the interviews completed after the Indianapolis explosion, for example, I became aware of many improvisations that were critical to the response. For example, officials with the local Red Cross Chapter set up a telephone welfare inquiry system which was a major community asset. As calls from far and wide arrived at law enforcement offices, fire departments, hospitals, and elsewhere, they were directed to personnel in the emergent component of the Red Cross Chapter. This was not preplanned nor was the rapid construction of a “phone bank” whereby hundreds of calls could be processed daily. We sensed that these types of improvisations increased the response capacity of the community, thereby reducing the overall stress levels, but precise measurement was seen only as a challenging future task. What was clear, however, at least within the complex networks of governmental

agencies and the mixes of volunteer private disaster relief organizations, was this: the prevailing planning strategy of “command and control” borrowed from the military did not fit. And those who pressed to put the round pegs into square holes were destined to fail.

Key Ethical Issues

When the DRC was launched in 1963, we did not have the benefit of the insightful analyses completed recently by Browne and Peek (2014). Certainly their work would have helped a great deal. I’ll note four issues that were confronted during our initial years.

What Are the Requirements for “Informed Consent”?

I still recall the rush of emotion I experienced during the first session of the laboratory police simulation—“My God, we’ve done it! They are behaving just like they did when I observed them at police headquarters.” As the three “routine” sessions continued with each of the three shifts of Columbus police officer, I felt pride in the system we had created and thankfulness for the numerous DRC staff who played their roles with skill. And for all of us, the stress session—a fictional air crash scenario—was going to be our chance to “sock it to the cops.”

And boy, did we! Their system confronted demand loads far beyond their capability to manage. As the minutes ticked by, their scarcity of resources caused them to fall further and further behind. Captured in the visual and audio recordings were their personal responses of stress, but also a series of improvisations in both resource call-ups and their call processing procedures. Just as our embryonic theoretical structure predicted, their responses reflected the impacts of stress and coping strategies of reduction.

In the debriefs that followed the stress sessions, the officers indicated to me that they had developed a hunch following the first one or two routine sessions. Their conclusion—OSU had been contracted to establish a model performance testing process whereby communications units with police and fire departments could be evaluated. “So we really took this very seriously and thought we might even get evaluations that could affect our future pay levels and promotion opportunity.” Of course, we never had mentioned anything like this and were shocked to learn of this emergent laboratory norm.

Remarks like these hit me hard. In fact, about 10 min into the first stress session, I suddenly had a panic response within my gut. “Christ sakes! What if that guy has another heart attack during this experiment?” I knew we had secured signed informed consent statements that were drawn up by the OSU legal staff and signed off on by the Columbus Police Department administration who viewed this

simulation as a helpful training experience for their officers. And it was—but still, what if a personal tragedy occurred? As I learned more about what was going on across the country in so-called small group experiments, including the administration of LSD and other drugs to students—remember Tim Leary—my personal interest in the matter increased and resulted in my participation in the establishment of Institutional Review Boards for Human Subject Protection, both in my own University and several others. Unfortunately, as complex organizational theorists would predict, some such Boards have given birth to excessive rule-following bureaucrats that many researchers resent. Cameron (2015), who has formulated some good coping strategies, put it well. “Just like the ghoulish dementors of the Harry Potter series, IRB committees are typified as the foulest of creatures who feed on the happiness of unsuspecting researchers” (p. 72).

What Does a Promise of Interview Confidentiality Require and What Potential Legal Exposure Is Created?

Shortly after we completed the first round of interviews in Indianapolis, several key officials were indicted by a Grand Jury. People like the local fire and police chiefs, and state officials like the fire marshal were alongside the coliseum management and concession vendors who actually brought the propane gas units into the coliseum. Their action was illegal and law suits were filed as victims and their families sought justice. Could we be called to testify? And if asked to reveal what our interviews contained, could we refuse on the grounds that confidentiality had been promised? It was clear that a host of policy decisions had to be formulated by DRC staff (see Drabek and Quarantelli 1967).

What Policy Guidance Was Required Regarding Media Interviews, Sponsor Inquiries, and Such?

Very quickly, the Indianapolis media contacted the DRC regarding lessons learned from our work. And some sponsor personnel inquired requesting the same thing. This could have had the appearance of federal agencies dispatching “university spies” into local communities to obtain evaluative information for future agency decisions. Clearly, both lines of inquiry had potential political implications, especially for the Center and the University. Fortunately, the DRC co-directors handled these matters correctly through responses that reinforced the idea that no comments would be made until the analyses were complete and the official reports published—at least at the level of a DRC “working paper.”

You might think that over time such interest would wane. But in October, 2012, nearly 50 years after the Coliseum tragedy, my wife Ruth and I had the honor of

re-visiting the explosion site and photographing the recently placed memorial plaque honoring the victims. And when we arrived at the registration desk for the annual state meeting of the Indiana Emergency Management Association, we were pleased to learn that each registrant was provided a backpack which contained a copy of the DRC report, i.e., *Disaster In Aisle 13* (Drabek 1968). And once again, to a packed banquet audience, I was proud to explain what was learned and how new research has carried us further in our understanding of human response. Indeed, it was a special honor to enter the banquet hall and see a copy of the first edition of our summary volume on nearly every chair in the room (Drabek 2010).

What Dissemination Obligation Does a Researcher Have Who Has Collected and Analyzed Disaster Data?

As I stood before that Indianapolis audience—emergency managers from all over the state—I remembered a flashback to a telephone conversation with the late Harry Moore. “Tom, don’t just let our work languish in the dusty shelves of the library. Experiment with different approaches beyond academic journal articles to disseminate.” And so I said to Harry, who I didn’t talk to very often, inside my head, of course, something like this: “Well Harry, when we first met at your seminar in 1963 at the newly established DRC, never could I have believed that someday my journey would have taken me here.” And you know, that really is the truth. So I leave this thought with you, because there is so much more known than is being applied within the emergency management profession today. As I frequently say to such audiences, “Find it, use it, share it” (Drabek 2014c). The challenge remains!

This brief commentary on these three topics, i.e., issues of method, theory and ethics, partially illustrates the rich legacy of the DRC. It reflects the shoulders on which I and others have stood, as we peered out at the complex cluster of phenomena that make-up disaster scenes and human responses and recovery. And to Henry and Russ in particular, and all of the others who peeked into these scenes prior to 1963, we must humbly say “Thanks.” But we also say, “We accept the passing of the baton and will do our best to carry the legacy forward.” So what needs to come next?

While I worked on the second edition of *The Human Side of Disaster* (2013), reviewing study after study, I asked myself, “Where does this fit?” Gradually I came to realize that my vision of the emerging profession of emergency management was shifting. A new paradigm was needed, one wherein local emergency managers were encouraged to view their profession with a greatly expanded vision—a vision wherein they would see how new research could help them in becoming more effective *community change agents*. Since that time, especially as I have met with hundreds of local emergency managers during conferences where I have had a chance to talk about the human side of disaster, new questions have emerged. These reflect the next steps; collectively they outline a future research agenda. As they are addressed, the research legacy, including the continuing work by DRC staff, now

located within the University of Delaware (since 1985), will be enriched and strengthened.

New Directions

Hundreds of new research questions can be posed given the lapses within our current knowledge, including returns to many of the conclusions that we think we know. Thus, further confirmation, greater precision, and specification of the limits of generalization are required for most, if not all, of the conclusions drawn to date. That said, I will summarize a limited series of topics and questions that at this point in the history of disaster research merit priority. These reflect: (1) basic theoretical issues and (2) expansion of the emergency management interface.

Basic Theoretical Issues

Very long lists can be generated as the necessary lines of inquiry are numerous. Upon reflection, however, five key questions *illustrate* the range of challenges that await the attention of the next generation.

What Is a Disaster?

In his Presidential Address at the World Congress of Sociology in New Delhi, India (August, 1986), Quarantelli asked, “What should we study?” In doing so, he raised this most fundamental question, one that he and others have returned to several times (e.g., see Quarantelli 1987b, 1998; Perry and Quarantelli 2005; Perry 2006). And today, when many around the world wonder where and when the next terrorist attack will occur, some would suggest that disaster researchers need to refocus. “Why do research on the warning processes that saved lives prior to a tornado that hit—fill in your most recent case—when the biggest threat facing most people is future acts of terror?” So they ask. But the question Quarantelli first posed reflected much more than arguments designed to prioritize or constrain. It is not a question of whether or not flood studies should receive higher funding priority than terrorism, just as it is not frost consequences versus tornado or earthquake vulnerabilities. Thus, as with earthquakes, as Stallings (1995) documented years ago, the social construction processes whereby terrorism comes to be defined as a public issue must be illuminated. Stampnitzky’s (2013) work is an important step in this direction. And as government agencies are reorganized to adapt better to threats and actual acts of terror, researchers must seek to aid policymakers to maintain perspective (Tierney 2005). Technological innovation has enriched organizational

environments. Information overloads increase the difficulty of decision-making in the complicated global world of today, wherein diplomacy failures give way to drone-based killings which some argue is a superior strategy to massive troop invasions (see Rothkopf 2014, pp. 316–336). We must explicitly recognize that different theoretical frameworks and orientations serve to define and delimit the phenomena any researcher or group of such choose for their focus.

Clearly, not all disaster events are the same in their impact (Quarantelli 1997). So the real question is, how and why are some disasters different in the threat perceptions that are socially constructed and the patterns of diverse impacts on social systems ranging from family groups to communities and societies? Civil disturbances and riots, for example, appear to stimulate looting patterns that differ significantly from behaviors observed after a tornado has smacked a city, as Quarantelli and Dynes (1970) documented years ago. So by asking the broader question within a context of theoretical exploration, rather than funding or political rhetoric, we begin to underscore not only pattern differences for certain behaviors like looting, but address an even more fundamental question: i.e., what are the *limits of generalization* for any specific finding or conclusion?

Following Quarantelli's suggestion that there may be qualitative differences among certain types of disaster events, Kreps and his team explored numerous pattern differences within hundreds of organizational units hidden within the DRC archives (Kreps 1989; Kreps and Bosworth 1994). These analyses were placed within fundamental sociological theories of social structure and process. Others, like Erikson (1976), whose seminal work on the impacts of the Buffalo Creek flood (1972) in West Virginia unveiled the far reaching effects of a "loss of community," has argued that a "new species" of disaster is defined by a single key variable—agent toxicity (Erikson 1994). While others of us would place this objective quality, *and* perceptions of it, into a more complex taxonomy of disaster events (see Drabek 1989), future work must go beyond the analogy we borrowed from the biologists. Most likely multivariate networks of variables will be laced together within dynamic models reflecting changes over time, rather than static sets of taxonomic niches that might identify different "types" or "species" of disaster events. System levels may vary from micro to more macro units with varying qualities of vulnerability, resilience, and risk that are in turn impacted by alternative stressors reflecting either internal or external agents or both simultaneously. It is analyses rooted within frameworks reflective of this type of reasoning that will be the future of disaster research.

What Are the Historical Antecedents to Disaster?

All disasters occur within a historical context. Many have critiqued the NORC field teams and others following that tradition including much of the early work conducted by DRC staff (e.g., Hewitt 1983; Klinenberg 2006). Referring to field study reports as "the quick hit" tradition, they correctly point out the failure to assess "root

causes”. In doing so, economic and political decisions are not identified that resulted in the nexus of conditions that predated specific disaster events (Burton et al. 1978; Wisner et al. 2005). In Colorado, for example, thousands of abandoned mines are leaking toxic waste products into groundwater runoff especially after heavy rain-falls. In August, 2015, an EPA team tried to relieve pressure building up within the Gold King Mine near Silverton, Colorado. Suddenly, millions of gallons of toxic waste water were released. The ribbon of toxic sludge plunged downward into the Animas River which runs through the tourist town of Durango and into Farmington, New Mexico. From there the sludge flowed through a section of the Navajo Nation and headed for Lake Powell in Utah (Hughes 2015; McGhee 2015). Drinking water safety and environmental impacts remain vulnerable from the mining history of this state, like many others. This event differs from contaminated portions of the West Virginia Elk River in January the year prior. There it was leaking chemical storage tanks that put people at risk (Griffin et al. 2014). And prior to that it was the continuing flow of oil leaking from the explosion at the *Deep Water Horizon* oil rig (April 20, 2010). These few examples illustrate another dimension of disaster, i.e., industrial accidents, but also highlight the issue of antecedents. While some events appear to be more “natural” than others, even weather phenomena like tornadoes and especially floods illustrate why some have concluded that there is no such thing as a “natural” disaster (Hartman and Squires 2006). Flooding in New Orleans after Hurricane Katrina illustrated the point all too well. How “quick hit” studies can be enriched through a broader historical perspective remains an important challenge.

How, When and Why Is Disaster Reflected in Popular Culture?

Few recall, if they ever knew, that Shakespeare’s play *The Tempest* probably had its origins in an actual hurricane that hit the Bahamas when the English Ship *Sea Venture* was enroute to Jamestown, Virginia in 1609. Sylvester Jourdain, a possible cousin of Samuel Jordan, one of the first American colonial legislators, kept a journal depicting their journey. The passengers were delayed months while they tore the ship apart and constructed two smaller vessels—the *Patience* and the *Deliverance*—that safely took them to Jamestown (May 20, 1610) (see Fitzwater n.d.). Disaster events have long inspired others, often perpetuating false images of actual human response (Quarantelli 1960).

But there is much more to this significant cultural area than the job of debunking. Drama, music, poetry, and other forms of artistic expression are only the obvious. Anniversary celebrations, monument and memorial construction are reflections of important recovery processes that only a few have explored to date, e.g., Eyre and Dix 2014; Quarantelli and Davis 2011. As this research area matures, it will provide important insights into the human condition as it reflects disaster and how people cope.

What Theoretical Frameworks Will Inform Assessments of Adaptations and Consequences of Climate Change?

While a host of future disaster events will be ascribed to the broad concept of “climate change”, the sociological community, including disaster researchers, should refocus. Recently an expert study team, under the guidance of Dunlap and Brulle (2015), outlined a multitude of perspectives and challenges. Clearly, others will follow (e.g., Phua 2015). And as they pick up on these themes the literature comprising “disaster research” will be redirected in ways not yet clear. As the challenges are confronted, the intricate webs of institutional and political networks will be exposed and more clearly understood.

What Theoretical Frameworks Will Guide Analyses of Cross-Societal Comparisons and Assessments of Both Global Impacts and Multinational Response and Relief Efforts?

When a massive earthquake struck the highly vulnerable nation of Haiti (January 12, 2010), we saw the transition from disaster to catastrophe. Some would argue that Hurricane Katrina represented this shift for the United States. Clearly the complexities exposed by the earthquake that struck the northern section of Japan (March 11, 2011) illustrate the point. And as the debris field caused by the monstrous tsunami began to reach the western shores of the U.S.A., many wondered about damages to the Fukushima nuclear power plant and its contamination. Future epidemics, war related migrations, and events like this earthquake will provide opportunities and challenges when researchers seek to build on recovery analyses like those completed by Delany (2015), Kiyota et al. (2015) and others (Companion 2015). Some, like McEntire et al. (2012) will focus on a narrow but highly important topic like the processes used and difficulties encountered with unidentified bodies in mass-fatality management. By comparing the experiences following the Haiti (2010) earthquake to subsequent incidents in India, Bangladesh and Sri Lanka, this team highlighted recent trends that “... reveal that more research is urgently needed on mass-fatality disasters” (p. 323). Peacock’s (1997) agenda for cross-national and comparative research programs still awaits implementation.

Aldrich (2012) demonstrated that pathways for increasing community and national resilience can be explored empirically within theoretical frameworks that link a host of concepts together. And in doing so, we begin the transition to a new paradigm wherein disaster victims are viewed as survivors who will enhance community resiliency especially if they are assisted by a new type of emergency manager who understands what it means to be a community change agent and how to implement a broad range of strategies designed to reduce vulnerabilities and enhance resiliency (Drabek 2013; Urby and McEntire 2015).

Expansion of the Emergency Management Interface

As I have reviewed dozens of recently published disaster research studies, I have detected an altered view of emergency management as the evolution continues to mature from a bureaucratic occupation into a full blown profession wherein research is actively reviewed and conducted. Those working within academic settings will still lead the way on more basic research reflecting the themes just outlined, but members of this new profession will collaborate more frequently with their academically based colleagues. And the topics they will investigate will enrich the existing knowledge base in an exponential manner. What are some of the topics that will be explored during the next decade or two? Again, my list is not intended to be comprehensive, rather it is *illustrative*. But the following strike me as being especially noteworthy and certainly merit the attention of future researchers.

Professionalism

Disasters are non-routine social problems (Kreps and Drabek 1996). Viewed from this perspective, emergency management professionals can better understand why victims should not be blamed when warnings fail to help them get to safe havens. Rather than accepting the excuse that “we warned them but they were too stupid to leave”, the professional asks: “how must our warning system be changed to produce higher levels of evacuation compliance?” Hence the professionalization process, as others have noted (Springer 2009), has far reaching consequences that merit study.

In 1996, the Federal Emergency Management Agency (FEMA) initiated a project to encourage faculty at colleges and universities to implement relevant curricula and degree programs in emergency management. To date about 200 such programs have been implemented. The content, quality, and impacts of these programs require assessment. FEMA also encouraged “a whole community approach” (FEMA 2011; Sobelson et al. 2015) which reflects both my community change agent concept (Drabek 2013, pp. 267–287) and the views of researchers, like Mileti (1999), who approached disaster mitigation through the rich tradition of sustainability.

Recently, Jensen and Chauvet (2014) provided a snapshot of our current reality through interviews, both face-to-face and via telephone, with purposive samples of county level emergency managers in North Dakota (n = 53) and Florida (n = 67) (see p. 355). These data clearly indicated that the concept of sustainability remains complex and rather nebulous for most in their samples, not too unlike what one discovers in much of the academic literature. Be that as it may, other researchers like Aldrich (2012) have empirically linked community resilience to social capital theory in a highly creative series of studies (e.g., see Aldrich and Sawada 2014). Similarly, Robert Gardner (2015) illustrated how an “emergency community” (EC) model offers: “A radical alternative to traditional relief approaches...” (p. 258). Reflecting on emergent community leadership groups during recovery from

Hurricane Katrina in several Louisiana and Texas locales, he illustrated how this model "...empowered volunteers to work *with* and *within* existing communities to rebuild frayed social ties through the intentional cultivation of community interaction. Their decentralized, collaborative decision-making processes allowed considerable organizational flexibility to improvise, retool, and respond to emergent community needs" (p. 264).

As the Boston Marathon attacks (April 15, 2013) reminded us, small groups of individuals can kill and injure large numbers of people and cause extensive economic disruption and loss (Arsenault 2013). While the tactic of terrorism has been used throughout history, around the world recently its use has increased. As political and religious extremists indoctrinate their converts with intensified levels of hate, such actions take on an emergent, but false, legitimacy. Hence threat detection and prevention also must be incorporated into the goal structure of emergency management. But the insights of "big picture analysts" like Tom Friedman must be remembered as these functions are implemented. We must never lose awareness that "... the greatest dangers we Americans face are excess of protectionism—excessive fears of another 9/11 that prompt us to wall ourselves in, in search of personal security..." (Friedman 2007, p. 574).

Equally controversial, however, are future limits on building within high risk locations. This should be and will remain controversial. It is a complicated matter that communities must confront with full recognition of the range of viewpoints that define "levels of acceptable risk" for structures of varying types. Flood prone lands used for tennis courts, may not be acceptable to many for a school location. As with building codes, it is not the role of the emergency manager to try and dictate specifics, but rather to nurture community processes and group participation required to reach temporary levels of consensus and acceptance. And as the impacts of climate change begin to emerge, such as sea level rise and greater intensity of storms, new adaptations will be required (Klinenberg 2013). Flooding in Houston, Texas during May, 2015, illustrated the "new normal" (e.g., Rieken and Weber 2015). This flooding was repeated during the fall, thus reinforcing the "new normal" vision. There also must be advocacy for maintenance and renewal! Bridges, dams, roadways, and the like, must be attended to with a vision rooted in public safety over the long haul (Ix et al. 2012).

Less obvious than the need to garner public enthusiasm for funding needed bridge repairs, however, are important social dimensions that may increase vulnerability. Wide scale economic inequalities can erode the stability of a community far worse than a bridge collapse. Yet, few emergency managers have developed an awareness of this social factor or its consequences. Like racial, gender, or age based discrimination, social constraints define community vulnerability with a potency that exceeds the physical dimensions that commonly frame such discussion (Perrow 2007; Kroll-Smith et al. 2015). More recent research studies have documented the complex layers of social constraint that identify more vulnerable community sectors (Thomas et al. 2013). Effective emergency managers, who explore the rich insights that flow from viewing disasters as nonroutine social problems, will begin to grasp these less obvious processes (Kreps and Drabek 1996). And when they incorporate

them within their portfolio, their effectiveness as community change agents will be enhanced. And so too the safety and security those for whom they work.

Four additional shifts in orientation and perspective are required by both researchers and emergency managers.

Redoing Gender

Decades ago, early disaster researchers like the late Harry Moore and his colleagues (e.g., Moore et al. 1963) documented clear variations in responses to hurricane warnings that reflected the reality of gender. In the years that followed, many other researchers, including myself (e.g., Drabek 1969b), published data tables that confirmed Moore's observations—typically, females responded more quickly and with higher levels of threat perception than did males (Drabek 1986, pp. 74–83). A recent study by Pace and Montz (2014) underscored this pattern variation within the literature they reviewed on risk perception (see p. 469 for a summary). Unfortunately, despite mailing a reminder card to the 601 North Carolinians within their sample—all were within the warning areas impacted by Hurricane Irene in 2011—only 31% responded. And a majority of these people were "...older retired males with college degrees and in high-income brackets" (p. 472). Thus, while other factors that have been documented to pattern risk perceptions such as gender, only locational differences could be analyzed carefully within this data set. Turned out, no matter how they sliced the data, one conclusion emerged: "...risk perception varies with location, but perhaps not to the extent or in the direction that one might hope" (p. 476). Hence, they recognized that other social factors may be far more influential in structuring risk perceptions and various decisions that might be forthcoming, like evacuation and related social processes.

Clearly the matter of gender is far more complex than this research or most other studies reflect. Fortunately, a series of scholars have begun to shine lights into greater depths of impacts reflecting gender differences as illustrated by recently published volumes by Pardee (2014), David and Enarson (2012), Fothergill and Peek (2015) and Weber and Peek (2012). Their insights into the dynamics of the recovery processes after Hurricane Katrina have pushed disaster research forward and pinpointed numerous areas for future research.

Judith Weshinsky-Price (2015) built on this research base and offered numerous specific recommendations to emergency managers who must move toward a new paradigm wherein the constraints of gender are better understood and taken into account. For example, she emphasized that: "Emergency managers should also make an effort to obtain patterns of resource distribution in their communities, such as the percentage of female-headed households living in poverty and gender-specific employment rates..." (p. 44). Furthermore, she suggested that emergency managers should: (1) allocate funds for staff education on gender issues; (2) include more women into key agency positions; (3) allocate time for consulting with women's work organizations; and (4) seek better understanding of the social composition of

their community (see p. 43). A related area that has been explored minimally is the unique, and at times intense levels, of role conflict that many women in the work place confront especially single mothers. Thorpe's (2015) case studies of several Indiana National Guard women who served tours in both Iraq and Afghanistan is a brilliant piece of work that illuminates their pain. Those selecting careers in emergency management, especially during times of crisis will suffer similar challenges. Identification of coping strategies and potential policy change are required.

I have been especially impressed with the insightful analyses of the processes Pacholak (2013) labeled "redoing gender." Through a focus on one of the largest wildfires in Canadian history that resulted in millions of dollars in property loss and the evacuation of 26,000 people living near Kelowna, British Columbia, in August, 2003, Pacholak's in-depth interviews with both structural and wildfire personnel revealed the complexity of emotional and behavioral responses by two women and 37 male firefighters (see p. 21). Her analysis carefully takes our understanding of "doing gender" to "undoing gender" and finally to "redoing gender" within this occupational group. Beginning with the recognition that both women and men can operate a chainsaw and work on a fire line, she assessed the altered definitions and perceptions of restrictions that had previously constrained the images that defined gender differences. Hence, "...the work of women disrupted the doing of gender by men. This is a hopeful sign of gender change" (p. 103). In short, going many steps beyond prior analyses of the processes whereby disasters accelerate trends already in process (Anderson 1970), this fire exacerbated gender crises and "...demanded the production of a new firefighter" (Pacholak 2013, p. 113). And that change might not have "... even materialized at all, if it had not been for that fateful lightning strike in the remote reaches of Okanayan Mountain Park" (p. 113). Clearly, these matters comprises a core research agenda of highest priority.

Social Media

Disaster warnings, responses, and recovery behaviors, like all other areas of social life, have been impacted greatly by social media (see Drabek 2017). Evidence of this revolution in social behavior is beginning to emerge with insights that are most revealing, including the popularity of text messaging (Harrison et al. 2015). For example, Sultan (2014) documented that in 2012 there were more than 60 million BlackBerry Messenger (BBM) users and another 300 million WhatsApp users. He also reported that his online survey of 552 undergraduate students enrolled at a large university in Kuwait revealed that nearly one-third (32%) used BBM or WhatsApp more than 12 times per hour. In the U.S.A., Crosswhite and her colleagues (2014), have documented similar use patterns. For example, through an advertisement on Facebook, which had over 604 million users in 2012, they surveyed 127 young adults. Their results documented that just over 66% sent or received more than 1000 texts per month; only 14% received or sent fewer than 500 texts per month; and 20% sent and received over 5000 texts per month. Emergency management personnel are

implementing social media in a wide variety of ways too (Wukich 2015). Renda-Tanalli (2014), for example, documented such use during Hurricane Sandy within Maryland's emergency management organizations. Research on the diffusion, impacts, and consequences for emergency response and recovery will be a top priority during the next decade. Successful implementation of these technologies into emergency management programs will be a core requirement.

Importance of Improvisation

In response planning the importance of improvisation must be emphasized. It really is one of the two pillars of emergency planning, the other being preparedness (Kreps 1991). When hospital personnel in Memorial Hospital in New Orleans experienced Hurricane Katrina, for example, they faced difficult priority decisions. Who should be evacuated first when power was lost and only a few patients could be moved as boats and rescue helicopters made their way? As Fink (2013) described so vividly, these situations required much creative thinking and many there did risk their lives as they successfully moved many patients under very dangerous conditions who later were evacuated successfully. Unfortunately, others were not evacuated soon enough to extend their lives. So despite much improvisation, the outcome was less than desirable!

In contrast, as Fink pointed out, during responses to Superstorm Sandy (October 29, 2012), hospital personnel in New York hospitals had learned many lessons from Katrina, both about the complexities inherent in triage decisions and the importance of improvisation. "Yet incredibly, just as in Katrina, some staff members said they had never pondered or planned for what they would do in case of the failure of the backup plan to the backup plan—a complete loss of power" (Fink 2013, p. 464). Efforts to transport fuel to keep backup generators operational, rather than patient evacuation as a priority, is but one of many improvisations that hospital personnel devised. Similarly, Angle et al. (2012) documented the many ways that nonprofits and voluntary organizations tried to fill in the gaps in governmental aid as the Katrina recovery process continued for years. While these improvisations helped thousands of survivors, this team concluded that their efforts still fell short—they were not an adequate substitute for a more effective governmental response.

The attacks on the World Trade Center (WTC) meant that the New York City Office of Emergency Management had to establish operations at an alternative site since WTC 7 had been its home base. With detail and precision, Wachtendorf and Kendra (2012) documented the many forms and types of improvisations that were implemented by agency personnel. Even before these activities were underway, others were moving people out of the impacted area across water routes. While some were using routine conveyances, many were moved through improvised procedures. So how did the alternative EOC come to be? The insights from Wachtendorf and Kendra (2012) greatly enhance our understanding but also underscore future directions.

As one official said, ‘It [the organization] was in my head.’ By maintaining a shared vision of the resource and the structures, activities, and tasks it was supporting, the ERON was able to reproduce the EOC while carrying out response activities during a large-scale and protracted disaster. A virtual EOC peristed in the minds of those who had trained and worked in the facility despite the loss of 7WTC. (p. 270)

While the study of the EOC reestablishment points to several key factors . . . research on other episodes and on organizations in other environments may lead to a fuller understanding of their distinct improvisation form. (p. 271)

These two researchers also documented the improvised means that hundreds of thousands used to get out of Manhattan after 9/11. Indeed, they aptly named their report “American Dunkirk” since this represented the largest water-based evacuation in U.S.A. history (Kendra and Wachtendorf 2016). While researchers have recognized and documented emergent groups and improvised behavior for decades (Dynes 1970; Drabek and McEntire 2002), studies with comparative designs are required so that patterned variations can be identified with greater precision, and to offer practitioners future awareness of these processes. Even today many responders still express surprise at how their date with disaster precipitated improvisations of varied types.

Bridge Building Activities

As I have (2014c) emphasized, much more is known about human responses to disaster than is being used today by emergency management professionals (Drabek 2014b). Researchers must implement a variety of strategies to build information transmission bridges (Lindell and Perry 2004). Obviously, to simply hand out a list of suggested journal articles or books will not get this job done. Yet, few researchers make much effort to reach out across the divide (Drabek 2009, 2014a). Consequently, few practitioners ever benefit much from the mountains of study findings that simply gather dust in academic libraries. A variety of strategies can be implemented to improve the knowledge transfer process. And future research is required to document the relative efficacy of these and those yet to be imagined and tried (Cwiak 2014). The potential risk reduction payoff of this research agenda is immense. And so too is the increased level of public safety for the entire nation and beyond.

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Disaster Studies at 50: Time to Wear Bifocals?



Ben Wisner

Abstract Other writers have cataloged the many contributions to understanding and practice that disaster studies have produced over the years, many of them, and the earliest, coming from sociology. The Disaster Research Center at the University of Delaware was founded in 1963 by, and is still inhabited by sociologists, but has embraced an interdisciplinary approach over time, including core and affiliated faculty from English, history, political science, civil engineering, and environmental policy). My thoughts in this essay are not confined to the DRC's corpus of work, but 'disaster studies' more broadly defined below. This said, the roots of disaster studies in sociology are deep, the classic Ur-source being an unpublished PhD study of the 1917 explosion in Halifax, Nova Scotia. This disaster continues to be a source of continuing research that provide lessons for our time. My own essay will mention some of these contributions, and they are truly something to celebrate; however, the central theme I will emphasize is what has been missed and could be added to the research agenda over the next decade or so. I employ an optical metaphor that has as much to do with philosophy of science ('vision' and Mao's famous question, 'Where do ideas come from?') as it does with optics, optometry and the detailed application of methods at micro and macro scale. The lens is a remarkable human invention. Glass shaped and polished in one way opened up the microscopic world. Treated in another, the lens gave us the telescope. I will argue that politics – the creation, use and maintenance of power to influence other people and to control space and resources – has been a largely missing raw material, like glass, from which disaster studies could shape lenses for its own tools of inquiry. Consideration of power has not been totally missing. Yet lenses fashioned from an understanding of power have not been used sufficiently in a number of critical areas of research.

Keywords Disaster research · Disaster studies · Theories of disaster

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Introduction

Other writers have cataloged the many contributions to understanding and practice that disaster studies have produced over the years, many of them, and the earliest, coming from sociology. My own essay will mention some of these contributions, and they are truly something to celebrate; however, the central theme I will emphasize is what has been missed and could be added to the research agenda over the next decade or so. I employ an optical metaphor that has as much to do with philosophy of science ('vision' and Mao's famous question, 'Where do ideas come from?') as it does with optics, optometry and the detailed application of methods at micro and macro scale. The lens is a remarkable human invention. Glass shaped and polished in one way opened up the microscopic world. Treated in another, the lens gave us the telescope. I will argue that politics – the creation, use and maintenance of power to influence other people and to control space and resources – has been a largely missing raw material, like glass, from which disaster studies could shape lenses for its own tools of inquiry. Consideration of power has not been totally missing (Pelling and Dill 2010; Anderson 2011; Mascarenhas and Wisner 2012; Guggenheim 2014; Tierney 2014). Yet lenses fashioned from an understanding of power have not been used sufficiently in a number of critical areas of research.

My argument is that mainstream disaster studies¹ (DS) has had problems with both near and distance vision. It has often ignored or misunderstood processes at the highly local, micro scale as well as processes unfolding at the global, macro scale. Like many 50 year olds, DS needs to look again with the aid of bifocals. The lens needed to correct both near and far sight as well as astigmatism and distorting conditions is more often than not a political lens. Along side the microscope and telescope, humble spectacles can clarify vision and improve acuity.

In particular, I will argue that DS has missed the depth, complexity and utility of local knowledge, coping and self-protection ('autonomous adaptation' in the language of climate change scholarship and practice – Smit et al. 2000; Fussler and

¹I define disaster studies (DS) as a broad interdisciplinary attempt to understand the causes and consequences of events that cause sufficient harm and loss that assistance is required from people and/ or institutions unaffected, whatever size of the group and area affected (a few households in a neighborhood, in the case of urban arson fire to multiple countries in a region of the world in the case of the Zika virus epidemic). DS is not a single, unified epistemic community, rather a series of partly overlapping and intermittently interacting ones that include research and training nodes within established disciplines: sociology, geography, anthropology, political ecology, political science, economics, development studies, epidemiology and public health. In its outreach, advocacy and policy advisory role, DS comes closer to being a univocal community of practice, as witness global consensus-building and lesson learning efforts such as the Sphere Project (<http://www.sphereproject.org/>) and the Tsunami Evaluation Coalition (<http://www.alnap.org/TEC>). In this essay I focus on English language literature from these overlapping disciplines. DS has taken different trajectories in other parts of the world, especially Spanish speaking Latin America, where a similarly wide range of disciplinary professionals have interacted with officials of their countries' government civil protection institutions (see <http://www.la-red.org/> and for core publications by Andrew Maskrey, Gustavo Wilches-Chaux, Allan Lavell and many others <http://www.la-red.org/public/>).

Klein 2006). In addition, with significant exceptions,² DS has also failed to take seriously the political dimension at local scale: the interaction and struggle over power, decision and choice among state, non-state actors and citizens. Turning to macro issues, I will argue that preoccupation with so-called disaster risk reduction (DRR) has left little intellectual (and political) space for addressing disaster risk *creation*: how business-as-usual economic, social and political life under conditions of globalization creates and distributes risks. Secondly, I will suggest that application of a political lens helps DS investigate the limits of risk governance. A third problem with DS's long range vision concerns new, emergent, trans-boundary and existential risks and the complex ways that governments, corporations, international institutions, the media and citizens understand and respond to these risks.

Near Vision

Beyond 'Perception' and 'Participation'

Assessed against the technocratic, hazard-focused paradigm that DS inherited from the Cold War, research into people's perception of hazards and risk was a huge step forward (Burton et al. 1978). Early work by sociologists demonstrated that people behaved in rational and predictable ways in extreme situations (Quarantelli 1954, 1960; Wenger and Parr 1969; Dynes 1970; Quarantelli and Dynes 1972) and that there were many persistent myths about human behavior in disasters. Likewise, the study of emergent organization following disaster and the potential for community involvement in disaster planning underpinned such innovative government programs as US Federal Emergency Management Agency's (FEMA) Project Impact (Drabek 1987; Stallings and Quarantelli 1985). At the international scale, 'community participation' in disaster risk reduction (DRR) became a watchword from mid-way through the International Decade for Natural Disaster Reduction (1990–1999), with governments and inter-governmental organizations finally catching up to pioneering researchers and innovative non-governmental organizations (NGOs) in this regard (Maskrey 1989; Anderson and Woodrow 1989).

However, no sooner was the catch phrase 'community participation' widely circulating, than researchers found that involvement of residents and risk bearers could take many forms, some involving quite superficial engagement and others much greater. Recalling Arnstein's (1969) so-called ladder of citizen participation, local participation often was found to be a means to ends pre-conceived by external agents. Wisner (1988) juxtaposed such instrumental participation with transformative forms to be found near the top of such a 'ladder' that involved local decision-making and control over resources. Cooke and Kothari (2001) collected evidence

²Exceptions include Bates and Peacock (1987), Nigg and Tierney (1993), Bolin and Stanford (1998), Enarson (2001), Enarson and Fordham (2001), and Grineski et al. (2007).

that the discourse of participation can serve in a variety of ways to control and constrain local autonomy and, in effect, become a ‘new tyranny’.

Valuable as such research has been, the human beings who ‘perceive’, ‘behave’ and ‘participate’ remained objects of study, not subjects. The interiority and intentionality of people’s experience were seldom the starting point. There was no attempt to develop a phenomenology of disaster risk. People’s risk perceptions were juxtaposed to ‘correct’ scientific views and used to design public information campaigns or catalogued as cultural phenomena by anthropologists. Just as clinical medicine assesses cardiac function of an individual or the immunization status of populations, DS assessed and even attempted to quantify the vulnerability of people to hazards and their capacity to cope (Birkmann 2013; Wisner 2016). Generally these ‘vulnerable people’ (often schematized and taxonomized as ‘vulnerable groups’ – children, older people, people living with disabilities) were still only objects of study, not agents of their own history. Such work did not identify ways to open up political and social space within which local residents were encouraged to assess their own vulnerability and develop their capabilities.³

Researchers focused carefully, accurately and usefully on local knowledge as well as on perception. But the focus was also too narrow. Yes, people know things, but they also have intentions. They improvise and innovate, cooperate and compete. In localities, people perceive and prioritize risk from the quotidian point of view. Larger hazards may be on their radar but are mixed with ‘everyday risks’ that include social and economic threats.⁴ It was important to demonstrate the existence of very large repertoires of local knowledge people have: for example, more than 75 options for coping with drought known by farmers in semi-arid Kenya (Smucker and Wisner 2008). However, such knowledge seldom played a role in negotiations among residents, government officials or, until recently, non-governmental development partners (Wisner 2010; Hewitt 2012; Mercer 2012).

The big question, and a continuing challenge for DS, is whose knowledge counts, indeed, ‘whose reality counts’ (Chambers 1999, 2002, 2008). Just as there is a ladder of participation, or degrees of engagement ranging from nominal consultation through fully devolved decision-making, local knowledge can be approached in many ways. Local knowledge – say vernacular terminology for weather phenomena or soil types – may simply be catalogued by external experts or authorities for purposes of better translating their own pre-conceived disaster risk messages (Wisner 2010). In such cases, hazards and risks have been pre-defined by agencies and experts. Rarely do government or NGO staff accept local stakeholders’ definitions

³The distinction between *capacity* and *capability* is critical. In the context of disaster risk, the former refers to a repertoire of behaviours available to individuals for reducing loss and damage and for rapid recovery (Wisner et al. 2004). *Capability* is more than a behavioural repertoire, referring more broadly to expression of intellectual, social and emotional potentials that combine to allow a person to define and to strive toward goals including, but not limited to, reduction of loss and damage (Wisner 2016, drawing upon Nussbaum 2011; Sen 2005).

⁴See Frontline (<http://www.gndr.org/programmes/frontline-programme.html>), a methodology designed to capture these perceptions/ priorities and to work with them together with partners at various scales.

of priority threats as a basis for action planning and programming. This is particularly true when local priorities diverge from official expectations. For instance, during the pilot test of the Frontline methodology mentioned in the footnote above, residents of a hamlet on the side of an active volcano insisted that the greatest threat they faced was lack of water (Gibson and Wisner 2015).

Beyond ‘Top-Down’ and ‘Bottom-Up’

A logical and practical consequence of growing attention to perception, participation and local knowledge is the distinction in planning and public administration between ‘top-down’ and ‘bottom-up’. These are, of course, two extreme ends of a continuum of states describing the relationship between government or NGOs and local residents at a point in time. ‘Top’ refers to centralist, bureaucratic and usually technocratic goal setting and resource mobilization to achieve goals. Levels of ‘acceptable’ risk are often defined in this way by regulators. ‘Bottom’ refers to citizens and their formal and non-formal institutions. In the course of the twentieth century there has been increasing demand by citizens for a voice in determining ‘acceptable’ risk, among other important decisions, and a role in determining how resources are used to implement such decisions (Jasanoff 1986; Leiss and Chociolko 1994; Munzara and Benn 2014). Decentralization, devolution and informality characterize this end of the continuum.

Social science has studied risk governance as an outcome of the interaction of ‘top’ and ‘bottom’ as well as ‘expert’ and ‘lay person’ along this continuum (Wisner 1995; Kelman and Mercer 2014). Also studied have been the phenomena of ‘learned helplessness’ (Freire 1973; White 2008), dependency⁵ (Harvey and Lind 2005; Bartle 2012), resistance (Scott 1987, 2010) and ‘exit’ (Hirschman 1970) that can result from top-down programs that attempt to control people, even for purposes of uplift, betterment and community development, or, indeed disaster risk reduction.

Important as recognition of the ‘top-down’ versus ‘bottom-up’ continuum is, DS’s near vision is also faulty in this case. Insufficient attention has been paid to struggle over power, decision and choice among government departments, among non-state actors and among groups of citizens (Wisner and Haghebaert 2006; Thompson 2012). The ‘top’ often ends up fragmented and fighting over resources while the ‘bottom’ may become a bottomless array of intermediary institutions competing with each other. Equally serious is failure to question the limitations of governments as vehicles for ensuring public safety or, at least, facilitating reduction of disaster risk. DS generally views catastrophic malfeasance of risk governance such as the cases of Hurricane Katrina, Bhopal, Chernobyl and the West African

⁵The devil is in the detail, and the way that social protection and other top-down policies are implemented has a good deal to do with whether dependency is a side effect. See, for example Shepherd et al. (2011).

Ebola epidemic as failures of ‘good governance’ that can be corrected by new laws, policies and procedures. But are there limits to risk governance reform?

Some authors think there are. Charles Perrow argued in his book, *Normal Accidents* (1999) that failures are inevitable in complex, tightly coupled systems. He revisited that theme in the post 9–11 era (Perrow 2011). Ulrich Beck has a similar view, expressed in the 1992 English translation of *Risikogesellschaft* (1986). *Risk Society* argues that ecological modernization is an impossible project of advanced capitalist society based on technology whose failures may provoke ‘fixes’ that in turn are increasingly complex and prone to failure. In Beck’s words (2008: 6):

In risk societies, the consequences and successes of modernization become an issue with the speed and radicality of processes of modernization. A new dimension of risk emerges because the conditions for calculating and institutionally processing it breaks down...

Jasanoff (1994: 2) is convinced that Bhopal and other technological disasters are not ‘mishaps’ because they open up ‘windows to previously unsuspected weaknesses in the social matrix surrounding the technology’. Government ineptitude in the face of Hurricane Katrina was partly due to massive shifts in funding priorities for public safety and organizational changes in FEMA following the September 11, 2001 terror attacks (Tierney 2006). Regarding Ebola, MSF’s general director, Christopher Stokes, said in that organization’s report (MSF 2015): ‘For the Ebola outbreak to spiral this far out of control required many institutions to fail, and they did, with tragic and avoidable consequences’. Joanne Liu, MSF’s international president wrote: ‘This Ebola response was not limited by lack of international means but by a lack of political will to rapidly deploy assistance to help communities’ (MSF 2016). So, too, evidence shows that less dramatic, small and moderate hazards are made into disasters by chronic, widespread, even systemic institutional failure. For example, Güiza et al. (2016) show how clientelism and cartelism in Mexican politics increase vulnerability to flash flooding in a peri-urban locality.

Distance Vision

From ‘DRR’ to ‘DRC’

Over the past 50 years, DS research has helped to move disaster policy and practice from a reactive stance to an increasingly proactive one. Progressively *disaster risk management* involving blue light services, emergency medicine and surgery, shelter management and other coordinated logistics and finance took on the character of more holistic *disaster risk reduction* (DRR). The latter used planning, legislation and regulations, economic incentives, engineering and public education to reduce exposure, vulnerability, damage and loss from natural hazards and other potentially damaging events.

In the US it was Florida's 1992 Hurricane Andrew that catalyzed institutionalization of DRR (or 'mitigation' in US terminology).⁶ The need for both vertical and horizontal integration was recognized in a state of Florida report on the 1992 disaster (Huffington Post 2012), words that would be repeated in variations following Hurricane Katrina in 2005, further evidence that DRR is not easy and is a work in progress (Washington Post 2006). The 1992 report stated:

The lack of adequate preparation by our community and our state was obvious. Even more obvious was the total lack of coordination that existed between the various disaster relief agencies after the hurricane had passed. No one was in charge. No one knew what to do. There was no plan. As a result, a large segment of our community that had been reduced to a 'third world' existence remained that way.

DS has made many contributions to unraveling the complexities of DRR and its application at local/municipal, sub-national, national and international scale. A challenge for DS in the immediate future is to identify obstacles to even greater degrees of comprehensive and integrated risk governance in a post-2015 world, where there is a need and opportunity to plan, program and monitor action on a renewed and expanded set of sustainable development goals (SDGs), actions to adapt to climate change and continued action to reduce disaster risk (Davies et al. 2009; Gaillard and Mercer 2013; Aitsi-Selmi and Murray 2015; Kelman et al. 2015).

Even more demanding a challenge for DS is to clarify conceptually and to document empirically the process of disaster risk creation (DRC) – the shadow, hidden and silent counterpart of the watchword, 'disaster risk reduction' (Lewis and Kelman 2012). Preliminary studies have shown DRC to be the result of much normal, routine economic activity (Wisner 2003; Wisner et al. 2004; Pelling et al. 2011). Unregulated changes in rural and urban land use or changes that escape scrutiny of regulators expose people and assets to coastal storms, landslides and flooding as well as exposure to industrial explosions and toxic contamination of air and water.

The UN's biennial reports on disaster risk have focused attention on the role of global finance and direct foreign investment in risk creation through resource extraction, energy and other megaprojects and property development (UNISDR 2013, 2015b; Lavell and Maskrey 2014). The use of financial power in a starkly divided world means that many investment decisions increase the disaster risk of ordinary people while reaping profits for a few (Sassen 2014). Drawing on C. Wright Mills (1959), Wisner et al. (2004: 33) wrote that the audience for their book on the causes of vulnerability to natural hazards includes those with power who create risk and may not even be aware that they are doing so. Benson (2012: 664) insists that mainstreaming disaster risk into economic development means taking stock of how

⁶While most of the world has adopted the UN's term, 'disaster risk reduction', the US continues to use FEMA's earlier term, 'mitigation'. This has two unfortunate consequences. Firstly, 'mitigation' is more difficult to translate into other languages. Secondly, subsequent development of the pair of terms, 'climate change adaptation' and 'climate change mitigation' adds further potential for confusion.

economic development policies, programs and projects affect vulnerability to natural hazards.

Not only do specific developments displace urban and rural people, who often must find a way to live in more hazardous land and cityscapes, but financial power is also destroying the web of life (Moore 2015). The poor depend on biological resources in a more direct way, and a recent World Bank study demonstrates yet again that consequences of climate change will fall heaviest on the poor (World Bank 2016). Just to take one example, consider the fires that consumed large swaths of Indonesia's remaining forest in 2015 and the illegal logging and burning that lies behind this environmental disaster (The Guardian 2015).

Lewis and Kelman identify a number of ways that disaster risk is created by business-as-usual social, political and economic transactions (2012).

- Environmental degradation
- Discrimination
- Displacement
- Impoverishment
- Self-seeking public expenditure
- Denial of access to resources
- Corruption.

Radically transformative approaches to globalized patterns of consumption and unlimited, destructive economic growth include delinking and downsizing scenarios. A set of research questions DS has not yet taken up includes the risk and risk governance implications of localization: for example, depending more on locally produced and processed food and local energy sources. Would local or regional self-reliance create new risks? Could famine result if the local food system failed or would winter heating emergencies ensue if there were problems with local renewable energy systems? Such questions need to be asked, but a main obstacle to such critical inquiry is what Castree et al. (2014: 763) refer to as 'stunted conception of "human dimensions" at a time when the challenges posed by GEC [Global Environmental Change] are increasing in magnitude, scale and scope'.

Through a Glass Darkly

A lot is being made in the early twenty-first century of 'the dark horizon of the future' in Christophe Bouton's (2013: 77) dramatic phrase. Terrorism, accelerating climate change, pandemics (SARS, for example) and epidemics that threatened to become pandemic (Ebola, MERS, Zika) all fuel a discourse replete with gloomy metaphorical treatment of uncertainty and surprise. 'Opacity' is my personal favorite because it fits with the optical metaphor I have been using throughout this essay.

However, is this current work on uncertainty addressing anything fundamentally new? As Beck (2008: 4) remarked, 'Threat and insecurity have always been among the conditions of human existence'. These conditions have been recognized and

reflected upon since antiquity. There are words in the ancient Sanskrit language that span a range of meanings associated with uncertainty: ambiguity, dilemma, doubt, suspense, risk and peril (Apte 1890: 1088). Buddhism has taught for millennia that ‘the root of suffering is resisting the certainty that no matter the circumstances, uncertainty is all we truly have’ (Chödrön 2008: xvii–xviii). The *Tao Te Ching*, a principle text of Taoism, teaches courage in the face of uncertainty and danger (http://divinetao.com/dt_73_courage.htm):

Courage expressed through daring
is likely to lead to death
Courage restrained with caution
will continue the journey of life ...

Sometimes it helps
Sometimes it harms
whether decided early or late
by mathematics, chance
or a mark on a slate
The sage understands the way...

Chance and uncertainty, personified as the goddess Fortuna was understood to be capable of dashing human aspirations and plans in Renaissance Italy. The strength or courage (*virtù*) of Machiavelli’s prince is the cultural antithesis of character of Taoism’s courageous sage. The prince is decisive and daring in the face of uncertainty. Earlier heroes in ancient Greek literature were seen to have flaws that make them vulnerable, their lives contingent and uncertain (McCoy 2013).

What is new is humanity’s ability to intervene in processes small and large. We are able to change the world at the quantum scale and more crude, yet tiny, scale of nano-engineering and manipulation of genomes. The consequences and side effects of this dexterous manipulation are, indeed, uncertain. Some worried that when the Large Hadron Collider was powered up and used, the earth might be gobbled up in a black hole (CERN 2016). Concerns with genetic engineering led to a spate of legislation in Europe that enshrined the precautionary principle.⁷ Humanity’s manipulation of the entire biosphere and atmosphere as well as our massive impact on the hydrosphere open a new chapter in earth history, the Anthropocene (Crutzen and Stoermer 2000), the consequences of which are not clear. Stephen Hawking,

⁷The precautionary principle as defined by UNESCO and the EU: ‘**When human activities may lead to morally unacceptable harm that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm.** *Morally unacceptable harm* refers to harm to humans or the environment that is (1) threatening to human life or health, or (2) serious and effectively irreversible, or (3) inequitable to present or future generations, or (4) imposed without adequate consideration of the human rights of those affected. *The judgement of plausibility* should be grounded in scientific analysis. Analysis should be ongoing so that chosen actions are subject to review. Uncertainty may apply to, but need not be limited to, causality or the bounds of the possible harm. *Actions* are interventions that are undertaken before harm occurs that seek to avoid or diminish the harm. Actions should be chosen that are proportional to the seriousness of the potential harm, with consideration of their positive and negative consequences, and with an assessment of the moral implications of both action and inaction. The choice of action should be the result of a participatory process’ (EU 2016).

before his death, and others at the Centre for Existential Risk at Cambridge University focused on a set of risks in part driven by such human technological (over)reach (CER n.d.):

- Biological and biotechnological risks
- Artificial intelligence
- Molecular nanotechnology
- Extreme climate change
- Systemic risks and fragile networks.

Writings and reflections on opacity and uncertainty are important contributions to our understanding of risk, especially as they broaden the scope of research to include a wider range of technological, social and biological hazards. However, here too DS's distant vision can be distorted if uncorrected by a political lens. True, the sudden explosion of Zika virus cases in Brazil was unexpected (McNeil et al. 2016). But viewed in the context of the political ecology of health and disease in Brazil, the causal cascade or progression of vulnerability responsible is not at all opaque (Wisner et al. 2012). Brazilian law professor Debora Diniz puts it like this (Diniz 2016):

Lost in the panic about Zika is an important fact: The epidemic mirrors the social inequality of Brazilian society. It is concentrated among young, poor, black and brown women, a vast majority of them living in the country's least-developed regions. The women at greatest risk of contracting Zika live in places where the mosquito is part of their everyday lives, where mosquito-borne diseases like dengue and chikungunya were already endemic. They live in substandard, crowded housing in neighborhoods where stagnant water, the breeding ground for disease-carrying mosquitoes, is everywhere. These women can't avoid bites: They need to be outdoors from dawn until dusk to work, shop and take care of their children. And they are the same women who have the least access to sexual and reproductive health care.

Lack of a political lens distorts DS' distance vision in another way. Governments are entirely capable of using fear to discipline and to control their populations. DS should ask to what degree at least some of the discourse of existential risk, surprise and uncertainty is the twenty-first century version of a tactic of discipline and control that Foucault (1988, 1990) called bio-politics and dates from the eighteenth century (Baumann 2006; Grove 2013; Lorey 2015). Some have argued that the US and other governments have used public fear of terrorism to justify a huge expansion of the national security state, 'securitization' (Altheide 2006; Furedi 2009; Warner 2013; Walklate and Mythen 2015) and the rise of what Hewitt (2013) calls 'the security-industrial-state'. In the process, local, state and national scale capacity to prevent and to respond to other 'normal' hazards (floods, coastal storms, earthquakes, landslides and wildfires; industrial fires and explosions; toxic spills) has decreased (Tierney 2006; Perrow 2011; Hewitt 2013), not to mention decreased visibility of smaller scale, everyday disasters. In another context, research on climate change policy in Tanzania as it affects the ability of small farmers to adapt spontaneously to climate change shows a similar kind of manipulation by government. Appeal to 'the climate imperative' is being used by the Tanzanian state to justify land grabs, displacement of pastoralists and mega-projects that displace yet

others and as an excuse for malfeasance and failed rural development plans (Smucker et al. 2015).

(Failing) to Govern Risk

New forms of global risk governance have been proposed and much discussed by legal experts, philosophers and political scientists (Innerarity and Solana 2013). Ulrich Beck developed his earlier ideas of the risk society (1986) into a systematic exposition of what he called world risk society (1999, 2008). By this he refers to border-transcending risks that no state can cope with alone and to which globalized capital will not respond (Beck 2013). The latter point is not surprising in light of the argument I made earlier that globalized capital is responsible for a good deal of risk creation. Indeed, some have argued that capitalism makes profit from catastrophes (Klein 2008; Loewenstein 2015).

The response to such an unprecedented set of challenges is, for Beck and others, new forms of global governance, in which ‘boundaries, basic rules, and basic distinctions are renegotiated – not only between national and international spheres, but also between global business and the state, transnational civil society movements, supra-national organizations, and national governments and societies’ (2013: 15). Beck (2008) considers as civilizational risks climate change, transnational terrorism, global health problems and financial market instability. Such challenges require cooperation among states and, according to Beck and others, are leading to a cosmopolitan model of risk governance (Jáuregui 2013). Researchers and practitioners in the humanitarian community have come to similar conclusions (Donini et al. 2008). In the words of a group that has launched a new resource platform for humanitarian planning (Planning from the Future 2016), there is a need to:

Lay out the reasons and evidence for why the [humanitarian] system needs to fundamentally change, and ... suggest measures that will make it fit for an ever more complex, uncertain and, in many respects, unknown, future. In so doing, ...draw upon the lessons of the past, capture the rapidly changing landscape of the present, and propose ways to prepare for a world in which the types, dimensions and dynamics of threats that produce humanitarian needs will increase – in some instances, exponentially.

There are, indeed, precedents for global cooperation to manage serious transboundary challenges. Nobel laureate Elinor Ostrom, developed a notion of polycentric governance of natural resources that has had some success in managing the world’s 200 or so international rivers (Myint 2012) and other transborder resources (Ostrom 1990, 2010). Other examples of global cooperation in confronting problems include atmospheric ozone destruction, pandemics and proliferation of nuclear weapons. Those urging cosmopolitanism (and polycentrism) might also draw encouragement from the long survival of the Antarctic treaty and agreement on the non-military uses of outer space. However, against this evidence of cooperation

there is the slow and questionable progress on agreeing on an effective international response to climate change and partial, halting progress on the law of the sea (especially as regards mining the deep sea bed) and patchy enforcement of the ban on trade in endangered species, not to mention trafficking in people, arms, drugs and money laundering.

A reality check for theoreticians of a cosmopolitan architecture for risk governance is the poor record of the UN's organization devoted to disaster risk reduction. The UNISDR's Hyogo Framework for Action for Disaster Reduction (HFA) was supposed to be implemented by the 168 states that signed up to it in 2005. But the UNISDR's efforts to monitor compliance relied entirely on self-reporting by the nation states, and it has been shown that these reports exaggerated success (GNDR 2009, 2011, 2013). While there has been development of political will to implement risk reduction in some countries, and some development of capacity to do so, progress has been uneven (Lavell et al. 2012; UNISDR 2015b).

The role of national systems for social protection in disaster risk reduction is underdeveloped (Peacock and Prater 2012), and researchers and policy makers do not fully understand how rapid urbanization in most of the world interacts with disaster risk (Johnson 2012). Meanwhile welfare reform and the policy of austerity are being implemented in many countries around the world and threaten social protection (Ortiz et al. 2011) while urbanization continues to accelerate. The combined impact of austerity and unplanned urbanization holds the potential for unprecedented disaster impacts.

Can the political lens help to sharpen the focus of DS on forms of global risk governance that are desirable, possible or likely? Beck believes that confronting global risks such as climate change, terrorism, pandemic disease and financial crisis will provoke a radical transformation among the stakeholders within the modern nation state as well as among those states. He writes (2013: 15–16):

Action strategies, which global risks open up, overthrow the order of power, which has formed in the neoliberal capital-state coalition: global risks empower states and civil society movements because they reveal new sources of legitimation and possibilities of action for these groups of actors; on the other hand, they disempower globalized capital because the consequences of investment decisions and externalizing risks in financial markets contribute to creating global risks...

The notion of radical change or transformation has become common in the discourse of climate change and disaster risk reduction. For example, Tschakert et al. (2013) provide an account of iterative decision-making, action and reflection that they believe has the potential for such structural change. They propose a process that begins and ends (and begins again) with vulnerability assessment that involves households and communities as agents and beneficiaries in partnership with administrators and professionals at various scales. Such a dialogical, decentralized approach is just one of a vast number of similar action research and activist interventions taking place across planet Earth (Wisner 2016). They have in common a conversation with and among people about their own capabilities in the face of change and threats. They involve a locally based process that can raise consciousness and

begin a process of social and political mobilization. The result can be a demand on the state and on corporations for transformation, and at times the circumvention of the state and market as groups of people create their own alternatives (Hardt and Negri 2004; Gibson-Graham 2005; McCarthy 2005; El-Khoury 2015).

DS is well placed to study the role and function of social movements that are likely to be the bottom-up counterpart of top-down forms of cosmopolitan, polycentric global risk management. These social movements work across both public and private spheres and may be described as 'rhizomic': being diffuse, non-hierarchical, heterogeneous and operating without an organizing center (Jones et al. 2014: 130; Deleuze 1976; Deleuze and Guattari 1987), taking advantage of social media (for example see *This Changes Everything* <https://solutions.thischangeeverything.org/> and *Peaceful Uprising* <http://www.peacefuluprising.org/>). Such social movement networks have been studied by political ecology using actor-network theory (Latour 1987; Law and Hassard 1999), but not in the context of DS (Holifield 2009; Blok 2010). There is a good deal that is not known about these movements for climate justice, corporate industrial safety and public health accountability, financial sector reform, citizen and faith community support for migrants and refugees. As I argued above, all of these issues bear directly, and some indirectly, on our understanding and management of disaster risk. How do these movements originate? How are they maintained? How and when are they likely to become bureaucratized and rigid? How do they interact with governments and with more traditional, hierarchical non-governmental organizations (INGOs)? In some cases, such as in Nepal, civil society, INGOs, bilateral and international donors have more or less completely taken the place of the national government in promoting and building capacity for disaster preparedness over the past 20 years (Jones et al. 2016).

Conclusions and Recommendations

Over the past 50 years disaster studies has made great contributions to our understanding of risk. Human beings, their perceptions, knowledge and behavior, groups and networks have been brought into focus in the causal nexus that determines vulnerability, exposure, risk, and risk reduction. Individual and group recovery has also benefited from DS research, as has the development and critique of disaster risk planning and management approaches. Time has seen an increase in the scope of DS focus that now embraces a comprehensive set of hazards: natural (earthquake, flood), social (terrorism, violent conflict), biological (epidemics, biodiversity decline), technological (pollution, industrial accidents), and climate change related. Impressive as these contributions have been, they have been limited by insufficient attention to issues of power at micro and macro scales. The foregoing has identified a number of distortions in DS's near and distant vision that have resulted from a lack of such a political lens. Wearing bifocals that would correct these problems of

vision, DS could dramatically increase its relevance to the next 15 years⁸ of common effort to reduce disaster risk and support people in recovery.

Acceptance and Support for the Following Recommendations Would Constitute a Start

1. DS research could focus more on the potential of all human beings to be full partners in identifying, assessing, managing and reducing risk. DS could identify ways to open up political and social space within which local residents can assess their own vulnerability to the hazards to which they give priority and develop capabilities to reduce risk while pursuing other goals. The action research task would be for DS to help facilitate going beyond merely understanding and acting on risk messages from experts. Local residents would feel empowered to work out their own paths to greater security in ways that are consistent with their cultures and aspirations (Oliver-Smith 2015). DS has already contributed to understanding obstacles to active partnership in risk management by some groups: women, children and youth, older people, and people living with disability (Wisner et al. 2012), but more could be done.
2. DS research could address institutional failures at multiple scales, looking especially at the role of corruption and neo-liberal management strategies such as public private partnerships and outsourcing of regulatory and other government functions. There is much that DS research could do to support the trend toward monitoring, evaluation and upwards as well as downwards accountability within the UN and international systems, in governments and among the varied institutions making up civil society. In the first instance, a common inter-agency system for monitoring the roll out of all of the post-2015 international initiatives would be of great benefit (Hasan 2015). From 2015 governments and other stakeholders will face the challenge of implementing agreements that have emerged from international negotiations on disaster reduction, climate change adaptation, development finance, sustainable development goals (SDGs) and the global humanitarian system. Implementation needs to be monitored, and given the interconnections among all these issues, a comprehensive and integrated approach seems logical. In addition, recalling my earlier remarks about top-down and bottom-up planning, perception and knowledge, monitoring should include the views and experiences of ordinary people and give them considerable weight, not just lip service.
3. DS research could complement attention given to disaster risk reduction (DRR) with work on disaster risk creation as a function of business-as-usual economic, social and political transactions. DS could also help to anticipate the risk implications of localization and delinking strategies some have proposed as an

⁸The Sendai Framework of Action to Reduce Disaster Risk, agreed by 193 countries in 2015, is scheduled to run until 2030 (UNISDR 2015a), hence the figure of 15 years.

alternative to unlimited globalized economic growth. My argument above was not that DRR is mistaken, rather that it is one-sided. One does not want to throw baby out with bath water. DS achieved a good deal by focusing attention on many of the processes that hold the key to risk reduction. In particular, early research showed clear connections among poverty, environmental destruction and disaster vulnerability (Cuny 1983; Blaikie and Brookfield 1987; Varley 1995; Blaikie et al. 1994). Nevertheless, this work remained trapped by the very word ‘development.’ Rodney (1972) turned development discourse on its head with his book, *How Europe Underdeveloped Africa*, using the word ‘underdeveloped’ as verbal adjective, not a noun describing a condition. DS has to ask what is going on outside the conventional domain of ‘development’ and ‘environment’ that contributes to risk creation.

4. DS research could help to anticipate new and complex risks and to assess critically alerts and risk management messages by governments and other interest groups, especially those that make claims about the role of opacity and uncertainty. Most members of the broad community of practice I defined earlier as ‘disaster studies’ do not have the technical background to develop or to assess critically models that begin to hint at nasty conjunctures in the future. In any case, most risk scenarios are only extrapolations of events that have already occurred: combinations such as civil conflict and epidemic disease (e.g. Boko Haram’s refusal to allow children in northern Nigeria to be vaccinated) or earthquake, tsunami and nuclear reactor melt down (e.g. Tohoku and Fukushima Dai Ichi). The contribution of DS lies more in detailed study of the relationship among science, government and society: the organization of the scientific labor process and how it is influenced by ideology and political pressure, how questions about future threats are generated, how results are communicated, and how they are received and interpreted.
5. DS research could study the new wave of social movements and networks emerging around the world as a response to global environmental change and concerns with an expanded notion of food security and climate change that take a human rights and justice perspective (Alkon and Norgaard 2009; Pettit 2009; Gottlieb and Joshi 2010; Bond 2012). What is their potential for moving governments and corporations to change? How do these movements differ from mobilizations of people seen in the past in post-disaster situations (Olson and Gawronski 2003)? Can they have a role in monitoring disaster risk reduction efforts (as in recommendation number 3, above)? Can social movements be both active partners and watchdogs during the roll out of the array of post-2015 programs and reforms? If so there may be a greater chance for effective climate governance and management of other trans-boundary risks as well as for social protection and advancement of the capabilities of marginal groups and the poorest people.

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Part II
Confronting the Second Environmental
Crisis

The Silence Before the Storm: Advocacy Groups' Current Perceptions of Future Climate Vulnerability



Carlos Eduardo Martín

Abstract Numerous organizations and institutions have traditionally represented, advocated for, or served those U.S. populations that are identified as vulnerable to environmental hazards and emergencies. However, we know little about how these organizations currently perceive or are acting on these threats to their constituent communities—in particular, the threats from hazards associated with climate change's effects. This chapter documents the organizations' current climate adaptation strategies and activities on behalf of these populations if any, and describes key themes regarding the contexts and challenges, surrounding the current state as well as the opportunities for possible future action.

Structured interviews were held with representatives from a wide pool of organizational types, from local environmental justice groups to national civil rights and environmental advocacy institutions. Responses corroborated the study's primary finding from policy and document reviews: the groups' current advocacy or programming related to climate change is generally nascent and, on the whole, does not extend beyond the identification of general vulnerabilities.

The silence, however, is not intentional. External and contextual barriers continue to hinder many organizations: the current national policy direction is focused almost exclusively on climate mitigation strategies over adaptation planning and action, and on equity in disaster recovery rather than in disaster mitigation and preparedness. Internal institutional barriers persist as well, such as resource constraints, gaps in technical capacity, and the lack of a demographically diverse staff that is attuned to the concerns within the vulnerable communities in question. Local groups also struggle with the task of messaging climate change in communities that face a broad array of intersecting social, economic, and environmental challenges.

To overcome these barriers, the author suggests policy and funding instruments that expand the technical and resource capacity of local organizations like environmental justice groups to better serve their vulnerable constituents' adaptation needs. However, the investment must produce actionable programming tied to the goals of

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current environmental and emergency management policy and to achievable community outcomes beyond solely identifying vulnerabilities.

Keywords Non-governmental organizations · Climate change adaptation · Institutions

Introduction

Natural hazards and environmental challenges know no geographic boundaries. Yet, the preparations for, responses to, and impacts of the disasters they inflict do, in fact, vary by social and economic community. A wide body of literature demonstrates how disasters are a product of preexisting vulnerabilities and stressors as much as the environmental or natural hazard in question.¹ Disenfranchised communities typically have less access to information on emergency preparations as well as on the nature of overall environmental challenges they face.² Vulnerable populations like the poor, disempowered racial groups, the elderly, and physically challenged are less likely to be prepared for disasters, suffer more losses from them, and have a more difficult path to recovery.³

The relationship between vulnerable communities and the effects of climate change—a unique set of environmental hazards—are also beginning to emerge.⁴ Vulnerabilities cut across numerous domains, from financial outcomes due to property loss to health conditions from increased extreme weather.⁵ Many studies point to the nature of vulnerabilities and vulnerable communities, yet not to the

¹K. Tierney (2014). *The Social Roots of Risk: Producing Disasters, Promoting Resilience*. Stanford, CA: Stanford University Press; D. Thomas et al. (eds.) (2013). *Social Vulnerability to Disasters, Second Edition*: Boca Raton FL: CRC Press; B. Bolin (2006). “Race, Class, Ethnicity, and Disaster Vulnerability” in H. Rodriguez, E. L. Quarantelli, and R. Dynes (eds.). *Handbook of Disaster Research*, New York: Springer; Cutter, S, Boroff, B, Shirley, W. (2003). “Social vulnerability to environmental hazards.” *Social Science Quarterly* 84:242–261.

²Mileti, D. and L. A. Peek (2002), “Understanding individual and social characteristics in the promotion of household disaster preparedness” in *New Tools for Environmental Protection: Education, Information, and Voluntary Measures*. Washington, DC: National Academies Press; Zhang, Y. (2010) “Residential Housing Choice in a Multihazard Environment: Implications for Natural Hazards Mitigation and Community Environmental Justice.” *Journal of Planning Education and Research*, 30(2): 1–15.

³A. Fothergill, E.G. Maestas, and J.D. Darlington (1999), “Race, ethnicity, and disasters in the United States: A review of the literature” *Disasters* 23:156–73; A. Fothergill and L. A. Peek (2004), “Poverty and Disasters in the United States: A Review of Recent Sociological Findings” *Natural Hazards* 32: 89–110.

⁴Urban Resilience Project. (2015). “Bounce Forward: Urban Resilience in the Era of Climate Change.” Strategy Paper from Island Press and the Kresge Foundation.

⁵M. Keim (2008). “Building Human Resilience: the Role of Public Health Preparedness and Response as an Adaptation to Climate Change.” *American Journal of Preventive Medicine*, 35(5); C. Huang et al. (2011). “Constraints and barriers to public health adaptation to climate change: a review of the literature.” *American Journal of Preventive Medicine*. 40(2).

effectiveness or even descriptions and agents of interventions designed to reduce those vulnerabilities.

Philanthropies, state and local governments, and federal agencies have very recently begun to consider the consequence of already-observable climate effects on these communities in the U.S. In the post-Katrina decade, these institutions merge the subjects of disaster mitigation, climate change adaptation, and local infrastructure and regional planning under the rubric of “resilience” as a physical *and* social condition. Yet, the public and civil-sector organizations whose traditional mission is to orchestrate and amplify these voices have existed for over a half-century. This chapter poses the question: How are the groups that traditionally advocate for vulnerable communities responding to climate change’s effects?

Background

Scholarship around disaster management and climate change adaptation provides useful insight. Disaster management and sociology literature demonstrates compelling evidence of the existence of vulnerabilities among certain populations that are exacerbated in disaster.⁶ What is generally accepted and understood is that disadvantaged racial/ethnic groups, age and populations with functional and access needs, and low-income households as well as other parties are more vulnerable than others to environmental hazards. This literature also focuses on the capacity of these communities *during* disasters with regard to disparate emergency response and relief activities.⁷ A growing body of work also looks at vulnerability in the context of recovery and rebuilding *after* the disaster, including unequal impacts on property and medical and psychological effects, and disbursal of recovery assistance.⁸

⁶A. Fothergill, E.G. Maestas, and J.D. Darlington (1999), “Race, ethnicity, and disasters in the United States: A review of the literature” *Disasters* 23:156–73; A. Fothergill and L. A. Peek (2004), “Poverty and Disasters in the United States: A Review of Recent Sociological Findings” *Natural Hazards* 32: 89–110.

⁷W. G. Peacock et al. (eds.) (1997). *Hurricane Andrew: Ethnicity, Gender, and the Sociology of Disaster*. Routledge; R. Bolin and L. Stanford (1998). “Shelter, housing, and recovery: A comparison of U.S. disasters.” *Disasters: The Journal of Disaster Studies and Management* 15: 24–34; L. Aptekar. (1991). “The psychosocial process of adjusting to natural disasters.” Working Paper Number 70, University of Colorado Institute of Behavioral Science and Natural Hazards Research Center: Boulder, CO; A. Fothergill. (2004). *Heads Above Water: Gender, Class, and Family in the Grand Forks Flood*. State University of New York Press: Albany.

⁸R. Bolin (1993), “Household and Community Recovery after Earthquakes.” Program on Environment and Behavior Monograph No. 36; University of Colorado Institute of Behavioral Science and Natural Hazards Research Center: Boulder, CO; E. Rovai, (1994). “The Social Geography of Disaster Recovery: Differential Community Response to the North Coast Earthquakes.” *Association of Pacific Coast Geographers Yearbook*: 56; N. Dash, W. G. Peacock, and B. H. Morrow (1997). “And the poor get poorer: A neglected Black community” in W. G. Peacock op cit.; M. Comerio (1998). *Disaster Hits Home: New Policy for Urban Housing Recovery*. University of California Press: Berkeley.

Disparate recovery assistance has been a focus of litigation in every major U.S. disaster recovery over the past three decades.⁹

Disaster Mitigation and Climate Change Adaptation

Despite the increased attention to post-disaster outcomes, there are fewer studies regarding disparate access and unequal engagement in the planning, mitigation, preparedness, and resilience capacity-building efforts conducted *before* a disaster.¹⁰ Early findings suggest that income is associated with risk perception.¹¹ Property buyers and owners in vulnerable communities are given less information about their risks and ways to mitigate them than other groups.¹² As a consequence, they are less prepared with emergency supplies and plans when disaster strikes.¹³

There is an overlap between climate change adaptation and disaster mitigation activities.¹⁴ Social disparities associated with disasters are repeated in climate change-related events like extreme storms, drought, and rising sea levels as they are for other hazard agents. The climate change adaptation literature provides some nuance to the framing of vulnerability by including future, chronic, and repeat-exposure environmental hazards.¹⁵ Disparities across populations have been noted globally and nationally by the seminal consensus groups on the subject, the United Nation's Intergovernmental Panel on Climate Change (IPCC) and the US National

⁹In Hurricane Katrina's recovery, for example, see: K. Fox Gotham (2014), "Reinforcing Inequalities: The Impact of the CDBG Program on Post-Katrina Rebuilding." *Housing Policy Debate* 24(1).

¹⁰In contrast to preparedness or response, disaster mitigation refers to actions that reduce exposure to a hazard agent such as physical protections, or reduce the economic or social losses of a disaster such as property insurance.

¹¹J. Flynn, P. Slovic, and C. K. Mertz (1994). "Gender, race and perception of environmental health risks." *Risk Analysis* 14(6); R. Palm and J. Carroll (1998). *Illusions of Safety: Culture and Earthquake Hazard Response in California and Japan*. Westview Press: Boulder, CO.

¹²Zhang, Y. (2010) "Residential Housing Choice in a Multihazard Environment: Implications for Natural Hazards Mitigation and Community Environmental Justice." *Journal of Planning Education and Research*, 30(2): 1–15.

¹³R. H. Turner et al. (1986). *Waiting for Disaster: Earthquake Watch in California*. University of California Press: Berkeley, CA; Mileti, D. and L. A. Peek (2002), "Understanding individual and social characteristics in the promotion of household disaster preparedness" in *New Tools for Environmental Protection: Education, Information, and Voluntary Measures*. Washington, DC: National Academies Press.

¹⁴The IPCC defines adaptation as adjustments in response to actual or expected climatic stimuli or their effects to moderate harm, and disaster mitigation as the lessening of the potential adverse impacts of physical hazards to reduce hazard, exposure, and vulnerability. See also, T. Cannon. (1994). "Vulnerability analysis and the explanation of 'natural' disasters." In: A. Varley (ed.). *Disasters, Development and Environment*. John Wiley and Sons: Chichester, UK; S.B. Manyena. (2006). "The concept of resilience revisited." *Disasters*. 30(4): 434–450.

¹⁵J. Paavola and W. Neil Adger. (2006). "Fair Adaptation to Climate Change." *Ecological Economics*. 56(4): 594–609.

Climate Assessment (NCA), respectively.¹⁶ In these reports, vulnerability is defined as an inability to cope with negative external change such as that caused by a natural or environmental hazard; more succinctly it is the “potential for loss.”¹⁷ As noted in the disaster management literature, this potential can vary across the different stages of the hazard.¹⁸

Vulnerable Communities

So, *who* is vulnerable? Hazard exposure due to geographic location defines much of this population, but so do social and economic position. Cutter et al. (2003) provide a helpful summary of the range of vulnerabilities by population characteristics. Similarly, the IPCC notes specific populations as being vulnerable within higher income nations like the U.S., starting with low-income households.¹⁹ This group typically lives in poorer quality housing and in communities with infrastructure incapable of meeting future demands.²⁰ They also have less access to property insurance, quality healthcare, and other prevention and treatment facilities.²¹ Beyond

¹⁶A. Revi et al. (2014). “Urban areas.” in C. B. Field et al. (eds). *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the 5th Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press: Cambridge; S. L. Cutter et al. (2014). “Ch. 11: Urban Systems, Infrastructure, and Vulnerability.” In J. M. Melillo, Richmond, and Yohe (eds). *Climate Change Impacts in the United States: The 3rd National Climate Assessment*. US Global Change Research Program.

¹⁷H. M. Fussler. (2007). “Vulnerability: A generally applicable conceptual framework for climate change research.” *Global Environmental Change*. 17: 155–167; W. N. Adger. (2006). “Vulnerability.” *Global Environmental Change*. 16: 268–281; S. L. Cutter, B. J. Boruff, and W. L. Shirley. (2003). “Social vulnerability to environmental hazards.” *Social Science Quarterly*. 84: 242–261.

¹⁸J. Hardoy and G. Pandiella. (2009). “Urban poverty and vulnerability to climate change in Latin America.” *Environment and Urbanization*. 21(1): 203–224.

¹⁹IFRC (2010). *World Disasters Report 2010: Focus on Urban Risk*. International Federation of Red Cross and Red Crescent Societies (IFRC), Geneva, Switzerland; C. Moser and D. Satterthwaite (2009). “Towards pro-poor adaptation to climate change in the urban centres of low- and middle-income countries.” In R. Mearns and A. Norton (eds.) *Social Dimensions of Climate Change: Equity and Vulnerability in a Warming World*. World Bank, DC. See also B. H. Morrow (1999). “Identifying and mapping community vulnerability.” *Disasters* 23(1).

²⁰J. Posey (2009). “The determinants of vulnerability and adaptive capacity at the municipal level: evidence from floodplain management programs in the United States.” *Global Environmental Change*, 19(4); UN-HABITAT. (2011). *Cities and Climate Change: Global Report on Human Settlements 2011*. Earthscan: London.

²¹H. Frumkin and A.J. McMichael (2008). “Climate change and public health: thinking, communicating, acting.” *American Journal of Preventive Medicine*, 35(5); J.M. Balbus and C. Malina (2009). “Identifying vulnerable subpopulations for climate change health effects in the United States.” *Journal of Occupational and Environmental Medicine*, 51(1). G.B. Anderson and M.L. Bell (2011). “Heat waves in the United States: mortality risk during heat waves and effect modification by heat wave characteristics in 43 U.S. communities.” *Environmental Health Perspectives*, 119(2).

income, race and ethnicity are significant contributors to vulnerability measures in the U.S. in multiple ways.²² Those with existing physical or mobility challenges who may face climate change-induced health challenges disproportionately are also vulnerable.²³ This group includes elderly members of exposed communities, who are more at risk from the effects of heat waves.²⁴ Homeownership status and housing quality are other factors likely correlated with income that are believed to contribute to climate vulnerability.²⁵ In the aftermath of Hurricane Katrina, many of New Orleans's poorest and mostly minority residents were disproportionately affected by flooding due to their location in low lying areas.²⁶

Policy and Advocacy Groups

The growth in literature on climate vulnerability has occurred over the last decade, an era in which the awareness of climate change's effects and hazards' disparate impacts has increased.²⁷ At its core, the adaptation needs of climate-vulnerable populations exacerbate general environmental hazards or disasters. Organizations and institutions that advocate or serve these communities with the hope of reducing their environmental, social, and economic disparities already exist. But, what do we know about how these entities are planning for climate change?

A body of literature has begun to track how organization and institutions emerge or evolve after a disaster.²⁸ The nearly universally-accepted existence of climate vulnerabilities would suggest that action on climate adaptation should be afoot. Yet,

²²C. R. Browning et al. (2006). "Neighborhood social processes, physical conditions, and disaster-related mortality: the case of the 1995 Chicago heat wave." *American Sociological Review*, 71; R. Morello-Frosch, M. Pastor, J. Sadd, and S. Shonkoff (2009). "The Climate Gap: Inequalities in How Climate Change Hurts Americans & How to Close the Gap." Program for Environmental and Regional Equity (PERE), University of Southern California: Los Angeles, CA; K. Lynn, K. MacKendrick, and E.M. Donoghue (2011). "Social Vulnerability and Climate Change: Synthesis of Literature." General Technical Report PNW-GTR-838, U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station: Washington, DC.

²³K.R. Smith et al. (2014). "Human health: impacts, adaptation, and co-benefits." In C. B. Field et al., op cit.

²⁴J.L. Gamble et al. (2013). "Climate change and older Americans: state of the science." *Environmental Health Perspectives* 121(1).

²⁵Y. Kim, H. Campbell, and A. Eckerd (2014). "Residential Choice Constraints and Environmental Justice." *Social Science Quarterly*, 95(1).

²⁶M. Turner and S. Zedlewski (eds). (2006). "After Katrina: Rebuilding Opportunity and Equity into the New New Orleans" Urban Institute: Washington DC.

²⁷NRC (2006). *Facing Hazards and Disasters: Understanding Human Dimensions*. National Research Council, Committee on Disaster Research in the Social Sciences: Future Challenges and Opportunities, Division on Earth and Life Studies. National Academy Press: Washington DC.

²⁸Wachtendorf, Tricia 2013. *Emergent Organizations and Networks in Catastrophic Environments, in Preparedness and Response for Catastrophic Disasters*. Ed Rick Bissell, CPC Press: Boca Raton, FL.



Fig. 1 Policy areas relevant to climate-vulnerable communities and organizations

a formal plan of action among the organizations and institutions that represent or respond to these populations is difficult to find. A handful of philanthropic foundations and public institutions in the U.S. have been funding non-governmental organizations to explore climate-related subjects in general for almost a decade, and place-based adaptation activities for approximately 5 years.²⁹ A wide range of adaptation and disaster mitigation strategies has been proposed, including physical infrastructure improvements, social or behavioral interventions and awareness campaigns, and institutional incentives from property insurance to building regulations.³⁰ Yet, implementation is limited³¹; in a 2011 survey of U.S. cities, 58% of respondent cities noted moving forward with climate adaptation activities, though 48% of these noted that activities are limited primarily to preliminary planning.³²

To simply identify organizations and institutions that work on climate vulnerability and adaptation, we mined scholarly sources, public documents, and press coverage that describe any statement, behavior, policy, advocacy, or programs by groups working in communities burdened with environmental or physical hazards in general. Ultimately, we identified groups in seven areas (depicted in Fig. 1): envi-

²⁹As noted in reports produced by the Funders' Network for Smart Growth and Livable Communities and corroborated in background interviews with foundation representatives conducted as part of this study.

³⁰I D. Dodman and D. Satterthwaite (2008) "Institutional capacity, climate change adaptation and the urban poor." *IDS Bulletin*, 39; M. K. Van Aalst, T. Cannon, and I. Burton (2008). "Community level adaptation to climate change: The potential role of participatory community risk assessment." *Global Environmental Change* 18; J. Carmin, D. Dodman, and E. Chu (2011). "Ch. 8: Engaging stakeholders in urban climate adaptation: Early lessons from early adapters" *UGEC Viewpoints: Addressing Grand Challenges for Global Sustainability* 6J. Foster, S. Winkelman, and A. Lowe, (2011) "Lessons Learned on Local Climate Adaptation from the Urban Leaders Adaptation Initiative," Center for Clean Air Policy: Washington, D.C; and R. Noble et al. (2014) "Adaptation needs and options." in C.B. Field et al. (eds), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press: Cambridge.

³¹W. Solecki and C. Rosenzweig (eds) (2012). "U.S. Cities and Climate Change: Urban, Infrastructure, and Vulnerability Issues" Technical Input Report Series, U.S. National Climate Assessment; NRC (2010) "Adapting to Impacts of Climate Change. America's Climate Choices: Report of the Panel on Adapting to the Impacts of Climate Change." National Academies Press: Washington DC; T. Wilbanks et al. (2012). "Climate Change and Infrastructure, Urban Systems, and Vulnerabilities," Technical Report to the U.S. Department of Energy in Support of the National Climate Assessment: Oak Ridge National Laboratory.

³²J. Carmin, N. Nadkarni, and C. Rhie (2012). "Progress and Challenges in Urban Climate Adaptation Planning: Results of a Global Survey" Massachusetts Institute of Technology and ICLEI Local Governments for Sustainability: Cambridge, MA

ronmental policy organizations; environmental justice (EJ) groups; equitable “green” employment and workforce development advocates; disaster and emergency management scholars and practitioners; public health planning and policy advocates; fair housing groups; and community organizing and civil rights advocates.³³ A brief background of each category is provided below.

Environmental Advocacy and Policy

The first and obvious organizations associated with climate change are the environmental advocates, given their focus on environmental outcomes in general and their policy activities related to climate change especially. The institutional environmental movement in the U.S. dates back to the land and wildlife conservation organizations at the turn of the twentieth century.³⁴ The increased awareness of pollutants and toxic emissions in the 1960s and 1970s spurred the institution of more nationally-focused organizations.³⁵ This growth in national environmental advocacy coincided with the passage of the Clean Air Act, Clean Water Act, and the establishment of the U.S. Environmental Protection Agency.

The traditional focus of advocacy has been on the physical or environmental outcomes of human activities, and the policy and legal strategies for minimizing them. Over the past two decades, most of these organizations have expanded the environmental topics under their purviews to include climate change—more specifically, the reduction of its underlying greenhouse gas emission sources. In this arena, the national environmental organizations played key roles during the failed cap-and-trade legislation in 2009, as well as the release of the Clean Power Plan (CPP) rulemaking in 2015.³⁶ The focus of both milestones has been climate mitigation over adaptation.

These groups’ relation to vulnerable communities has been less straightforward, however. The larger of these groups—commonly referred to as “Big Green”—have supported the establishment of other advocacy organizations, including sector-specific professional associations and legal aid outfits. Occasionally, EJ organizations and their constituents have benefitted from funding from the larger

³³An additional subject area of household finances (e.g., residential energy efficiency and renewable energy and their disparate effects on household energy expenses) was also considered. However, the scholarship in this area is too slim and focuses primarily on the disparities related to climate mitigation.

³⁴Nash, R. (1989). *American Environmentalism: Readings In Conservation History 3rd Edition*. New York: McGraw-Hill Publishing.

³⁵S. Stoll. (2007). *U.S. Environmentalism since 1945: A Brief History with Documents*. Boston: Bedford/St. Martin’s; The Green Revolution: K. Sale (1993) *The Green Revolution: The American Environmental Movement, 1962–1992*. New York: Hill & Wang.

³⁶E. Pooley (2010). *The Climate War: True Believers, Power Brokers, and the Fight to Save the Earth*. New York: Hyperion.

environmental organizations. Yet, environmental organizations have come under recent scrutiny for the lack of demographic diversity in their leadership and staff, particularly racial diversity.³⁷ The link between internal diversity within these organizations—or lack thereof—has been described as a contributing factor to the lack of explicit mission and activities focused on historically vulnerable populations.³⁸ In response, several larger national environmental organizations have recently launched staff diversity campaigns, created EJ divisions, and increased funding to local EJ groups and national civil rights groups directed at environmental awareness in underrepresented communities.³⁹ Recently, a few groups sponsored polls of Latinos' and African-Americans' perceptions of climate change.⁴⁰

Environmental Justice

The EJ movement and scholarship has been filling much of this gap, with its early focus on toxic pollutant sources and racially-delimited geographic communities.⁴¹ Histories of the movement suggest that the movement was born in the early 1980s in Warren County, North Carolina—a primarily African-American rural community that was the site of a toxic landfill.⁴² The EJ movement and its related scholarship produced the first body of knowledge relating environmental disasters to vulnerable populations, particularly racial/ethnic groups' and low-income households' exposure to environmental conditions that negatively impact their health, finances, or community cohesion.⁴³ Consequently, federal and state agencies have integrated

³⁷D. Taylor (2015). "The State of Diversity in Environmental Organizations: Mainstream NGOs, Foundations & Government Agencies." Criticisms of the lack of diversity stem back to a 1990 letter from several environmental justice advocates to the "Big 10" environmental groups regarding racial bias in environmental policy and lack of staff diversity, followed by the First National People of Color Environmental Leadership Summit in 1991.

³⁸D. Taylor (2002). "Race, Class, Gender, and American Environmentalism." United States Department of Agriculture, Forest Service Pacific Northwest Research Station: General Technical Report, PNW-GTR-534 (April).

³⁹For example the Building Equity & Alignment for Impact Initiative, or BEA-I, was one such coalition.

⁴⁰G. Segura and A. Pantoja (2015). "Polling Memo and Summary for National Release: 2015 Environmental Attitudes Survey." Submitted to Earthjustice and GreenLatinos (July 22): <http://earthjustice.org/sites/default/files/files/National%20Release%20Polling%20Memo%20Formatted.pdf>; D. Metz, M. Everitt, and B. Hairston (2015). "Findings from a National Survey of African Americans on Energy Issues" Submitted to Green For All and the Natural Resources Defense Council (October 12): http://docs.nrdc.org/energy/files/ene_15110401a.pdf.

⁴¹R.D. Bullard (ed.). (1993). *Confronting Environmental Racism: Voices From the Grassroots*. Boston: South End Press.

⁴²R.D. Bullard (2000). *Dumping in Dixie: Race, Class and Environmental Quality*. 3rd ed., Boulder: Westview Press.

⁴³B. Berry (1977) *Social Burdens of Environmental Pollution: A Comparative Metropolitan Data Source*. Ballinger: Cambridge, MA; B. Chavis (1987), *Toxic Wastes and Race in the United States*:

disparate impact analyses on “environmentally overburdened, underserved, and economically distressed communities” during rulemaking, permitting, and planning processes.⁴⁴

Most of the EJ community’s work has focused on the locational characteristics of toxic source or waste sites. Further, the literature on the EJ movement has generally documented a history of organizing in reaction to a negative environmental condition or a decision (like a toxic pollutant source) that generates a socio-economic or health effect.⁴⁵ More recent scholarship has looked at disparities in access to positive environmental conditions as well.⁴⁶ Among this group, increasing attention has been paid in the last decade to greenhouse gas reductions that could improve outcomes for vulnerable groups.⁴⁷ A few interventions in climate adaptation have also take root, including post-Sandy assessments of climate adaptation plans by EJ groups in New York.⁴⁸ The passage and signing into law of California’s SB 535 was also a landmark achievement for the EJ community with regard to climate adaptation; the law requires one quarter of the state’s cap-and-trade auction revenues be invested in programs that benefit disadvantaged communities, and 10% of the funds be invested within those geographic areas. These investments could take multiple forms, including reductions of health impacts from climate change.⁴⁹

EJ activists have recently expanded their purview to the realm of disaster recovery, too. Many of the environmental organizations that have roots in 1980s EJ advocacy have also been involved in disaster recovery organizing, particularly

A National Report on the Racial and Socio-Economic Characteristics of Communities with Hazardous Waste. Commission for Racial Justice; . S. Cutter, (1995), “Race, class and environmental justice.” *Progress in Human Geography* 19; M. Pastor, J. Sadd, and J. Hipp. (2001). “Which came first? Toxic facilities, minority move-in, and environmental justice.” *Journal of Urban Affairs*. 23 (1): 1–21; S. Cutter, (2006) “The Geography of Social Vulnerability: Race, Class, and Catastrophe.” *Understanding Katrina: Perspectives from the Social Sciences*; S. Cutter (2012). *Hazards Vulnerability and Environmental Justice*, Routledge: London.

⁴⁴EPA (2012). “Draft EJ 2020 Action Agenda Framework.” <http://www3.epa.gov/environmental-justice/resources/policy/ej2020/draft-framework.pdf>.

⁴⁵P. Mohai and R. Saha. (2006). “Reassessing racial and socioeconomic disparities in environmental justice research. *Demography* 43 (2): 383–99.

⁴⁶J. R. Wolch, J. Byrne, and J. P. Newell (2014). “Urban green space, public health, and environmental justice: The challenge of making cities ‘just green enough’.” *Landscape and Urban Planning*. Vol. 125 (May); K. A. Gould and T.

Lewis (2017). *Green Gentrification: Urban Sustainability and the Struggle for Environmental Justice*. Abingdon, Oxon: Routledge.

⁴⁷The recent publication of the final U.S. CPP rule pays particular attention to environmental justice analysis and low-income communities as targeted populations for intervention, for example. Benefits for some of the vulnerable populations from these actions are estimated in health, household finances, and employment outcomes, though the impacts of the few articulated policies, programs, strategies, and tools are still generally unknown.

⁴⁸WE ACT for Environmental Justice (2015) “#NMCA Northern Manhattan Climate Action: A Draft Plan” <http://www.weact.org/climate>.

⁴⁹V. Truong, (2014) “Addressing Poverty and Pollution: California’s SB 535 Greenhouse Gas Reduction Fund. *Harvard University Civil Rights-Civil Liberties Law Review*, 49(2) (March):493–529.

post-Katrina and post-Sandy. EJ advocates are beginning to pay attention to climate change and its consequent natural hazard events in addition to the chronic technological hazards that were their focus.⁵⁰ This activity has focused on identifying the vulnerability in question, and concerns with relief and recovery efforts after disasters. Yet, the policies, programs, and behavior-changing interventions that could reduce vulnerabilities in the communities facing disproportionate risks from climate change's effects before disasters are still a work in progress.⁵¹

Green Economy and Workforce

A related but substantively distinct subset of EJ groups includes those that propose workforce training and employment opportunities from climate change-related policy. The “green jobs” advocacy movement of the 2000s produced several policy actions regarding the opportunity for low-income communities to address climate change via the energy retrofitting of buildings and installation of on-site renewable energy sources.⁵² A key focus of this advocacy has been on community benefit agreements wherein local residents are trained or employed on construction projects—typically, publically-funded ones. This collective body of knowledge and policy has focused less on this community's climate adaptation needs and more on their climate mitigation opportunities for providing workforce training and eventual employment in energy-efficiency and renewable energy work.⁵³ Recent incarnations of green jobs advocacy have also looked at the employment opportunities from major infrastructure projects in general (particularly green storm water services) and physical defenses that might be undertaken for climate adaptation purposes.⁵⁴ A counter-narrative regarding the negative financial effects of mitigation activities on

⁵⁰R. Bullard and B. Wright (2012). *The Wrong Complexion for Protection: How the Government Response to Disaster Endangers African American Communities*. New York: NYU Press.

⁵¹Some criticisms of the EJ community have included concerns about their technical capacity to assess risk, their legal conceptualization of justice, and their policy-making limitations: C. H. Foreman (1998). *The Promise and Peril of Environmental Justice*. Washington, D.C., Brookings Institution Press; A. Ramo (2000), “Book Review: The Promise and Peril of Environmental Justice by Christopher H. Foreman” *Santa Clara Law Review*. V40; D. Schlosberg (2004). “Reconceiving Environmental Justice: Global Movements And Political Theories” *Environmental Politics*, Vol. 13, Issue. 3.

⁵²V. Jones, (2008). *The Green Collar Economy: How One Solution Can Fix Our Two Biggest Problems*. Harper Collins: New York.

⁵³Bivens, Irons, and Pollack, (2009), “Green Investments and the Labor Market: How many jobs could be generated and what type?—Issue Brief #253,” Washington DC: Economic Policy Institute; M. Muro, J Rothwell, and D. Saha (2011). “Sizing the Clean Economy: A National And Regional Green Jobs Assessment” Washington DC: Brookings Institute; C. Martín (2013). *Evaluation of the Sustainable Employment in a Green US Economy (SEGUE)—Initiative in Development*. New York: Rockefeller Foundation (January).

⁵⁴E. Gordon et al. (2011). *Water Works: Rebuilding Infrastructure, Creating Jobs, Greening the Environment.* Oakland: Green For All.

low-income communities has arisen, though with less evidence or political support.⁵⁵

Disaster and Emergency Mitigation

The disaster and emergency management literature is especially relevant to conversations about climate vulnerability. As noted earlier, the literature associated with emergency mitigation, communications and alerts, preparedness, response, and recovery have increasingly become concerned with vulnerable populations. The Hurricane Katrina response particularly brought this issue to light. However, most of the attention in this community has been on response and relief efforts and, to a lesser extent, preparedness (such as evacuation planning) and long-term recovery (post-disaster assistance formulas). Further, the organizing and advocacy groups embedded within socially vulnerable communities are less likely to be involved in disaster management planning and disaster assistance rules.⁵⁶ Bethel et al. (2013) examined the correlation between race and disaster preparedness, concluding that ethnic minorities are less likely to be prepared in the wake of disaster.⁵⁷

The disaster management community has not developed particularly robust policies or programs for addressing these communities either. Recent changes to state level mitigation plans submitted to FEMA which determine federal mitigation assistance now require a broader focus on resilience.⁵⁸ National mitigation grants to communities are generally used for hazard assessments, protection of public and critical buildings (like hospitals and shelters), the promotion of voluntary property retrofit technologies, and studies for local adoption of more stringent building or land use regulations. Few of these activities have focused on demographic groups—such as low-income households—for prescriptive policy action, or even measurement of disparate effects with the exception of recent inquiries into the affordability

⁵⁵ Most of these monographs center on the arguments around whether energy regulations add costs to low-income and racial minority households without commensurate benefits. A controversial report in the most recent incarnation of this debate is Management Information Services, Inc. (2015). “Potential Impact of Proposed EPA Regulations on Low Income Groups and Minorities” Washington DC: National Black Chamber of Commerce (June), which focuses on the CPP. See also, Ari Phillips (2015). “How The National Black Chamber Of Commerce’s Leader Is Harming African Americans” (March 17) Blogpost by Climate Progress: <http://thinkprogress.org/climate/2015/03/17/3634581/house-takes-on-smog>.

⁵⁶ A variety of reasons are suggested for this, including the control of technical knowledge by risk and disaster management experts: Scott Gabriel Knowles, *The Disaster Experts: Mastering Risk in Modern America* (Philadelphia: University of Pennsylvania Press, 2011).

⁵⁷ J. W. Bethel, S. C. Burke, and A. F. Britt (2013). “Disparity in disaster preparedness between racial/ethnic groups.” *Disaster Health* 1(2).

⁵⁸ http://www.fema.gov/media-library-data/1425915308555-aba3a873bc5f1140f7320d1e-bebd18c6/State_Mitigation_Plan_Review_Guide_2015.pdf.

of FEMA's National Flood Insurance Program.⁵⁹ Recent mandates for properties' earthquake retrofit in California cities, though unrelated to climate change's effects, have also been described as models for climate-related mitigation.⁶⁰

Public Health

The public health community has maintained a relatively longer focus on how climate change and disaster events increase or exacerbate any disparities in health outcomes. For example, The Center for Disease Control and Prevention's Climate and Public Health Framework was created in 2006, with the formal establishment of its Climate and Health Program in 2009. The health field is concerned with both physiological and mental health outcomes associated with climate change's effects, as well as differences in access to healthcare between the most vulnerable populations and others.⁶¹

As a consequence of these findings, public health practitioners and EJ activists have placed some importance on preventative public health strategies to mitigate health impacts. Given the resources in the public health profession, assessments and programs are growing around the specific types of exposures that can be modeled given current climate scenarios.⁶² Much of this literature has been either clinical, or has looked at the capacity of public health institutions to accommodate or respond, but not necessarily at policy or programs that vulnerable communities can implement or that are implemented on their behalf. In practice, there are several public health organizations both in governmental and civil sectors that are monitoring extreme weather incidents like heatwaves and developing responses for immediate needs.⁶³ In sum, public health entities in the U.S.—particularly, environmental health practitioners and policymakers—have paid particular attention to climate change's effects in more explicit and arguably more assertive ways than other organizations categorized in this study.

⁵⁹NAS (2015). *Affordability of National Flood Insurance Program Premiums: Report I*. National Academies Press: Washington DC.

⁶⁰San Francisco's "soft story" ordinance was the first among these (<http://sfdbi.org/mandatory-soft-story-program>), leading to Los Angeles' and other cities' regulations (<http://www.latimes.com/local/lanow/la-me-ln-earthquake-retrofit-20151009-story.html>) and subsequent financing mechanisms being debated at the state level (<http://www.latimes.com/local/cityhall/la-me-quake-20150921-story.html>).

⁶¹USGCRP's Interagency Group on Climate Change and Human Health (2014). "Impacts of Climate Change on Human Health in the United States: A Scientific Assessment" Draft Paper for US National Climate Assessment.

⁶²HHS (2014) "HHS Climate Adaptation Plan 2014" <http://www.hhs.gov/sites/default/files/about/sustainability/2014-climate-change.pdf>; HHS (2015) "Environmental Justice: Priority Areas of Focus.": <http://www.hhs.gov/sites/default/files/ej-priority-areas-of-focus.pdf>.

⁶³All respondents in the public health sector noted the Center for Disease Control and Prevention's Building Resilience Against Climate Effects (BRACE) framework and its Climate-Ready States & Cities Initiative grantees and particularly emblematic of the field's activities and programs: http://www.cdc.gov/climateandhealth/climate_ready.htm.

Fair Housing

Like EJ, fair housing has typically focused on the locational disparities of housing and residency among different racial, gender, disability, and other protected class populations. In post-disaster scenarios—especially after Hurricanes Katrina and Sandy, fair housing advocates and legal scholars have focused on disaster recovery assistance, which is typically offered mainly to property owners in affected areas.⁶⁴ The field is also historically concerned with other geographic segregation, housing access (physical and economic), and physical housing surroundings—conditions which are all likely to be impacted by climate change. Despite this, there is no policy or program action that can be detected within the fair housing world focused on the likely disparate effects of climate change policies on vulnerable populations, the disproportionate allocation of adaptation or disaster mitigation resources across communities, or even the identification of failures in land use, disaster management, and resilience planning to accommodate for or anticipate variations in community vulnerability. As a literature produced largely by legal scholars, negative consequences have to be realized prior to action—an obvious impediment to anticipating climate adaptation needs and responses.

However, the scholarship around fair housing law and practices is particularly insightful for climate vulnerability discussions for three reasons. First, the communities identified statutorily in the Fair Housing Act and other civil rights laws are largely the same as those that are expected to be the most vulnerable to climate change's effects. Second, land use laws, housing finance regulation, other public rules at the local and national scale have been known contributors to housing discrimination and segregation. These practices are also proposed as possible adaptation strategies and, in theory, could be used to make already vulnerable populations even more vulnerable. Current and future adaptation plans and mitigation strategies could benefit from the scholarship on the formation and implementation of these policies and rules. Third, research on the definition and measurement of disparate impacts from housing policies and practices could support the analysis of disparate impacts from climate adaptation plans (and lack of planning) on vulnerable populations. Though legal scholars have entered into disaster management terrain only with regard to recovery, mitigation and adaptation plans and programs may be an entirely new activity within which to determine discriminatory consequences.⁶⁵

⁶⁴Walsh, Kevin. December 12, 2013. "Christie Documents Show African Americans and Latinos Rejected at Higher Rates for Sandy Relief". Fair Share Housing: <http://fairsharehousing.org/blog/entry/christie-documents-show-african-americans-and-latinos-rejected-at-higher-ra/>.

⁶⁵A. Kaswan (2012). "Domestic Climate Change Adaptation and Equity." *Environmental Law Reporter* 42. Since the research underlying this chapter was conducted, a variety of fair housing and civil rights organizations have filed comment on proposed rulemaking on non-discrimination in EPA's program grantees and activities that could serve "to build an important bridge between... [EPA's civil rights rules] Title VI... and the Fair Housing Act." See Haberle and Rich (2016) "Re: Comments on Nondiscrimination in Programs or Activities Receiving Federal Assistance from the Environmental Protection Agency, EPA-HQ-OA-2013-0031." Letter to EPA's Office of Civil Rights (March 16): http://www.prrac.org/pdf/EPA_Letter_re_Fair_Housing_Coordination.pdf.

Civil Rights and Community Organizing

The link between community groups and advocacy organizations for civil rights or certain population is obvious: these organizations exist to improve the conditions and reduce barriers in law and treatment for their constituents. The social capital supported by these groups can play a role in adaptation to climate change, and the interaction between individuals and the state is vital to the adaptation process and planning.⁶⁶ The general areas of participatory city planning, community activism and organizing (including civil rights advocacy) have a long history in U.S. policy and scholarship, particularly with regard to race and ethnicity. However, only a few of the local and national organizing groups have taken on climate or disaster policy issues in the last decade. Scholars of organizing and advocacy among vulnerable communities have started to produce cases and evidence of climate or disaster related interventions and effects globally, that could be relevant to organizing around climate adaptation.

Summary

The merging of environmental vulnerability and disaster management accelerated by calls for climate change adaptation is still nascent in the U.S. policy and practice arena. Much of this movement harnesses the term “resilience” to focus beyond the nature of the hazards and integrate the social, economic, enviro-physical, and political stressors that shape vulnerability.⁶⁷ A few pioneering voices argue that action should be taken to implement climate adaptation strategies.⁶⁸ To date, however, there appears to be very little implementation in the policy, program, and practitioner world regarding these communities’ climate adaptation and disaster mitigation activities.

⁶⁶Laukkonen, Julia, et al. 2009. “Combining climate change adaptation and mitigation measures at the local level.” *Habitat International*. 33(3): 287–292.

⁶⁷National Academies’ Committee in Increasing National Resilience to Hazards and Disaster (2012). *Disaster Resilience: A National Imperative*. Washington DC: National Academies Press.

⁶⁸Martinez and Sheats (2015). “Protecting Environmental Justice Communities from the Detrimental Impacts of Climate Change” in Luber and Lemery, *Global Climate Change and Human Health: From Science to Practice* (2015” Jossey-Bass, San Francisco CA).

Study Data and Methods

The literature regarding established organizations' climate adaptation and disaster mitigation activities for vulnerable communities in the U.S. ranges from local anecdotes about preparedness actions to global projections of the size of the vulnerable populations. The gaps leave us with more questions:

- How do these organizations understand climate change's effects in relation to their core constituents, or how different communities are disproportionately vulnerable to these effects?
- Have the organizations taken any action—advocacy, program, or otherwise—based on that understanding?
- Do the organizations have any relationships with other organizations that typically have focused on climate change—namely, environmental advocacy and program organizations? Or, if the organizations are primarily focused on environmental hazards or climate change already, what relationships do they have with organizations that typically have focused on specific communities?
- Have the organizations taken any climate change-related action as a consequence of their relationships with environmental groups or, conversely, vulnerable population advocates? What is the range of these actions (positions, advocacy, programs, research, etc.)?
- What are the barriers or challenges that the organizations believe they face in developing or expanding climate change responses?
- What are the organizations' perceived opportunities for engagement in climate change adaptation?

To answer these questions, the researchers designed an exploratory research study to describe the current state of climate vulnerability perceptions and adaptation activities among key stakeholder groups. The researchers reviewed all public documents related to organizations identified as having explicit missions and implementing currently or recently active programs, educational campaigns, or legal or policy advocacy in relation to (1) a climate-change vulnerability such as health impacts, property exposure, or potential loss of livelihood, and (2) one or a combination of the communities that are identified as climate vulnerable in the literature and policy review. This information formed the background for structured interviews with representatives from recruited organizations in the seven topic areas noted above. Responses to interviews were recorded and analyzed to uncover consistent, frequent, and significant themes across respondents.

Sample Selection and Recruitment

The diversity of organizational types in sample selection was intentional. The researchers sought to identify any organizations that may have played a role in promoting climate adaptation strategies or are likely to play a role in the future based

on their involvement with the vulnerable communities in question. From the typology of 7 organizational types, researchers developed a list of over 65 national and local organizations or individuals that are operationally active. This list was culled from various sources, including public and philanthropic grantee lists, references in public and scholarly documents, professional association memberships, and the researchers' identification of known leading stakeholders for each type. These lists were supplemented during the data collection process through "snowballing," or the direct and indirect identification of additional possible respondents during respondent interviews.

Organizations that have conducted public activities with regard to climate change's effects within each type were especially recruited. Program officers from engaged philanthropy and scholars focused on climate vulnerable communities were also interviewed. On the whole, the executive directors, presidents, or equivalent position holders in each group were solicited first via email, then through telephone recruitment. In the cases of vary large organizations, the staff member charged with focusing on either climate change programs or policy (or general environmental policy or programs) or on vulnerable communities was contacted first. The researchers completed hour-long interviews with almost 30 responsive recruits or their designated representatives across all 7 organizational types from October 2015 to January 2016.

Documentation and Confidentiality

Staff took written notes during all interviews and recorded the conversations with the interviewees' consent to confirm responses. Both recruitment messaging and the introductory statements of interviews included: (1) a general description of the project, the interviewing organization, and the project's funding; (2) more detailed descriptions for likely questions; and (3) confirmation of the voluntary nature of the respondents' participation and non-attribution of their responses in any analysis or publically-available documents based on the interviews.

Structured Interview Protocol

The structured interviews used an identical protocol focused first on the respondent's depiction of her or his organization's mission in relation to specific environmental conditions, to specific demographic groups, or both, if any.⁶⁹ Interviewers

⁶⁹Exceptions were made for additional background interviews held with scholars of environmental justice and climate adaptation efforts. Because these individuals were not the focus of the study, a condensed version of the standard protocol was used to identify the respondents' familiarity with any climate vulnerability efforts across all of the subject-matter fields.

asked additional questions to identify the history, mission evolution and general structure of the respondents' organizations as well. Respondents then also provided exhaustive information regarding their primary activities across three categories: awareness and education; service delivery; and policy or political advocacy. Interviewers exhaustively asked about the history of activity, partnerships, achievements, and challenges in each of these categories to ensure that any activity related to environmental and social vulnerability would be revealed.

Then, interviewers asked one of two parallel series of questions regarding current activities that may bridge environmental and social objectives. One series, directed at self-identified environmental organizations, focused on their partnerships with non-environmental groups and the significance of vulnerability and vulnerable communities to their environmental mission. The other series asked self-identified non-environmental organizations about partnerships they may have had with environmental organizations and the significance of environmental concerns to their core social missions.

Finally, interviewers asked all respondents about climate change issues in general, and about climate adaptation policy and programs in particular. Respondents were asked to describe the placement of climate change in their environmental or social missions, their knowledge about the distinction between climate change mitigation and adaptation, and any activities that they may have undertaken in the past, or are currently undertaking, or are planning to undertake in the future. Probes attempted to uncover any policy or program work that the respondent may not immediately identify as climate adaptation-related, and were based on the literature regarding global adaptation activities, such as property insurance access, infrastructure planning, emergency preparedness training, or hazard mitigation plan commentary. Regardless of their organizations' level of activity or awareness, respondents also answered questions attempting to gauge their perception of the opportunities and challenges with regard to climate change policy and programming. These open-ended questions referred to both internal determinants of future adaptation activity (such as staffing, leadership commitment, and fidelity to mission) as well as external ones (e.g., perceptions or capacity of their constituents, resources, strategic initiatives).

The protocol was pilot-tested twice among a social service provider as well as an EJ consultant prior to conducting any interviews.

Findings

The researchers analyzed responses within each organizational type and across all interviews to produce the themes noted in the findings below. In total, eight key themes emerged: the first corroborates the general estimation about the low level of program activity around vulnerable communities and environmental and emergency hazards. The other seven, however, are substantive themes that illuminate the challenges and opportunities for further activity. All themes were noted by a significant proportion of respondents, with quotes taken directly from them.

Nascent Field

The primary finding is that, at the time of the study, there was little to no program activity around climate adaptation or hazard mitigation and preparation for vulnerable populations across all three activity categories—awareness and education, service delivery, and advocacy or policy-making. Common statements made included: “It comes up, but not in a big way;” “It’s been brought up before, but we don’t have a solid plan...;” and “We are trying to let the communities take that lead.” In some cases, respondents even noted having had the conversation about whether they should be doing something, and decided to table the conversation indefinitely.

This sentiment was consistent across most group types, including the national environmental advocacy groups who noted a purposive focus on climate mitigation. In all cases, the vast majority of respondents placed climate change adaptation—and, in some cases, climate change in general—as a relevant but not the most critical issue in their groups’ missions or current agendas. Non-environmental groups described the environment in general as relevant or important but less critical. Most of the national civil rights and fair housing organizations interviewed described environmental concerns as lying just beyond their current scopes despite their interest in the disparate impacts of environmental hazards and other emergencies on their communities of interest.

The exception to this rule included a few local EJ organizations, one national civil rights organization that has significant local programming and works with local EJ groups, and the national and local public health community at large. These groups cited a few preliminary needs assessments and research projects undertaken in the last 2–4 years. The subjects of these adaptation-related projects include:

- Grassroots awareness-building and public messaging regarding resilience as “resistance”
- Neighborhood-level emergency preparedness scenario modeling, outreach, and planning
- Listening tours of coastal communities likely to be affected by sea-level rise
- Frameworks for monitoring emergency management outcomes before and after climate-related disasters
- Cooling station access and design for heat waves, and
- Projections of vector-borne disease, asthma, and pest infestation rates from global warming.

Yet, even in this grouping—that is, organizations with varying missions but some early adaptation or hazard mitigation activity, there is a general consensus that much of this work is recent: “Ten years ago probably, there was no awareness.” The aftermath of Hurricanes Katrina and Sandy and their impacts on specific low-income households and communities of color were commonly cited as catalysts for beginning the conversation. All respondents that are familiar with adaptation policies noted that equity has only recently entered into the national discussion, though a few mentioned attempts at gaining traction for the idea up 8 years ago. In several

groups, however, the subject is “on the agenda,” as a senior representative from a large environmental organization reported.⁷⁰

Political Context

All respondents noted that any discussions about future environmental hazards or disasters—especially around climate change mitigation or adaptation—must be contextualized against the current political backdrop in the U.S. In particular, they noted the Republican Party’s refusal to accept climate science’s evidence of global warming and its causes within its formal platform, and its leadership’s proposals to rein in the EPA. Several respondents linked this political context to the continued obfuscation of climate change in particular in political messaging which, in turn, was viewed as contributing to a persistent confusion or “lack of understanding of the magnitude of threat” from climate change in the general public (as articulated by one environmental funder).

In some cases, respondents linked “climate denial” to a general muddying of the popular awareness around environmentally-related science, regulations, and overall policy. A handful of interviewees from EJ and green economy organizations particularly noted the attempts by politically conservative groups, advocates, and funders to appropriate civil rights language through the funding of proxy groups and studies depicting the financial costs to households in marginalized communities of greenhouse gas or related environmental regulation.⁷¹ For a few local EJ groups and community organizers in urban areas, further, the political rhetoric is particularly disturbing since it preys on perceptions in low-income and racial minority communities that environmental policies have historically benefitted wealthier and white communities and bestowed them with environmental amenities and economic advantages at the expense of other communities.

Respondents from within the larger environmental groups also noted a bifurcation of internal advocacy strategies, with some advocates arguing for engagement and negotiation with the political right for short-term wins while others actively promote alignment with “like-minded” organizations for the longer term. Some of the groups that have performed the early adaptation activities described earlier were quick to point out that they work in regions, states, or municipalities in which the use of the terms “climate change” and its corollary phenomena (e.g., “global warming”) are either explicitly banned in public policy discussions or implicitly unacceptable. Emergency management experts and public health officials that were

⁷⁰ Only two respondent noted purposely not supporting or at least being wary of supporting climate adaptation or hazard mitigation activities for reasons other than capacity or timing. These respondents argued that adaptation discussions were “being abused” by the fossil fuel industry presumably to divert attention from climate mitigation.

⁷¹ These responses corroborate the documents found during the policy review regarding alternative depictions of climate policy from civil rights groups. See Note 81.

interviewed described adopting terms like “climate trends” or “weather events” in their outreach and research activities, and label activities in reference to specific climate change effects—e.g., “dengue fever project” or “heat wave preparedness.” In these cases, the respondents noted being able to affect the desired changes in policy or programming without generating a political backlash or confrontation.

The theme of contemporary politics also spills into other contextual themes that surfaced from the interviews. In particular, respondents noted that the persistence of climate science obfuscation has forced the large environmental organizations to strategize around policies that focus on the basics of climate change’s core causes. It has also jeopardized federal funding and the institutionalization of governmental programs, policies, and cross-departmental collaboration that could better address environmental crises of all kinds, especially slow-moving ones like global warming. In turn, resources for local activity are described as inadequate. A few respondents noted that some national non-environmental organizations may be reluctant to take on environmental issues because they may be receiving support from “fossil fuel interests” for their current activities.

Ultimately, however, all respondents pointed to the broader political fights occurring over environmental issues in general—and especially over climate change-related policy—as a critical contextual theme underlying their work. In other words, the lack of robust adaptation activity should not be viewed as silence on their part as much as the microphone being moved away.

Policy Context

The political tensions produced the loudest cacophony during the 2009–2010 cap-and-trade bill debates in the U.S. Congress, a legislative failure whose voices echo in the contemporary CPP debates. For organizations that work with the most environmentally-vulnerable populations, the last decade of advocacy, and programming around climate adaptation have been highly shaped by a key policy strategy: the almost exclusive focus on addressing climate change’s causes (namely, reducing greenhouse gas emissions) rather than its effects.

Respondents described the focus on climate mitigation (reducing greenhouse gases to impede climate change) over climate adaptation (reacting to climate change’s effects) as being logical from both scientific and policymaking perspectives, and the interviewed groups working in environmental or climate arenas invariably described their extensive climate mitigation activities over the last 10–15 years. These projects generally focused on the reduction of fossil-fuel burning energy plants, energy efficiency and renewable energy programs, “smart growth” planning promotion, and the creation of green jobs as a consequence. The original activities or variations of them continue through the present.

Several respondents referred to the cap-and-trade bill failure as a significant milestone in the general discussion around the environment and marginalized communities. Prior to this, during what one respondent referred to as the “first green

cycle,” national environmental and green economy groups worked jointly on several fronts, including: green job campaigns, the implementation of the American Recovery and Reinvestment Act, and the development of climate mitigation legislation. This broad coalition expanded to include a wide set of stakeholders that splintered during and after the time that the legislation failed. For example, the EJ community’s departed publicly from large environmental groups on cap-and-trade strategies during the final legislative push. Three years later, organized labor’s rift with Big Green on energy infrastructure funds such as the Keystone Pipeline caused an additional rift that left the environmental community looking for new allies.⁷²

The “second green cycle” that continues to the present has focused on renewed coalition-building but still with an eye on climate mitigation policy, including support of the CPP. For many respondents, this cycle involves the national environmental organizations’ outreach to different, traditionally non-allied constituencies like communities of color, to engage in the discourse on climate change policy in particular, but also the environment more broadly. The reasoning for this was described by respondents as both simple (with these groups “coming up as a huge part of the electorate in next few decades”) and more nuanced.

Respondents described the engagement of a broader constituency on environmental issues as one that would inherently require engaging in different policy discussions and forming more robust alliances. Where the first policy cycle focused on “just communications,” the second involves “partnerships” (as one respondent in a national environmental organization involved in both noted). These partnerships involve focusing on policy arenas—and with constituents—that are not in the environmental organizations’ traditional scope. As one environmental group respondent noted: “we need to do a better job rallying them [non-traditional environmental communities], elevating their concerns related to climate change, and making those voices heard.”

A handful of respondents offered a more nuanced take on the evolution of this partnering beyond increasing support and its effects on climate adaptation policy, or the lack thereof. For example, several respondents noted that climate mitigation policies are regulatory, allowing for legal action when a regulation is violated. Climate adaptation and disaster mitigation, in sharp contrast, involves predicting negative scenarios and their potentially disparate impacts and benefits. Historically, most environmental policy in the U.S. takes the former structure, leaving national environmental groups with gaps in their skill sets: “...our legal wheelhouse is better at stopping stuff rather than promoting the right investments... In terms of really helping vulnerable communities from the effects of climate change, I don’t think we’re there yet.”

⁷²Though most EJ coalitions decried cap-and-trade policies at the national level, the debate was most heated in California between 2008 and 2012 where a cap-and-trade bill successfully passed after the EJ community’s protests: K. Sheppard (2008), “Environmental Justice V. Cap-And-Trade” *American Prospect* (February 28) and T. Schatzki and R. Stavins (2009), “Addressing Environmental Justice Concerns in the Design of California’s Climate Policy” Analysis Group, Inc.

By focusing on climate mitigation policy, other respondents argued, many national environmental groups could avoid dealing with the complexities of crisis and disaster vulnerabilities—and avoid having the difficult conversations about adaptation and disaster mitigation policy solutions like relocation—with communities in which they had little experience or knowledge. A comprehensive look at climate adaptation policy would require addressing these vulnerable communities individually, with granular scientific evidence and with the appropriate sensitivity. A prominent environmental justice spokesperson noted when asked about the policy focus on climate mitigation: “There’s a reason why there is a dearth of adaptation projects. It’s the most difficult.”

Governmental Context

A third contextual theme that emerged from the responses involved the lack of coordination between different governmental entities both across the federal government and between the federal, state, and local levels. This issue was notable in that it is both (1) a product of the context in which climate mitigation and adaptation are viewed as distinct policy areas requiring different sources of governmental attention; and (2) produces a program and funding disparity for local governments and advocacy groups between the two.

This theme was reported only by respondents with knowledge of climate adaptation or disaster mitigation policy. Specific agencies were mentioned as not coordinating on climate adaptation—namely, EPA, FEMA/Homeland Security, HUD, and the Army Corps of Engineers given their relevance to climate policy, disaster management, and infrastructure. In contrast, respondents who were only familiar with climate mitigation policy or could not distinguish did not mention any emergency- or infrastructure-related governmental departments when asked about agencies with which they work, receive funding, or monitor.

Among the few respondents familiar with the broader governmental roles and functions, many also noted historical disparities in how agencies approach marginalized communities and interact with the groups that advocate on those communities’ behalf. For example, HUD has been historically familiar with local community organizing and development groups based on its legal, program, and resource mandates; the Fair Housing Act is a driving factor in promoting equity there. EPA’s funding and programming around EJ and the actions of its Office of Civil Rights have also arguably bridged its technical regulatory mandate with its obligations under Civil Rights Act’s Title VI. In contrast, a few respondents noted the consideration of disparate vulnerability and equity is “very new to FEMA.” One national EJ stakeholder equated the federal government to the national environmental organizations: “I know how we struggled to make sure that EJ was infiltrated throughout.”

In turn, these distinctions were described as having similarly bifurcating effects on state and local governments and their interactions with vulnerable communities and advocacy groups. These effects include gaps in the professional understanding

of public servants about the communities they serve. In the FEMA example, for instance, one respondent noted that in turn: “you have traditional disaster managers that will need to get up to speed on what you’re talking about, what this means.” Another respondent speculated that decreasing technical sophistication, policy capacity, and financial resources in government from the national to the local levels suggests lots of opportunities for problems between local public agencies and their most vulnerable constituents, challenging local advocacy groups’ efforts. However, a handful of respondents noted that recent engagement opportunities between advocacy groups and government at all jurisdictions levels—including for disaster management and local community planning—as positive signs that need “more robust” substance.

Besides local government, one respondent noted that the divergent funding and compartmentalization of governmental programs had an effect on local advocacy groups as well. Information and knowledge were also bounded. Organizations attempting to link vulnerable communities with climate- or disaster-related action are similarly restricted in their capacity beyond what they know through their existing funding, program, and policy channels. The respondent referenced the specific example of local environmental justice communities and their absence from local emergency planning activities.

Resource Constraints

Regardless of which governmental agency or philanthropic funder provides financial resources and technical assistance to local advocacy groups, however, all respondents noted that the current pot is simply too small. Aside from purposive policy strategies (i.e., climate mitigation versus adaptation) or functional limitations (e.g., *ex post* legal defense versus *ex ante* planning), the lack of funding and bandwidth limits organizations of all sizes and constituent types. Funds to hire qualified planning consultants or for local training and awareness campaigns are non-existent, let alone for major infrastructure construction or retrofit. One emergency management professional noted that resource constraints play out in even the most mundane ways, for example the lack of formal meeting spaces in rural, low-income, or tribal communities perpetuating marginalization in the very engagement process that is meant to include these groups.

Every respondent mentioned funding regardless of whether they faced current gaps or the degree to which they currently work, or want to work, on environmental hazards. Among all of the organizations, the ability to identify and successfully acquire funds that would allow for the dedication of explicit staff and materials was described as a key cause of their current limited work in adaptation. Even those organizations that are often local public entities, like public health agencies or emergency management offices, reported significant resource constraints though these are primarily due to public budget cuts than to funder interest or lack of competitive funding opportunities. A few organizational representatives noted the role of spe-

cific foundations in bridging this gap, while others added that the funding community is only now breaking the silos between social equity issues and the “different world” of environmental concerns.

EJ groups face a particularly challenging funding pool because of their commitment to remaining grassroots, locally-focused organizations.⁷³ This scale often leads them to compete for funding against other local advocacy groups that may work in either non-environmental or environmentally-related areas. In some cases, further, local EJ groups also have not undergone non-profit incorporation, and are legally limited in their ability to access funds. According to these groups, the more endowed national environmental organizations are also reluctant to sub-grant, divert, or share their program funds or donation revenue with others locally given their broader geographic and policy scope. As a consequence, as one respondent noted, this scenario has led to a “mismatch” between “what’s going on in those communities and who’s doing the work.”

Respondents familiar with local groups further elaborated that activities related to future environmental scenarios, community and infrastructure development, and other climate adaptation and disaster mitigation planning (as opposed to organizing around an already transpired crisis or taking legal action) are even more difficult to fund, though the groups are still expected to be at the table. One national EJ leader noted: “The best disaster response is addressing vulnerabilities beforehand. But, where is the money going for disaster preparedness? Not to EJ groups or any groups representing or constituted by vulnerable citizens.”

In addition to the overall funding constraints, several respondents reported that past and currently available funding tied to specific policy strategies, governmental silos, and funders’ interests further restricts organizations: groups must “follow the money.” In most cases, that involves focusing on climate mitigation activities over adaptation because national resources steer it.⁷⁴ As a consequence, funding availability and requirements are contributing factors for the possible gaps in adaptation, environmental vulnerability, and crisis planning.

Knowledge and Capacity Constraints

Respondents also noted technical capacity and access to adequate and appropriate knowledge sources as a significant constraint to their work in general, and to their ability to further programming focused on environmental vulnerabilities. In some cases, particularly related to specific technical subjects (such as climate change models) or demographic data (as explained by one respondent, for example, the size

⁷³One respondent quoted a statistic with unidentified source that 4.5% of foundation funds in 2002 went to EJ causes, and that this went up to 15% by 2012.

⁷⁴A few national and local groups did note the recent role of specific private foundations in providing funds for broader climate activities that include adaptation, and the EPA’s inclusion of climate preparedness and resilience in its 2015 Environmental Justice Small Grants Program.

of rural disabled populations in specific regions), the information is either complex or difficult to obtain in general. Though related to the funding constraints they all face, respondents speaking from within smaller local groups noted this in particular. Among a few respondents from national organizations, only a handful of local environmental organizing groups were repeatedly brought up as having some technical capacity and partnering with larger groups.

On the whole, however, these smaller groups with the most familiarity with local communities' social and economic needs—and the best position to communicate issues within communities—often have limited access to environmental science or data, particularly those as complicated as detailed local climate models or disaster scenarios that often do not exist and might require funding of entirely new research. In some cases, small EJ groups have been able to gain allies in local universities that can provide modeling, laboratory testing, and health assessments at a nominal cost or pro bono. Most, however, cannot afford the costs for granular analyses related to the geographic neighborhoods or demographic communities described in their missions even after negative impacts have been identified—let alone pro-actively in planning processes before they can arise.

In the cases of early adaptation projects, the smaller organizations often had to hire outside expertise or consultants despite having limited funds with which to do so. In fact, several respondents from smaller EJ and green economic groups were unable to make technical distinctions between environmental phenomena when asked detailed questions about environmental issues, such as climate mitigation versus adaptation activities. In some cases, respondents in social service and civil rights organizations were more familiar with the current scientific and policy terminology.

Some respondents noted that the purposeful strategy among EJ groups to remain locally-grounded and accountable to a grassroots base has challenged their ability to have the capacity to access and use the kinds of information available to larger national groups, though the increase of electronically available resources and datasets has helped. Another strategy that smaller groups have employed is the formation of coalitions on specific program activities with other like-minded small groups, with another local non-environmental community organization, or larger environmental organizations from which to access information resources though, as noted previously, this approach occasionally yields competition for funding and “turf.”⁷⁵ Local non-environmental organizations, for example, reported having contact with environmentally-focused colleagues within their same community organizing worlds.

Ultimately, however, technical knowledge about which scientific evidence is needed and how to acquire it is critical in this arena. A respondent familiar with local climate adaptation planning activities across the country reported how often “local officials didn’t analyze disproportionate impact on communities.” The importance of technical capacity for understanding scientific information and pol-

⁷⁵ Coalitions pertinent to adaptation that were frequently mentioned in the interviews included the Climate Justice Alliance, the Environmental Justice Leadership Forum on Climate Change.

icy analysis and program requirements among these communities' organizers and representatives is therefore especially critical for climate adaptation and mitigation activities regarding any environmental disasters. Several respondents at both the national and local levels reported coming to the issue of environmentally-vulnerable populations and environmental policy as community organizers and not necessarily as "experts on the issues," as one organizer for a national environmental organization noted: "...we're aware of a big problem about our capacity to do research. We have a lot of people, but we're limited." The capacity gaps in some smaller, local groups, then, are even more apparent. Further, they impede the ability of some organizations to explain environmental problems and translate solutions to their constituents who are likely to be less familiar with the technical information than they are.

Persistence of Marginalization and Lack of Diversity

The lack of demographic diversity among the more powerful and nationally-focused environmental organization persists according to interviews—particularly racial and ethnic diversity, but also diversity in income backgrounds. A similar concern was noted with regard to the community of emergency management and climate adaptation professionals by the handful of respondents familiar with these individuals and organizations. Despite the acknowledgement from the broader environmental advocacy sphere of this problem over the last decade (and especially after the failed 2009 cap-and-trade legislation), virtually all respondents mentioned this continuing underlying gap; one respondent working with a large national environmental group laughed: "For a movement that supports biodiversity as one of its bases and protection of every creature, we haven't done a good job in being diverse in our ranks and valuing that diversity in our ranks."

Two distinct nuances are important in the depiction of this representativeness gap that we provided in the background policy and program review. First, multiple informants noted the implications of this exclusion on the funding and capacity-building gaps between the large groups (composed of the "usual suspects" that were typically described as funded and managed predominately by Whites) and the smaller local groups, especially EJ organizations (broadly described as African-American, Latino, Native American, and Asian-American). Given the EJ groups' principles of grassroots activism at the local scale, the question of diversity had organizational repercussions: "how big do the green groups need to be?"

A few interviewees also added that some larger organizations have rushed to window-dressing by integrating staff of color or having spokespeople of color that ultimately are not empowered or have limited technical or policy knowledge in environmental or hazard areas. One respondent referred to this as "diversity versus tokenism." For their part, most of the representatives from community organizations that are not or minimally working on environmental issues that were interviewed were conscious of the racial representation concerns among environmental organi-

zations, but did not necessarily link that to their decisions to not work on the subject or to any of their resource constraints.

Secondly, there was repeated concern among respondents that the large organizations continue to prioritize overarching environmental outcomes without considering their interplay with community concerns and place-based social or economic outcomes—that is, that the lack of staffing diversity perpetuates a gap in mission and program. For many interviewees, particularly those in the EJ community, the connection between being socially or economically vulnerable communities and their environmental and climate vulnerabilities is readily understood by the communities themselves. However, members of these communities do not or may not “necessarily identify as environmentalists.” From a wide representation of the groups included in this study, then, comments regarding the importance of having people “that can relate to communities” or who can “translate” environmental information at the grassroots level were repeated: “Equity issues are not just about who is affected by climate change effects and how, but also regarding who gets to work on policies and activities for building resilience.” For several respondents, the link between staff diversity (particularly racial) and program inclusion (especially of communities of color) was clear.

In parallel to the comments about window-dressing of staff, a few respondents noted similar window-dressing of policy and program strategies, or, “equity washing” according to one interviewee. This “disconnect” or “disengagement” between the environmental movement and the people impacted by environmental crises was articulated by one informant, for example: “When the environmental movement advocates for environmental improvement, they will use the impact on vulnerable communities. The problem is that it’s not clear that they advocate for the environmental benefit to truly go back to those vulnerable populations.” To corroborate that sentiment, many representatives from the larger groups themselves noted that the issues of vulnerable communities consistently ranked as moderately but not significantly or critically important to their groups’ work—including representatives working exclusively on EJ issues or outreach and awareness building to underrepresented racial and ethnic communities. For these groups, the environment is the focus, and the nation or planet is the scope. Local, vulnerable human communities are a departure from their traditional practice in addition to the need to acquire different skills necessary for working in those communities. One informant put it in simply: “We have a long way to go.”

Vulnerable Communities Context

A final theme that emerged in the interviews is less straightforward than the others, but described as just as critical to understanding the state of environmental and natural hazard preparations: the various ways in which environmental conditions interrelate or intersect with other issues in the lived experiences of individuals and

households in vulnerable communities. Variouslly termed “intersectionality” or “equitable development,” several respondents among both social and environmental groups emphasized how these policies and programs need to be placed within the greater social context within these communities. By definition, the most climate vulnerable populations in the U.S. are also those that suffer from disinvestment, persistent social, political, and economic disadvantages, and “preexisting deficits of both a physical and social nature.” As one EJ respondent noted:

Trying to disentangle those institutions, practices, policies that place communities at a disadvantage is hard during normal times... Before we even get to resilience, we have to deal with moving beyond survival mode. We work in a lot of communities... and people wonder how your community can be resilient if it doesn't have the basic necessities of life, well-being, healthy, sustainable, livable, etc.?

This was particularly noted with regard to perceived distinctions between climate mitigation and adaptation in particular and between climate change and general environmental conditions, despite polling showing how climate change is prioritized highly in some of these communities. These distinctions were portrayed as ultimately being moot in the eyes of residents that deal with a myriad of social and economic challenges (from racial profiling to persistent poverty, as noted by social groups) to “legacy” environmental problems (such as air and water quality hazards and utility costs by EJ and environmental groups).

Respondents took pains to note that this did not mean that members of communities were not interested or worried about environmental crises. Rather, those crises needed to be contextualized among multiple community concerns and, in turn, appropriately messaged to communities:

[Communities] may or may not understand or care about carbon emissions initially, but they may understand there's a hierarchy of needs. They may have a need for jobs. They may have a need for a manageable utility bill. They may have a need for understanding about asthma or heath concerns.

Several respondents, for example, noted how race as a topic for public discourse and grassroots activism has been elevated in the past decade. In this light, communities view environmental and hazard vulnerabilities as another layer in a historical pattern of intentional disparity. Even positive environmental advocacy or actual changes in communities are occasionally viewed with suspicion, since environmental amenities have often been associated with a lack of access or with gentrification of lower-income communities. For example, one respondent in the Gulf Coast area noted suspicions against “resilience” planning in the New Orleans area given the massive volume of resources and assistance brought to bear after Hurricane Katrina at the same time that the city's African American population continued to be depleted.

When asked about the importance of the environment for programming and other activities, coincidentally, no non-EJ community groups and national civil rights organizations interviewed ranked the issue higher than “important, but not critical.” However, one respondent noted that rankings of any kind were problem-

atic given the multiplicity and interconnectedness of concerns in these communities. A consequence of this has been a backlash against some of the terminology used by environmental advocates to integrate environmental considerations within these communities' perspectives and goals; the most telling example of this reaction was the conscious appropriation and substitution of the term "resilience" with "resistance" among post-Katrina community advocates in the Gulf region.

In this context, most of the respondents in both national and local environmental organizations working in these communities stressed the importance of holistic planning and programming. Even though respondents from these groups ranked environment in general and climate adaptation in particular as highly significant or critical priorities for their missions, EJ groups recognized that their activities are defined by whether and how community members frame their needs. One informant with an EJ background in a large environmental organization noted: "If the community is not interested [in an environmental hazard], you can't force it and we need to respect that."

For these groups, further, polices or programs that can have benefits across multiple outcome areas for community members are the only viable ways in which environmental concerns can be addressed. Their primary task as organizations in these communities is "to help them make a connection with the environmental issue after that understanding [about the issue's effects on them] is made." As multiple respondents noted, some of these interventions ultimately may not be specific to pressing climate vulnerabilities or even environmental hazards in general. Even among groups that try to address multiple disparities including the environment and not selectively prioritize between them admit that: "Some issues get more attention, like criminal justice issues, because [they're] so 'dramatic'."

Beyond the urgency of any specific issue, though, most respondents described trying "to get out [of] the silo approach." Both because of the array of issues that vulnerable communities face as well as the intersection of environmental vulnerabilities with them, EJ respondents in particular noted that there is "no way you can work in a community and only focus on one issue." The consequences of acknowledging and addressing this context appropriately and ethically, however, has led to prioritizing the most impending crisis with whatever resources are available. Future natural hazards and environmental emergencies, then, are not necessarily on the immediate horizon.

Conclusion

This exploratory study corroborates the observations from literature and policy reviews that there are persistent gaps in recent and current programming around future environmental crises and natural hazards among U.S. civil-sector organizations at the national and local levels. Seven primary reasons were noted for this "silence:"

1. The obfuscation regarding climate change's causes that continues to confuse public perceptions in the U.S. and impede either mitigation or adaptation action overall;
2. The current policy focus on climate change mitigation activities over adaptation;
3. The lack of coordination between governmental entities and other funders charged with chronic environmental impacts and the management of acute disasters
4. The under-resourcing of the advocacy groups that are most familiar with the issues and challenges—especially, EJ organizations;
5. The lack of specific and local climate change impact data or information from which to anticipate vulnerability and create actionable programming as well as the capacity of local groups to understand and “translate” environmental and emergency planning data to local communities;
6. The persistent omission of traditionally marginalized populations from the prioritization and decision-making process in environmental politics, especially in the larger, nationally-focused environmental organizations; and
7. The challenge of positioning environmental issues in general—and climate adaptation or emergency planning in particular—within the complex environmental, social, economic, and political context of the vulnerable communities in question.

All respondents noted a combination of these factors as contributors to the current state of educational and awareness campaigns, program activity, and policy advocacy in their organizations during interviews.

However, several respondents also noted a few rays of light among these clouds. With regard to the general political context, respondents noted the increasing polling of U.S. citizens in general—and of disenfranchised communities of color in particular—that suggest an increasing awareness of climate change, its causes and likely effects, and its influence on broader familiarity with the natural environment. Lessons from Hurricanes Katrina and Sandy were also brought up as signs of increased attention to climate adaptation measures, as well as improving linkages between community development, environmental, and emergency management policies federally; one respondent working on emergency management planning noted the “move beyond hazard mitigation and [looking] at long-term solutions” that are both social and physical.

Even in the area of diversity gaps in the environmental communities' staffing and program focus, respondents were clear to mention that “there has been some progress over the last 20–30 years.” Several respondents invoked the broader public discussion about social exclusion, structural racism, and civil injustices over the last 4 years—and the environmental movement's acknowledgement of its internal failings—as signs of a broader societal exploration of vulnerability of all kinds, including environmental ones. Some EJ and national civil rights respondents pointed out that many of the key activists in these cultural and political discourses are young adults—suggesting a not-so-distant opportunity for additional attention and activity in addressing needs in environmentally-vulnerable communities and reinvigorating and redefining the population of organizations that work in them.

As such, the respondents collectively did not suggest that the current state of affairs portends future doom and gloom.

Policy Recommendations

In fact, the only contributing factors for which there was not much stated overt optimism were the organizational and resource constraints that face the community organizations working at the local levels. Four categories of recommendations can be gleaned from the study's findings as well as the literature review about environmentally-vulnerable communities and the current policy scenario.

The first intervention for overcoming the challenges posed by these factors focused on increasing the demographic diversity among staff of the national environmental groups, or expanding the resources and support from leadership in the national groups for internal staff that deal with vulnerable communities (typically, the large organizations' EJ or community initiative offices). The findings from this study would seem to support further diversification within the organized environmental movement's ranks and within its programmatic scope in order to better identify and serve these communities. Likewise, expanding the attention of those community organizers, social advocates, and civil rights organizations that traditionally have not focused on the potential of future environmental crises to affect their constituents is also a likely trend that should be supported by philanthropy and public program funds where active, local groups do not exist. Virtually all respondents stated that meeting these objectives is necessary and feasible in order to bridge the gaps between the two advocacy and service worlds of the environment and social equity.

Increased funding for environmental community groups is a second, and obvious, recommendation. More than a few respondents also noted the opportunities for increased funding opportunities from federal sources, including obvious ones like the EPA's EJ grant program. For climate adaptation in particular, however, other, less obvious sources could also be harnessed. FEMA's mitigation grant programs have typically focused on physical mitigation strategies rather than comprehensive planning that accounts for and involves vulnerable communities. These programs have also received appropriations at levels incompatible with the costs of post-emergency cleanup and recovery.

Beyond money, the federal enforcement of EJ executive orders and civil rights laws in relation to protected classes that typically overlap with environmentally-vulnerable communities has typically been weak and underfunded as well, particularly with regard to requirements to: (1) fully engage all affected parties during the planning for programs and infrastructure; and (2) in considering the unequal treatment or exacerbating of vulnerabilities that are occurring directly as the observed consequences of a program or infrastructure project—and that might occur from it in the future. The support of recent legal rulings with regard to disparate impacts suggests a third potential area for policy intervention and organizational advocacy:

moving beyond ex post legal action after a population's vulnerability has been confirmed to ex ante planning and community engagement for identifying and mitigating vulnerabilities early. FEMA's expanded requirements on states' hazard mitigation plans constitute one ideal channel for this attention. The role of local community groups in planning and larger environmental organizations in litigation in these policy shifts would be critical in this and other place-based plans and infrastructure developments.

To accomplish those activities, however, current groups need more than just funding. The internal capacity issues in organizations, particularly the technical knowledge of grassroots organizations, must also be expanded. As noted by the groups themselves, they typically have to contract out health surveys, soil and water tests, and land use studies, often without the requisite skill to know what to request or how to interpret results. For these smaller community groups, potentially those in the long-serving EJ movement, a dramatically expanded volume of technical resources is required. The fourth category of recommendation, then, revolves around expectations for organizing and program activity that is cognizant of environmental science. In short, an expanded type of environmental community group or environmental community professional is needed.

A "community environmental translator" could bridge technical data, local contexts, and policy savvy in ways that can mitigate future environmental crises, reduce current environmental vulnerabilities, and right past environmental wrongs. The organizations in which they would be housed would need commensurate access to funds to hire technically-proficient and community-sensitive experts, acquire appropriate and relevant scientific information, and draw links between the different planning and policy streams that traditionally perpetuate their constituent communities' vulnerabilities. Some of the respondents noted the existence of a few high-capacity EJ groups, for example, that are already attempting to move in this direction by having experienced science, engineering, and policy analysis staff in-house.

With regard to climate adaptation especially, these currently strapped organizations could then not only identify vulnerabilities, but also begin to pilot program and service delivery in the areas of property insurance, infrastructure upgrades, relocations, water and utility planning, urban and disaster planning—the actions that are notably missing now but desperately needed given environmental legacies and futures. Ultimately, as this exploratory study suggests, the current gaps in the organizations' activities with regard to future environmental crises is not intentional. Regardless, that silence is still deafening.

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Beautiful and Safe Landscapes for Sustainable Disaster Risk Reduction



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Abstract Landscapes are not merely physical resources to be catalogued and managed but are “places with a story, which people take care of and with whom they develop a sense of belonging” (Williams and Patterson, *Soc Nat Resour* 9:507–521, 1996). Efforts to transform environments to reduce disaster risk, if not integrated with the stories and social and emotional conditions of the community at risk, may face opposition, apathy, or lack of political or financial support. At the same time, in this period of dramatic climate change and increasing disaster risks, efforts to produce only comfortable and beautiful landscapes may create potentially dangerous ones. Drawing on studies, land use planning projects, and risk reduction efforts in Norway, the US, the Netherlands, Italy, Hong Kong, and Chile, this essay argues that integrating environmental aesthetics principles, nature conservation, ecologically oriented landscape design, and disaster risk reduction can help communities create and maintain sustainable, safe, and ecologically healthy environments.

Keywords Mitigation · Adaptation · Landscape · Design

Introduction

Human communities’ shaping of the landscape has created functional places for the cultural and material needs of these communities, but has also produced unstable and dangerous landscapes. As humans shape territory to exploit it according to their needs (Gambi 1964), they produce landscapes that facilitate economic activity but can also accentuate natural hazards and the vulnerability of the resident communities. Understanding why individuals and communities shape their territory without considering the risk and the possible consequences of certain choices has long been

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a subject of research for those who study disasters. Among the various explanations of human acceptance of risk is the notion of “bounded rationality”: having to manage a complex situation without knowing all the elements and the possible consequences (the incomplete information framework), individuals and groups seek to achieve satisfactory levels of safety, not necessarily the optimal ones (Alexander 1984; Burton et al. 1978). Mediation between short-term risk and reward depends on many factors, including ethical values and economic considerations in managing resources. Academic debate and public discourse on risk reduction revolve around the circumstances, considerations, and factors that can improve prevention and motivate people to improve hazard-reducing measures. However, an effective scheme of risk management has not yet been reached.

The principles of environmental sustainability are becoming a powerful engine of change in the interaction between human communities and the environment (Camuffo and Soriani 2015; Tinacci Mossello 2008), and various disciplines, including human ecology, landscape architecture, and environmental geography, are exploring the intersection of sustainability and cultural values. For example, the “European Landscape Convention,” adopted by the Committee of Ministers of the Council of Europe in Strasbourg on 19 July 2000, combines the principles of environmental sustainability with the idea of landscape as a “common heritage which cooperates to the development of local cultures and is a basic component of the cultural and natural heritage” (Council of Europe 2000). While there may be disagreements within a community and among various stakeholders on what constitutes a beautiful landscape, conversations about how to shape the environment according to principles of aesthetics and cultural values can be a powerful component of disaster risk reduction activities. Considerations of beauty can help drive the transformation of landscapes, even when it involves significant costs, and stimulate actions to prevent and mitigate risks when purely economic considerations may not. The challenge is to integrate aesthetics in the standards and practices of disaster risk reduction, to be able to create recognizably beautiful landscapes that are also stable and safe. Examples of such integrations from all over the world suggest promising potential.

Landscape as Identity and Common Good

Since its appearance, *Homo sapiens* and their predecessors have changed the environment to extract the resources necessary for survival. The transformation of the environment into functional spaces for social and economic development has led to the creation of places and landscapes which represent the synthesis of natural, cultural and social aspects, a landscape with which a community identifies and develops a sense of belonging (Linehan and Meir 1998). The landscape is therefore a product of historical processes enacted by a plurality of actors (Olwig 2007). In the past, the impact of human activity was likely to allow ecosystems to rebalance natural processes, but, since the industrial revolution, the increasing human ability to

shape the territory has resulted in growing environmental impacts, up to the point where some processes may be irreversible (Goudie 2000). In addition, the pressures of an increasing population and the huge consumption of resources are altering the fragile balance on which the integrity, stability and beauty of the landscape itself is based (Leopold 1949). The growing number of disasters, resulting from extreme natural processes intersecting with vulnerable socioeconomic tissues, is one of the most obvious manifestations of the increased fragility of the landscape, threatening the welfare of present and future generations. In this sense, the landscape becomes the space in which we compare the real with the ideal, its current uses with aspirations for alternative uses (Soja 1996; Zanetto et al. 1996; Soja et al. 2007). The landscape has the dual potential to provoke past memories and to prompt completely new scenarios for the future. However, the transition to a concept of the landscape as a common good requires a definition of the link between sustainable land use, ownership, decision-making and risk reduction (e.g., landscape, citizenship, and democratic participation). Through which instruments and institutions should we manage the landscape? What criteria and models should we use to assess changes in the landscape (Castiglioni et al. 2015)? Important ideas in this debate come from ecology (Troll 1939), aesthetics (Carlson 1977), and environmental ethics (Hardin 1968).

To help integrate these principles, we might first clarify what motivates individuals and communities to take action to safeguard their land. The existing literature on the subject highlights attachment to place (Giuliani et al. 2003; Hidalgo and Hernández 2001; Walker and Ryan 2008; Lokocz et al. 2011), the emotional bond that individuals develop with the environment in which they live and with which they try to maintain a close relationship. Closely related is the perception of a local identity (Sharifi and Murayama 2013; Yuen 2005), in which residents feel part of a place and come to understand the environment as constituting some part of their identity, individual and communal. Going beyond an appreciation of scenic qualities, this sense of place attachment, reflecting emotional and psychological responses to certain landscape elements as well as cultural and personal values, has been correlated with an increased willingness to support conservation efforts and the protection of natural and cultural resources (Walker and Ryan 2008).

New Forms of Territorial Governance

The integration of environmental aesthetics and ethics in the territorial planning and development for risk reduction is relatively recent. One of the earliest attempts at such integration is the study conducted by Kaltenborn in the Svalbard Islands of Norway's Arctic region. This area still contains relatively pristine and undeveloped land, yet increasing commercial and tourist activities are substantially and rapidly changing the environment. To counter these changes, local authorities investigated the community's sense of attachment to the place, in order to define a methodology of environmental impact assessment that—unlike past approaches—was not based

exclusively on economic and ecological factors. In the new model, a socio-demographic component is included to help document and predict the effects of the proposed actions on individuals and groups, and to help analyse how resource use and development affect human relationships and the meaning of a place. Kaltenborn argues that people construct images of places that are connected to their emotions and their history. Kaltenborn's study involved giving questionnaires to the inhabitants of the town of Longyearbyen. To document the residents' perceptions of the naturalness of the Svalbard Islands, respondents were asked to indicate their level of agreement with the statement that Svalbard represents a part of the last great wilderness area in Europe. Kaltenborn studied the value residents placed on naturalness by evaluating its existential value (the value of just knowing that a place/resource exists, even if you have no possibility to access it), use value (the value of real use or access to a place), testament value (the value of knowing that future generations will have the possibility to access a place) and option value (the value of a different use of a place). He also studied their perception of environmental conditions and their behavioural responses to climate change. Faced with possible impact scenarios, such as oil spills or increased tourism, respondents indicated for each scenario if they preferred to move their activities elsewhere, to contribute to solving problems, or to not react at all. The results suggest that residents recognize the importance of the Svalbard Islands for their environmental value; they believe their existence provides subsistence to the current generations and should be preserved for future generations. A strong sense of belonging to place also correlates with an increased willingness in the local population to mitigate or prevent potentially dangerous economic activities (e.g., tourism or oil drilling) to protect the local natural landscape, rather than abandon their lands and move to another place.

Similarly, Walker and Ryan (2008) show how a bond with a particular rural environment motivates residents to support actions to preserve natural and cultural environments. The study is conducted in Monmouth, Maine, a town defined by beautiful vistas and open spaces, forests, orchards, and small villages. Maine rural areas represent an important natural and cultural element and a source of resources for local communities. The exploitation of these resources, however, is making major changes in the landscape, and residents, particularly long-term ones, have begun to develop a sense of loss as agricultural and forest lands are transformed into sprawl residential development. The study conducted by Walker and Ryan included the administration of questionnaires that included photos of typical Maine landscapes, to measure residents' level of attachment to the rural environment, their perceptions of landscape change, and their attitudes towards preservation and land use planning. The results show that those living in the area for a greater time have a greater interest in protecting environmental features (in particular, agricultural landscapes, forests, and cultural elements) from impacts caused by development. The residents were asked to express their opinion about new development in the town, about how and where this development should be directed and what resources should be protected. Higher sensitivity and desire to preserve is found in people with a greater sense of belonging and identification with the place. The authors suggest that

planners should understand this relationship as they design and implement conservation policies that consider the needs and preferences of the community.

Lokocz et al. (2011) carried out a similar study in a rural part of Massachusetts that is undergoing transformation as suburban development expands into and replaces farmland. Lokocz et al. wanted to understand how the residents' sense of attachment to the rural environment affects their willingness to support conservation policies and how the transformation of rural areas into suburban areas affects their sense of attachment to place. The study area includes several towns in the Berkshire Mountains, with a focus on the town of Conway. The study found that Conway inhabitants are very attached to the rural qualities of their town and preserving rurality is very important to them. Long-time residents also stated that they had witnessed great changes in the town due to the construction of new homes that have reduced the rural character of the region, a character which was produced by both cultural and natural features. Cultural factors include the historical built environment, of which the town library, a historic covered bridge, old cemeteries, and a prominent church are few examples. The rural character is also formed by forests with large trees, wild animals, and particular characteristics of the soil; though many of these elements were severely altered during European settlement and resource exploitation in the nineteenth century, they have increased in area and age since agricultural pressures diminished in the twentieth century (Foster and Motzkin 1998). Results show that in general the residents are very willing to conserve the environment, especially natural (rivers, lakes, woods and open spaces) and cultural landscapes (villages, small houses and narrow streets) and limit development in rural areas. The population is, in fact, willing to pay to protect the land, including accepting higher taxes; the sense of attachment to the place is therefore a motivation that influences the propensity of the population to undertake conservation activities.

The "Room for River" project is an example of how the strong bond with a place can promote risk reduction strategies. "Room for River," developed in the Netherlands, has the goal of creating more space for occasional water storage, including constructing side channels. These measures go hand in hand with the restoration of rivers and nature conservation. The work of de Groot (2012) demonstrates how attachment to the river relates to the public perception of flood risk management. The area of study includes two major West European rivers, the Rhine and the Loire, which flow through Germany, the Netherlands, and France. People are asked to respond to written questions about various topics including flood risk management policies, and are asked to compare two approaches to the flooding problem: increasing the lateral space that rivers can occupy during floods (the approach advocated for by Room for River), and increasing the river banks' height. They are also asked about their sense of attachment to their place (investigated as identity, connection, and dependence on place). The flood risk management strategy based on the approach of Room for River is more widely accepted than the purely engineering approach of raising river banks. In addition, respondents in favour of the sustainable management of rivers have been shown to have greater sensitivity to nature, recognizing human systems to be integral parts of nature and taking an

active role in environmental management. This suggests that risk reduction activities may effectively be integrated with efforts to maintain natural landscapes, including collaboration between experts and citizens in the development of protective measures, values, and relationships between human communities and nature.

The Province of Potenza, Basilicata Region, is an Italian territory affected by all the major natural hazards that can create significant impacts on affected communities (Attolico 2014). Basilicata Region has been repeatedly hit by heavy rainfall and, although the measures implemented as a result of an extreme event are generally effective, much more needs to be done in terms of prevention and the reduction of impacts. The use and indiscriminate consumption of the natural resources of the region are contributing to increased risk in the area. To try to mitigate these risks, the Province of Potenza has introduced the concepts of Disaster Risk Reduction and resilience in urban and regional land use plans. To implement these two concepts, it is necessary to put in place a process to engage and educate authorities and citizens, building on the emotional drive that encourages the community to preserve the land for economic but also social, environmental, and cultural reasons. These reasons are included in the plans as integral tools of the local planning process, presenting a new model of interaction with the territory, “*a new way of living in urban/territorial context*” based on better use and government of the territory that combines sustainable development and safety. This approach is based on the use of structural and non-structural actions to be applied at different levels (from the local to the larger regional level), in order to reduce the exposure of people and goods to risks and reduce vulnerability. The innovative aspect of the Province of Potenza plan is involving not only the public and private sectors but also individual citizens in the process of resilience building.

Halfway around the world, Hong Kong offers an interesting example of the integration of urban environmental aesthetics and risk reduction as a strategy in response to the conflict between the conservation of green spaces and urban development. The presence of stonewall trees (trees grown in the stone walls built between 1800 and the beginning of World War II in order to stabilize the slopes against landslides in the city) are an example how nature and culture can be harmoniously inserted into the urban context. The development of the city threatens the preservation of such structures, to which the population shows a strong link (Lo and Jim 2010). To date, the development of the city is run by the central government and the population is not sufficiently involved in urban planning. Lo and Jim (2015) seek to understand the attitude of the population towards the stonewall trees and to the changes brought by development taking place in the official plans and in management practices. The study is aimed at the local population and visitors to public parks where these trees are present to evaluate the difference in the degree of attachment to stonewall trees with locals and tourists. The parameters analysed include the perceived intrinsic value of the trees and the need to protect them, the benefits that can be derived from the presence of trees (cool environment, wind damping), emotional responses, interest in local history, familiarity, and social relations. Residents recognize the aesthetic and historic value of the trees and are alarmed by the damage that urbanization could create, and so recognize their responsibility in the trees’ protection. The

uniqueness and importance of the natural environment in Hong Kong is also highlighted by non-residents' positive perceptions of the landscape. Tourists with a strong sense of attachment to the community show an attitude of solidarity with the people of Hong Kong, expressing their approval for the conservation of the urban and natural landscape. Trees and vegetation taken root on these dry walls, thus, in addition to their functional role in stabilizing the slope, have a cultural and aesthetic value, and are recognized by residents and others as a symbol of the naturalness of the city.

Post-disaster reconstruction may be an occasion in which to integrate aesthetics with disaster risk reduction. During a catastrophic event, the emotional sphere has an even greater value and people's expressed desires to return to everyday life can indicate which environments individuals feel the strongest relationship with. For this reason, different communities have different perceptions about the same landscape and its possibilities of restoration. Emotion-regulation can be used as a link to join the place identity concept with the restoration of the environment (Korpela and Hartig 1996). Islas and Felsenhardt Rosen (2015) study the way people identify the significance of a certain place. The study is conducted in the city of Valdivia, Chile, in an emergency scenario as a result of an earthquake, and is based on Personal Construct Theory developed by Kelly (1991), according to which humans create a series of characteristics in order to understand their environment and make sense of the stimuli to which they are subjected. Residents are asked to take part in interviews with the aim of identifying the urban areas most used by individuals and the community during the post-emergency period. According to the findings from the study, for post-disaster planning of the city of Valdivia it is necessary to provide access to waterways that allow a steady supply of water, to green spaces, and to constructed elements with historical value. Consequently, in the post-disaster reconstruction designers must plan to protect these elements against drastic action that might totally change the urban environment. It also suggests that emotional attachments to the landscape should be considered in restoration plans following a disaster. Landscape beautification, in fact, can help people to recover more quickly, from a psychological point of view, through the restoration of natural elements. The link between urban planning and emotions assumes even greater value in terms of strength and resilience: the presence of natural environments in the city's design may provide the ability to adapt to the occurrence of an event, without profoundly changing the physical characteristics of the environment. The maintenance of the natural characteristics of the city also has a redundancy effect useful for the city itself and the surrounding cities, which can benefit from the services offered by these natural spaces in urban settings if affected by a disaster in turn. Villagra Islas and Felsenhardt Rosen insist on the need to insert in urban development plans tools and guidelines to enable the cities affected by a disaster to be resilient.

The reconstruction project "Borghi Attivi – Statuto Partecipato dei Paesi d'Italia" (Active Villages – Participated Statute of Italian Villages), defined after the earthquake in L'Aquila (Abruzzo, Italy) in 2009, is another example of how environmental aesthetics can be a guideline for the recovery of an entire suburban area. The project is inspired by the English "Village Design Statement" (VDS), which aims at

developing an urban planning tool that preserves the rural character of landscapes and improves their environmental quality. The post-earthquake reconstruction in L'Aquila entailed the creation of new residential areas, completely dissociated from their existing context before the earthquake, in the so-called "New Town," and people started to feel almost strangers in their own house. In response, the "Borghi Attivi" projects seeks to define a participatory reconstruction path, through suggestions from citizens, to ensure that the unique characteristics of the area will be considered, preserved and enhanced in future urban planning. The ultimate goal is to incorporate a collection of the particularities and distinguishing features of each village and its people in an "Atlas of Places," which will be the basis for the drafting of the "Statute of Places." The project started in 2011 and ended in December 2012 and was extended to five rural communities affected by the earthquake of 2009, located in three of the four provinces of Region Abruzzo: Tione degli Abruzzi, Fontecchio, and Pescomaggiore, in L'Aquila province; Civitella Casanova in Pescara province; and Fano Adriano in Teramo province. The aesthetic enhancement of the landscape is a central and common element of the guidelines of the five villages involved in the project. The main guideline identified by the citizens is aimed to recover and improve the historical town centres. In particular, in Fano Adriano, Pescomaggiore and Tione degli Abruzzi, aesthetics played an important role in the reconstruction of the villages. The inhabitants encouraged a reconstruction that includes the maintenance of historical aspects of their towns through the indication of the materials and design that every building should have (doors, railings, windows, gardens, roofs and gates). Another guideline focused on the recovery and reuse of historic homes and old shops and small coffee shops, both in the city centre and in the suburbs. The rural landscape had a central role in defining the local identity, which would also support economic recovery, including the return of the tourist industry. Examples are the small stone huts in Pescomaggiore and dry stone walls in Fano Adriano and Fontecchio. In Civitella Casanova places of worship have been defined as representative elements of the local identity to be protected. The "Statute of Places" compiled in each village has been adopted by the local governments as a guideline for the revival of the five communities.

Another example of the integration of local conceptions of beauty, place attachment, and risk reduction is a master plan for a small town in southern Vermont created by students at the Conway School, a graduate program in sustainable landscape planning and design in Massachusetts (Lague and Smith 2013). In August 2011, Tropical Storm Irene inundated the town of Wilmington (population 2300). The Deerfield River rose 27 ft, destroyed many buildings in the village center, and took one life. The town relies on tourist dollars—skiers and second-home-owners pass through the town on their way elsewhere—and sought the help of the school to create a master plan for a vibrant, revitalized downtown. At the beginning of the design process, the town's government representatives, and many residents, believed the project would focus on simply restoring and beautifying the downtown.

LaGue and Smith conducted analyses of environmental, social, and economic conditions. The village is in a mountainous region with steep and rocky landscape. Water runs off quickly and in large volumes during storms, particularly during the

spring thaw. The village center is at the confluence of the Deerfield River and Beaver Brook and sits largely within the 100-year floodplain. Many buildings in the floodplain (and many of the town's historical structures) have been destroyed or sit partially or fully vacant. The students, in consultation with community members, made a number of recommendations: within the floodplain, they recommended creating flood-appropriate public spaces, reducing impervious surfaces, and increasing stormwater storage capacity; throughout the town, they made the case for new zoning regulations that would encourage dense development to take place, over time, outside the floodplain in an area near the current village center but well outside the 500-year flood zone. Using various criteria developed with the help of the community, the students identified a location for this future village center. They created a master plan that illustrated how such a future center could evolve over time to become a "traditional" New England village: walkable, with a diversity of housing types, attractive to residents and visitors alike. Here, as in many projects in rural and suburbanizing New England (like Monmouth, Maine), planners must use language, concepts, and images that are consistent with how the community envisions itself and its future. This involves engaging in an aesthetic conversation (though it is rarely discussed in those terms), as residents struggle to come to an agreement about their various, multiple understandings of what constitutes the good life, where "good" takes on both aesthetic and ethical meanings. In Joan Nassauer's terms, it is essential to be attentive to *cultural* sustainability, to frame ecologically healthy environments in terms that are familiar and acceptable to human communities: "Landscapes that evoke the sustained attention of people—that compel aesthetic experience—are more likely to be ecologically maintained in a world dominated by humans" (Nassauer 1997, 81).

In another Conway project, students concluded that a coastal town rapidly suburbanizing, where residents were concerned about losing beloved farmland and woods, should consider directing residential and commercial development to an already developed downtown neighborhood—well outside the area projected to be at risk of floods and storm surges as climate changes take effect. If the students talked about "dense development" and "urban form," residents would have rejected their recommendations because the language did not reflect their visions of their landscape, or community. However, when framed as "traditional New England village design" that would create a pedestrian-friendly center where residents who wanted to age in the town, near friends and family, rather than move elsewhere, or where the young people of the town could afford to rent small apartments downtown rather than move to the city, the recommendations became acceptable. In addition, by directing development to such an area, the town could still grow without destroying its farms and forests. Such a strategy was consistent with Nassauer's conclusion that "Policies and strategies, landscapes and technologies should be designed to align aesthetic expectations with ecological health" (82).

Conclusions

Decisions to transform environments, if not integrated into the social and emotional characteristics of the community, may produce comfortable and beautiful landscapes, but potentially dangerous ones. The territory and its natural resources are not raw material to catalogue and manage as a commodity, but are “places with a story, which people take care of and with whom they develop a sense of belonging” (Williams and Patterson 1996). Environmental aesthetics principles should be integrated with ecology and nature conservation (Nohl 1997), and our understanding of the landscape as a common good should be further developed. The changed perception of the role of *Homo sapiens* in the terrestrial ecosystem is central in the debate on environmental and climate change and has brought greater awareness of hazards, risks, and human responsibility in disasters. However, prevention, mitigation, and adaptation activities to reduce disaster impacts are still meagre. The unpredictability of certain extreme natural events (due to our incomplete knowledge of such processes) makes it difficult to justify the costs of prevention and mitigation. Thus, incentives through which we justify and make more acceptable such costs must be devised; possibly blending disaster risk reduction into environmental aesthetics and ethics may provide such allure.

The political sphere should encourage activities to “beautify security” in order to build the safe communities. Security should not be subject to changes depending on the political force in office (both at local and at central scale) but should be guaranteed in any case. Similarly, improving security is also a duty of each citizen and we need to define criteria by which such a right and duty can be expressed. Public debate should play a central role in this discussion. At present, public meetings during which a project is introduced to the community and stakeholders, and opponents and supporters of the project discuss alternatives can be extended beyond landscape beautification to introduce and link disaster risk reduction to the restoration of the landscape for mitigation or reconstruction after a disaster.

At the legislative level, lawmakers should review regulations and codes that guide the reconstruction of historical settlements, especially those that are extremely fragile as a direct consequence of the very elements that constitute their beauty (e.g., their materials and building techniques). The combination of sustainable landscape design and disaster risk reduction can help support communities to take care of their territories in a sustainable, safe and pleasing way. Historical villages and cities could develop in a sort of open-air laboratory and show that an equilibrium between beauty and safety can be reached, demonstrating that is possible to move from an old and catastrophic vision of extreme natural events to one of coexistence and resilience to natural processes.

At present, resources are spent more easily to beautify the landscape rather than to make it more stable and secure. The challenge is, therefore, to insert risk reduction in the environmental aesthetic discourse and vice versa. It can be argued that this is not a new idea. After the earthquake that destroyed Noto Valley in 1693,

Sicily undertook a process of reconfiguring its urban spaces to make them beautiful, useful, and seismically safer.

As with the quest for good and healthy food, perhaps we should pursue “beautified safety” models that, besides safeguarding landscapes from disaster risk, also makes them beautiful.

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Mobilizing Communities to Confront Global Challenges: A Phronetic Inquiry



Philip Barnes and Andrea Sarzynski

Abstract Communities across the globe face myriad and interacting socio-economic and environmental challenges. This chapter evaluates a citizen-led, community-scale response to these challenges offered by the Transition Movement. Phronetic inquiry is used as an analytic framework to answer four value-rational questions posed: Where are we going? Is this desirable? What should be done? Who gains and who loses? The analysis points to the strengths and potential of the Transition Movement for mobilizing a community-scale response to global hazards, but it also highlights possible shortcomings, especially for who gains and loses because anecdotal evidence suggest that Transitioning communities are predominately White, educated, upper-middle class. The chapter empirically tests these anecdotes and finds that Transition host communities in the United States are indeed generally better educated and less racially and ethnically diverse than American communities on average. There is less evidence for an upper-middle-class nature of the Movement in the United States.

Keywords Community · Climate Change · Adaptation · Institutions

Introduction

Communities across the globe face myriad and interacting socio-economic and environmental challenges. The drivers vary widely in scope and duration and range from macroeconomic forces governing capital markets, to geopolitical forces affecting international relations, to extremely localized forces impacting access to community resources such as wells. Responses to such challenges demand action at all levels, and widespread energy has been invested to develop appropriate national and international institutions that target the multiple pillars of sustainable development such as through the United Nation's Development Programme and UN-HABITAT.

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Capacity to address such challenges differs markedly among smaller-scale communities, especially when it comes to preparing for slow-onset hazards such as sea level rise, increasing temperatures, and weather volatility as a result of global environmental change. Recent scholarly and practitioner attention has shifted to the local scale for promoting adaptation to these challenges, with substantial interest in “community-based adaptation” efforts that simultaneously improve the environmental resilience and livelihoods of local communities (Archer et al. 2014; Dodman and Mitlin 2013; Soltesova et al. 2014).

Further research is desired that explores opportunities to effectively increase the “adaptive capacity” of local communities in addressing these challenges, described as “the ability of a system to adjust to climate change; it is thought to be determined by a range of factors including technological options, economic resources, human and social capital, and governance” (McEvoy et al. 2006, p. 186).

In this chapter, we aim to contribute to this ongoing research effort by describing and evaluating the citizen-led, community-scale response provided by the Transition Movement, originally established by Rob Hopkins (2008, 2011a) in Totnes, England, and now present in 1200 communities in 43 countries. As a framework for the analysis, we use phronetic inquiry to answer four value-rational questions posed by Flyvbjerg (2001) for social-scientific research, including: Where are we going? Is this desirable? What should be done? Who gains and who loses? After reviewing the foundations of phronetic inquiry, the chapter moves on to answering Flyvbjerg’s four questions in the context of the Transition Movement’s practice in the United States. The analysis points to the strengths and potentialities of the Transition Movement for mobilizing a community-scale response to global hazards, but it also highlights possible shortcomings, especially for who gains and loses in the economically localized future envisioned by the movement’s participants.

Phronetic Inquiry

This essay utilizes the methodological foundation of phronetic inquiry articulated and refined by the urban planner and philosopher of science Bent Flyvbjerg (2001). Flyvbjerg argues that social science researchers should refrain from efforts to emulate the physical sciences, both methodologically and epistemologically. Whereas the physical sciences create instrumentally rational knowledge, or *techne*, the development and accumulation of knowledge of the social world and the ability of that knowledge to predict social outcomes is limited in subjective disciplines such as sociology, public policy, urban planning, and disaster studies.

Flyvbjerg suggests that social science researchers should reorient their methodological compass away from *techne* and toward Aristotle’s (1973) value-rational concept of *phronesis*, roughly translated as practical wisdom or prudence.

The shift to a phronetic understanding of the social world gives actors a normative decision-making framework that goes deeper than the instrumental rationality of *techne*. Because *phronesis* takes practical wisdom and value rationality as the

points of departure, it can inform individual and collective action toward improved technological, environmental, and social ends. Those ends cannot be known with full certainty, nor will they be agreed upon with the full consensus of all social actors. Yet phronetic inquiry, when conducted with sensitivity and self-reflexivity, can illuminate what ought to be and can equally provide guidance on practical actions that can be taken to achieve desired ends. Relatedly, the validity of a phronetic inquiry is evaluated against the transformation of real world conditions and the charting of alternative courses. Research results must be meaningful to social actors so they can be internalized and implemented to improve conditions (Majchrzak and Markus 2013). Praxis, as opposed to theory, is the yardstick by which phronetic inquiry is measured. It is inherently pedagogical because it links research results and informed practical action (Frank 2012).

The process by which one conducts phronetic inquiry varies greatly depending on the subject (see especially Flyvbjerg et al. 2012) but in its most basic form, self-reflexive and self-critical researchers must ask and answer four value-rational questions: Where are we going? Is this desirable? What should be done? Who gains and who loses?¹ In answering these questions, phronetic researchers spotlight the current social development trajectory and anticipate eventual outcomes if the status quo is maintained. Researchers then pass a judgment on the overall desirability of those outcomes, investigate and analyze practical strategies for improving future conditions, and highlight the likely benefits and costs of pursuing those strategies, up to and including the distribution of benefits and costs across a community of social actors. Fundamentally, the four value-rational questions involve similar political judgments and insights required to conduct public policy analyses (Morçöl 2002). The output of the inquiry is also similar to policy analysis, namely a compelling and persuasive case for change coupled with a set of recommended, practical, and implementable steps (Bardach and Patashnik 2015; Majchrzak and Markus 2013).

Answering Flyvbjerg's Questions

Flyvbjerg's series of four questions lends itself to utilization as a novel method for evaluating local community responses to larger, systemic forces and challenges. The Transition Movement is particularly well suited as a subject of phronetic inquiry for several reasons. First, as will be described shortly, the Transition Movement is a network of disaggregated community initiatives that intentionally and prefiguratively adapt to global hazards. Second, these groups prioritize practical action above discourse. Third, the groups have been criticized by observers as being populated

¹Flyvbjerg (2001), summoning Foucault and Bourdieu, recommends an extended version of the fourth question: Who gains and who loses, and through what power relations? Although our analysis is not dismissive or ignorant of power relations, we chose to ask and answer the shorter version due to space limitations. A full treatment of winners and losers that incorporates an assessment of power relations requires a larger discussion than can reasonably be offered here.

with predominately White, highly educated, upper-middle class members (Alloun and Alexander 2014; Chatterton and Cutler 2008; Seyfang 2009). These critiques directly raise the justice-related question of “Transition for whom?” The Transition Movement, its practice, and existing critiques over the distribution of costs and benefits square neatly with Flyvbjerg’s four-question framework of phronetic analysis. We now turn to those questions.

Where Are We Going?

Four converging environmental, economic, and political challenges facing the United States give a strong indication of our present development trajectory. First, anthropogenic climate change impacts are already being felt and pose extreme long-term risks that threaten the destabilization of critical human and natural systems (IPCC 2014; Melillo et al. 2014). Moreover, these impacts vary according to geographic location, socio-economic status, and race, thus raising questions of social equity (Hoerner and Robinson 2008; Lynn et al. 2011). Second, the financial crisis that unfolded in 2007–2008 and the subsequent Great Recession demonstrated the complex and perhaps unknowable interplays in global markets and the vulnerability of economic models and technologies such as financial derivatives and collateralized debt obligations to widespread, systemic failure (Colander et al. 2009). Third, while the American macroeconomy has rebounded since the financial crisis, 91% of income growth in the United States from 2009 to 2012 accrued to the top 1% of earners and current wealth inequality is at a level not seen since the 1930s (Saez 2015; Saez and Zucman 2014).

When race is considered, wealth inequality is widening between White, African American, and Hispanic families in the post-Great Recession “recovery,” with the latter two groups’ net worth decreasing since a mid-2000s peak (Kochhar and Fry 2014; Pfeffer et al. 2013). Fourth, supra-local political and regulatory institutions are largely captured by this concentrated wealth and power, much of which resides with financial and fossil fuel interests that would be harmed by comprehensive reform efforts (Baker 2010; Klein 2014; Stockman 2013). Recent investigations reveal that the judicial system is becoming overwhelmed and influenced by moneyed, special interests (Gass 2014; Lipton 2014). In 2010, the fourth challenge was further embedded in America’s governance landscape after the US Supreme Court’s *Citizens United v. Federal Election Commission* decision for the plaintiff, which solidified the fusion of the pecuniary and political spheres into an unencumbered, undemocratic, crony capitalist system of campaign finance (Lessig 2011).

Meaningful societal interventions are needed to address these challenges. One option is to position the United States as a proactive leader in domestic and international climate change mitigation, as a nation whose economy is not colonized by the accelerating globalization process made possible by a periodically dysfunctional techno-financialization model, and as a country where equality of socio-economic opportunity is transformed from hollow rhetoric into reality for millions of margin-

alized individuals. Practically, however, because of the fourth challenge, comprehensive policy responses that might otherwise catalyze transformative change are stymied by a political economy of wealth and power that strategically constructs and diffuses doubt among citizens on the necessity and efficacy of government intervention (Dunlap and McCright 2015; Oreskes and Conway 2010; Rayner 2012). Indeed, we saw immediate political resistance to President Obama's support for international climate action at the United Nations' Conference of Parties meeting in Paris in late 2015, and now refreshed hostility owing to the election of Donald Trump. In this polarized environment, policy non-decisions are frequent and progress toward resolution of the challenges struggles to gain traction. In those instances where policy interventions do materialize, the outcomes consistently favor elite interests over those of most American citizens, further entrenching socio-economic inequality and exacerbating the most pressing global challenges (Gilens and Page 2014).

Is This Desirable?

Taken as a whole, the United States is facing converging and intensifying challenges – climate change, macroeconomic failure, and extreme socio-economic inequality – and existing public and private sector institutions are unlikely to address these “wicked” problems in an effective, comprehensive way (Rittel and Webber 1973). This is not a cheerful diagnosis. It points to an impending hybrid crisis scenario, one that could materialize slowly over the course of many years (as with the slow, creeping onset of climate change and socio-economic inequality), or one that could arise suddenly with little or no advanced warning (as with a techno-financial crisis and subsequent economic collapse). In either case, if the status quo outlined here continues to fester, both human and natural systems will experience significant hardships. Clearly, this is not a desirable development trajectory and some form of proactive response will be required to chart an alternative course.

What Should Be Done?

Answers to the question of what should be done depend upon the scales at which change occurs. Comprehensive policy change at the national or state level could materialize if the American public rallies around a political message and resoundingly rejects the status quo at the voting booth. Indeed, the electorate may be in the midst of such an ideological shift, although the final direction of the shift is far from certain. For example, the emergence and growing influence of the anti-establishment Tea Party across various scales of governance and the electoral success of Donald Trump is an indication that members of the ultra-conservative and/or populist flanks of American's political spectrum are rebelling against longstanding Republican conventions inside Washington DC and state capitol buildings.

Populist resentment of the status quo is also rising on the left flank, with rhetoric reminiscent of Occupy Wall Street reverberating through the Democratic electorate.

What this indicates, unfortunately, is that the American electorates' values are diverging further apart, and an ideologically polarized environment is not a solid foundation for meaningful political negotiation and compromise over important issues. From this brief analysis we may conclude that effective national and state-scaled policy interventions to address the four challenges highlighted above will likely be slow to materialize and implement. Even though anti-establishment leaders swept to power in 2016 through a populist wave, their policy prescriptions for rescuing our faltering socio-economic and climactic systems would encounter strong opposition from the opposing ideological flank.

Given that virtually all top-down policy solutions to the urgent and converging challenges will face extremely stiff political headwinds, it is worthwhile to investigate autonomous, bottom-up, and localized strategies for change that operate separately from formalized governance structures. Debate will forever continue on the most appropriate scale of problem-solving as well as the efficacy and ability of local, independent social action to aggregate and ameliorate global challenges such as climate change (Dryzek 2013). It is not our intention to engage in that debate here, but rather to identify opportunities for grassroots community mobilizations that are able to function parallel to institutional and administrative systems, thus promoting the adaptive capacity of local communities.

Toward that end, we will examine one such mobilization that has a well-defined identity and is growing in popularity in the United States: the Transition Movement (or simply Transition). The Transition Movement was selected above other grassroots actions, such as communes and other forms of counter-cultural resistance, because it recognizes similar converging challenges and presents a coherent and comprehensive strategy for local community mobilization and action. The Transition model is therefore designed from the outset to proactively engage communities in a collective response to the current development trajectory.

History and Current Status of the Transition Movement

The Transition Movement is a bottom-up, citizen-led social movement that offers a consistent definition of the challenges facing all communities and a belief that substantive economic, political, and technological change is not only necessary, it is quickly becoming inevitable (North 2011; Seyfang and Haxeltine 2012). For Transition Movement members, there is an overwhelming consensus about where community development should be heading. Equipped with this conviction, the movement's activists are able to anticipate and engage in the prefigurative practice of creating their desired future. As a grassroots community-based social movement, the Transition Movement encourages all communities to seriously consider the

major global challenges and implement local, contextually appropriate development strategies in response.

More specifically, the Transition model's community development strategy is designed to confront the implications of three exogenous problems: peak oil, climate change, and macroeconomic dysfunction. The movement originated in Totnes, England through the sustained effort of a small group of residents. Rob Hopkins is the model's leading architect and most visible figurehead, and he was an influential member of that core group. Hopkins, a permaculturalist, designed Transition to reflect permaculture principles and in 2008, he published the movement's guiding document, *The Transition Handbook: From Oil Dependency to Local Resilience* (Hopkins 2008). *The Transition Handbook* discusses the community-level implications of peak oil and climate change and it offers a set of local development guidelines for communities to follow to adapt to peak oil and climate change impacts.² The book recounts events in Totnes where, in 2005, the core group of activists began to raise awareness among the town's residents about the threats peak oil and climate change pose to the community and what, if anything, the residents could do to proactively mitigate those threats and adapt to the consequences. After 8 months of awareness raising, which included film screenings and talks on peak oil and climate change, the group decided there was sufficient community and local government motivation to act and in September 2006 the participants anointed Totnes with the title of "Transition Town Totnes" (Hopkins 2008). Afterward, community members active in Transition Town Totnes began to reshape a number of different aspects of social and economic life in the town. Residents planted almond and walnut trees on public land to enhance food security and established a local currency, the Totnes Pound, in an effort to recirculate economic activity and value within the community.

At the September 2006 launch of Transition Town Totnes, a public meeting was held in the Totnes Civic Hall to celebrate the event. In attendance were residents from the nearby municipalities of Falmouth, Penzance, and Lewes who returned home with an eye to adopt the Transition model in their communities. Soon afterward, Transition Town Totnes leadership began receiving enquiries from other communities. A decision was made to create Transition Network, a central resource and support hub for communities looking to start a local Transition group, or what is called an "initiative" (Hopkins 2011a). The Tudor Trust offered startup financial support to Transition Network and funds were used to rent a small office, hire an office manager, create a website, and write an information and start-up guide for communities (Transition Network 2013). Transition Network organizers planned training sessions to help communities successfully navigate the early stages of initiative formation and soon after, new initiatives formed in other towns and cities

²The collapse of global financial markets in 2008 occurred after *The Transition Handbook* was published so the three forces the Transition Movement model confronts today was a dual threat (peak oil and climate change) when the movement formed in 2005. The dysfunctional macroeconomy force is a post-2008 addition to the movement's interpretation of why the current trajectory of economic, political, and technological development cannot be sustained indefinitely.

throughout southern England (Hopkins 2008, chapter “[The Emergency Manager as Risk Manager](#)”).³

After publishing *The Transition Handbook*, awareness of and interest in the model began to spread beyond England. Transition initiatives formed in Austria, Canada, England, Germany, Ireland, Italy, the Netherlands, New Zealand, Scotland, South Africa, Spain, Sweden, the United States, and Wales (Transition Network 2013). Over time, national coordinating hubs and training courses were developed in these countries to support communities interested in the Transition Movement model. What began with Transition Town Totnes in 2005 morphed into the wider Transition Movement in a relatively short time. As of November 2014, nearly 1200 communities in 43 countries have adopted the Transition Movement’s development strategy (Transition Network 2014).

While the Transition Network and the national hubs offer support to communities, they refrain from managing individual initiatives (Hopkins and Lipman 2009). A core tenet informing governance of the wider movement is that each initiative is unique and contextually grounded so there is a strong emphasis on affording each community the space and freedom to determine its development pathway (Seyfang and Haxeltine 2012). Nevertheless, all Transition initiatives are encouraged to adopt several best practices such as developing plans to reduce energy consumption and creating working groups that focus on local food security, local economic revitalization, energy conservation, and mental healthcare. The movement takes pains to be open and inclusive so that any community member who wishes to become involved feels welcome to join an initiative or start one if no initiative is present in their community.

In the United States, initiatives typically form in smaller towns or medium sized cities, although some initiatives, such as Boulder, act as regional coordinating hubs for surrounding Transition groups. At the time of writing there are 160 recognized initiatives in the United States, all located in the contiguous 48 states (Transition US 2015). The initiatives are located in communities ranging in size from just 152 in Julian, Pennsylvania, to more than 3.8 million in Los Angeles. In total, the American Transition initiatives are located in communities including 23 million residents, as of 2010 (Sarzynski and Barnes 2015). The majority of initiatives are located within the Northeast and Western regions, although the movement has diffused throughout the country (Fig. 1).

³In the early days of the movement, the phrase “Transition Town” was used but this wording quickly became problematic when larger, more metropolitan communities located in places such as Brixton chose to adopt the model.

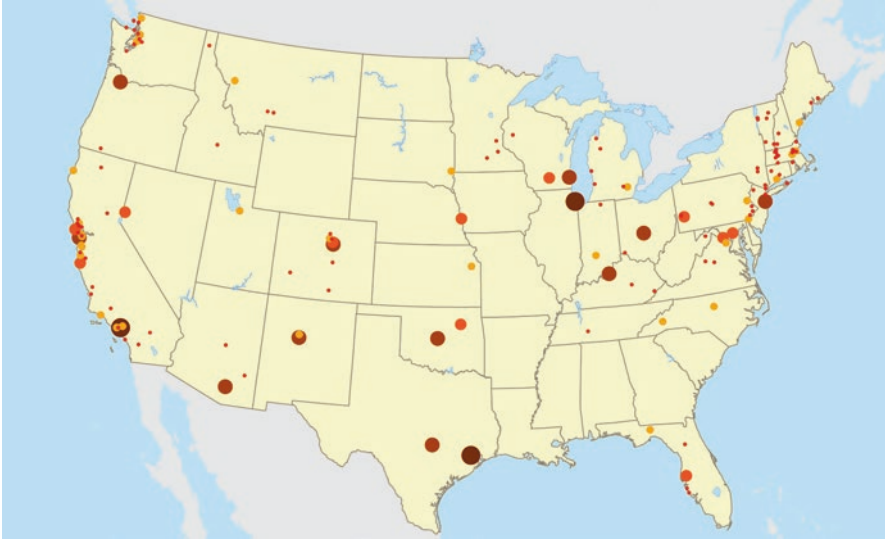


Fig. 1 Transition Initiatives in the US (dot size varies with the size of the community)

From Theory to Practice

The Transition Movement's three major concerns – peak oil, climate change, and macroeconomic instability – are all exogenous forces that local communities have little capacity and power to control. The movement and its members are skeptical that governments will formulate effective policy solutions in a timely matter. A popular expression among Transition activists is that “if we wait for governments, it will be too little, too late.” The implication is that peak oil, climate change, and macroeconomic dysfunction are inevitable and non-negotiable, but what communities can do is proactively prepare themselves for the impacts of scarce and expensive fossil fuels, a climate system that is a significant socio-ecological stressor, and an economic system that exhibits volatile and uncertain behavior.

Distinct elements of a neo-Malthusian “limits to growth” worldview motivate the Transition Movement's community development model (Daly 1996; Dietz and O'Neill 2013; Meadows 1972). At the systemic level, peak oil, climate change, and macroeconomic instability imply that the petro-powered, globalized, growth-dependent socio-economic system cannot be sustained. Peak oil and climate change represent, in the starkest terms, limitations to business as usual and the movement anticipates an eventual reversal of fossil fueled globalization and contemporary community development processes, which most American communities currently depend on to satisfy their basic material and economic needs. Macro-level processes that can no longer be taken for granted include, but are not limited to, the production and supply of raw materials, supply chains that move those materials around the planet, just-in-time manufacturing, the international bulk transportation

of consumer goods, and the exportation and sequestration of waste products following consumption (Curtis 2009; Heinberg 2004). At the community level, other practices are called into question such as long auto-centric commutes, sprawling development patterns, and materialistic high consumption lifestyles (Hamilton and Denniss 2005; Wheeler 2013). Post-industrial education and the intellectual constitution of America's workforce, which has undergone a massive shift from craft- and technical-based vocational training toward a service-based "knowledge economy," is also threatened as many individuals lack practical skills to meet their or their neighbor's basic material needs (Levesque et al. 2008; Tuma and Burns 1996).

From the Transition Movement's point of view, community life cannot continue and must adapt to a future low-energy reality. The local community is viewed as the most appropriate scale of action for several reasons, one of which is that catalyzing change in the community is seen as more feasible than state or federal levels (Aiken 2012). It is a scale at which people are deeply invested in their everyday lives, and consequently a scale at which social giving and mutual aid frequently occur in times of great need (Solnit 2010). The local community tends to be smaller and more homogenous, promoting trust, reducing transaction costs of organizing, and making collective action more likely (Olson 1965). But there is also a geographic imperative to the local community given the expected decline of petro-powered globalization. The community scale will become, by necessity, the scale upon which people will increasingly depend to satisfy most of their material needs.

Socio-economic localization is a core objective of the Transition Movement's community development efforts (Barnes 2015b). Localization helps their communities become as self-reliant as possible in many of their basic material needs such as energy, food, transportation, and housing (Bailey et al. 2010; North 2010). It also demands greater attention to local governance and decision-making systems. While localization is intended to shrink the spatial footprint of a community's socio-economic activities, it should not be taken to the logical extreme of complete self-sufficiency. Hopkins (2008, p. 55) is clear that full enclosure – where "we put a fence up around our towns and cities and refuse to allow anything in or out." – is an unattainable and undesirable situation.

Transition initiatives engage in various projects and activities to prefiguratively prepare for and adapt to a localized lifestyle. In a recent survey of US Transition initiatives, many expressed concern for their current and future ability to satisfy their most basic needs, for instance food needs (Barnes 2015a). Nearly all American initiatives are taking steps to enhance local food production, whether through the creation of community gardens (Amherst, MA; Anacortes, WA; State College, PA), raising backyard hens (Sarasota, FL; State College, PA; Venice, CA), starting farmers markets (Bellingham, WA; Media, PA), or developing seed sharing groups (Carnation, WA; Salt Lake City, UT; Richmond, CA; San Francisco, CA; Sebastopol, CA). Initiatives have taken steps to reduce energy consumption and localize renewable energy production. Holding home weatherization workshops (Media, PA; Sarasota, FL; Woodstock, NY), as well as project managing and marketing Solarize programs (bulk community purchases of home solar systems) are popular activities with initiatives (Staunton, VA; Greenfield, MA; Media, PA).

The Transition movement aims to localize economic transactions while simultaneously building interpersonal relationships between community members, and to that end a number of initiatives have created Time Banks (Albany, CA; Media, PA; Aromas, CA; Missoula, MT; Northfield, MN; Ridgway, CO; Anacortes, WA; Vashon, WA). With Time Banking all participating community members register, on a centralized website, the personalized services they are able offer to other members of the community. When a Time Banker is in need of a particular service available on the website, they make contact with the individual and request assistance, which usually requires face-to-face interaction and relationship building. Afterward, in exchange for performing 1 h of service, the individual providing the service is subsequently entitled to 1 h of service offered by another participant in the Time Bank. No money changes hands when an exchange occurs and all participants' time and labor is valued equally: 1 h of cabinetry work is equivalent to 1 h of walking someone's dog. As an essentially localized economic system, Time Banking is a free flowing inner-community service exchange, organized through a central accounting platform to keep track of hours banked and owed, and it facilitates inter-personal interactions and social capital formation between participants (Seyfang 2004).

While the Transition Movement stresses the importance of local economic self-reliance and service exchange, it recognizes a major internal barrier to achieve this outcome. Hopkins (2008, pp. 98–99 and 166) notes that, “it is no exaggeration to say that we in the West are the single most useless generation (in terms of practical skills) to which this planet has ever played host. . . [W]e no longer have many of the basic skills our grandparents took for granted.” Many communities currently lack the knowledge, skills, or capacity to create the localized, low-carbon, economically vibrant future that is envisioned. Therefore, a key process in each initiative is the “reskilling” of community members. Reskilling is both the teaching and learning of knowledge and skills used to produce and create goods and services, all without the added benefit of large fossil fuel energy inputs (Hopkins 2008, 2011a). In practice, any community member possessing practical, useful knowledge and skills required to produce a good or service – for example the knowledge and skills to produce food – freely shares their insights with other community members. On the recent survey of US initiatives, half of the respondents stated their initiative currently advances the reskilling process through multiple methods and settings, with another eight initiatives planning to do so (Barnes 2015a). Workshops focusing on one particular skill, demonstrations, one-on-one tutoring sessions, and reskilling fair and expo formats are all used by Transition initiatives. Popular skills that are shared between community members include gardening and food production, food preservation techniques such as fermenting and canning, beekeeping, animal husbandry, rainwater harvesting, vernacular architecture and building construction, bicycle maintenance and repair, sewing, mending, darning, wool spinning, soap making, mental and physical health care, and residential home energy auditing. Reskilling develops capacity for localized self-reliance, and like Time Banking it connects people with each other and builds mutually beneficial interpersonal relationships and social capital.

Despite scepticism of the effectiveness of political action, Transition initiatives in the United States are politically active and involved in local governance (Barnes 2016). Local regulations and ordinances limit some initiatives' ability to localize their economies, such as restrictions on backyard hens, prohibitions against edible plants and trees in public spaces, and bans on small structures such as free library huts. Some initiatives are therefore lobbying local governments to modify or eliminate restrictions that limit economic localization (Mankato, MN; Culver City, CA; Charlottesville, VA). In other instances, Transition activists are gaining access to local decision-making bodies such as councils and commissions with the intent to develop a more permissive policy environment for their community (Santa Monica, CA; Longfellow, MN; Montpelier, VT; Fairfax, CA). Initiatives are active with local urban planning efforts and are participating in the public engagement stages of comprehensive redevelopment plans (Port Townsend, WA; Portland, OR; Anacortes, WA; Asheville, NC). Through design charrettes, visioning sessions, and planning task forces, initiatives have advocated planning consultants and commissions for improving non-motorized transportation infrastructure, increased use of and access to public space, land for community gardens, and incentives for renewable energy development. Such activities blend the resources and interests of Transition members with that of authoritative governmental institutions, generating examples of "civic capacity" where both the desire and capacity to act are joined in pursuit of common goals (de Souza Briggs 2008).

Who Gains and Who Loses?

Like the wider environmental movement, individual Transition groups have received criticism for being populated by a narrow socio-economic and racial demographic: highly educated, White, and upper-middle class (Alloun and Alexander 2014; Chatterton and Cutler 2008; Seyfang 2009). This charge, which has so far been based on anecdotal evidence rather than careful analyses, directly raises the justice-focused question of 'Transition for whom?' If Transition communities and a narrow demographic band are taking an advanced position for a low-energy, resilient future, the less well-off may continue to struggle with systemic marginalization, vulnerability to exogenous forces, and unhealthy environments. One must therefore take seriously the possibility that Transition initiatives could further entrench present inequities if the movement is indeed populated by a privileged, White, upper-middle class.

To verify anecdotal reports of Transition initiative demographic qualities, we analyzed census data of the cities and towns where the 160 US initiatives are located. The analysis is limited because it examines the characteristics of host communities rather than of participants in each initiative, yet it gives a reasonable picture of demographic features of Transitioning communities. Indeed, our review finds that the host communities are generally more White, less Hispanic, and with fewer foreign-born residents on average in 2010 than the United States as a whole (Sarzynski and Barnes 2015). The host communities also have generally smaller

households on average, suggesting an older age distribution, and were better educated with both higher rates of high school graduation and of post-secondary education. Thus, we conclude that the Transition host communities are generally better educated and less racially and ethnically diverse than American communities on average.

Nevertheless, we do not find as much evidence of the upper-middle-class nature of the Movement, since the host communities on average look much like the rest of the United States in terms of poverty and household income (Sarzynski and Barnes 2015). Some communities do have extremely high household incomes, such as the Transition communities in Wayland outside Boston, Hastings-on-Hudson outside New York, and Palo Alto outside San Jose. Yet other communities have substantially lower than average income and higher than average poverty rates, including State College, Pennsylvania, and Romney, West Virginia. Indeed, our analysis finds that there may be five distinctive types of Transition communities within the United States according to their socio-demographic diversity and economic capacities. Only one cluster of 23 communities had relatively low racial and ethnic diversity and somewhat higher than average economic capacity, as was expected based on prior literature.

The economic diversity among American Transition communities suggests that the movement is capable of benefiting not just the residents of elite suburbs but also diverse and less-resourced communities throughout the country. We suspect that the benefits of the Transition movement may extend most favorably in communities where traditional resources are absent and community-based development strategies are most needed to promote adaptive capacity. Notably, those Transition initiatives with economic programs such as Time Banking, swapping, and collaborative consumption tended to be found in host communities with lower economic capacity than other host communities, suggesting that those activities might be used to compensate for a smaller resource base (Sarzynski and Barnes 2015). By contrast, the initiatives currently planning to implement local food activities are located in host communities with higher education and economic capacity, on average, than host communities not participating in such activities, raising again the question of “Transition for whom?” Several initiatives have narrowed their efforts to a select few activities such as local food and reskilling, abandoning efforts such as energy descent planning and psychological support groups intended to ease participants into a lower-energy lifestyle.

Discussion and Conclusion

Having answered Flyvbjerg’s four basic questions, we are now able to better evaluate the Transition Movement, its development practice, and offer recommendations to improve its performance. As a bottom-up community development model that operates parallel to macro-level processes and systems of governance, the Transition Movement is positioned to respond to three of the four converging environmental,

economic, and political challenges facing the United States, namely climate change, global techno-financial failure, and electoral and regulatory capture. Initiatives are explicitly motivated by the threat of climate change (as well as peak oil and macro-economic instability) to localize their economies and satisfy many of their immediate needs. Participants are not waiting for state and federal-level elected representatives and public administrators to resolve these challenges, instead opting to proactively and prefiguratively create a more sustainable and climate adaptive community development framework. This enables Transition's proactive, grassroots localization strategy to bypasses the political polarization and gridlock experienced at higher scales, and it places communities in a more resilient position against the threats posed by climate change, techno-financialization, and political capture.

However, our analysis of US initiatives' demographics suggests that the challenge of development inequities remains exposed. Part of this is likely due to the fact that Hopkins' (2008, 2011a, b, 2013) writings tend to avoid overt judgments of just development outcomes and instead focus on de-politicized expressions of environmental quality and community resilience. Yet we argue that equity should become a core tenet of the movement and the US Transition Movement should aim to broaden its membership to communities of color and ensure that the benefits of its development strategy are more evenly distributed. To improve its performance going forward and to ensure a fairer distribution of costs and benefits, we recommend that the Transition Movement and its followers revisit the model's permaculture roots and embed the ethical precepts of "People Care" and "Fair Share" into its adaptive strategy by emphasizing just community development outcomes (Holmgren 2002).

Encouragingly, there is some indication that this process is underway. Recently, the United States Transition Movement has engaged in critical self-reflection and actively promoted community development outcomes to marginalized groups. For instance, Transition US (TUS), the national coordinating hub of US initiatives, publicized and sponsored a January 29, 2015 TeleSeminar entitled "Diversity and Social Justice; Transition for Whom and to What End?" that allowed participants to share concerns about demographic homogeneity and their efforts to combat the issue. TUS held another TeleSeminar on November 4, 2015 entitled "Just Transition" that explored similar issues. We strongly recommend that these conversations continue.

At the level of individual Transition initiatives, some groups are making efforts to ensure that the benefits of their community development projects assist those who are most in need. For instance, the Pasadena, CA initiative is working with the city's government to update its urban forestry plan and prioritize the planting of fruit and nut trees in parts of the municipality that are underserved by fresh food retailers. In Media, PA, the initiative created a FreeStore, which is like a Salvation Army or Goodwill except there are no prices for items – everything is donated and taken freely. When the project was created, the members of the group consciously designed social justice into the FreeStore model so that it would benefit low-income residents of the community. Another example of Transition projects benefiting those in difficult circumstances is the Time Bank, which can be useful for unemployed individuals. Some Time Banks require a sign-up fee that may be waived if an indi-

vidual is experiencing economic hardship. These projects and actions that invite participation from marginalized individuals are part of a practical approach to expanding the socio-economic and racial character of demographically homogeneous initiatives, and they should continue to be encouraged and supported by the movement.

Still, while these efforts are noteworthy, initiative diversity is slow to materialize. There are, however, further steps that can be taken to advance the Transition model beyond the current demographic representation. For instance, the international Transition Network might expand its supporting materials by drafting a “Transition Equity Guide” and training course on operating in and reaching out to diverse and low-income communities. Working groups might be promoted within each initiative that address equity and inclusiveness, and a sub-network of initiatives might be constituted to promote social learning within the network communities on best practices in this realm. Indeed, the network structure of the Transition Movement may be one of its greatest assets – expanding social learning opportunities and extending the resource base of individual initiatives, while also leveraging the bottom-up efforts of individual participants into a more impactful climate adaptation and community development strategy. Looking toward the future, and considering the challenges faced by communities, local grassroots campaigns working together through such a network will likely become increasingly important.

We conclude by offering suggestions for further inquiry for researchers looking to contribute to the rapidly growing literature on the Transition Movement. Now that the movement is over 10 years old, it would be worthwhile to reassess the Transition Movement’s impact and development efforts in light of the experience of over a thousand communities worldwide. Which local strategies are easiest to implement, are most effective, and most popular among participants? Which strategies have been harder to sell and may be worth reconsideration? How have initiatives built cross-sectoral support for their efforts, including collaboration with the private sector and government? How can Transition initiatives become community partners for emergency managers, urban planners, and economic development coalitions? Answers to these questions could help improve the performance and efficiency of Transition initiatives, the wider Movement, and would create more resilient, sustainable communities.

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Sleepwalking into Disaster? Understanding Coping in the Broader Field of Mental Barriers. Examples from the Norwegian Arctic in the Face of Climate Change



Anna Lena Bercht

Abstract Despite being one of the most urgent societal tasks of the twenty-first century, public engagement with climate change remains low. Mounting research illustrates, however, that there is a significant and growing number of local citizens who are informed about climate change, appraise it as a current, visible, local and personal threat, and express concern – but they fail to act. What prevents them from translating their concern into more widespread and proactive coping action? Structural barriers such as a lack of financial capital and outdated policies are a necessary but insufficient explanation. New perspectives are needed that integrate the role of mental barriers and insights from cognitive psychology and neuroscience into climate adaptation debates and nudge thinking in new directions. Against this background, the present chapter firstly seeks to advance the discourse on coping by discussing (Lazarus and Folkman's, Stress, appraisal, and coping. Springer, New York, 1984) prominent schematization of coping, appraisal and emotion from psychology. Key conceptual aspects are highlighted that help to explain the prevailing dissonance between concern and appropriate climate action. Secondly, based on these outlines and underpinned by my own empirical data on Arctic change in Norway, examples of coping in the broader field of mental barriers and their crucial relevance for practice are illustrated. The aim is to demonstrate the necessity and benefits for intellectual and policy systems of considering intrapsychic processes in climate adaptation. In this regard, selected policy considerations are discussed to indicate the possible scope of action and policy designs.

Keywords Climate Change · Adaptation · Arctic · Coping · Mental barriers · Fisheries

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Introduction

By the end of this century, the Arctic will be a very different place.

Temperatures are warming more than twice as fast as they are for the planet as a whole.
Sea ice is melting. Arctic wildlife and people are beginning to live altered lives.
(WWF Global 2013)

No no, I don't think about climate change because it will be a catastrophe.

(Own interview with a fisherman from the Lofoten Islands, Norway 2015; see section on "Empirical Data Collection")

We suggest that cognitive appraisal is the mediating process that sets the whole train of psychological events into motion, including coping activity.

(Lazarus and Folkman 1984, p. 284)

Addressing global climate change and its impacts is undoubtedly one of the most urgent tasks and serious challenges facing humankind, policymakers and the science community today. Despite the fact that global climate change is a very complex, multifaceted and place-specific phenomenon, there is now broad-based consensus among nearly all scientists, scientific organizations and governments around the world that the current and projected increase of the earth's average surface temperature is largely due to anthropogenic greenhouse gas emissions and constitutes a significant threat to the planet and all human societies. The very recent and historic Paris Agreement under the umbrella of the United Nations Framework Convention on Climate Change (UNFCCC), negotiated in Paris in 2015 and initially adopted by all 195 countries, marks this joint awareness. It is the first-ever universal, partially legally binding global climate deal, demonstrating the unprecedented global and political acknowledgement of climate change as a common concern for humankind and the willingness of the world's nations to take common and more radical action.

However, as research illustrates, not only scientists, politicians and NGOs but also a significant and growing number of local citizens are informed about global warming processes, believe global warming is happening and consider it an important problem to be addressed. According to the latest international Pew survey, conducted in 40 countries in 2015, most nations polled believe global climate change is a pressing concern.¹ Majorities in all 40 countries view climate change as a serious problem, and a global median of 54% regard it as a very serious problem (Pew Research Center 2015). A median of even 78% support their country's commitment to reduce greenhouse gas emissions as part of the Paris Agreement. Moreover, climate change is not considered a distant threat. Across the nations surveyed, 51% think people are already being harmed by climate change and another 28% expect harm in the next few years. Likewise, the recent Yale study on "Climate Change in the American Mind" reveals that the number of US-Americans who think global warming will cause personal harm has increased substantially from 36% in spring

¹The climate change concern index, applied in this Pew study on global public opinion about climate change, is operationalized by three survey questions that ask about the extent to which people believe global climate change is a serious problem, is harming people now and will impact them personally at some point in their lives (Pew Research Center 2015).

2015 to 42% in autumn 2015 (Leiserowitz et al. 2015). There are still crucial differences between regions and countries and within nations, and public opinion still lags behind scientific conclusions (e.g. due to poor education, partisan-ideological or religious divides, perceived well-being, cohort influences). For instance, climate change concerns are more prevalent in Latin America and sub-Saharan Africa than in the USA and China, and in general the political left is much more likely to view climate change as a major threat than the political right (for more sustained reflection on these interrelations see Gallup 2015; Pew Research Center 2015; Lee et al. 2015, presenting a 119-country survey; as well as Norgaard 2009 on previous studies on knowledge and concern regarding climate change).

What is striking, though, is that people who know about climate change, who appraise it as a current, visible, local and personal threat and who express concern, nonetheless make little effort to respond and translate their concern into continuous proactive and problem-focused coping activity (APA 2009; Gifford 2011; Marshall 2014). While information- and knowledge-deficit explanations are fundamental, they do not apply for aware and well-informed people (Lertzman 2015; Norgaard 2009). If then the lack of knowledge and information access fails to explain the dissonance between appraisal and appropriate climate action, how does it arise? Part of the answer lies in different, at times intertwined structural barriers such as economic barriers (e.g. insufficient financial capital to upgrade one's house to storm-resistant standards), political barriers (e.g. limited state support for investment credits in more energy-efficient fishing vessels), physical barriers (e.g. the difficulty of avoiding car use in remote areas) and socio-cultural barriers (e.g. national pride and tradition of supporting oil exploitation). However, many people, as Gifford (2013, p. 41) illustrates, do have the "structural capacity to act, but do not... or do much less than they could" (cf. also APA 2009). With so much at stake, why do people fail to act? And, just as important in light of the urgent need for climate action, is there anything that can be done or are we, to put it somewhat polemically, sleepwalking into disaster?

One key question related to climate change has only recently been addressed more profoundly and nudges thinking in new directions: What is happening in people's brains? What kinds of mental barriers or psychological "dragons of inaction" (Gifford 2011, p. 290) prevent people from confronting the threat and interfere with offensive coping? (Lertzman 2015; Marshall 2014; Norgaard 2009). Mental barriers (here synonymous with psychological barriers) refer to any cognitive and emotional process in the human mind that keeps people from doing something specific or changing their behavior. These mental obstacles are not completely restricted to the individual (APA 2009). Instead, they are likely to interfere dialectally with structural barriers, but what does this interference look like? To date mental barriers have been less well documented and acknowledged than structural ones and have as yet been insufficiently addressed by climate policy and decision makers (Norgaard 2009; Lertzman 2015). However, in order to better understand how to get people to act more proactively, we must also look at the intrapsychic reasons for people's inaction or restricted behavior. A perspective is thus needed in which insights from psychology and neuroscience are more deeply integrated into overall investigations

of exposure, sensitivity, barriers, and coping responses. Analyzing coping activity and its complex facets in the broader field of mental barriers and the role of internal processes such as cognitions (e.g. appraisals: Is there threat and what can be done?), emotions (e.g. hopelessness increases the likelihood of giving in to despair and resignation) and intrapsychic coping (e.g. reappraising) is crucial. Only so can we improve understanding of how to translate concern about climate change into a more widespread and effective coping response.

Against the backdrop of these research needs, the intention of this chapter is twofold. Firstly, it seeks to advance the conceptual discourse on coping by discussing in detail insights from cognitive psychology. Elaborate emphasis is thereby laid on Lazarus and Folkman's (1984) prominent schematization of coping, appraisal, and emotion, which has not yet been adequately recognized in the climate change debate. Conceptual key aspects are highlighted that help to explain dissonance between concern and appropriate climate action. Secondly, based on these outlines and underpinned by my own empirical data on Arctic change in Norway, examples of coping in the broader field of mental barriers and their crucial relevance for practice are illustrated. The fishing communities on the Lofoten Islands face the particular harm and risk of shifting fish migration, altering fish-stock levels, and extreme weather and storms due to rapid Arctic change. A crucial aim of this chapter is to demonstrate the necessity and benefits for intellectual and policy systems to consider intrapsychic processes in climate adaptation, by arguing both from conceptual and case study evidence. Concluding insights into selected policy considerations are provided to indicate the possible scope of action and potential policy designs. In fact, recommendations need to take into account local conditions and context-related cross-scale interlinkages between the local, national and global scales. Obviously, there cannot be a one-size-fits-all solution. Nevertheless, the exemplified suggestions might inspire new ideas, boost creativity and stimulate novel perspectives on how to reduce the gap between concern and efficient response in climate change contexts.

Conceptual Considerations from Cognitive Psychology

The Notion of Coping

Coping can be seen as a key concept for theory and research on adaptation. As documented by contemporary academic debate, there is broad scientific agreement that coping is not an individual endeavor since it does not occur in a (social) vacuum. Instead, it is a complex, multidimensional process that is sensitive both to the environment and its demands, constraints and resources, and to individual capacities, demands, constraints, beliefs, goals and values. People are, as Aldwin (2007, p. 92) representatively summarizes, "neither passive responders to environmental circumstances nor are they guided solely by inborn temperament". They actively select and

shape their environment. This viewpoint that coping emerges from the dialectic interplay between person and environment variables constitutes the fundamental proposition of Lazarus and Folkman's (1984) well-known and widely cited schematization of coping modes and functions, appraisal components, emotions, and their reciprocal relationship. The way that their approach specifically helps to analyze coping in the broader field of mental barriers is discussed below in greater depth. It is important to recognize that due to its dialectic and relational point of reference, and its epistemological, process-oriented and action-centered holistic outlook, Lazarus and Folkman's conceptual framework is still one of the most approved and referenced approaches (Cooper and Deve 2005). Complemented by more recent neurobiological findings, for example on the complex interplay of slower, conscious reason and quicker, subconscious emotion (i.e. feel first and think second; cf. LeDoux 1996), Lazarus and Folkman's conceptualizations have served as a scientific basis for a great number of contemporary studies (cf. e.g. Aldwin 2007; Eppel 2007; van der Linden 2015).

Core Themes

In particular, with regard to the concept of coping, (c.f. Tennen et al. 2000), Lazarus and Folkman (1984, p. 141) offer the most widely accepted definition of coping: "We define coping as constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person." This wide-ranging definition contains four interrelated core themes. These aspects and their implications for understanding coping in a broader field of mental barriers are discussed in the following.

Process Orientation

According to their above-cited definition, Lazarus and Folkman (1984) regard coping as process- rather than trait-oriented, as reflected in the words "constantly changing" and "specific" demands. They do not argue against the influence of personality dispositions or traits (e.g. favorable ways of thinking like optimism) on coping thoughts and the formulation of stable coping styles over time and across conditions (cf. also Lazarus 1999). Likewise, they acknowledge that people do have personally preferred modes of coping with the same or similar sources of stress or adversity. However, by referring to empirical evidence, the authors demonstrate the predominant limitations of trait conceptualizations and their insufficient compliance with the complexity and variability of actual coping efforts (e.g. trait concepts ignore goal-oriented intentions shaped by environmental factors). As emphasized by Lazarus (1999), in accordance with a dialectic outlook, no person or environmental variable acts alone, but each interacts with other people and/or environmental variables and thus contributes to coping behavior. In line with this argument, coping thoughts and

actions are always directed towards a specific demand. Hence, “to speak of a coping process means speaking of *change* in coping thoughts and acts as a stressful encounter unfolds” (Lazarus and Folkman 1984, p. 142; original emphasis). Applied to climate action discourses, it is thus vital to consider coping as a shifting process. At certain times, for example, people rely more heavily on offensive problem-solving strategies and at other times on defensive coping modes, as the status of the person-environment relationship changes. Decisions about coping actions vary in accordance with changing resources, ways of thinking (primary and secondary appraisals, see below) and emotional experience. Based on reappraisals, for instance, which refer to a modified appraisal due to new information or feedback from the environment, new coping options might be considered. This standpoint is particularly important for developing policy recommendations and climate change communication (e.g. framing information in ways that trigger reappraisals, see below).

Cognitive and Behavioral Coping Modes

To avoid restricting coping analysis to observations of behavioral coping efforts, which are (more or less) directly observable by others, and discounting “invisible” but extremely important intrapsychic coping modes, Lazarus and Folkman (1984) use coping to refer to both “cognitive and behavioral” efforts. Cognitive coping processes include all ways of thinking oriented to the problem caused by a troubled person-environment relationship (e.g. reappraising, accepting or trivializing a demand) and/or to its emotional consequences (e.g. regulating fear through denial, avoidance or intellectualized detachment). Evidently, a gap between concern and offensive coping does not necessarily imply a lack of coping. How mental barriers are likely to impede more offensive and behavioral coping efforts by the complex interlay of cognition and emotion is exemplified in a later section.

Independency from Outcome

By defining coping as “efforts” to manage, Lazarus and Folkman (1984) point out the importance of studying the process of coping independently from its outcomes. This unbiased perspective allows coping to “include anything that the person does or thinks, regardless of how well or badly it works” (ibid. p. 142). Accordingly, no coping mode is considered inherently better or worse than any other. Instead, the specific person-environment relationship must be taken into account to judge whether a certain coping mode or process fits with both the personal and environmental factors of that relationship (e.g. individual resources, constraints, institutional conditions). A coping mode that is effective at one stage can be ineffective at another, and vice versa. The timing of denial, for example, illustrates this point. For instance, denial of climate change may be less harmful and more beneficial in the early stage of adversity (e.g. sudden flooding or storm), when the encounter

provokes an extreme stress experience and fear, than in later stages (Filipp and Aymanns 2010; Lazarus and Folkman 1984). Initial short-term denial can thus be beneficial as an initial protective response, as it gives the mind the opportunity to (unconsciously) absorb shocking or distressing information at a pace that will not plunge the person into psychological disequilibrium. In this way, cognitive strength is increased, which facilitates concentrating all efforts and resources on managing initial flood or storm damage without being overburdened by acknowledging that climate change exists, making even more serious damage likely in the future (cf. also section “Background and the Challenges Ahead”). At a later stage, however, it is essential to face and engage with climate change. Otherwise, denial could delay or prevent a person from trying more productive coping activities in a situation that can be improved. Correctly interpreting such processes can help policymakers from confusing people’s denial with a lack of caring or political will. In addition, this example serves to demonstrate the aforementioned necessity of a process-oriented approach. Coping needs to be “studied in slices of time so that changes can be observed in what is thought, felt, and done as the requirement and appraisals of the encounter change” (Lazarus and Folkman 1984, p. 317). Consequently, what is needed are principles that guide and specify the conditions under which a coping mode might have favorable or unfavorable outcomes.

No Mastery

By using the less-specific term “manage” in connection to dealing with demands, Lazarus and Folkman (1984) avoid equating coping with mastery over the environment or oneself, as not all sources of external or internal demands are amenable to mastery, but need to be coped with (e.g. changing patterns of fish migration, inevitable losses, diseases, aging). Applied to the analysis of climate action, an overly narrow understanding of coping as mastery, which implies complete control of a person-environment relationship, would solely focus on coping as *problem-solving*. This would result in the neglect of important coping modes concerned, for instance, with regulating emotions (as in the case of time-limited denial mentioned above), maintaining self-esteem and a positive outlook, especially in the face of climate situations that are uncertain, ambiguous, irremediable or difficult to predict. Therefore, as highlighted by Lazarus and Folkman (1984, p. 142), “managing can include minimizing, avoiding, tolerating, and accepting the stressful conditions as well as attempts to master the environment”.

Coping Functions

An important feature of Lazarus and Folkman’s conceptualization of coping, which is consistent with its process-oriented, cognitive-behavioral and outcome-independent outlook, is the distinction between two major coping functions:

problem-focused and emotion-focused. In contrast to a coping outcome, which refers to the effect of a coping mode, a coping function relates to the purpose a coping mode serves (Lazarus 2003). For example, the coping mode “seeking information on local climate change impacts” can have the functions of generating coping ideas based on more information and reducing emotional concern (which might positively affect stress appraisals, for example a change from threat to challenge appraisal; see below). Yet the outcome may not be emotional relief but even more concern due to fear-inducing communication on climate change (cf. later section for more details), which can negatively influence appraisals of coping options (e.g. the threat is too great to be met with available resources) and the resulting coping behavior (e.g. avoiding threat through profound denial or distancing).

With respect to the problem-focused function, the purpose is to actually change a troubled person-environment relationship; that is managing or altering the problem causing stress or adversity, by acting on the environment (altering economic barriers, procedures) or oneself (e.g. learning new skills, readjusting attitudes and goal hierarchies). In contrast, the emotion-focused function is not aimed at changing the actual person-environment relationship in question. Instead, it targets the person’s cognitive effort to regulate the emotions tied to that troubled relationship by either (a) changing the way the adverse relationship with the environment is attended to (as in vigilance or avoidance), or (b) changing the relational meaning of what is happening (by reappraising it), which modifies emotional experience even though the actual conditions of the relationship have not changed (e.g. deciding there are more important things to worry about than climate change). For example, a threat that a person successfully avoids thinking about, even if only temporarily, no longer causes concern. Similarly, the reappraisal of a threat in nonthreatening terms removes the cognitive basis of being concerned (Lazarus 1999). Importantly, however, Lazarus (1999) stresses the fact that, although conceptually distinguishable, problem- and emotion-focused coping are interdependent and work together: “Both are essential parts of the total coping effort, and ideally facilitates the other. It is the fit between thinking and action – that is, the balance between them and the environmental realities – which makes coping efficacious or not” (ibid. p. 124). The case study examples under consideration further demonstrate the importance of considering coping functions in climate adaptation.

The Notion of Appraisal

A core tenet of Lazarus and Folkman’s notion of coping is that the way a person appraises an encounter influences if and how he or she will cope. “The essence of my theory [...] is the process of *appraisal*, which has to do with the way diverse persons construe the significance for their well-being of what is happening and what might be done about it, which refers to the coping process.” (Lazarus 1999, p. 9; original emphasis). This statement highlights Lazarus and Folkman’s cognitive-phenomenological frame of reference, which regards the concept of relational

meaning that an individual constructs from the person-environment relationship as the most important theme in emotion and coping response.

Relational Meaning

Relational meaning refers to the person-environment relationship as being combined with the subjective process of appraising, which is centered on the personal significance of that relationship. In other words, personal variables and those that characterize the environment dialectally come together in the relational meaning that, in turn, depends on the appraisal process through which that meaning is constructed. And this meaning is, as Lazarus (1991) proposes, the crucial cause for emotion and (varying) coping responses.

Before elaborating further on this relationship and different kinds of appraisal, it is necessary to elucidate the relevance of relational meaning to climate change research and the implementation of suitable policy recommendations. The crucial point is the difficulty of understanding the harm and threat of climate change from the standpoint of the person *or* the environment *per se* (cf. also APA 2009; van der Linden 2014). Arguing from Lazarus and Folkman's constructivist perspective, the relational meaning of climate change needs the "conjoining of both by a mind that considers both the environmental conditions and properties of the person in making an appraisal of being threatened" (Lazarus 1999, p. 12). Although climate change is a physical process, it is driven by and understood through social and political processes, including appraisals of events discussed in the media or climate programs. Climate change is fixed in place and meaning only for the moment.

Without a goal at stake, however, there is no potential for loss or concern. Lazarus and Folkman (1984) illustrate that a person is under stress or experiences negatively toned emotions (e.g. concern) only if events negate or endanger important personal goals and commitments or violate highly valued expectations. In this sense climate change can be thought of as a potential threat that is transformed into an active threat or concern when that which is considered of importance is jeopardized. Importantly, this relational approach acknowledges environmental *and* personal characteristics and their relative significance based on cognitive mediational processes that negotiate between and integrate these two sets of variables. "We suggest that *cognitive appraisal* is the mediating process that sets the whole train of psychological events into motion, including coping activity, the emotional reaction, and the somatic changes that are part of any stress state." (Lazarus and Folkman 1984, p. 284; original emphasis). Human judgements about climate change are important because they affect both levels of concern and the motivation to act (APA 2009). However, mental barriers such as a lack of perceived behavioral control ("I'm only one person, what can I do?"), social comparison ("Why should I act if *they* won't act?"), distrust ("I don't change because their recommendations have failed before.") or tokenism ("I'm a member of the Fishermen's Association, so I've done my part.") drive appraisal and, in turn, coping activities (cf. also Gifford 2013).

Primary and Secondary Appraisal

Lazarus and Folkman (1984) use the pleonastic expression of “cognitive appraisal” to emphasize appraising as a continuously changing “set of cognitive actions” (Lazarus 1999, p. 75) or judgments. Appraising is understood as a multifaceted, evaluative mental process that is involved in categorizing the flow of events and their various facets with respect to their implications for well-being and coping behavior. Such processes can be, as they state, both deliberate and largely conscious (e.g. when new and complex demands require a slow and deliberate evaluation of available coping resources), and intuitive, automatic and unconscious (e.g. when previous experiences with a certain threat provoke associated coping modes without the need for extensive reflection or learning; cf. Lazarus 1991 for more detail).

In order to facilitate the analysis of the complex and multilayered process of coping and emotion, Lazarus and Folkman (1984) make an analytical distinction between two kinds of appraising: primary and secondary. These two kinds have different functions and deal with different sources of information, although they operate interdependently and can appear simultaneously. Their consideration is particularly important for climate action advocates and policymakers, because, as detailed below, it enhances understanding of a mismatch between problem awareness and concern on the one hand and maladaptive coping activities or inaction on the other. Primary appraisal relates the event to its significance for the person’s well-being and is thus concerned with the motivational relevance of what is happening, that is, whether anything is at stake. “Do I have a goal at stake, or are any of my core values engaged or threatened? And if there is a stake, what might the outcome be?” (Lazarus 1999, p. 76). According to Lazarus and Folkman (1984), a person may appraise a given event in three different ways: as irrelevant (no implication for well-being, no concern about climate change), as benign-positive (positive implication for well-being, no coping required, positive emotions such as happiness or exhilaration) and as stressful.

Primary stress appraisals are of particular relevance for this chapter’s topic. They involve a negative evaluation of one’s present or future state of well-being and evoke (except for a challenge appraisal) negatively toned emotions such as fear, anxiety, guilt, anger, 4.1 or sadness. Following Lazarus and Folkman (1984), stress appraisals are of three broad categories, namely harm/loss, threat, and challenge. While harm/loss relates to damage that has already occurred, threat concerns harm/loss that has not yet happened but can be anticipated. In comparison with harm/loss, threat permits anticipatory coping. To the extent that people can anticipate the future, they generally have a chance to prepare themselves for approaching difficulties and to plan for future occurrences (Lazarus and Folkman 1984). Challenge, the third type of stress appraisal, focuses on the potential for gain or growth inherent in a situation. To be challenged implies feeling positive about demanding events and refers to pleasurable emotions such as eagerness or excitement. Nevertheless, Lazarus and Folkman (1984) see challenge as a stress appraisal because the person must mobilize coping efforts in order to produce a positive outcome. At the same

time, there must be some risk of harm to have the experience of challenge. In particular, the consideration of challenge in contrast to threat has important implications for climate policy recommendations.

In addition to the stake a person has in an encounter, evaluations are required about whether anything can be done to manage or improve the troubled person-environment relationship, and if so, which coping options might work. This type of evaluation is called secondary appraisal: “Do I need to act? When should I act? What can be done? Is it feasible? Which option is best? Am I capable of doing it? What are its cost and benefits?” (Lazarus 1999, p. 78). Secondary appraisal is vital in shaping the coping activities and refers to a complex evaluative process that considers available coping resources and options, timing and coping potential, which is the likelihood that a given coping option will accomplish what it is supposed to. Secondary appraisal is thus a crucial supplement to primary appraisal since irrelevance, benignity, harm/loss, threat and challenge depend also on how much control a person thinks he or she can exert over an outcome. How cultural values and beliefs can act as a mental barrier and influence secondary appraisal is described later.

Primary and secondary appraisal permanently interact with each other in shaping the meaning of a person-environment relationship and the strength and quality of the emotional reaction (Lazarus and Folkman 1984). The assumption that cognitive evaluations such as appraisals cause emotion is a fundamental part of Lazarus’ schematization of cognition and emotion (Lazarus 1991). He argues that “the way we evaluate an event determines how we react emotionally” (Lazarus 1999, p. 87) and that the resulting emotion is likely to influence later appraisals reciprocally. Fear, for example, is experienced when an individual faces uncertain, existential threat (primary appraisal) and at the same time anticipates probable failure in efficient coping (secondary appraisal). However, the stronger the experience of fear, the faster and less smart can be the interplay between emotions and cognitions (LeDoux 1996).

The perspective of emotion as a post-cognitive process has received substantial empirical support (cf. e.g. Scherer et al. 2001; Siemer et al. 2007). On the other hand, however, there is also strong empirical evidence that, for example in threatening fright-flight situations, emotions occur without preceding cognitions (for more sustained reflection see LeDoux 1996). Yet, in line with Helgeson et al. (2012) and van der Linden (2014), it is, in contrast to such situations, more likely that a causal attribution of personal well-being to complex climate change consequences necessitates cognitive appraisals. It is important to recognize though that both viewpoints have validity and are not mutually exclusive. In fact, the debate on the relationship between cognition and emotion greatly depends on how these concepts are defined and operationalized. Crucial for the present topic is that coping with climate change and the influence of mental barriers cannot be properly understood without considering intrapsychic cognitive processes such as primary and secondary appraisals, emotions, problem- and emotion-focused coping functions and, furthermore, that person, environment and coping mutually influence one another in a process that evolves over time.

Lofoten Islands Cod Fisheries in the Face of Arctic Climate Change

Background and the Challenges Ahead

The Arctic is one of the most complex and rapidly changing and most vulnerable regions on earth (Sommerkorn and Hamilton 2008). In particular, the Barents Sea marine living resources and the coastal fishing communities on the Lofoten Islands in the Norwegian Arctic are severely affected by rising atmospheric and oceanic temperatures, a dramatic decline in sea ice extent and volume, food web modifications, loss of traditional hunting and fishing routes, the altering of biographical careers and lifestyle patterns, and the shifting migration of both people and animals (ACIA 2005; Øseth 2011).

The Barents Sea is the main nursery area for economically and ecologically important fish stocks. The fisheries sector accounts for 4.7% of employment in North Norway, as against 1% for the country as a whole. In some Lofoten Island communities, such as Røst, Værøy and Moskenes, the fisheries industry even accounts for over 40% of total employment (Norwegian Ministry of the Environment 2012). These figures illustrate the importance of marine ecosystem services for value creation and society and thus make evident the crucial need to analyze the impacts of Arctic change on fishers' livelihoods on the Lofoten Islands and their coping response. These islands were home to around 24,500 people and 892 registered full-time fishers in 2015 (Directorate of Fisheries 2015).

In particular, the historic Lofoten winter cod fisheries and traditional production of the world-famous stockfish (air-dried cod fish) can be documented back about 1000 years to the time of the Vikings, and are vital for settlement and employment structures, coastal culture, identification and the local, regional and global economy. Benefiting from the warm North Atlantic Current and the resulting rich cod fish stocks and favorable outdoor drying conditions in the winter period from January to April (perfect mixture of wind, frost, rain and sun), the Lofoten Islands are the only place on Earth where the production of first quality stockfish is possible. However, observed and projected climate-change impacts bear the risk of weakening Lofoten's unique position in cod fishery and, to follow Lazarus and Folkman's coping notion (cf. section "The Notion of Coping"), thus creating demands that are appraised by the local inhabitants as taxing or exceeding their resources. Full-time small-scale coastal fishers, especially, with small fishing vessels less than 28 m long, conventional gear and fishing grounds within 12 nautical miles of the outer coastline, depend heavily on the Lofoten winter cod fishery. On average, 80% of their annual income is derived from catching and selling cod to local fish buyers (interview with Norwegian Coastal Fishermen's Association and coastal fishers in 2015).

Despite profound uncertainty about the details of future development and the magnitude, rate and quality of impacts (e.g. the decline in sea ice has been faster than predicted, cf. Sommerkorn and Hamilton 2008), there are crucial indicators of

changes today that will increasingly challenge Arctic people to adapt (West and Hovelsrud 2010). According to a recent survey by Fossheim et al. (2015), global warming led to a temperature increase of 1 °C in the Barents Sea from 2004 to 2012. And further temperature rises are projected. As a consequence of warming, a northward shift in the Northeast Arctic cod spawning and feeding locations towards colder waters is very likely, which would cause a significant decrease of cod spawning in the Lofoten area (ACIA 2005). These changes in cod migration patterns have especially dramatic impacts on local fish buyers and fish processors and, above all, on the livelihoods of small-scale fishers who operate close to the Lofoten coastline and are not able to access cod fishing grounds offshore and further north due to small vessel size and limited equipment. Furthermore, negative spin-off effects on other sectors are expected, including employment in local shipbuilding or marine technical supply companies. In the light of these challenges, it is particularly valuable to investigate what kind of relational meanings the coastal fishers construe from their person-environment relationships. Or more specifically, what kind of primary appraisals and secondary appraisals do they have, and if mental barriers exist, how do they interfere with coping activities?

Empirical Data Collection

The abovementioned research question was addressed within a larger study on Arctic change, resilience and translocal relations between fishers on the Lofoten Islands in 2015, funded by the German Fritz Thyssen Foundation. The empirical results presented in this paper are based on an iterative and qualitative-interpretive research design that focuses on meaning in context and aims for a broad and in-depth understanding and elucidation of human experience, behavior and the reasons that govern such behavior in the face of Arctic change. Local feedback and input from different stakeholders have been fundamental for critical reflexivity and refining the research scope throughout the research process. The main sources of information about local knowledge and appraisals are transcriptions of interviews, discussions with key informants, participant observations, social and cultural gatherings, and extensive site-inspections. Two field trips to the Lofoten Islands were undertaken in the spring and autumn of 2015, lasting 4 months in total. Within this timeframe, 43 problem-centered interviews with narrative sequences were carried out in English on the Lofoten Islands; 31 of these with small-scale fishers, the rest with fish buyers, other local residents, environmental charities and organizations, representatives from the communities as well as with fisheries officials (e.g. Norwegian Coastal Fishermen's Association/*Norges Kystfiskarlag*). The results from the fieldwork were analyzed in close conjunction with a literature review on fisheries management and Arctic change on the Lofoten Islands.

Coping in the Broader Field of Mental Barriers

Within the course of empirical research on the Lofoten Islands, it became evident that about half of the interviewed small-scale fishers have profound local experience-based knowledge and accurately identify climate change as a crucial driving force for their shifting person-environment relationships. As meteorological parameters specifically determine when, how often, how long and at what risk they may leave the harbours to go out to catch fish at sea, they pay close embodied attention to local weather conditions. According to their observations, that are broadly consistent with scientific findings and the results of similar studies (cf. e.g. ACIA 2005; West and Hovelsrud 2010), the warming ocean affects the distribution and abundance of cod fish stocks and leads to an increased influx of southern species such as mackerel (*Scomber scombrus*) and blue whiting (*Micromesistius poutassou*). Shorter winter seasons, higher winter temperatures and more winter rain influence the onset and quality of the stockfish production. Moreover, the interviewed fishers observe a rise of sea-level, storms and polar lows that negatively affect landing and fish processing facilities, transportation and supply chains, fishing nets left out overnight, weather predictability and the safety of sea navigation.

Obviously, climate change is not abstract and distant from the daily lives of the fishers. They are exposed to and vulnerable to various kinds of climate change impacts and, as they state, extremely concerned about their future lives as coastal fishers. Similar to the participants of the Pew survey mentioned above, their primary appraisal (appraisal of well-being) relates to concrete harm/loss (e.g. fewer days at sea due to hazardous conditions) and to salient threat (e.g. stronger northward shift of cod spawning grounds). However, despite considering climate change as causing major harm and threatening their livelihoods, they seem to be restricted in translating their concern into proactive intrapsychic and behavioural problem-focused coping (e.g. changing their goal hierarchies and attaching greater importance to alternative sources of income). It is important to recognize that other structural barriers exist and affect coping activities (e.g. lower market prices for other fish than cod make a shift toward targeting other species less attractive). Besides, the other half of the interviewed fishers interpret weather changes in the context of natural climatic variability and thus do not appraise their well-being as being negatively affected by anthropogenic climate change. They are, as they explain, experienced with and accustomed to the large weather perturbations that have always existed. Presumably, this kind of relational meaning gives them a sense of invulnerability or resilience. Likewise, they attribute the cause of past and current cod fluctuations to natural variation and human-induced overfishing and ship sewage pollution. These findings, and the human tendency to appraise natural risks as less threatening than human-made risks, however, are not new and have been discussed elsewhere in considerable depth (cf. e.g. Marshall 2014; West and Hovelsrud 2010). For this reason, the present chapter rather focuses on the so-far insufficiently addressed interplay of concern, mental barriers and limited proactive coping.

Weak Cognitions and Hard-Wired Emotions

The analysis of the fishers' interview statements regarding their concern about climate change impacts reveals that defensive cognitive coping modes with an emotion-focused function are widely applied. These modes aim to regulate the negative emotional response of concern and fear to the troubled person-environment relationship, through either reappraisals (i.e. changing the relational meaning of that relationship) or avoidance (i.e. efforts to avoid dealing with the demand). For example, reappraising ("There are more important things to worry about.") or avoidance in terms of shifting responsibility ("The Fishermen's Association will take care of it.") and ignoring ("I refuse to think about it.") illustrate that the interviewees have a significant goal at stake, specifically, to continue to earn a living from cod fishing. However, there is no guarantee that they will achieve this goal. What kinds of processes operate in their minds that help to explain their prevailing emotion-focused coping modes? Or, more specifically, what kind of cognitive barrier limits more widespread proactive coping on the part of the fishers for whom such coping is feasible?

The answer can only be approached by drawing on knowledge from cognitive psychology and neurobiology. Within these disciplines there is consensual evidence that human risk and threat perception rely on two qualitatively different neural processing systems (Epstein 1994; Kahneman 2011; LeDoux 1996). One – involving the brain's neocortex – is cognitive-analytical, deliberate, rational and slow. It requires conscious effort and encodes reality in words, numbers and abstract symbols. The other – belonging to the evolutionary older brain's subcortical structures (especially to amygdala circuits) – is experiential-emotional, associative, impulsive and fast. It maps experienced, uncertain and adverse aspects into emotional responses (especially fear and anxiety) and is also quick to apply mental shortcuts in order to reach quick conclusions (e.g. in phobic reactions). In practice, both systems continually interact and function in parallel to guide human behavior and decision making (Damasio 1994, for further information see LeDoux 1996). According to Lai et al. (2012), the way in which these two systems (cognition and emotion) affect each other is strongly dependent on the context (e.g. simple vs. complex risk).

With regard to climate change, my empirical results strongly suggest that a post-cognitive process prevails. This is consistent with Lazarus' appraisal theory, and with similar findings from van der Linden (2014) and Helgeson et al. (2012). Hence, the fishers first perceive and consciously appraise the impacts of the climate change they experience in terms of personal significance and available resources. And these primary and secondary appraisals (of threat and lack of coping options) lead, in turn, to concern, fear and anxiety. Once this cognitive-emotional link has been made salient, it is equally likely that the evoked emotions influence reappraisals (Lazarus 1999). However, and this is particularly important for the manner of coping, when cognitive and emotional responses diverge then the experiential-emotional system (where fear begins in the amygdala) tends to dominate the cognitive-analytical system and reactions are more likely to be guided by emotion (Loewenstein et al.

2001). The neuroscientist LeDoux has extensively studied these neural pathways and their linkages. In his book “The Emotional Brain (1996, p. 19)”, he points out that “[w]hile conscious control over the emotions is weak, emotions can flood consciousness. This is so because the wiring of the brain at this point in our evolutionary history is such that connections from the emotional systems to the cognitive systems are stronger than connections from the cognitive systems to the emotional systems.” The amygdala evolved before the neocortex and has maintained its hard-wired (i.e. innate) dominance over cognition in stressful situations because of its ability to rapidly assess threats (as in flight-fright responses; for more explanation see LeDoux 1996). In other words, the fishers’ cognitive-analytical brain is sufficiently aware that there is harm and threat, but their experiential-emotional brain becomes too involved and thus exerts a strong influence on problem-focused coping activity. Simplistically, the fishers feel more and think less, as also indicated by the following interview statements: “No no, I don’t think about climate change because it will be a catastrophe. [...] I’m very afraid of it” (interview with a fisherman in his forties 2015). “The future scares me. I rather live from day to day.” (interview with a 55-year-old fisherman 2015). “We are afraid that the cod will stay away one day. [...] I try not to think about it too much. When I do, I am very worried” (interview with a 36-year-old fisherman 2015).

In the light of these research results and insights into findings from psychology and neuroscience, it becomes obvious that one crucial mental barrier relevant to climate adaptation is linked to the basic architecture of the human brain and the powerful interplay of weaker cognitions and stronger emotions in the context of troubled person-environment relationships (cf. also Gifford 2013; Marshall 2014). This explains that when the fishers feel concern and fear they are more likely to take action to reduce this unpleasant emotional experience by (unconsciously) choosing primarily coping modes with an emotion-focused function (cf. section on “Coping Functions”). They feel a lack of control and helpless, and thus want to protect themselves from facing and approaching the problem through (even more disturbing) proactive and problem-focused coping (e.g. information seeking). They cognitively zone out, try to regulate their emotional response and focus on other things rather than harm and threats related to climate change.

Policy Implications

What can be done to reduce the influence of the mental barrier’s emotional dominance and enhance more proactive coping? According to the prevailing opinion of the interviewed fishers, much of the media, scientific and policy discourse around Arctic climate change solely highlights losses, costs and severe, uncertain threats. This one-sided perspective fosters and manifests their concern, fear and helplessness, as well as the wish to avoid the topic. In addition, as noted by the interviewees, the media and, in particular, scientists use language heavily steeped in threatening, stressful expressions such as “irreversible”, “worse than previously thought”,

“extremely rapid” or “disastrous”. These empirical results are also in entire agreement with emerging studies on climate-change communication and public engagement (cf. e.g. Center for Research on Environmental Decisions 2009; Nisbet 2009). Hence, what is needed is a shift in communication away from fear-mongering narratives and tales of encroaching disaster to a much stronger focus on clear messages, specific policy solutions and positive examples (e.g. recasting the influx of southern fish species as an opportunity to grow the economy). Referring to Lazarus and Folkman’s conceptualization of coping and appraisal, it is about changing people’s relational meaning of their person-environment relationship. In other words, when climate change and corresponding policy solutions are additionally framed in terms of what can be gained (and not only in terms of what is or will be lost), it might weaken the mental barrier of emotional dominance and related subcortical structures and instead activate people’s neocortex. In consequence, people will be more likely to face climate adversity more actively (cf. also Center for Research on Environmental Decisions 2009). This way of framing, which sets another “train of thought in motion” (Nisbet 2009, p. 15), also corresponds to Lazarus and Folkman’s notion of challenge appraisals, which, as opposed to threat, refers to the potential for gain and growth. “The quality of functioning is apt to be better in challenge because the person feels more confident, less emotionally overwhelmed, and more capable of drawing on available resources than the person who is inhibited or blocked.” (ibid. 1984, p. 34).

Group Belonging and Cultural Cognition

Most of the interviewed fishers were born and raised on the Lofoten Islands. They live in local fishing communities and are, as Jentoft (2000, p. 54) nicely puts it, embedded in “social and cultural systems that give meanings to their lives and directions for their behaviour. Their fishing practices are guided by values, norms and knowledge that are shared within their community”. Within social psychology, it is widely assumed that the individuals’ cognitive representation of themselves as a member of a group (e.g. of the Lofoten small-scale coastal fishers) forms an essential basis for intragroup and intergroup relations (Levine 2013). As described by Turner et al.’s (1987) widely cited self-categorization theory, categorizing the self and others into groups involves a distinction between the group containing the self, ingroup (“us”, the coastal fishers), and other groups, outgroups (“them”, e.g. the offshore trawler fishers). According to Dovidio et al. (2013), self-categorization is a universal facet of human thinking that makes sense of complex person-environment relationships (like in climate change contexts) and is thus essential for psychological functioning. The ability to sort people into meaningful categories is often automatic and based on similarity, proximity and shared fate (ibid.). My interview results underline this theory. The fishers interviewed proudly perceive themselves as members of the coastal Lofoten fisher group, which is, as they state, known throughout the world for its extraordinary small-scale fishing skills, especially in heavy sea

conditions. Evidently, the fishers share common ground (e.g. same skills, expertise and daily routines; use of traditional fishing gear; main income from cod fishery) that constitutes their identification with this ingroup.

Research findings, which are shared across theories from psychology, indicate that the stronger an individual's group identity, the less sharply he or she differentiates between self-interest and collective interest (Levine 2013; Smith and Mackie 2007). This includes ways of thinking and behaving that are specific to this group. As a consequence, these individuals become more compliant to group norms, and act in accordance with group-based beliefs, motivations, knowledge, attitudes and goals. Particularly when faced with uncertainty, strongly identified individuals are more likely to turn to similar others, their ingroup, for support and information on what to think, feel and do, which can drive coping activities (Dovidio et al. 2013). The debate on the influence of group norms and values is supported by similar recent research on the theory of "cultural cognition", focusing especially on risk and climate change. The term "cultural cognition" refers to the tendency of people to fit evidence of risk to positions that predominate in groups of those they most strongly identify with. In other words, "individuals are psychologically disposed to believe that behaviour they (and their peers) find honourable is socially beneficial" (ibid. p. 147). Individuals particularly trust those who share similar worldviews and choose to believe in what those around them believe.

This kind of social turning towards one's ingroup can also be observed among the interviewed fishers. They have a strong need to share their concern about climate change impacts with their peers and exchange opinions on what to do (especially with regard to increasing storms). The valued feedback of their peers, in turn, shapes their secondary appraisal of coping options. The fishers' coping behaviour, which can be subsumed under the category of "information seeking", represents both a problem-focused function (managing the problem causing concern) and emotion-focused function (reducing concern and feeling some kind of hope or relief). However, according to the fishers interviewed, the majority of their ingroup members, especially the older ones, continue to hold to the solid group-based value of being a tough fisherman who considers dealing with climate change induced, highly variable weather and fish stocks as a way of life. Thus, as they argue, there is no need to offensively face climate change and anticipatorily cope with threats. The interview data suggest that this strong ingroup belief of invulnerability impedes adaptive climate action on the part of the interviewed fishers. They selectively reappraise the situation to make it reflect a more favourable view of the self and thus fail to perform offensive coping activity.

Obviously, the interviewed fishers adhere to their peer group's values and beliefs that reinforce their connection to their ingroup and identity formation. In accordance with the theory of "cultural cognition", they are motivated to search for information in a biased way in order to avoid dissonance and threats to identity and to protect social standing. They are more likely to take the position of their trustworthy peers, that is consistent with their cultural predisposition, than to adopt a position inconsistent with it (based on reappraisals they change the relational meaning of their person-environment relationship). This case study illustrates how the complex

and intertwined processes of group belonging and cultural cognition have the potential to act as mental barriers that reject sources of information provided by outgroups or non-salient identities (e.g. scientists that predict higher storm frequencies). Taken together, these dynamics help to explain why the interviewed fishers are not encouraged enough to engage more offensively in climate change adaptation. The mental barrier of group belonging and cultural cognition is comparable to invisible defense walls inside the brain that block messages coming from the outside in order to maintain a coherent relational meaning.

Policy Implications

According to research on how to mitigate the effects of group belonging and cultural cognition is less advanced than research on the mechanisms behind them. Nevertheless, progress has been made in identifying helpful communication techniques. One such technique, as the authors (*ibid.*) suggest, is identity affirmation. This approach takes into account that identification is not only a source of but also a solution to the problem of climate adaptation. Such a resource-oriented strategy is also considered suitable for the present study context. For example, when presented with scientific climate change information on risks (e.g. increasing storm frequencies due to climate change) that is inconsistent with the fishers' cultural values and beliefs (storms are manageable), the majority of the fishers apparently tend to respond dismissively toward that information. However, when shown that the information (e.g. the fishers' toughness at sea will be increasingly challenged) in fact affirms their values and beliefs, such fishers might be more likely to consider the information open-mindedly. In consequence, and this would represent offensive problem-focused coping, they might discuss more directly with their ingroup members, for instance, how to improve their safety at sea (e.g. by specifically using social media networks as an informal tool for quick weather advice and localized warnings).

Another helpful technique for enhancing engagement could be to give a platform to a representative from the coastal fishers' ingroup who is at the same time a knowledgeable, trustworthy and recognized fisher. Following people are less resistant to consider information when they know that an experienced and familiar ingroup member with converging values accepts it. The following interview example might inspire such an approach. An interviewed fisherman in his late fifties has been politically active in the local labor party since 1990 and is a voluntary member of the Norwegian Fishermen's Association (their main focus is to safeguard fishers' best interests). His biggest concern is, as he emphasizes, to raise awareness to the problem of climate change among his fisher colleagues. "I talk about climate change. I am not afraid to talk about it. Maybe I talk too much [laughing], but that's my problem. I want to talk about it and I want people to see it in my way. So that's why I talk about it." (interview 2015). Other interview partners, both fishers and community representatives who know this fisherman personally, confirm that he has achieved

considerable respect and recognition among the coastal fishers over the years due to his profound knowledge and his background as a practicing cod fisher, politician and fishers' lobbyist. This example illustrates that fishers like him could be trustworthy spokespersons, mediating between policymakers, scientists and the Lofoten coastal fishers. A much-needed platform could be provided by engaging him (and his expertise) in scientific research on storm frequency and adaptation and reporting on this collaboration in local media or climate policy recommendations.

Conclusions and Moving Forward

Using Lazarus and Folkman's schematization of coping, appraisal and emotion from psychology as an explanatory point of departure as well as an analytical tool to deepen understanding of the dissonance between widespread concern about climate change and limited offensive coping action, this chapter sheds new light on a newly emerging object of investigation. While acknowledging that there are still crucial controversies, the majority of people worldwide now believe in anthropogenic climate change and, especially due to personal experience, no longer view it as a distant, unreal, impersonal and unimportant phenomenon. In consequence, the predominant academic and political focus on how to mitigate and prevent climate change denial is no longer sufficient. Likewise, it has increasingly become evident that structural barriers alone cannot explain such a dissonance. Instead, it is time to strike out on new paths and explore elusive territory, namely the human brain and the challenging power of its mental barriers. The battle over climate action is – to a significant extent – fought in people's heads.

Following Lazarus (1999, p. 12), “[t]he person and environment interact, but it is the person who appraises what the situation signifies for personal well-being.” Thus, it is indispensable to take into account the cognitive and emotional processes that intervene between the person and his or her environment and constitute the relational meaning of that relationship (i.e. concern about climate change but paralyzed in appropriate action). Considering this crucial issue, the research results and my empirical findings presented in this chapter importantly show that the limited nature of offensive climate action can be seen as having two (intertwined) phases. In the first phase, people appraise harm/loss and/or threat because specific climate-change demands tax or exceed their resources (primary appraisal). Subjective evaluations about what can be done conclude that appropriate coping options are insufficient and coping failure is likely (secondary appraisal). Within this process, the primary appraisal of what is at stake and the secondary appraisal of coping options continuously interact with each other in shaping the degree of impact on well-being and the strength and quality of the emotional reaction (e.g. concern, fear), which, in turn, drive behavioral and intrapsychic coping modes and coping functions (problem- and/or emotion-focused). In this regard, considering solely problem-solving modes of coping is insufficient and narrows the focus to conditions that are appraised as changeable or controllable by action.

In the second phase, however, a variety of mental barriers come into play and interfere with effective climate adaptation, particularly due to the incongruence between primary and secondary appraisals (need of appropriate coping versus inappropriate coping options), which constitutes a pitfall. The examples from neuroscience and social psychology discussed above demonstrate this point. The evolutionary hard-wired dominance of emotion over cognition in the face of threat negatively affects appraisals and, in particular, makes people eager to reduce the unpleasant emotional response of concern (thus defensive emotion-focused coping modes are more likely). Likewise, due to the human desire to belong to a certain ingroup, people feel compelled to take cues for what they should think and do from their ingroup members with whom they strongly identify and share stories. In the above case study, group belonging and cultural cognition function as mental barriers. They “take advantage” of the appraisal incongruence and impede (initial) offensive coping efforts. Influenced by these mental barriers, the interplay of primary and secondary appraisal then reboots and resulting reappraisals lead to climate inaction.

Taken overall however, it is crucial to highlight that without an imbalance between primary and secondary appraisals the impact of mental barriers might be less intense in the second phase. In particular, the quality of secondary appraisals (“There is something I can do effectively” versus “There is nothing I can do”) is fundamental for emotional response and the initiation of offensive coping action. Against this background, this chapter appeals to policymakers to take this issue into account and frame climate-change communication in such a way that people reappraise their person-environment relationships more positively (e.g. reconsider new coping options which reduces concern and, in turn, the powerful influence of mental barriers). In this regard, it is additionally important to rely on Lazarus and Folkman’s (1984) broad, differentiated and unbiased notion of coping because it is process-related rather than trait-oriented, embraces behavioral *and* cognitive coping modes, deconstructs coping from outcome, and implies a developmental rather than a mastery approach.

Obviously, not only is climate change a very complicated and multifaceted process but people’s relationship with climate change, as both source and victim of its impacts, is equally complex. This leads back to the initial question: Are we sleepwalking into disaster? If the status quo prevails, then the answer has to be yes. However, if we try to understand how neural pathways, emotions and human appraisals work, and thus recognize and avoid their pitfalls, there is a chance of walking fully awake into times of challenge rather than stumbling bleary-eyed towards threatening disasters. Moreover, results from the abovementioned Pew survey indicate that people do support climate policies, which is a hopeful piece of information. Even with our limitations, humans have immense capacity for critically reflecting upon their person-environment relationship and taking action. Yet, knowing what the barriers are and deciding what to do about them are two very different things. Climate information alone will not sway people. Instead, the key is to use communication strategies that reduce the likelihood that people appraise climate change as threatening, for example by framing climate change as a challenge or in a manner that does not threaten people’s values and group identity. To sum up,

there cannot be a magic bullet in climate communication due to complex local specifics. However, basic principles can guide policymakers and academics. There is hope, especially when scientists from different disciplines, policymakers and citizens as local experts meet as equals and collaborate. In this sense, quoting Lazarus (1998, p. 404.), “I would like to believe I have thrown some useful light on the never-ending effort to understand”.

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Growing the Constituency: A Twenty-First Century Challenge



James K. Mitchell

Abstract Interest groups that have hitherto shaped disaster policies are too small, too limited in scope and too impermanent to effect meaningful long term improvements. A major expansion of public involvement is called for. This chapter identifies three progressively larger groups that are differentially affected by disasters – the permanent, fluctuating and latent constituencies. Each of these has the potential to grow in different ways that, collaboratively, can create a revitalized basis for action capable of addressing the challenges that lie ahead.

Keywords Hazard · Constituency · Health · Public policy

Introduction

Why don't we do better? This question about the faltering application of research knowledge to loss reduction continues to be asked by experienced observers in the global community of hazard and disaster experts, often accompanied by calls for new thinking (White et al. 2001; Mitchell 2005a; Tucker and Chakos 2009; Aldrich 2011; Hutton 2012; Kunreuther et al. 2013; Aven and Krohn 2014; Etkin 2016; Kasperson 2014; Spiekermann et al. 2015; Elliott and Hsu 2016). Many answers have been offered and various putative solutions have been put into practice, but, despite some successes and promising developments, the trend of losses continues to rise, with prospects of worse to come. (Centre for Research on the Epidemiology of Disasters 2015).

What is to be done? Perhaps the crucial stumbling block is not to be found among the usual suspects – imperfect knowledge, insufficient resources, inequities of power and governance, bureaucratic inertia, institutional mismatches, fickle public attention, faulty risk communication? Could it be that we are missing a simple truth that holds the key to success, namely that when it comes to taking actions that will ensure a future that is acceptably safe in the face of environmental risks, we have not

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been able to convince enough people to do things that would make a difference? Might failure to conceive the problem on a sufficiently ambitious basis, one that grasps the full extent of its implications for humans, be a flaw that impels this deficiency?

Hazards are strongly affected by the contexts in which they occur (Mitchell et al. 1989; Wolf and Moser 2011). Their intricacy and dynamism greatly complicate the task of making decisions about the future (Binder et al. 2015; Leckner et al. 2016). Furthermore, the web of impacts and consequences that extends out from extreme events touches on so many aspects of our lives, that narrow engagement with only their most obvious pathological manifestations is insufficient. Complexity, uncertainty and ambiguity – triple characteristics of the planet that is our home – provide a meta-context for living that requires a more ambitious response to hazards than has yet been attempted (Renn et al. 2011). Together those three factors cloud judgment, put humans at risk, and limit our responses – but they also enable us to enrich our lives through challenge, encounter, discovery, learning, enchantment and creativity. This essay argues that we need to grow the constituency for hazards, by which I mean not simply the number of people who are willing to act but also the basis on which such actions can be founded. In the pages that follow I elaborate the lineaments of the hazard constituency and give examples of promising initiatives that illustrate what can be done to make it larger and more effective in the years to come.

Overview

The seemingly inexorable rise of disaster losses associated with floods, storms, droughts, earthquakes and other extreme natural events has, over many decades, been a source of perplexity for scholars, managers, public policy makers, and others with special interests in environmental hazards¹ (Leichenko and Thomas 2012; Kousky 2014; Hoeppe 2016). This problem has now taken on added urgency because many foresee an acceleration of future losses, propelled by growing physical risks of human forced climate change, worsening vulnerability gaps between privileged and disadvantaged populations and faltering resilience of existing institutions during an era of socio-political and technological ferment.

Analysts have identified a wide variety of possible reasons for the upward trend of losses and there is little doubt that many contributory factors are involved. But there is one important explanation that has not received the attention it deserves. The public constituency in support of improved hazard policies and programs is fundamentally weak (Burby 2003; Baker 2009; Healy and Malhotra 2009; May et al. 2011; Berke et al. 2014). This is not just a consequence of its small size and

¹ This was the question that prompted my mentor, Gilbert White, to develop the influential Chicago School of Hazards Research that focused attention on biases in human decision-making under conditions of uncertainty and the need for sustainable adjustments to natural extremes (Hinshaw 2006).

the influence of irregular, often idiosyncratic, “focusing events” that keep resetting the policy clock (Birkland 1996); perhaps more important, it is disproportionately organized around concerns that are too remote from the everyday worries and enthusiasms of most people, to initiate or sustain popular support for actions that are necessary to prevent disasters before they occur or to adopt sustainable recovery strategies thereafter.² Despite repeated warnings about the buildup of risks and vulnerabilities and the withering of resilience, as well as the roles that all of us play in exacerbating these trends, most people regard them as matters for experts and go about their daily lives without giving them much attention. Typically, a wider population only becomes engaged with problems of floods, storms, droughts and similar phenomena during times of disaster and even then only for limited periods and largely as compliant subjects that are expected to follow official directives, not query their wisdom or lobby for better policy alternatives. Meanwhile populations that (mis)perceive themselves to be unaffected by hazards and disasters remain unconnected with, and uninvested in, the policy process.

Thus far, efforts to develop effective responses to hazards have focused mainly on improving the quality of scientific knowledge and technologies of intervention, instituting legal restraints on unwanted actions, buttressing existing societal arrangements for reducing risks and vulnerabilities, developing economic incentives for sustainability-seeking behavior, and facilitating empowerment of underrepresented groups.

Most of these initiatives privilege the roles of: (1) scientific experts who are expected to supply new knowledge about hazards and hazard management alternatives; (2) technical specialists in public and private organizations that are charged with implementing and managing the products of science and technology; and (3) governmental officials that are deemed to articulate, represent and guide the interests of affected communities. (UNISDR 2009) Although there is a groundswell of scholarly opinion in favor of increasing the capacity of non-expert individuals and groups to become producers and co-producers of the knowledge on which successful actions are based (Chowdhury and Haque 2011; Donovan et al. 2014; Scolobig et al. 2015; McCarthy and Sugrue 2016), as well as growing pressure for inclusion from victims and community activists, non-experts remain on the fringes of public decision-making (Pelling 1999; Corburn 2003; Becker and Tehler 2013; Brown and Mackie 2015).

Herein is proposed a redemptive strategy that aims to empower the constituency for hazard-sensitive governance by growing its membership and restructuring their roles around a series of rebalancing maneuvers. These include: (1) re-privileging knowledge and a holistic perspective over stake-holding by different groups as a basis for decision-making; (2) re-arranging relationships between knowledge-

²Some scholars have tried to find a way around this dilemma by arguing that a focus on extreme events is misplaced and should be replaced by concern about chronic (everyday) hazards, especially in poor countries, because there a daily struggle to survive takes precedence over occasional catastrophes. However worthy such a refocusing might be on humanitarian and other grounds, it does not remove the (growing) problem of acute hazard, which is intrinsic to the human condition in all kinds of societies.

production and knowledge-consumption; (3) re-defining the distinction between expert knowledge and lay knowledge; and, especially, (4) broadening the bases for involving presently uncommitted publics in decision-making processes. Central to this thesis is the notion that existing public discourse about hazards and disasters is hampered by an unnecessarily narrow preoccupation with safety and security considerations and accompanying concerns about danger, death, damage, disruption and disadvantage. A broader policy engagement with the full spectrum of hazard themes and the contexts in which they are embedded would be highly beneficial as a loss-reducing strategy as well as being liberating and empowering, for society as a whole. The goal is to foster a mass population that is not just aware of dangers and cooperative with policies that have been devised to counter them but is able to recognize broader contexts in which those hazards are embedded and to reap benefits from exploiting interconnections with other aspects of their lives. My primary focus is the United States but the basic argument applies to other developed countries and there are major implications for the developing world also.

A Constituency Defined by Interests, Not Stakes

Before progressing further it is important to be clear about the meaning of “constituency” as employed here. In popular discourse the term refers to bodies of people who espouse particular ideals and can be mobilized to take action in support of them. Constituencies are thus related to other human collectives that have action components such as “interest groups”, “stakeholders”, “mobilization networks”, “citizens” and “communities” (Solecki 1999; Prater and Lindell 2000; Kahane et al. 2013; Hutter and Lloyd-Bostock 2013; Levine 2014; Fahey and Pralle 2016). Of these the term “stakeholder” deserves further attention because of its current prominence in discourse about hazards and disasters.

“Stakeholder” is one of the striking additions to the terminology of hazards and disaster studies in recent years. This neologism originated in the fields of public administration, business economics and finance where it has strong connotations with people or entities that stand to gain or lose from a given transaction (Sharma and Starik 2004; Mitchell et al. 1997). The term has been widely adopted by students of hazards and disaster as a way of referring to those who are affected by, or have an effect on, decisions about public safety in the face of extreme events (English 2000; Amaratunga 2011; Mojtahedi and Oo 2014). However, it remains only loosely defined with precise meanings inferred from the contexts in which it is applied. According to some scholars of emergency management “we are all stakeholders” (Lindell et al. 2007, p. 21).

The recognition of stakeholders as a discrete class of people with legitimate interests in decisions about hazards is one reflection of a more “democratic” approach to hazards policy-making that has gained recent acceptance. In the past such policies were disproportionately shaped by a small body of specialists from science, engineering, government and the environmental professions but wider pub-

lic participation is now encouraged through such mechanisms as Public-Private Partnerships and other blended expert/lay institutions that “co-produce” knowledge and action (Becker and Tehler 2013).

However, the interests of humans are both numerous and varied; many of them do not fit comfortably into the calculus of gains and losses that underlies the “stakeholder” notion. To capture these further connotations it may be more appropriate to broaden the definition of constituency beyond that of stakeholders. Especially in more privileged societies like the United States, many individuals and groups pursue vocations, cultivate talents and engage in pursuits that are guided by imagination, moral norms or shared aspirations for the satisfaction of personal or collective physical, emotional and spiritual needs rather than in expectation of deriving material gains or other advantages (Terpstra 2011; Brugger et al. 2013). In a society that employs holistic perspectives, frugality, altruism and concern for the welfare of others may be just as necessary as a healthy regard for self-preservation and the safeguarding of one’s possessions (currently the most prominent justifications for hazard policies).

Mixed motivations are the norm for a great deal of human behavior and the goal of accommodating them in hazard policies should not be viewed as an unrealistic project. Indeed, the signs of a more inclusive stance are already visible. It is increasingly common to find that public decision-making is being shaped by tenets of good governance (e.g. access, empowerment, transparency, accountability) as well as by dictates of marketplace efficiency and by political advantage (Tierney 2012; Fra 2015). The upsurge of interest in seeking justice through the application of human rights criteria to public policies reflects the potency of ideas about decision-making that go beyond narrow principles of gain and loss. In the new calculus of hazard it will be necessary to go even further, beyond such conceptions to take account of human faculties like reflexiveness, curiosity, passion, empathy, expressiveness and morality, that mediate our thoughts and actions but are driven to the edges of public policy discourse by assumptions about the primacy of expediency, survival and material welfare. Notions of hazard and disaster tap into a truly broad spectrum of human interests that requires recognition and accommodation in our responses.

In this chapter I employ a definition of the hazard constituency as emergent and potentially much larger than customarily perceived. In addition to those who are concerned about losses and protective actions, this definition takes account of people that have interests not adequately represented in conventional discourse about hazards as well as those who are not yet aware they have interests affected by hazards. Such a constituency might eventually include the vast majority of the human population once the range of conceived hazard connotations expands beyond those that are loss-centered and once the degree to which hazard is a more or less ubiquitous feature of life on Earth becomes fully recognized. At present we remain well short of that goal.

Impact-Related Hazard Constituencies

The hazards constituency is composed of many different subgroups. One useful characterization of its various parts was provided by the economist Hal Cochrane who codified the general relationship between numbers of people affected by hazards and/or disasters and types of impact (Cochrane et al. 1974, referenced in Cochrane 1975). He described a “continuum” or “cascade” of effects that range from a relatively small number of fatalities, through increasing numbers that suffer injuries, damage and other lesser impacts, to a great many whose aggregate burden is very large but who individually pay relatively small amounts for reconstruction in the form of donations and taxes (p. 23) (Fig. 1). Each of these differently-impacted groups is, in effect, a different constituency for hazard policymaking. Since Cochrane’s formulation others have employed the concept of cascading impacts to illuminate various kinds of differentiated disaster effects including the triggering of secondary disasters and other consequences that ripple far from their sources to

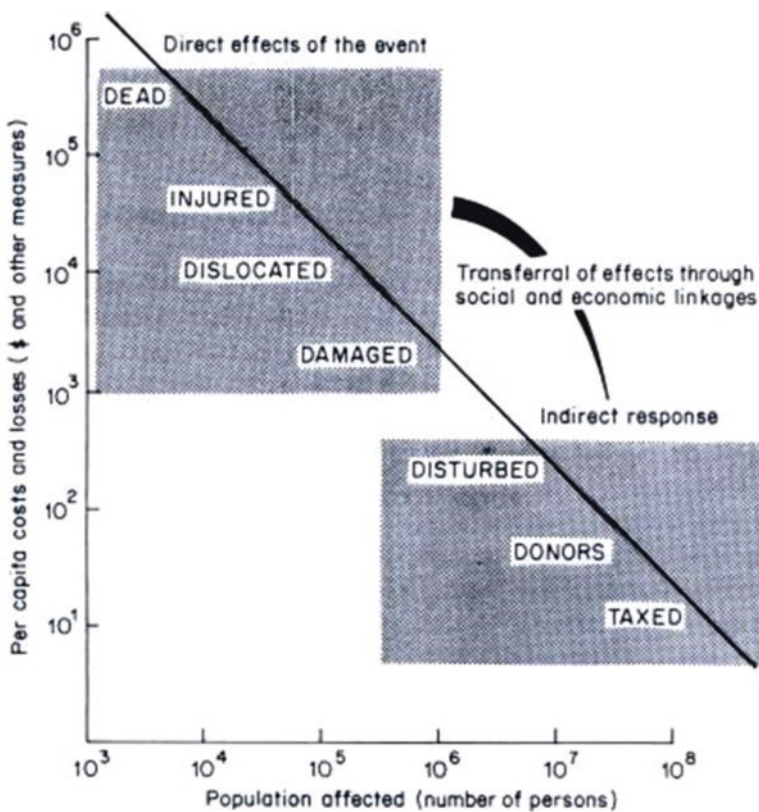


Fig. 1 The distribution of hazard effects (After Cochrane)

affect distant “downstream” places and people – in effect, other constituencies (Alesch 2007; Pescaroli and Alexander 2015; Berariu et al. 2015; Kelly 2015).

Agency-Related Hazard Constituencies

An alternative way to define constituencies might focus not on effects of hazards and disasters but on the degree to which different groups engage with those phenomena. Using this metric, the hazards constituency can be divided into three main sub-groups: a permanent constituency; a fluctuating constituency; and a latent constituency.

The **permanent constituency** consists of individuals and organizations that are more or less continuously involved in the creation and execution of hazards policies. They consist mainly of scientists and hazard specialists in academia as well as personnel from research organizations, government warning and regulatory agencies, professional associations, non-governmental civic organizations, charities and emergency management bodies. They also include private sector stakeholders with interests in investment, planning, land development or hazard management such as architecture businesses, engineering and construction firms, and insurance companies. This group usually acts in support of the legislative and administrative organs of government that have formal responsibilities for making and discharging public policies. Coalitions among these interest groups and partnerships between public and private entities are common distinguishing features (Solecki 1999; Mitchell 2006; Chen et al. 2013). The permanent constituency has also historically been the highest priority target for outreach efforts by hazards scholars and other agents of change (Birkland 1996; Alexander 2007).

The size of the permanent global hazards constituency is not known with precision but in the United States it probably lies in the range from tens of thousands to hundreds of thousands but possibly larger.³ Membership of hazard-related professional associations and employment figures for national hazard management agencies give some idea of the numbers involved. Compared with other public policy constituencies they are quite modest. For example, U.S.-based members of the International Association of Emergency Management number around 4200 and the Association of Flood Plain Management includes 6500 (International Association of Emergency Managers 2016; Association of State Floodplain Managers 2003). The National Weather Service employs about 5000, the United States Geological Survey close to 9000, the Federal Emergency Management Agency about 10,000, and the Centers for Disease Control and Prevention about 15,000. Some federal

³This estimate includes personnel with designated responsibilities for monitoring, managing or responding to natural hazards in government agencies at all levels as well as hazard scholars and researchers in public and private institutions. This is probably an overestimate of the actual numbers because only a subset of these specialists are customarily involved in the making and modification of policy.

agencies that include hazards management among their responsibilities are much larger; personnel in the U.S. Army Corps of Engineers number around 37,000 and the Department of Homeland Security (DHS) has 240,000.⁴ However, in all of these agencies there are non-professional support staff and many of the specialists have responsibilities other than hazard management; for example the vast majority of DHS personnel work on terrorism and related problems where the threats are human rather than environmental. The same is true of the very large numbers (c. 2 million) of U.S.- based “first responders” (i.e. fire, police and emergency medicine personnel) most of whom have priorities other than natural hazards.⁵ Private firms with hazard-related functions are a further segment; the world’s most important reinsurance companies – Swiss Re and Munich Re (both global in scope) – each have staffs of around 11,000–12,000. Hazard engineering companies are also large employers, sometimes including tens of thousands of personnel.

Beyond the permanent constituency lies a **fluctuating constituency** that is usually only mobilized at certain times, for specific purposes of limited duration, most often in association with threatened or actual disasters. They are mainly comprised of warned and/or evacuated populations, disaster victims, aid-giving organizations active in relief and recovery activities, mass media, representatives of the travel and tourism industries, community organizers and other activist groups. (Lovell & Le Masson 2015) In any single year these groups might number upwards of several million individuals. A recent global estimate puts the average annual numbers of displaced people at around 25 million reaching a high of 40 million in 2015 (Norwegian Refugee Council 2015). One recent report published by a Washington D.C. think tank notes that 243 million people live in U.S. countries that experienced at least one weather-related disaster between 2007 and 2012 (Dutzik and Willcox 2012). This is an annual average of about 12% of the present U.S. population. Evacuations are also reaching major proportions. (Association of American Geographers 2012) It is estimated that more than 1.7 million people were evacuated from homes in Louisiana ahead of hurricane Katrina (August 2005), and even more (3.0 million) in anticipation of hurricane Rita, a month later. A further 1.9 million evacuated in Louisiana before the arrival of hurricane Gustav (2008). Very large numbers of aid workers were mobilized for each of these storms – the American Red Cross estimated 245,000 in the case of Katrina. The effects of such displacements can be long lasting; around 250,000 people were still out of their homes in Japan 4 years after the complex earthquake/tsunami/nuclear radiation disaster of 2011.

Some members of the fluctuating constituency (e.g. institutionalized aid providing organizations)⁶ overlap with the permanent constituency, experiencing major

⁴This includes the 10,000 FEMA personnel.

⁵U.S. firefighters – more than 1 million (75% volunteers); Local police departments and Sheriffs’ officers – 637,000 full time; Emergency Medical Technicians – 155,000 (Cox n.d.).

⁶These should be distinguished from temporary or ad hoc aid organizations that spring up in response to specific, usually local, circumstances of disaster and generally subside thereafter.

expansion of their activities or shifts in their roles when risks and hazards turn into disasters. For example, when recovery programs are designed to give victims a continuing role in decisions about the future of disaster-affected communities they may exert strong influence on outcomes (Mitchell 2008). Despite the importance of the emergency phase of hazard management it often does not yield permanent recruits in support of improved hazards policies; most victims and many helping organizations are only weakly committed to long term adjustments that address other phases of disaster, especially those involving mitigation rather than emergency response. This does not mean that there is no scope for making better use of the fluctuating constituency. For example, it is estimated that as many as 63 million U.S. residents are involved in some form of volunteering each year. About 6% (c. 3–4 million) of these are believed to be active in responses to emergency, including natural disasters (United Nations Volunteer Programme 2015; Stewart et al. 2014). That population is available for recruitment to the permanent hazard constituency not just during times when the demand for emergency response personnel “surges” beyond the capabilities of permanent assistance agencies but by harnessing the disposition to new longer-term disaster-related tasks.

The largest constituency is the **latent constituency**; it includes a majority of the populations in developed countries and many of the more privileged sectors of developing countries. These are the people least likely to be vulnerable and most likely to be resilient to disaster. The latent constituency is also the least often considered as a potential resource by hazards researchers. This constituency consists of bystanders who suffer no direct losses but are indirectly linked to themes of hazard in other ways that might, under the right circumstances, move them to greater involvement. Perhaps they remain at risk to future disasters or fear that they do, without actually suffering losses. Or they may derive psychic satisfaction, spiritual uplift, emotional stimulation or creative inspiration from personal or vicarious hazard experiences. Or they perceive hazard events as gateways to opportunities for learning, teaching, empathetic bonding, entrepreneurial activity or sociopolitical change. For some of this group hazards may even be valued because they upset existing order and serve as an antidote to boredom, bringing variety, spectacle or entertainment into humdrum existence. Many of these connections with themes of hazard reflect their adherents’ everyday, long-term permanent interests rather than concerns sparked by catastrophe. Growth in this sector of the constituency might have the greatest impact on developing an effective base of public support for improved hazards policies.

The relationship between each of these constituencies and the hazards research community is worth commenting on at this point both because of the challenges that are posed and the ways in which researchers have responded. Historically, the permanent constituency has mostly turned to hazards researchers for information that helps to clarify and reduce uncertainty in planning for, and responding to, ambient risks. This has encouraged the development of models for understanding decision making about hazards and methods or techniques for communicating and applying expert information about risks and vulnerabilities to policies and programs of

action. While some critics might argue that this stance runs the danger of biasing the choice of research that is undertaken by scholars, and of subordinating inquiry to the dictates of prevailing policies, it can also be argued that theories informed by practical needs are no less valuable than those of a more abstract kind and that applied research on human response to hazards has opened decision processes to striking new ideas, new constituencies and new management strategies. Moreover, as will be shown below, there remain many opportunities for further broadening and deepening the permanent constituency by addressing the needs of expert populations that have hitherto been overlooked or neglected by hazards researchers and policymakers. In addition, we are entering an era that contains new kinds of risks and vulnerabilities as well as the familiar ones around which present policies have been crafted. This creates a context of exploration and encounter that, as students of the history of geographical knowledge well know, has massive potential to affect the way hazard problems are framed and addressed thereafter (Hutcheson 2013; Douglas 2014; Wilson 2016).

The fluctuating constituency has previously attracted a great deal of attention from the research community. Herein victims (or, more accurately, survivors) are often a focus of concern, closely followed by helpers and disaster relief organizations. Quick response studies of human behavior and institutional performance in disasters are a staple of research, providing windows into the gaps and barriers that separate policy intentions from policy achievements. There is also a high demand for researchers to diagnose flaws in the delivery of disaster aid and to help victims navigate the complexities of formal and informal disaster assistance systems. Indeed, inadequate understandings of the hazards they face due to their complexity, and of disadvantages that are driven by societal inequalities, are concepts often invoked by hazards researchers to explain the poor fit between people in the fluctuating constituency and risky environments. Increasingly, researchers are also alerting aid-giving organizations to neglected local knowledge and its potential uses, with a view to assisting the empowerment of survivors as active participants in their own protection and by helping them work with experts to co-produce better alternatives to existing disaster response services. However, the fluctuating constituency tends to have a selective engagement with hazards policy making; the difficulty of shifting public attention from reactive and palliative policies to anticipatory and preventative ones has long been noted by researchers and efforts to improve policy have had to work against the survivors' near-term focus and a short issue-attention cycle in the mass media, both signal characteristics of the fluctuating constituency.

The latent constituency may pose the toughest challenges of all, not just because it is the least mobilized at present but also because the research community needs to raise its own awareness of this neglected opportunity. We presently lack both a theory of hazard that makes room for the latent constituency and have been slow to accumulate a body of research findings that could contribute to such. A dearth of research on the making of hazard adjustment decisions under conditions of ambiguity (i.e. the mixed motivations, fuzzy objectives, and shifting frames of reference that characterize decisions about hazard taken by people for whom safety and security are not the primary considerations) is a particularly important lacuna. It is time

to recruit those uninvolved groups and individuals who care about hazard in all its manifestations, benign as well as pathological, to the common endeavor of designing a better fit between people and risky environments.

In summary, there is an uneven fit between the hazard research effort and the needs of the different constituencies. There is a strong fit with a relatively small permanent constituency, a partial fit with a much larger fluctuating constituency, and a poor fit with a latent constituency that probably includes a majority of the global population. Viewed from the perspective of the numbers of people that might be recruited to a more enlightened set of public policies there are enormous untapped opportunities available to exploit.

Ways of Growing the Constituency

The growth of a constituency can mean many things in addition to a simple increase in the number of its members. It can also mean an expansion of roles, reach and effectiveness, leading to *broader engagement* with the hazards meta-problem. For example, hazard constituencies typically fluctuate in size as the effects of disasters surge and then recede. A more durable (i.e. long lived) constituency would be more effective in supporting the formulation and adoption of public policies by keeping a critical mass of people actively engaged with the process of public decision making over a longer period. Growth might also mean a more diverse constituency, containing members with different vulnerabilities and experiences, able to take on a variety of roles and engage with a broader range of human responses in multiple venues (Weichselgartner and Pigeon 2015). Diversity would tend to discourage policies becoming dominated by single-issue interest groups that typically favor narrowly framed solutions when breadth and comprehensiveness are also needed. Closely connected with diversity are qualities like flexibility, versatility, robustness and representativeness that also usually function in ways that are likely to command broad-based support (Comfort 2005; Benadusi 2014; Steelman and McCaffrey 2013; Wagner et al. 2014). While a constituency that is larger, more durable, more diverse, more flexible, more versatile, more robust and more representative would likely be better positioned to make improved hazards management decisions, it would not necessarily be more committed to doing so or more empowered to act. The growth of commitment and empowerment are strongly influenced by the persuasiveness of arguments advanced in support of other priorities and by their positions on the public agenda.

Within the confines of this brief essay it is not possible to do more than provide a few examples of constituency building that are indicative of what might be accomplished by a more ambitious effort/project/campaign. The next section provides specific examples of recent initiatives that illustrate different ways of growing the constituency. They include efforts to broaden the permanent constituency by attracting involvement of professional communities that have not historically been much associated with it (e.g. specialists in historic commemoration and heritage

preservation; health professionals). Also included is a new decision support tool (i.e. Health Impact Assessment) that shows promise as a means of recruiting members of the fluctuating constituency into the permanent constituency and perhaps also of mobilizing some members of the latent constituency. The provision of “knowledge” is a common currency in all of these initiatives. Finally, the potential for mobilizing members of the latent constituency, independently of periodic involvement in disasters, is illustrated by noting the range of possible connections between aesthetic and artistic dimensions of disaster and the concerns of hazard managers.

Growing the Permanent Constituency by Adding New Interest Groups

Interest groups that were listed as part of the permanent constituency in Section “Agency-related Hazard Constituencies” are not of one mind about, or all equally involved in, hazard policy matters. It can be argued that the permanent constituency would be more effective if its members pursued mutually reinforcing strategies. For example, the insurance industry and the economic investment community tend to give priority to the profitability of their enterprises over the reduction of aggregate societal losses, though these choices do not necessarily always conflict. However, for purposes of illustration let us examine two other interest groups that have heretofore played little part in the formal hazards policy process.

Heritage Preservation and Commemoration Interest Groups

Compared with the protection of life and private property against disaster, the protection of public historical and cultural sites, buildings and artifacts has not been a high priority in the United States and many other countries (Thorp 2006). Too often public discourse is dominated by anxiety about the potential for irretrievable loss if valued heritage sites are affected by burgeoning threats. This may now be changing, especially in the aftermath of hurricanes Katrina and Sandy. U.S. federal programs for disaster assistance are now increasingly cognizant of the need for special attention to the protection of unique or highly valued places (Morgan et al. 2006; Appler and Rumbach 2016; Horowitz 2016). Recognition of disaster as a threat to heritage has been assisted by growth in the remit of preservation interest groups. As the scope of preservation widens to include complex cultural landscapes, as well as individual natural sites or buildings, preservation specialists are beginning to form partnerships with groups interested in improving urban environmental quality, biodiversity, the rights of indigenous peoples, and last, but not least, the management of hazards and disasters (Taylor et al. 2015).

Commemoration of hazard events is often closely connected with heritage preservation. Commemoration can play important roles in community recovery and in alerting populations to continuing threats, but there are many examples of missed opportunities to do so. (Natural Hazards Observer, August 2016) Much more remains to be done, especially in helping to understand the malleability and fallibility of memory (Mitchell 2000, 2011), the gaps and biases in our collective recollections (Foote 2003) and the contributions that humans have made to living successfully with the threat of disaster. One exception of special note to hazards scholars is the flood marker on Boulder Creek, Colorado that severally inscribes the site of repeated inundations, alerts us to the threat of even larger events and – perhaps most importantly – celebrates the achievements of Gilbert Fowler White “the father of plain management” (Hinshaw 2006) (Fig. 1). By extension, World Heritage sites and other locations with acknowledged cultural value, that demonstrate the evolution of successful engagements between society and natural risks, could be much more effectively used to educate the public about the record of human capacities for tackling previous threats as well as its positive implications for addressing new risks like climate change (Mitchell 2015, 2016a).

The inclusion of preservation interest groups in the permanent constituency is particularly valuable because they force consideration of how the competing values of authenticity and safety should be weighed and mediated in the formation of hazard policy. Recently the major Italian earthquake of August 24, 2016 has brought this tension to the fore once again. Whereas most of the permanent constituency is arrayed behind programs intended to “build back better,” preservationists are often more attuned to demands for the replication of historic structures, in as near an original state as can be achieved and to their survival in perpetuity. Speaking of post-earthquake reconstruction efforts, the head of the crisis unit at Italy’s culture ministry has commented: “As much as possible, the idea is to build as it was, where it was” (New York Times, September 19, 2016, A8). The need to retrofit and reconstruct ordinary homes and businesses to make them more disaster resilient is now widely accepted but the jury is still out for historic heritage structures. Is a safe simulacrum an acceptable substitute for an authentic but vulnerable original or a damaged relic? Countries like Japan, that have constructed replicas of castles and other monuments devastated during World War II, but invested them with fire and earthquake-proof features not present in the originals, seem to have answered this question in one way that permits hazard management goals to be incorporated in preservation policies. People in other places might come to different conclusions. It is in the working out of these contradictions that a more robust hazards policy is likely to emerge. No doubt other additions to the permanent constituency will present opportunities to consider further nuanced approaches to disaster preparedness and reconstruction by forcing consideration of legitimate values that have not been adequately represented in previous policy making.

Health and Wellbeing Interest Groups

Perhaps paradoxically in view of broad public concern with deaths and injuries from unexpected events, health considerations have not figured prominently in the literature and practice of hazard mitigation and disaster recovery, especially in more developed countries (Smith 2011; International Journal of Mass Emergencies and Disasters 2012; Gall et al. 2015). This deficiency appears to be fading. In recent years the definition of health has been applied to communities as well as individuals. In the words of a recent influential report: “*a healthy community is safe, economically secure, and environmentally sound, as all residents have equal access to high quality educational and employment opportunities, transportation and housing options, prevention and healthcare services, and healthy food and physical activity opportunities*” (Institute of Medicine 2015, p. ix). Operationalization of this new, more holistic, health concept is now ongoing in the United States. Health researchers, professionals and public leaders are vigorously promoting a “**Health in all Policies**” (HIAP) campaign that seeks to elevate the salience of health in public decision-making across the board – including decisions that affect disaster recovery and pre-disaster resilience (World Health Organization 2013; Rudolph et al. 2013).

For the first time disaster recovery is now formally included among the responsibilities of the nation’s flagship health bureaucracy. Leadership in this endeavor has been vested in the Office of the Assistant Secretary for Preparedness and Response in the U.S. Department of Health and Human Services (DHHS). DHHS will now oversee the Emergency Support Function of the National Response Framework and the Health and Social Services Recovery Support Function of the National Disaster Recovery Framework (U.S. Department of Health and Human Services 2016). Insofar as holistic hazard management strategies seek to create communities that are economically and environmentally sustainable (Natural Hazards Research and Applications Information Center 2001; McEntire et al. 2002; Peizer 2014), the goals of the two efforts (i.e. HIAP and holistic disaster recovery) are mutually reinforcing. Both also pivot around an expanded set of points for intervening and leveraging policy changes. In the process the hazard constituency also benefits from the addition of an influential professional interest group that previously had been little involved in most aspects of hazard reduction except emergency response.⁷ There are approximately 110,000 Public Health workers in the USA with demand for perhaps an additional 250,000 (Johnson 2008).

⁷Although growing in importance Public Health professionals have a complex relationship with other members of the medical and health communities (Starr 2009) and often possess less prestige (score 5.9–6.0) than surgeons, physicians (7.6–7.7 – the highest rated category) and other health workers (6.4–6.6) (Smith and Son 2014).

Retaining Involvement by the Fluctuating Constituency: A New Methodology

One way to keep survivors engaged with hazard policy making over the long term would be to involve them more intimately in planning and implementing post-disaster reconstruction and recovery actions. (Mitchell 2004) Attracting and holding the interest of people who have been affected by disaster is facilitated by the development of **Health Impact Assessment (HIA)**, a recent decision-support tool that is being adapted to encourage holistic hazard reduction policies that contribute to improved health (Fig. 2) (Mitchell 2016b). It is a highly flexible instrument that relies heavily on the contributions of laypersons, as well as experts, both in formulating visions of future health that act as targets for achievement and in supplying information about current health problems and responses. In other words, changes



Fig. 2 The Gilbert White flood marker on Boulder Creek, Colorado

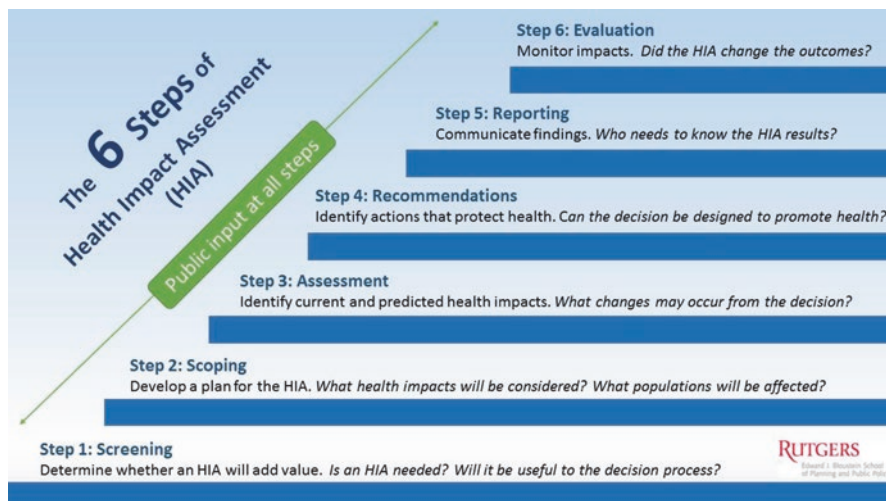


Fig. 3 The health impact assessment process

in the concept of health, especially the switch to a collective/community focus, and recognition of the role of hazards in shaping health, are making important contributions to growing the hazards constituency.⁸ For a more complete evaluation of HIAs in the context of disaster, see the set of reports issued by the Bloustein School of Planning and Public Policy at Rutgers University (2016) (Fig. 3).

In some respects HIAs are similar to Environmental Impact Assessments (EIAs). Indeed, the assessment of health impacts of public projects was originally intended to be included in EIAs, as construed by the National Environmental Policy Act (1970) but this component was never implemented. It might be possible to merge HIAs into EIAs though advocates of HIA are wary of moving in this direction because they judge that EIAs have lost some of their potency as a result of being bureaucratized and routinized. In contrast, HIAs are viewed as breathing fresh air into decision-making. At present about 400 such assessments have been completed in the United States, mostly that involve modifications of the built environment and transportation infrastructures but the Robert Wood Johnson Foundation and the Pew Research Trusts are spearheading efforts to expand the use of this decision support tool, especially into the hazards and disasters arena.

In summary, the importance of HIA should not be construed narrowly. It is a methodology with the potential to open up decision making to consideration of a raft of factors that are widely recognized as important drivers of health (e.g. environmental quality; socioeconomic status; cultural preferences; support networks) but are not restricted to the ambit of health. A similar range of factors also underlie vulnerability to natural and human-forced hazards and purposive changes in these

⁸ Disaster health specialists have also recommended adoption of a broader Health Systems approach to hazards management focused mainly on synthesizing emergency responses (Bayntun 2012).

variables can have major impacts on improving resilience against stresses of many kinds. (Berke & Lyles 2013) In other words, Health Impact Assessment permits joint consideration of factors that are deeply implicated in collective susceptibility to a wide range of hazards and disasters, not just those that have to do with the health status of individuals as defined by conventional measures of wellness (i.e. lack of disease). If this tool becomes more widely adopted in disaster contexts it is likely to capture and retain the involvement of members of the fluctuating constituency thereby benefitting the growth of a larger and more permanent hazards constituency.

Mobilizing the Latent Constituency

The members of a latent constituency remain immobile either because they see no reason to become involved or because they are unaware of an issue that might otherwise be compelling. In the case of the latent constituency for hazard, if the members incur no penalties for inaction or perceive no economic or political benefits from becoming involved in public decisions, inducements for mobilization must be sought outside the conventional calculus of gain and loss. Where might these be found? What other choice criteria exist? In previous publications I have sought to answer this question by directing attention to a range of impacts that hazards have on the functioning of society but are largely ignored by researchers (Mitchell 2005b). Ambiguity, novelty, creativity, performance, regulation and social learning are essential elements of any society that are rarely given significant weight in the mechanistic and metabolic system models of hazard that are now in routine use. These neglected factors might be accommodated in complex adaptive system models being pioneered by researchers but they have not, thus far, been included in them (Coetzee et al. 2016; Butsch et al. 2016). Though of importance in the daily lives of most laypersons such “fuzzy” decision factors are also largely missing from the formal procedures of public agencies that administer hazard policies.

In the absence of scientific guides for decision making that take account of such matters it may be worthwhile exploring branches of knowledge that have been underrepresented in the literature of hazard studies, especially the arts and humanities and various kinds of local information that is traditional or vernacular. The arts and humanities bring questions about creativity, meaning, value and significance to center stage and vernacular perspectives offer a window into the way laypersons have synthesized these and other streams of information to create coherent interpretations of risk-laden phenomena (Davidson and Goldberg 2004; Lack 2011). Given the vast scope of the literature that is potentially relevant the samples that follow are indicative rather than definitive.

Scholars from the arts and humanities have made significant contributions to hazards studies in recent years. However, much of this discourse remains internal to the disciplines of the researchers and not obviously connected with the project of hazards reduction. Some emphasize the degree to which catastrophic events have

spurred artistic creativity (MudiMembers of a 2010) and have shaped, or are reshaping, national traditions of art and artistry, on the one hand (Menegazzo 2014; Condry 2011), and the evolution of transnational artistic movements on the other (Presto 2011). In some of these cases artists play roles as chroniclers, interpreters and incidental therapists for troubled communities (Overton 2014; Atlas 2013; Spayde 2013; Murphy 2014) but the artistic stance can also be self-referential; at least one observer has pointed out that artists may sometimes use their talents to distance themselves from the consequences of events that disrupt the communities in which they live and work (Larochelle 2013). Indeed sometimes the function of disaster art is to make the experience of victims available to external observers who might otherwise not have access to the emotions that sometimes accompany disaster. At other times it is to insulate or distance the observer from the catastrophe, thereby making it comprehensible and “safe” for experiencing (Guth 2015).

At first glance publications like those just referenced might seem to have little to offer hazards policy specialists. But they do signal overlapping interests between the artistic community (both producers and consumers) and the hazards management community; interests that provide a basis for communicative *action* about matters that have different but yet joint relevance for both communities (Habermas 1981a, b, 1998). Each is available to be recruited by the other in support of their separate goals because of the overlapping interests. This opens a new kind of avenue for growing the hazards constituency.

History and culture-focused interest groups also have links to the theme of environmental hazard because of the light hazards shed on the structure and evolution of cultures and the role of perception, representation and social production (of nature) – processes that are essential to the creation of meaning in any human group. Thus many have commented on the drama and spectacle of natural risks and disasters as staples of popular culture (Sigurdsson and Lopes 2015). Others have shown how the language of immigrants has often not been equipped with terms and concepts that rendered meaningful the nature and scale of hazards they confronted in newly colonized lands – a feature with renewed contemporary implications among migrant populations that are increasingly unmoored from familiar landscapes (Cosgrove 2008). Yet others have pointed to destabilizing effects of hazard events and to long-term shifts in the interpretation of hazard that have repercussions for the broader societies in which they occur (Steinberg 2000; Bankoff 2003; Dynes 2003; Kempe 2003; Mitchell 2011; Joye 2014; Dodds 2015). The work of historical geographers on relationships between specific places and nuances in the production of science (e.g. Livingstone 2003) has been taken up by some hazards scholars to show how the same processes are at work in framing and setting the boundaries of contemporary hazards (e.g. on the volcanic island of Montserrat) (Donovan and Oppenheimer 2015). Some of these humanistic researchers have employed such insights to assist educators faced by the task of equipping succeeding generations with knowledge to confront new hazard regimes (Pawson 2015).

Yet other humanistic interest groups have taken a more overtly applied stance by viewing art, literature, music and similar humanistic pursuits as aids to science in the identification, perception and management of natural hazards (Izadkhah and

Gibbs 2015; Cartwright and Nakamura 2008) or as tools of disaster recovery (Looman 2006). For example, artistic projects involving the commemoration of disasters (Locke and Yates 2015), or reflecting community vulnerabilities to disaster, are helping to “rebrand” the public image of afflicted cities (Guazon 2013; Ten Eyck and Dona-Reveco 2015), raising awareness about local manifestations of risk-inflected global processes like climate change (Johnson 2012) and providing evidence of hopeful responses to these daunting challenges (Dunaway 2009). The artistic imagination of environmental and social futures in places impacted by extreme natural events has also attracted landscape painters, installation artists and photographers (Jackson 2015; Laroche 2013). This work is in part intended to assist disaster affected communities recover a sense of coherence and purpose in places where customary relationships between people and environments have been fractured and to choose among alternative visions of the future.

The preceding examples are but a fraction of the humanistic and artistic dimensions of risk that rarely are integrated into the making of policies and programs about hazard management. This is not the place for a more extended discussion but rather is intended to serve as an invitation for such to occur.

From Constituency to Movement to Culture

The foregoing pages have identified ways of growing the numbers of people who are willing to act in support of more sensitive and more holistic management of natural hazards, but they leave unanswered the means by which these various constituencies might be mobilized, in concert, rather than separately. That might require the construction of a broader *movement* that represents the next stage in the evolution of human-nature relationships, out of which might arise a permanent *culture* of judicious decision-making, perhaps founded on notions of continuing adaptation to hazards. The precise components of such a movement or such a culture, and their articulation, are appropriate topics for more extended treatment than can be attempted here but some pointers toward that goal are in order.

There is an extensive literature on cultural dimensions of hazard and disaster that affect behavior in the face of extreme risks (Kruger et al. 2015; International Federation of Red Cross and Red Crescent Societies 2014) but the number of publications about the creation of new hazard-sensitive movements and cultures is sparse. Most hazards reduction movements seem to have been stimulated by the emergence of grass roots protest organizations in the wake of specific flood disasters like the Memorial Day flood in Tulsa, Oklahoma (1986) and Hurricane Katrina (2005) in New Orleans (Blocker et al. 1991; Luft 2009; Heijmans 2009) As such they represent action mainly by the fluctuating constituency identified above.

Various individuals and groups have advocated for the creation of much broader hazard-sensitive cultures, often under different names and with slightly different orientations: “risk society” (Beck 2006); “risk culture” (Fichtelberg 2010), “culture of prevention” (Annan 1999), “culture of preparedness”, “learning culture of safety

and resilience” (UNICEF 2014), and “culture of disaster resilience” (Birkmann et al. 2015), among others. Most of these campaigns have targeted communities of hazard research and management professionals though some, like “sustainable hazards mitigation,” which fed off the widely publicized global movement to achieve “sustainable development”, addressed wider audiences (Mileti and Gailus 2005). Much of the energy that went into this effort now seems to have been folded into the well-publicized movement to reduce risks of global climate change (Endres et al. 2009; Klein 2015)

Valuable though they may be, none of these endeavors captures the sort of culture that is encouraged in this chapter. As argued herein the objective is to re-center decisions about hazards in the context of an adaptive culture that integrates contributions from the arts, humanities, sciences and vernacular wisdom to assist the making of choices, by experts and laypersons in all decision contexts, and subject to the heterogeneous mixes of rewards and penalties that typically confront humans.

Conclusions

The gist of this essay is that a determined initiative to grow the constituencies that have an interest in hazard response policies and practices is both warranted and promising. For too long hazards scholars and managers have been content to target their work to a relatively small permanent constituency and a larger but impermanent body of users (i.e. the fluctuating constituency). This has not well served the research community, hazard managers or the broader public, as evidenced by our dissatisfaction with the trend of losses and our continuing search for better hazard adjustments.

However, new opportunities for advancement are aborning. Established bodies of health and heritage professionals that previously had little connection with hazard decision-making are showing new interest and other skilled groups will likely join them, bringing new ideas to bear. A societal trend toward expanded conceptual framings of problems like hazards, environmental change, health, social justice and the like, has opened the way for the forging of new partnerships among problem analysts and agents of change. It has also given impetus to inter-disciplinary synthesis and the search for holistic or integrative concepts, methods and solutions (e.g. Health Impact Assessments).

Evidence that hazards serve many functions beyond those of loss is there to be uncovered and put to work by researchers who are prepared to widen their investigative horizons. This means including in a common discourse, specialists from all branches of knowledge including the arts and humanities as well as the specialists from the environmental sciences and social sciences. It also means greatly increasing the participation of laypersons whose knowledge of hazards in specific sites is presently underrepresented in decision forums. In addition, recognition that democratic processes of decision making require consideration not just of those with assigned formal roles, and those who are activists able to make themselves heard,

but also of those whose awareness of their roles in creating and maintaining hazard is low, whose interests in hazards are latent (but nonetheless real) and whose voices are generally silent. They also serve who only stand and wait.

It is time to bring together the waiters and the doers as well as the authorized participants and the insurgents in a common endeavor. A larger and more effective constituency for judicious hazard management is possible. This can be the first step towards creating a social movement that culminates in a new hazardous-sensitive culture; one that is able to operate successfully in an environment that is not just complex and uncertain but replete with ambiguities. The ambition of our agenda should be commensurate with the task at hand.

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The Role of Landscape Experience in Disaster Risk Reduction and Climate Change Adaptation. Is It a Strategy for Democratizing Resilience?



Sara Bonati

Abstract According to Beck’s “risk society” theory, local and global dynamics are interconnected, each contributing to frame new social, environmental and political risks in future scenarios. In this context, actors on the local scale have an active role in the production of changes and they are also extremely sensitive to the consequences of global phenomena (Wilbanks and Kates, *Clim Change* 43(3):601–628, 1999). Thus, as Wilbanks and Kates state (*Clim Change* 43(3):601–628, 1999), the study of global dynamics would present relevant benefits from giving more emphasis to the bottom-up perspectives and to the scale analysis. A bottom-up approach of place interpretation is here presented as a potential inclusive and democratizing approach. In particular, this chapter argues for a democratization of resilience policies, adopting landscape experience.

Keywords Landscape · Resilience · Institutions · Governance

Introduction

According to Beck’s “risk society” theory, local and global dynamics are interconnected, each contributing to frame new social, environmental and political risks in future scenarios. In this context, actors on the local scale have an active role in the production of changes and they are also extremely sensitive to the consequences of global phenomena (Wilbanks and Kates 1999). Thus, as Wilbanks and Kates state (1999), the study of global dynamics would present relevant benefits from giving more emphasis to the bottom-up perspectives and to the scale analysis.

According to these premises, recent literature on risk suggests the integration between climate change adaptation (CCA) and disaster risk reduction (DRR), promoting the interaction and cooperation between the different scales of action (e.g. Rivera and Wamsler 2014; Birkmann et al. 2015; Forino et al. 2017). In this

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interaction, the local scale should receive more attention, especially in terms of the decentralization of control dynamics and the empowerment of local stakeholders (Ara Begum et al. 2014). At the same time, the local scale should be viewed in relation to global events and to the potentiality of its intervention in their reduction or mitigation. Local communities are looking for new mitigation, adaptation and resilience strategies that could be useful to reduce vulnerability also at the global scale, contributing directly to global risk reduction or simply promoting best practices that could be replied in other places.

Accordingly, this work will discuss how to improve the role of communities in producing resilient places and how to democratize resilience. In particular, the chapter adopts the concept of landscape, defined by its spatial and social components, as a holistic, bottom-up and democratizing concept.

Investigating democracy in disaster risk and climate change studies means looking for actualizing the contemporary need to move to a local and participative level in disaster governance (for a definition of disaster governance, see Tierney 2012). The democratization of disaster governance could contribute to increase the effectiveness of DRR and CCA strategies at the different scales. In particular a bottom-up approach of place dynamics interpretation (through the observation of landscape) is here suggested as a potential inclusive and democratizing approach. Thus, this chapter argues for a democratization of resilience policies, adopting landscape experience as a useful starting point.

Defining ‘Ecological Democracy’

Ulrich Beck’s contribution in risk studies highlights the role of consumerism and forms of “social control of the consequences of over-consumption” (identified with ecological modernization and amnesia of environmental problems) in producing environmental crisis (Wisner et al. 2004). According to Beck, new risks are introduced by modernization and by the idea that we have control of everything. He states that there is a volunteer “organized irresponsibility” that he terms as a form of imposed amnesia or denial of the risks. The system establishes what is risk and what is not, normalizing some crises. He says: “It is not the rule violation, but the rule itself which ‘normalizes’ the death of species, rivers, lakes” (Beck 2009 p. 91). Thus, in some way, the system, as conceived currently, decides to ignore some risks (so ‘imposed amnesia or denial’), establishing levels of environmental and human tolerance. It is the case of thresholds of pollutants in water and air (e.g. the PM10 limits of tolerance under which the system does not intervene).

Therefore, according to Beck, both the strategies of risk management like “conserving biodiversity”, “reversing global warming”, and “disaster reduction”, and the attempts of impacts management would fail to investigate and discuss the deep origins of risk (this produced a discussion with Campbell and Currie 2006, that

defended the relevance of disaster analysis).¹ He states that these strategies never address the root causes of environmental problems, limiting their efforts to “fixing” them. Beyond the discussion, what appears of interest in Beck’s position is the recognition of the need for a social force, coming from the bottom-up, to improve studies of the causes of disasters. This social force (or social movement) is what Beck identifies as “ecological democracy” (Beck 1992, 1995).

The concept of ecological democracy has been addressed in political ecology and environmental justice debates (Watts 2000). For example, studies on environmental justice focus on rights distribution, participation, and environmental movements (e.g. reactive movements in response to unjust situations). In geography, authors like Bullard, Wright, Bryant, Pulido and Cutter (Agyeman and Evans 2004) stimulated the interest in concepts like equity, justice and their spatiality that were introduced in hazard vulnerability studies. Finally, the political ecology of hazard vulnerability has focused on studying the relationship between social inequalities and exposure to risks (Collins 2008; Wisner et al. 2004; Oliver-Smith and Hoffman 1999; Hewitt 1997; Watts 1983).

Mitchell (2006) defines ecological democracy (Mitchell 2006; Ungaro 2005; Shutkin 2000; Mason 1999; Faber 1998; Morrison 1995) as a different model of democracy with the purpose of involving citizens in environmental decision-making. Moreover, he states, it is the equal distribution of environmental amenities and the absence of difference in exposure to environmental degradation and consequently, we can add, to risk.

In the last decade, the debate on democracy has been dominated by two different theories: deliberative democracy, the dominating one, and social choice theory. The first is based on a deliberative system, where people potentially affected by a decision can deliberate on that decision. In the second theory, the deliberation is not considered. It is based on the aggregation of ideas. However, the limit of this second system is its incapacity to create aggregation (on this, see Dryzek and List 2003).

Accordingly, in the last years the literature has showed a tendency towards the introduction of participation and direct democracy in governance practices (Bucek and Smith 2000). Examples have been identified by Helmut Wollman, Brian Smith, Jan Bucek and Eran Razin (see Bucek and Smith 2000) about e.g. the role of direct democracy, sublocal institutions, and tendencies against extensive participation.

According to these premises, ecological democracy in disaster and climate change studies could be interpreted as the need to move to a local and participative level of risk management, where the community has an active and central role and acts without waiting for top-down processes of inclusion.

¹ Scott Campbell and Greg Currie, in 2006, published a paper entitled *Against Beck. In defense of risk analysis*, in which they answer Beck’s critiques of epistemological fundamentalism and the methods of risk analysis. The authors accuse Beck of not knowing in depth the mechanisms of risk analysis.

Participation in Disaster and Climate Change Studies

According to van den Hove (2000), there are different levels of participation that take place in different situations in which the stakeholders are invited to participate formally or informally in the decision-making process. However, she states the need for an extended period of participation to be able to guarantee a higher level of legitimacy in the decision-making process.

Chambers (1994) is the first to introduce participation in social studies, suggesting the PRA method (Participatory Rural Appraisal). The purpose of this method is to collect information and facilitate the active participation of all the members of a community in the decision-making process. With this method, a community would have the basis to use its knowledge in order to solve local difficulties (van Aalst et al. 2006, p. 167). In participatory planning, the community works for the production of information, generating maps, observing, quantifying, estimating, and comparing data and information. Moreover, it participates in the process of interpretation and elaboration of the results. Thus, participation is the active involvement of all the community in building policies and strategies of development and in analyzing, managing, implementing, monitoring and valuating through a process of decentralization and sharing of the decision-making process (Godshalk et al. 2003). Accordingly, participation is a way through which people can increase their quality of life and produce social changes. In this way, participation is useful also for making individuals responsible for specific questions. However, this interpretation of participation typically emerges from top-down initiatives.

The role of participation has been recognized also in disaster studies and continue to arouse attention in disaster risk reduction research (e.g. Gaillard et al. 2013; Clark-Ginsberg 2017; Henly-Shepard et al. 2015). Calls to participation are present also in scientific literature and policy documents on climate change adaptation (e.g. UNFCCC 1992, p. 17; IISD et al. 2003; Few et al. 2007; Adger 2003).

Anderson and Woodrow (1989) are the first researchers to introduce participatory methods in disaster research, investigating the system of relief response during disasters. According to them, this process needs to receive the support of the local population in order to better manage the crisis and plan the reconstruction.

PCRA (Participatory Community Risk Assessment) and PDRA (Participatory Disaster Risk Assessment, Pelling 2007) are today used in DRR strategies. One of the purposes of disaster risk reduction is to increase community resilience and to make the community ready to handle the emergencies and work proactively in order to identify and deal with hazards and vulnerabilities (Kelman et al. 2012, p. 12). Thus, PCRA constitutes “the sum” of participatory methods used to analyze and measure potential dangers, vulnerability and response capacity in order to support the local process of disaster risk reduction (van Aalst et al. 2006, p.165). Similarly PDRA is a community-based method used for DRR.

Participatory methods in risk and disaster governance were also introduced by the Hyogo Framework for Action (2005–2015) that underlined the need to facilitate the access to information, resources and power by community members and

stakeholders in order to improve actions of DRR (Pelling 2007, p. 2). Recently the Sendai framework for Disaster Risk Reduction 2015–2030 (SFDRR) has underlined the need for “all-of-society engagement and partnership” in disaster risk reduction. Participation must be “accessible and non-discriminatory, paying special attention to people disproportionately affected by disasters”. Moreover, “organized voluntary work of citizens” should be improved (UN Sendai framework 2015, p. 13).

However, van Aalst et al. (2006) argue that the participatory processes have some limits and in particular one of them is that a community can adopt these strategies but it can continue to not consider DRR or CCA as a priority with consequent and negative effects on their effectiveness.

The Democratization of Resilience in Disaster Risk Reduction and Climate Change Adaptation

According to van Aalst et al. (2006), participatory strategies alone do not constitute an adequate solution to disaster risks and climate change; they state that the priority should be to build participatory awareness of risk. In this way van Aalst et al. (2006) meet Beck’s vision of fighting against the volunteer political denial of the risks. The “amnesia” of risks and human culpability, discussed by Beck, could be overcome through the adoption of innovative systems of education able to promote awareness of community power ahead of disasters and in building resilience.

About this, Mercer (2010) states that a local and bottom-up approach is needed in disaster risk reduction (and we can add in climate change adaptation) in order to ensure the sustainability of the policies adopted and to create resilient communities. In 2007, UNISDR underlined the role of community in the promotion of resilience and defined community resilience as “the degree to which the community has the necessary resources and is capable of organizing itself both prior to and during times of need” (UNISDR 2007). In this way, it implicitly emphasized the need for sustainability and democracy in DRR and CCA.

Democratizing resilience means, first of all, to reduce social differences (social vulnerabilities) ahead of risks and disasters, as also suggested by SFDRR. Moreover it means to implement an “open model” in disaster risk reduction and climate change adaptation. Because a lot of challenges are new, an open process has more possibilities to produce innovative answers and “more preventive and pro-active approaches” (van den Hove 2000, p. 464). A system of this kind should be opened to the contribution of different stakeholders that are not usually involved in the decision-making process and that can contribute to higher quality levels of information (van den Hove 2000). Thus a first relevant step in DRR and CCA is to understand the relationship that people create with their geographic, political, and socio-cultural spaces and the relations that places create with other places.

The Usefulness of the Landscape Concept

The growing attention and response to worldwide environmental campaigns, like Greenpeace and WWF initiatives, is a first step towards collective responsibility and a first way of participation, as Mitchell states. Moreover, the increasing perception of environmental injustices and the consequent public response may be considered a new form of exercise for participatory democracy (Mitchell 2006). However, how to reach a high level of local awareness and active involvement? Which are the tools that communities have in order to understand what can affect their lives? The current consensus in the literature is that people have the ability to deal with local and global emergencies and more generally with risk situations, as well as to increase capacities of resistance, resilience and adaptability. Thus, which are these abilities? The concept of landscape can be a democratic tool in risk vulnerability analysis. Thus, the first step is to understand what landscape is and what its potentialities in this research field might be.

We can describe landscape as a dual concept, defined by its spatial and social components. It is the result of the action of two forces. The first force is the action of space organization operated by local communities (Vidal de la Blanche and Martonne 1922). This results in a differentiation on the regional scale that is not only in the natural conditions but also in the cultural conditions that materialized in models and territories of different settlements (Antrop 2000). The second force comes from natural dynamics or human- nature relations. Landscape is the point of contact between humans and environment. It is the mirror of social and natural systems and their interactions. From them can be generated calamities that can modify temporarily or permanently, marginally or deeply, the characteristics of places (Antrop 2005) and that impact also on the social organized space.

Landscape is the visual (and more generally sensorial) result of human actions on nature. According to Turco (2002, p. 7), it is the empirical representation of territoriality. It is not simply an aesthetic representation but also the result of the social practices that built it in the past and that continue to modify its aspect (Castiglioni 2009). Thus, landscape can be used as a lens for seeing the dynamics that transform places (Fig. 1).

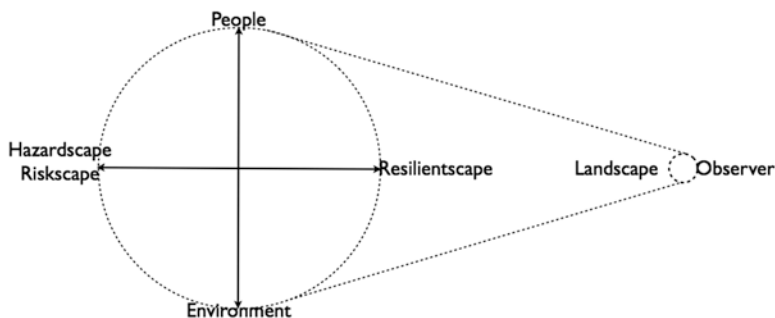


Fig. 1 Re-elaboration from Castiglioni and De Marchi (2007), “building resilientscapes”

The dynamics and relationships that act on landscapes can be understood starting with the observation of landscape temporal evolution that can be realized e.g. through a work of photographic, iconographic and/or cartographic filtering. According to this technique, old images are compared with more recent ones and subjected to a deep analysis in order to identify the temporal evolution of a place (its characteristics). The images are able to reveal the external agents (natural or anthropic ones) that have operated over time in producing temporary and permanent transformations. In this way, we could ‘read’ the evolution of a river basin or of the side of a mountain, interpreting also their socio-cultural-economic role in that landscape. Other strategies ask for sensorial interpretations and educational activities (Bonati and Mendes 2014).

Thus, adopting the idea that landscape is a concept for understanding and “regionalizing” the surface, it can be used in disaster risk reduction and climate change adaptation as a “narrating” tool useful to empirical, integrated, place-based and holistic analysis of risk and as an ideal scenario in which to experiment with projects of PDRA. According to Pickett et al. (2014), it is also an ideal laboratory to experiment strategies of resilience and measure the resilience and sustainability of nature and society.

Resilience in disaster studies is a process of continuous learning and of taking responsibility in order to adopt better decisions in disaster governance (Cutter et al. 2008, p. 600). Cumming (2011) uses “landscape resilience” as all the forces needed to maintain a stable condition of sustainability, while “landscape sustainability” is the result of the persistence of models of planning of sustainable landscapes and of relations that link among them the landscapes at the different scales. *Landscape resilience* and *landscape sustainability* are functions and policies of ecosystem conservation, in particular in terms of ecosystem services and social wellbeing (Cumming et al. 2012; Millennium Ecosystem Assessment 2005, 2003).

On the other side, in disaster studies, Shabana Khan (2012) adopts the concept of *hazardscape* (Corson 1999; Mustafa 2005; ODESC 2007) with the aim of answering a contemporary need to integrate different perspectives in disaster risk studies in order to consider the complexity and interdependence of all the aspects experiencing hazard. Khan sustains that, although many theories (as human adjustment theories and vulnerability and resilience approaches) give a deep perspective of disasters, they continue to present a partial vision of the reality, focusing only on one aspect of the hazard. Contrariwise, the analysis of vulnerable landscapes (with vulnerable landscapes are included “risksapes” and “hazardsapes”) helps to understand the local and global variables that influence risks starting with an analysis of the relationship between human and nature in which the risk is potentially present (see Fig. 1, re-elaborated by Castiglioni and De Marchi 2007).

Landscapes are the results of their ecological, human and incorporeal (perceptive) components, from which derive the two dimensions of landscape: social and spatial. Thus, they are the ideal places in which to represent and rebuild the dynamics of disasters. Landscapes, being a representation and a perceptive part of the place, give a central role to the population in their definition. They require participa-

tory strategies and policies (coming from top-down and bottom-up) that constitute the democratizing steps in place management.

According to this, landscape is for the European Convention on Landscape a democratizing concept. The definition given is: “part of territory such as perceived by communities”. It is a public commons; thus, participation in its planning and management is required. The democratic landscape, as defined by Castiglioni (2009), is a planning process, built collectively. All people act on places and in this way they are creators of them, not simply living on them. The idea of the democratic landscape gives space also to the notion of a “right to landscape” for the new generations (Olwig 2011; Egoz et al. 2011).

Moreover, the European Convention recognizes landscape as a key element for increasing and safeguarding individual and social wellbeing, management and planning, and bringing benefits and responsibilities for all the people (Olwig 2011). In this way, citizen participation is not only a way to improve the efficiency of the decision-making process but also a tool to help citizens to reach collective decisions.

According to these considerations, we can define a “resilienscape” (as in Fig. 1) as the result of social and ecological components whose interactions produce an adaptive system. This system is able to reduce those practices responsible for vulnerability and to activate sustainable relations at the different levels, thus creating a stable equilibrium (Bonati 2014). In this way, a resilienscape is a first step towards a sustainable landscape and it should be based on participatory processes and bottom-up forces involved in risk identification and prevention.

To conclude, the concept of landscape is a useful starting tool in order to involve all people in participating in disaster risk reduction and climate change adaptation. Moreover, this could be a step in order to reach not only a disaster democracy but more generally democracy, giving people a way to participate in landscape and territorial management and planning. In these terms, the resilience of landscape is a consequence of the levels of community participation in risk observation and the integration of bottom-up/top-down processes of prevention, adaptation and communication.

Steps for Democratizing Resilience

“Feeling comfortable” in a psychological sense is a factor of the security that comes from familiarity and preparedness (Temperley 2014) and it should be the basis for a successful DRR and CCA strategy. But how to reach the status of “comfortable security”?

Landscape is a personal experience that come from observation and that can have a perceptive, esthetic, artistic and existential meaning (Cosgrove and Daniels 1988; Lowenthal 1985). Reading the vulnerable landscape is possible through the process of observation and sensorial interpretation that allows a more democratic reading because it is opened to the public and not limited to an élite. It can also involve marginalized social groups (e.g. people with disabilities). Moreover, it is a participatory and shared experience. In this way, landscape becomes an instrument with which to

start to open the entire community to participation in the management of disaster risk, because landscape is the mirror of risk dynamics. In the European Landscape Convention, awareness and education are relevant strategies in order to encourage people's participating in building and managing landscape (basis of PRA).

Castiglioni (2012) defines landscape education as a formative pathway finalized to reach a high level of place awareness and place values, and of a more critical vision in place evaluation. Promoting the knowledge of local dynamics and extending the sense of responsibility to all the community adopting strategies of participation, can be a first step in building a resilient landscape or resilient scape.

Moreover, the education of landscape is a way to build a critical capacity able to elaborate the information produced by landscape, while educating through landscape means to teach reading the geographical contexts, how to use them in order to increase knowledge of the local dynamics observed in the landscape (Castiglioni 2012), and to reach better decisions in planning and managing the vulnerable and resilient components that act on landscape.

According to the concept of the "local knowledge system" proposed by Dekens (2007), "observation, anticipation, adaptation, communication" are the main steps for disaster prevention. Thus, they will be re-interpreted in this work as temporal steps or phases of landscape experience. Accordingly, the first phase is the "experience-scape", which helps to reach a richer comprehension of the "sense-scape" through an educated observation; the second is the phase of anticipation and adaptation, where the observer reaches a level of mastery of the technics of landscape interpretation. Thus, the observer can obtain new information from the observation and can adopt adequate strategies of prevention and adaptation that come from a work of place-based interpretation; the third phase is the "share-scape": communication and sharing of landscape experience that could be done through dissemination and multi-scalar policy. Thus, at the beginning the action is limited to the local context but in the third phase it goes beyond and reaches the global level. In this context, and in landscape studies, the community members have a double role: they are spectators of the action of time on the landscape and, because they live the place, they are also actors on the landscape "stage". However, usually community is a "passive" spectator and enactor of change.

If they can work through these phases, the community members can pass from "passive spectators" to become "aware actors". They are asked to "come into" the landscape and to become a sympathetic element. In this way, community is called to be active and to participate in the building of a more resilient landscape. It becomes first of all "reader" and "interpreter" of the temporal changes.

The stability of resilience in landscape is guaranteed by the stability of the other landscapes. It is a consequence of globalization and interconnection among places. Every process that interests one place or one geographical scale, inevitably interests also the other places and scales linked to it.

As in Fig. 2, during the different phases of participation, the actor changes, coming from a local dimension to a global one. In the first step, the passive actor is called to become active in front of his/her home place. The community members are used to live in places without questioning the impacts that their actions have on

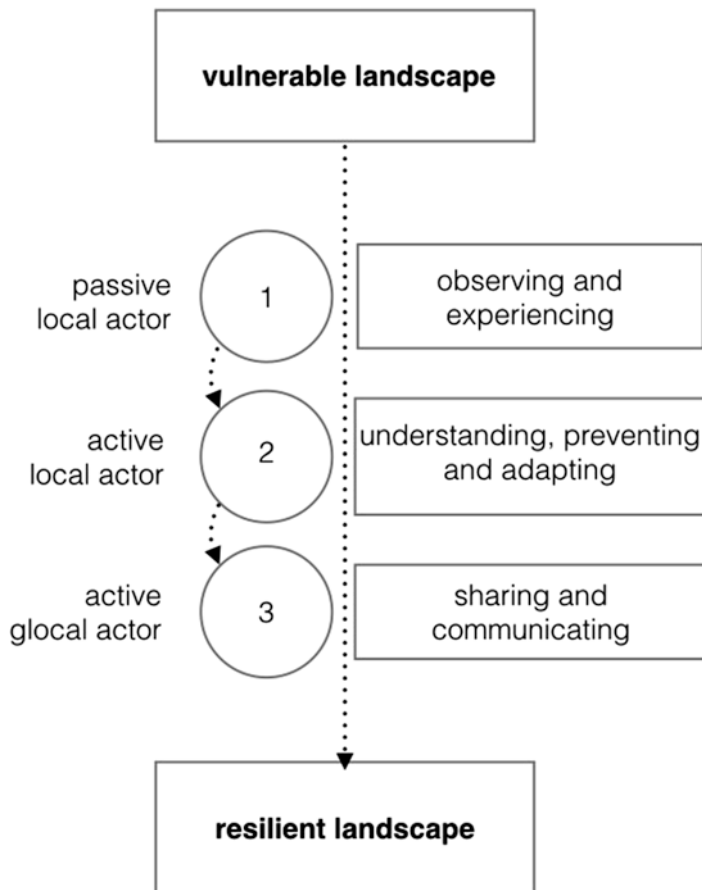


Fig. 2 Steps to build a resilienscape

them and how they contribute to local and global transformations. The passing from passive to active actor requires achieved awareness about one's own footprint. This step could be reached through processes of education and training to read landscape evolution along the time, noting differences, dialoguing with other people and experts, participating in collective actions for documenting positive and negative transformations, and modifying own lifestyles (Bonati 2014; Bonati and Mendes 2014; Tononi et al. 2017). In this way, people could be aware of their power.

In the second step, the actor is called to meet the other geographical scales, in order to reduce the number of risks in own home place. The interconnection among scales and places requires also consideration of the risk that can come from other scales and places. In this way he/she participates to reduce risks in own home place, contributing indirectly to implementing global resilience. This step requires the dialogue with external and local experts and a knowledge sharing process that can help to meet local solutions. Moreover it asks for a multi-scalar analysis, thus people should consider also the impact of other scales on local transformations. In this

phase, people participate in the international debate/system as spectators. They are not ready, yet, to become actors of the global governance, but they can take information and elaborate it for their needs. So, this step asks for understanding through knowledge collection, adapting to the inevitable changes, and then, preventing potential local consequences over which people have power. This needs a multi-scalar participatory process.

Then, the last step is finalized to ultimately “share” the experience and its results, in order to help the other communities to reduce risk levels of their landscapes and, in this way, to increase global resilience. This step can be realized by promoting scientific and non-scientific dissemination of the experience, participating in international networks, promoting multi-scalar policy and governance.

Conclusions

This chapter tried to discuss a different approach in disaster risk reduction and climate change adaptation, proposing an analysis of the potentialities of the concept of landscape in the improvement of community resilience.

Starting with the concept of ecological democracy, the author aimed to investigate alternative ways to reach a greater democratization of resilience at the local scale. Resilience is a complex and much-discussed concept, however considerable literature recognizes its usefulness for communities dealing with disaster risks.

Moreover, the need for democratizing resilience derives from the diffuse recognition that vulnerability is not democratic (about this see studies on class disasters, e.g. Wisner et al. 2004, and social vulnerability, e.g. Cutter 1996).

Accordingly, the chapter proposes the concept of a resilient landscape, discussing how a landscape could move towards the condition of resilience, interpreting it as a step to reach sustainability. Three phases are identified as needed to reach a condition of stable resilience in landscapes. Participatory processes and bottom up initiatives are at the basis of these steps. The chapter concluded that the interconnection between places is responsible for global consequences but such interconnections could also be useful for the diffusing of good practices. Future works on the democratization of resilience and the usefulness of the landscape concept in disaster risk analysis are called for. In particular, this chapter hopes to stimulate research that can demonstrate the potentiality of the proposed framework and experiment with alternative strategies in resilient landscape building.

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Part III
Old Problems with New Solutions

Building Disaster Resilience on the Edge of Chaos: A Systems Critique on Mechanistic Global Disaster Reduction Policies, Frameworks and Models



Christo Coetzee, Dewald van Niekerk, and Leandri Kruger

Abstract Since the dawn of the renaissance scientific inquiry has been guided by a mechanistic view of the world. Accordingly, the understanding of scientific theories, natural environments and human interactions under this paradigm has always aimed to simplify complex ideas as a means to facilitate greater understanding and innovation. Although this paradigm has undoubtedly served humanity well, there is an increasing realisation that a mechanistic view of the world does not provide a complete understanding of phenomena that are subject to dynamic change. This is especially true of human-environmental systems such as disaster resilience that are constantly altered through their mutual interaction between humans and their specific disaster risk contexts. This chapter argues that in spite of this reality, the mechanistic paradigm, and the linear reasoning associated with it, still dominates the theories and policies aimed at understanding and building disaster resilience and reducing disaster risks. It is argued that the presence of this type of reasoning places a lesser importance on understanding contextually specific variables and their effect on resilience profiles as well as the dynamic interaction that subsume disaster resilience. This often leads to very shallow and oversimplified understandings of disaster resilience.

Keywords Resilience · Edge of chaos · Complexity · Systems theory

Introduction

Since the dawn of the renaissance scientific inquiry has been guided by a mechanistic view of the world. Accordingly the understanding of scientific theories, natural environments and human interactions under this paradigm has always aimed to

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simplify complex ideas as a means to facilitate greater understanding and innovation. Although this paradigm has undoubtedly served humanity well, there is an increasing realisation that a mechanistic view of the world does not provide a complete understanding of phenomena that are subject to dynamic change. This is especially true of human-environmental systems such as disaster resilience that are constantly altered through their mutual interaction between humans and their specific disaster risk contexts. This chapter argues that in spite of this reality, the mechanistic paradigm, and the linear reasoning associated with it, still dominates the theories and policies aimed at understanding and building disaster resilience and reducing disaster risks. It is argued that the presence of this type of reasoning places a lesser importance on understanding contextually specific variables and their effect on resilience profiles as well as the dynamic interaction that subsume disaster resilience. This often leads to very shallow and oversimplified understandings of disaster resilience.

Consequently, this chapter will argue for the introduction of different theoretical perspectives by which our understanding of resilience can be enhanced. Many of these theories or concepts are linked to systems theory, and therefore aim to create a holistic understanding of the underlying processes that drive resilience building efforts in disaster affected communities. The argument is also made that for a community to move towards being more resilient we would also need to challenge the conventional wisdom of reducing vulnerability in its totality, as some vulnerability (or functioning at the edge of chaos) allows a community to be aware of their own risk, making them more agile, adaptable and resilient in the long run. As a point of departure the chapter will formulate a critique of the traditional mechanistic paradigm and its effect on our approach to building disaster resilience.

Traditional Paradigms of Scientific Argumentation

The mechanistic approach to scientific inquiry dates back to ancient Greece and medieval Christian Europe. This approach reached its zenith between the fourteenth and eighteenth century encompassing both the Renaissance and Enlightenment (Rihani and Geyer 2001:237; Schoones 1999:481; Wulun 2007:394–395). During this time, the approach has dominated scientific inquiry especially in western society by attempting to create a greater understanding of humans and the environment within which they are functioning (Rihani and Geyer 2001:238; Vallacher et al. 2002:266). The mechanistic approach to scientific inquiry postulates that complex human, environmental and psychological phenomena can be broken down into smaller components (reductionism), and through this reduction it becomes possible to determine the intricacies of larger systems behaviour (determinism). The combination of reductionism and determinism allows for the establishment of a linear relationship between micro and macro level systems components. This linear relationship is best typified by Isaac Newton's Third Law of motion: *"To every action there is always opposed an equal reaction: or the mutual actions of two bodies upon*

each other are always equal, and directed to contrary parts” (Hawking 1988:53–61; Rihani and Geyer 2001:238; Vallacher et al. 2002:266; Wulun 2007:394–39).

However, this traditional scientific paradigm is less satisfactory in explaining ever-changing complex phenomena, especially those at the interface between the environment and the society; for example disaster risks, disaster risk reduction (DRR), and climate change and adaptation (CCA) (Costanza et al. 1993:545; Wulun 2007:393; Levin 1998:433; Lichtenstein et al. 2006:3). According to Rihani and Geyer (2001:237) a prominent reason for why the traditional paradigm is less adequate to explain complexity and complex systems is that it entails problem solving from a closed-system perspective. Within this paradigm, a system is the sum of its individual parts (Vallacher et al. 2002:266; Wulun 2007:394–395). Therefore, the logical conclusion is that the components which could solve a problem, and also those that created the problem, are contained within a system’s boundaries, and these only need to be identified, and undesirable components eliminated to ensure a system’s return to normal functioning (Schoones 1999:482). According to Anderson (1999:219) and Morrel and Ramanujan (1999:279) a shift in thinking started to occur in the early twentieth century with the emergence of the systems movement.

The systems movement directly questioned the applicability of using mechanistic thinking to explain inherently complex systems¹ (Anderson 1999:219; Morrel and Ramanujan 1999:279). The basic premise of the systems paradigm is that some phenomena are subject to change and vary, and are therefore probabilistic by nature as opposed to deterministic as per the mechanistic paradigm (Rihani and Geyer 2001:238). The introduction of the probabilistic notion into the understanding of systems was significant as it recognised that all systems are not easy to understand, because constant change results in complex systems, which are more difficult to break down into parts because these parts are ever changing (Vallacher et al. 2002:266). This in turn triggered a growth in fields of inquiry pertaining to holism, general systems theory and complex adaptive system theory, all of which attempt to create a better understanding of the process of constant change (Von Bertalanffy 1968; Wulun 2007:398). The systems approach has introduced a different way of thinking in many scientific fields such as ecology, economics and physiology, but its use in explaining socio-ecological events such as disasters has been severely limited. This lack of different perspectives (including a systems perspective), being introduced to aid our understanding of disaster risk and disaster resilience, has meant that disaster theories and policies have mostly been formulated along the lines of the traditional mechanistic paradigm of scientific thought. The prevalence of mechanistic thinking can be identified in prominent disaster risk management theories and policies, and this can greatly affect our ability to build disaster resilient societies.

¹Complexity in this instance refers not to “difficult”, but to the number of interactions, linkages, components and feedbacks inherent to these systems.

Effects of Dominant Paradigm on the Understanding of Disasters and Disaster Resilience

A multitude of theories and policies have been developed to facilitate a comprehensive understanding of how disaster risk should be reduced and managed. Some of these theories, policies and tools include: the Pressure and Release Model (PAR) (Wisner et al. 2003; Kelman 2011:3), the Household Access Model (Wisner et al. 2003), the Sustainable Livelihoods Framework (Development:1999vq), Yokohama Strategy (1994), the International Strategy for Disaster Reduction (2001–2010), the Hyogo Framework for Action (2005–2015) and the Sendai Framework for Disaster Risk Reduction (2015–2030) (Birkmann 2006:10; Miller et al. 2010; Cimellaro et al. 2010; Blaikie et al. 2004). In spite of the quantity of theories, policies and models available to practitioners and scientists to reduce disaster losses and build disaster resilience, Cardona (2004:14) argues that these interventions have achieved limited success over the past 25 years. These failings are also recognised by both the Hyogo Framework for Action and Sendai Framework for DRR:

Disaster loss is on the rise with grave consequences for the survival, dignity and livelihood of individuals, particularly the poor, and hard-won development gains. In the past two decades, on average more than 200 million people have been affected every year by disasters. (UN 2005:1)

and

Over the same 10-year time frame (the period of implementation for the Hyogo Framework, 2005–2015), however, disasters have continued to exact a heavy toll, and as a result the well-being and safety of persons, communities and countries as a whole have been affected. Over 700 thousand people lost their lives, over 1.4 million were injured and approximately 23 million were made homeless as a result of disasters. Overall, more than 1.5 billion people were affected by disasters in various ways. Women, children and people in vulnerable situations were disproportionately affected. The total economic loss was more than \$1.3 trillion. In addition, between 2008 and 2012, 144 million people were displaced by disasters. (UN 2015:4)

The reason for this might lie in mechanistic thinking involved in the formulation of their policies. Both policies reduce the problem of disaster risk into five (HFA) and four (Sendai Framework) priorities for action (reductionism), in order to move towards a certain stage where policy recommendations can be made to guide the risk reduction efforts of national and international governance structures. In both of the documents given in Table 1, is an assumption that there is a definite linear relationship between the increase in disaster losses in all contexts, and the lack of the implementation of the priority areas addressed by these documents (determinism). Both of these policies therefore argue that if progress is made in reducing and eliminating disaster losses, the primary focus should then be on the implementation of the priority areas (linear reasoning). Thus, once these priority areas are implemented, communities which are at risk will be rendered safer from disaster risk or a state of equilibrium will be achieved. Oxley (2015:7) and Wisner (2015), critique the mechanistic premise and subsequent implementation of the HFA and envision

Table 1 International disaster risk management policies and linear outcomes

Framework	Priority action areas	Policy targets
Hyogo framework for action (2005–2015)	1. Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation	No specific policy targets outlined. The achievement of the five (5) priorities for actions serve as the main targets to be achieved
	2. Identify, assess and monitor disaster risks and enhance early warning	
	3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels	
	4. Reduce the underlying risk factors	
	5. Strengthen disaster preparedness for effective response at all levels	
Sendai framework for disaster risk reduction (2015–2030)	1. Understanding disaster risk	Substantially reduce global disaster mortality by 2030 aiming to lower per 100,000 global mortality between 2020 and 2030 compared to 2005–2015
	2. Strengthening disaster risk governance to manage disaster risk	Substantially reduce the number of affected people globally by 2030 aiming to lower the average global figure per 100,000 between 2020 and 2030 compared to 2005–2015
	3. Investing in disaster risk reduction for resilience	Reduce direct disaster economic loss in relation to global gross domestic product by 2030
	4. Enhancing disaster preparedness for effective response, and to “Build Back Better” in recovery, rehabilitation and reconstruction	Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030
		Substantially increase the number of countries with national and local disaster reduction strategies by 2020
		Substantially enhance international cooperation to developing countries through adequate and sustainable support to compliment their national actions for implementation of this framework by 2030
		Substantially increase the availability of and access to multi hazard warning systems and disaster risk information and assessments to the people by 2030

practical difficulties in implementing its successor document the Sendai Framework for Disaster Risk Reduction by stating that both documents “lack appropriateness in contexts of complexity, uncertainty, informality, fragility, insecurity (including conflict)” and that “provision is not made for the consideration of system wide perspectives and holistic approaches”. Both policies from a systems perspective, fail to take into account the dynamic nature of disaster risks and disaster events. This is problematic because it creates the impression that once these “arbitrary” targets have been achieved, communities will be safe. Therefore, through the linear reasoning and problem solving contained in these policies, risk reduction becomes an ideal outcome of risk reduction interventions and not as a constant process. It is therefore difficult for these global policies to be implemented and also adapted within different and dynamic contexts.

The influence of mechanistic thinking extends to theoretical tools that assist us in understanding disaster risks. A prominent example is the PAR model. The PAR model explains how societal vulnerability progresses from deeply embedded root causes to more observable dynamic pressures and specific unsafe conditions and how these interact with hazards to cause disasters (Blaikie et al. 1994; Fjord and Manderson 2009:67; Adger 2006:70; Birkmann 2006:29). Reducing the concept of vulnerability into three distinguishable categories is an attempt to simplify the complex disaster risk drivers that are societal vulnerabilities (Birkmann 2006:31; Kelman 2011:2; Cardona 2004:2). The assumption made by the model is that once remote root causes of vulnerability are identified, a departure point will be available to address more observable manifestations of vulnerability in the shape of dynamic pressures and unsafe conditions (Kelman 2011:4). The outcome of identifying and addressing the different levels of vulnerability is a less at-risk community (this being the ideal end state for a society) (Cardona 2004:7; Turner et al. 2003:8074). The PAR model displays the process and reasoning associated with mechanistic thinking, i.e. a problem reduced to its components (three levels of vulnerability), applying determinism to identify the linear relationship between components (root causes leading to dynamic pressures and unsafe conditions), and offering a linear solution to address the problem and reaching a desired end state (addressing root causes of vulnerability will eliminate undesirable dynamic pressures and unsafe condition and lead to a safer society) (Fig. 1).

This mechanistic argument encapsulated in the PAR model becomes problematic when viewed through the lens of a different paradigm such as a systems theory. Specifically, through this interpretive lens, it can be said that the PAR model fails to take into account two issues, namely, non-linearity of complex systems and dynamic interaction between systems components. In the case of the principle of non-linearity, the argument is made that the size of inputs into a system might not be proportional to expected outputs. Thus, this principle is that a perceived root cause may actually have a minimal effect or contribution to dynamic pressures and unsafe conditions in some contexts, while other root causes may have a major contribution (Birkmann 2006:31; Kelman 2011:5–6; Cardona 2004:7).

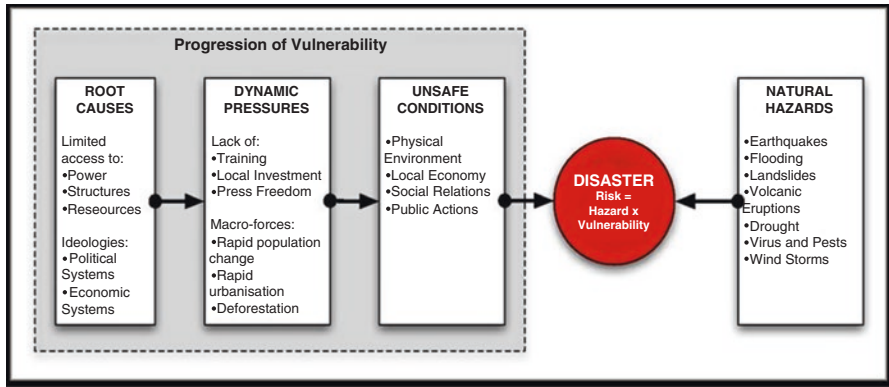


Fig. 1 Pressure and release model. (Blaikie et al. 1994; Wisner et al. 2003)

Underlying systems theory is the proposition that human-ecological systems are composed of a number of components that dynamically interact with each other to foster adaptation and system resilience (Railsback 2001; Boal and Schultz 2007). Thus, from a systems perspective the focus is not so much on being able to identify various components that make up a system (as per the PAR model), but also to examine the dynamic interaction between components and the system behavior that emerges from these interactions (Schneider and Somers 2006; Hartvigsen et al. 1998). Therefore, from this perspective, a root cause might lead to a certain level of vulnerability to disasters. Without the presence of root causes and the dynamic interactions they foster with other components, a social system could descend into chaos following a perturbation such as a disaster, thus making a society even more vulnerable (Heijmans 2001:6; Turner et al. 2003:8078; Adger 2006:275). It is not enough to reduce a problem like societal vulnerability to only root causes, dynamic pressure and unsafe conditions, without taking into account the dynamic interaction between the various components, their environment (context), temporal dimensions and the information exchange that subsumes adaptation within a system (Cutter et al. 2008:299; Cardona 2004:8). A failure to take into account the holistic nature of a problem fosters solutions that either promote stability or chaos, both of which are undesirable if the aim is to build more disaster resilient societies (Mathews et al. 1999:448; Turner et al. 2003:8076).

As can be seen from the systems critiques of contemporary mechanistic based disaster management policies and theories, it could be worthwhile to explore the possible contribution of different scientific paradigms in our endeavours to create a better understanding of disaster risk and disaster resilience. Two of these paradigms, including complex adaptive systems theory and resilience thinking, are briefly elaborated in the next section.

Complexity and Complex Adaptive Systems Theory

Complex adaptive systems theory (CAST) emerged in scientific fields such as ecology and biology as a means to explain natural systems that display non-linear adaptation behavior on micro and macro scales (Hartvigsen et al. 1998; Holden 2005; Ahmed et al. 2005; Levin 1998). Holland (1992:17) adds that CAST was developed to enhance our understanding of inherently non-linear systems such as economies, brain biology and immune systems that are impossible to accurately decipher using linear diagnostic tools and models. To create a better understanding of non-linearity and system complexity, CAST makes three basic assumptions: (1) complex behavior in systems emerges due to the interaction between inhomogeneous components at a micro level; (2) all complex systems learn from their environment; and (3) learning brings about adaptation or change to the system that helps it survive or absorb shocks to the system. Through these assumptions CAST has developed as a theory for analysing and understanding social dynamics (like building disaster resilience) not through the lens of society as a heterogeneous set of individuals, but as an aggregate of interacting diverse set of individuals. The benefit of analysing society in this way is that it gives more holistic impressions of population-level and community-level behaviours that either hamper or improve resilience building efforts (Railsback 2001; Hartvigsen et al. 1998). The CAS theory also contains various sub-theories that can be applied to enhance our understanding of how disaster resilience can be built.

Non-linearity

The basic premise of non-linearity in CAST is that the size of inputs into a system might not be proportional to expected outputs (Boal and Schultz 2007; Railsback 2001). Specifically, small seemingly insignificant variables or inputs in a system might fundamentally change the operation of a system whilst major inputs or variables might have no impact in changing the system at all (Schneider and Somers 2006; Plsek 2001). This notion is in line with the work of Lorenz (1963) and Chaos Theory. By viewing disaster resilience through the lens of non-linearity it might be possible to determine or track impact of individual variables on the overall generation of disaster resilience in a society.

Aggregation

According to Levin (1998:432), aggregation is the process whereby individuals in complex systems arrange themselves into sub-groups or hierarchal organisations that have similar interests, needs and practices. Once sub-groups are formed they do

not remain isolated. Instead, multiple interactions are established between different sub-groups that allow for dynamic development and adaptation to changing environments (Railsback 2001; Boal and Schultz 2007). The concept of aggregation provides interesting avenues of exploration within the field of disaster resilience, as it would help to focus some attention on the role, correlation and total contribution of social coping mechanisms to the overall resilience of a society.

Emergent Behavior

According to Innes and Booher (1999:417) emergent behavior is one of the key characteristics of complex adaptive systems. Emergence refers to how system level properties, characteristics and patterns emerge from interaction between individual elements at a micro level, even though the individual elements bear no similarity to the final wider system characteristics (Railsback 2001; Schneider and Somers 2006; Hartvigsen et al. 1998). The concept of emergence could be useful in the exploration of disaster resilience as it will allow for the investigation into how an aggregation of smaller variables could lead to improving resilience profiles of disaster affected communities.

Feedback Loops and Adaptation

According to Walker et al. (2012) and Holden (2005) feedback loops play a crucial role in the development of complex adaptive systems by either enhancing, stimulating, detracting or inhibiting elements within the existing system. Through these processes feedback loops allow for learning and adaptation within a dynamic environment, thereby preventing the extinction of a system (Begun et al. 2003; Rammel et al. 2007; Innes and Booher 1999). The study of feedback loops allows for greater insight into how communities learn and adapt from past events to improve their overall level of disaster resilience. It could also provide insight into the second and third order knock-on effects of building disaster resilience within a specific community (Innes and Booher 1999).

Context Based Responses

A key aspect of CAST is its emphasis on the importance of context in the functioning of a system (Boal and Schultz 2007). According to Holden (2005) and Holland (1992) any complex system is inseparable from the context and history that it finds itself in. The influence of context on CAST is so extensive that it contributes to making each complex adaptive systems unique (Begun et al. 2003; Hartvigsen et al.

1998). However, the context of a CAS is not static and can also be altered due to the dynamic interaction between interconnected elements (Holden 2005). For instance, dramatic events at a local level (i.e. disaster in a community) do not only change the context of the community itself, but could also cause changes at national and regional level (e.g. changes in disaster risk management policies), which in turn would impact once again on the context of the community (Zhou et al. 2010; Schneider and Somers 2006). The emphasis on the understanding of the context provides an opportunity of not only studying the aggregation of unique elements that make a community resilient on a case to case basis, but also allows for the exploration of the interconnectedness of elements and how changes at lower levels of a system can change the wider context of resilience.

Resilience Thinking

Resilience thinking has circulated in scientific discourse as early as 1625 with a multitude of reiterations formulated in the centuries that followed (Dahlberg 2015:544). For the majority of the time period (up to the current time) resilience was linked to the ability of mechanical, economic and human systems to return to equilibrium or steady state after disruptions. However, this traditional conception of what resilience entails started to be challenged in the early 1970s within research fields that focused predominantly on the interaction between bound human and natural systems (Kuhlicke 2010; Rose 2007; Gaillard 2010; Klein et al. 2003; Cutter et al. 2008; Zhou et al. 2010; Hufschmidt 2011). One of the most significant works at this time was conducted by the ecologist, C.S Holling in 1973. The work of Holling was influential in that it challenged the notion that resilience equated to a system's return to static equilibrium or a steady state and that in fact the resilient systems in human-ecological systems are often characterised by dynamic change and movement between various states of equilibrium. The notion that resilience profiles can dynamically change and adapt has opened various avenues of inquiry that can be explored to gain a more holistic understanding of disaster resilience (Hufschmidt 2011; Gaillard 2010; Rose 2007). One such line of inquiry relates to the influence of context specific variables in facilitating movement between different states of equilibrium.

Authors such as Renschler et al. (2010), Alexander (2013), Mayunga (2007:3), and Zobel (2011) all agree that the role of a community's specific social, economic and political context in generating unique resilience profiles cannot be underestimated. No one community has the same set of socio-cultural or economic dynamics, therefore it follows logically that their relative resilience will differ and therefore the optimal way to build resilience will differ from community to community (Zhou et al. 2010). To illustrate this concept, a study conducted by Zhou et al. (2010) in Xinghe county in Northern China, compared the relative resilience of three sets of agricultural communities operating in differing geographical contexts (highlands, plains and mountains) to drought. The study found that not only did resilience differ

between the larger geographic areas (i.e. the mountain and plain areas had significantly higher levels of resilience compared to the highland region), but also showed significant difference on a town-to-town basis within similar areas. The difference in relative resilience to prolonged periods of drought in communities that participated in the study was mostly ascribed to the influence, time, and learning of contextual factors such as physical location, climate topography, choice of irrigation method, agricultural type, condition of infrastructure, economic systems (markets), land use structure capacity and cultural practices. All of these factors, or combinations thereof greatly changed the adaptive resilience of individual communities in the larger regions and subregions. Contextual factors that influence resilience profiles also do not remain static and are in a constant state of change with new factors being added and others being discarded on a constant basis (Holland 1999:18; Plsek 2001). This is evident in the work of Fraser (2003) on the socio-ecological fragility associated with the Irish Potato Famine of 1845–1850.

The constant change in resilience profiles brought about by changes in context raises questions about building disaster resilience by using static parameters and objectives that are devoid of contextual sensitivity (Mayunga 2007; Zobel 2011). Instead the notion of viewing disaster resilience as a constant process of change can be introduced to our approach for building disaster resilience. Adopting a process approach provides a radical departure from the outcome-based resilience building paradigm visible in many DRR policies and theories (Sawyer 2004). Specifically, within the outcome-based orientation, disaster resilience within a society is treated as a closed-system or an ideal outcome, where the aim is to build resilience to the current disaster risk and render communities safe from risk (Manyena 2006). Although noble in itself, this approach often does not adequately recognise the fact that changes in the context might dramatically alter the efficacy of resilience building efforts in future (Manyena 2006; Von Bertalanffy 1950). Instead, adopting a process-oriented approach forces disaster practitioners and scientists to accept that disaster resilience is inherently an open-system process that will re-organise, change, and learn in response to shocks and stressors (Ahmed et al. 2005; Holden 2005; Lansing 2003). Thus within this orientation, disaster resilience is not treated as an end-point for a society to achieve, but rather a journey that will lead to constant adaptive change (Norris et al. 2008; Rose 2007). This philosophical orientation significantly increases our chances of gaining a holistic impression of societal resilience (Holland 1992).

On the Edge of Chaos

A final development that can be introduced into our conceptualisation of resilience, is the notion of building disaster resilience at the edge of chaos. The principle of edge of chaos has emerged within various scientific fields that describe behaviors, elements and systems (specifically complex adaptive, socio-ecologically linked systems) that are not inclined to total stability or total chaos (Wycisk et al. 2008:110;

Comfort et al. 2004:66; McCarthy et al. 2006:442). The edge of chaos aims to provide a relative balance between the poles of order and disorder and makes the argument that the only space in which human or environmental systems adapt, learn and evolve from dramatic changes to the system is, at the “edge of chaos” (Schneider and Somers 2006:356; Boal and Schultz 2007:412). The reasoning behind this argument is that systems that function at the edge of chaos are characterised by optimal internal and external information feedback loops that allow for interaction between different systems and components, which in turn facilitates adaptation and resilience building (these information feedback loops are limited in stable systems and too erratic and unpredictable in chaotic systems) (Holden 2005:656; McCarthy et al. 2006:451). Additionally, edge of chaos challenges the wisdom of removing all perceived vulnerabilities and risks from a system. Instead the argument is made that some vulnerabilities, although they place a system at risk (put it at the edge of chaos), these risks are acceptable as they serve as redundancies that allow for system flexibility, adaptation and resilience (Low et al. 2003; Colding et al. 2003:163). This allows a system to avoid total collapse following a perturbation. Holling (1973:19), and Hartvigsen et al. (1998:12) observe that elements which places a system at risk (such as hazards and vulnerabilities) could be necessary for the internal organisation of the system. This in turn contributes to the optimal level of adaptation, i.e. at the edge of chaos. The existence of such perceived negative elements in a system sparks positive and negative information feedback loops “that are innate to the interactive process between system levels and system states [and] could modify the initial function of an element to create new behaviour that could be beneficial to the system as a whole” (Coetzee and van Niekerk 2018).

Possible Contribution of New Paradigms to Resilience Theory and Policy

Disaster resilience is not fully understood or even measurable, due to the fact that the contextually based capacities lead to differing resilience profiles of communities, often within the same regions (Plsek 2001). Holland (1999:18), Rammel (2007:10), and Innes and Booher (1999:416) all emphasise that CAS would be an excellent tool to analyse systems that are constantly changing (“functioning at the edge of chaos”) (Cutter et al. 2008). By using CAS and its associated concepts such as non-linearity, aggregation, emergent behaviour, feedback loops and adaptation and context based responses, it would be possible for disaster researchers to analyse the dynamic changes in societal resilience profiles, whilst also allowing for the tracking of micro level interactions and the complex changes they create for macro level disaster resilience in society. This might provide insight into those capacities that most likely contribute to positive emergent behaviour and improved disaster resilience within a specific context (Holden 2005; Rammel et al. 2007; Zhou et al. 2010). Importantly, by basing the analysis of resilience and the formulation of subsequent models for understanding resilience on CAS, there is an inherent

understanding that resilience is not the end-point for a society to achieve, but rather a journey that will lead to constant adaptive change (Norris et al. 2008; Rose 2007), and imagining alternative futures. This philosophical orientation significantly increases our chances of gaining a holistic impression of societal resilience (Holland 1992). It has also been established that a disaster resilient system is inherently an open system that is able to anticipate, learn from previous disaster impacts and creatively adapt (from information feedback loops) (Ahmed et al. 2005; Holden 2005; Lansing 2003).

Three aspects of resilience thinking that can make a contribution to how disaster risk are reduced and resilience built are: the importance of considering contextual variations on risk and resilience profiles; the process nature of building resilience; and considering building disaster resilience at the edge of chaos. In the case of considering contextual influences, disaster scientists will be forced to move towards formulating theories that take into account contextual influences on changing risk profiles and formulation of tools and methodologies that are less generic in nature and move towards more flexible interventions that can be adapted to the unique nature of individual communities. On a practical level, the need to consider contextual factors in understanding risk profiles highlights the importance of community based disaster risk assessment to gain a deeper understanding of how contextual factors interact to bring about vulnerability, adaptation or resilience in a society. The focus of these disaster assessments should therefore no longer be just to determine what factors are perceived to cause risk, but to determine the interaction between parts and determine what negative or positive behavior emerges from these interactions in each context. What is also clear from the discussion of resilience thinking is that due to various influences within a system, be they economic, political or social in nature, resilience will never remain static and will constantly change. It therefore becomes crucial to recognise that resilience is not a desired outcome that will be achieved by setting pre-determined goals, but rather resilience outcomes will be achieved by setting fluid goals that can be easily adapted as the context changes (different communities), or starts to change within the same community. Recognising that resilience is a process could also have a major influence on how resilience building projects are funded and implemented. Specifically, the time scales of resilience building projects will need to be adapted from short term plans that aim to deliver a resilient society, to longer-term interventions over several decades that allow communities to have flexible resilience profiles. Monitoring and evaluation tools will also need to be developed to assist scientists, practitioners and communities to pick up variation in the resilience profiles (but not measure resilience) in order to ensure interventions are adapted accordingly. Finally, moving analytical and policy foci to the edge of chaos will change the focus of building resilience from merely building capacities and removing vulnerabilities, to a more critical process of determining the role of capacities or vulnerabilities in allowing a system to function at the edge of chaos, where optimal adaptation takes place. This might mean that our theoretical and practical orientation towards risk reduction should be adapted, as per the principle of edge of chaos, since some vulnerabilities might be acceptable or even needed for a system to be resilient.

Conclusion

The concept of disaster resilience is becoming a prominent issue in disaster risk reduction discourse. Over the years researchers have tried to simplify the understanding of the term “resilience”, by providing a comprehensive understanding of how disaster resilience should be measured, managed and reduced. However, researchers and practitioners have achieved limited success in this regard, despite the various policies, theories and models that already exist. This proves that one should not have a shallow and oversimplified understanding of disaster resilience; instead it should be understood as a complex system with constant processes of change.

This chapter aimed at critiquing the different theoretical perspectives by which our understanding of disaster resilience can be enhanced. The main aim of these theories is to create a more holistic understanding of the concept of disaster resilience in communities that are affected by disasters. This chapter furthermore challenges the conventional wisdom of aiming to reduce all vulnerabilities, because this will result in systems that will not be able to function “at the edge of chaos”. Systems (communities) that do function at the edge of chaos are characterised by the interaction between different systems and components. This will thus in turn facilitate the adaptation of disaster affected communities and result in truly building disaster resilience.

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Services Not Required? Assessing the Need for ‘Coordination Agencies’ During Disaster Response



Johanu Botha

Abstract In the 1950s, North American disaster research, then encapsulated within sociology, identified the lack of interorganizational coordination as a fundamental barrier to effective disaster response. Consequently, the idea of a public agency tasked with coordinating those organizations engaged in disaster response emerged. Disaster research has since grown into a multidisciplinary endeavor that has largely affirmed the importance of some type of coordinating agency during the response phase. Jurisdictions across the United States and Canada have paralleled this academic concern by including some type of disaster response coordinating agency within their bureaucracies. However, the need for coordination agencies expressed in the literature and their prominence in actual bureaucracies does not by themselves mean that coordination agencies perform a fundamental function during disaster response. Some form of hypothesis testing where the impact of coordination agencies is the main object of study is required. Yet no extensive review of disaster case studies and response frameworks has been pursued with the explicit goal of assessing the efficacy of coordination agencies in actual disaster responses. This chapter provides – to the author’s knowledge – the first such review, where the different disciplines engaged in disaster research are kept in mind. It is shown that a discrepancy exists in the disaster literature between the ‘conceptual frameworks’ of ideal disaster response and the case studies of actual disaster events; unlike the assumption of the frameworks, the case studies demonstrate that the assumed importance of coordination agencies is unfounded.

Keywords Emergency management · Institutions · Coordination

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Introduction

In the 1950s, North American disaster research, then encapsulated within sociology, identified the lack of interorganizational coordination as a fundamental barrier to effective disaster response.¹ Consequently, the idea of a public agency tasked with coordinating those organizations engaged in disaster response emerged. Disaster research has since grown into a multidisciplinary endeavor that has largely affirmed the importance of some type of coordinating agency during the response phase. Jurisdictions across the United States and Canada have paralleled this academic concern by including some type of disaster response coordinating agency within their bureaucracies. However, the need for coordination agencies expressed in the literature and their prominence in actual bureaucracies does not by themselves mean that coordination agencies perform a fundamental function during disaster response. Some form of hypothesis testing where the impact of coordination agencies is the main object of study is required.² Yet no extensive review of disaster case studies and response frameworks has been pursued with the explicit goal of assessing the efficacy of coordination agencies in actual disaster responses. This chapter provides – to the author’s knowledge – the first such review, where the different disciplines engaged in disaster research are kept in mind. It is shown that a discrepancy exists in the disaster literature between the ‘conceptual frameworks’ of ideal disaster response and the case studies of actual disaster events; unlike the assumption of the frameworks, the case studies demonstrate that the assumed importance of coordination agencies is unfounded.

This chapter will first provide a brief overview of coordination agency titles, mandates, and administrative locations in the American and Canadian disaster response systems. Second, the importance given to coordination agencies in disaster research and actual bureaucracies from the mid-twentieth century to the early twenty-first century will be demonstrated. Third, it will then be shown that the case for coordination agencies as a crucial component of the disaster response system has not been made. This third section provides a (re)interpretation of the disaster literature, including prominent case studies that span a variety of jurisdictional contexts and hazards. It provides a novel contribution to disaster research by assessing how coordination agencies deal with hazards independent of their official mandates. The conclusion will suggest avenues of future research to ascertain the actual roles that coordination agencies play, and the degree to which coordination agencies may be warranted, so that communities experiencing disaster, disaster management

¹While disaster management includes preparation for, mitigation of, response to, and recovery from disasters, this chapter focuses on the role of coordination agencies during the response phase as it is the response phase that was identified early on in the literature as ostensibly requiring central coordination. The role of coordination during the other phases also warrants investigation, but is beyond the scope of this chapter.

²In Waugh, Comfort, and Cigler’s overview of emergency management research within the public administration literature, none of the research focused on bureaucratic coordination agencies as primary objects of study (2012).

systems, and the public administration of disaster response in particular, can better meet the challenges ahead.

Coordination Agency Titles, Mandates, and Locations

Coordination agencies come under a variety of titles. During the years following World War II, nuclear attack was the most salient large-scale domestic threat in both the United States and Canada, which engendered the term ‘Civil Defense’ into the titles of agencies mandated to mitigate the effect of such attacks. Later in the twentieth century other hazards, especially natural ones, began to fall under these organizations’ purview and some variation of ‘Disaster/Emergency Management Agency’ became widespread.³ Most coordination agencies in the United States and Canada currently fall under the title ‘Emergency Management (or Measures) Organization (or Agency).’ The recent rise of similar organizations housed in policy-specific departments, such as ‘Health Emergency Management’ agencies, has somewhat complicated such generality. For the sake of convenience, all organizations mandated by government with the coordination of other organizations during disaster response will be referred to here as ‘Emergency Management Organizations’ (EMOs), regardless of the level of government or scale at which they function. Both the United States and Canada largely apply an ‘all-hazards approach’ to disaster management, wherein a single agency deals with a variety of threats, versus the ‘hazard-specific approach,’ wherein specialized agencies are created for each possible threat. While some threats may warrant specialized agencies (e.g. threats to national security and the resulting security-specific governmental apparatus), most public agencies mandated to ‘manage disaster’ include a variety of hazards under their purview. Even a policy-specific EMO such as the aforementioned ‘Health Emergency Management,’ will coordinate the mitigation of not only obvious health hazards such as epidemics, but also floods, heat, and smoke from wildfires.

EMOs should not be conflated with emergency operations centers (EOCs). EMOs are organizations while EOCs are physical areas from which a particular event is managed. EMOs have an evolving, but constantly active, organizational life, while EOCs activate for the duration of a hazardous – or potentially hazardous – event. An EMO may have an EOC, but an EOC need not exist in an EMO. Many disaster response organizations may have an EOC, including frontline organizations like police departments, but may not have the EMO-distinguishing feature of a specific mandate to coordinate other organizations during disaster response.

Similarly, the coordination function central to the mandate of EMOs should not be confused with collaboration. While collaboration is important to disaster management (Waugh and Streib 2006; McGuire and Silvia 2010), some aspects of

³For a detailed history on the evolution of hazards and the agencies tasked with ‘managing’ them in the United States, see Knowles, Scott Gabriel (2011) *The Disaster Experts: Mastering Risk in Modern America*, Philadelphia: University of Pennsylvania Press.

coordination, such as inhibiting redundant actions and miscommunication, entail more than initiating collaboration between agencies. Indeed, effective coordination may dictate that two organizations stop collaborating on an objective best achieved by a single organization.

EMOs should also be distinguished from ‘business continuity’ offices found in private and public organizations. The mandated goal of ‘business continuity’ offices is the survival of a particular organization as an end in itself, while the mandated goal of an EMO is to coordinate those organizations that respond to disaster. ‘Business continuity’ aims to keep a particular organization resilient, while an EMO aims to keep people and property within a defined jurisdiction resilient.

The Federal Emergency Management Agency (FEMA) in the United States, while active in all phases of disaster management beyond response, is tasked with the coordination of organizations and resources should local and state capacity for response be diminished. After the 9/11 terrorist attacks FEMA was folded into the Department of Homeland Security, but is still an agency of substantial import, with its own identity and evolution in the American federal government (Tierney 2007; Cigler 2009). Similarly, Canadian provincial governments, the level of government largely responsible for coordinating emergency management in Canada, all include an agency of considerable size specifically tasked with coordination during disaster response (Government of Canada). FEMA and provincial EMOs are the main players in the United States and Canada, respectively, but are not the only ones. Each American state has established some type of agency responsible for coordination during disaster response and the Canadian federal government holds formal coordination capacity in its department of public safety. The key difference between the two countries is the scope of the federal level EMO. While FEMA plays an influential role in the standards, guidelines, and even funding of state EMOs,⁴ as well as in actual disaster response, Public Safety Canada has not been a salient presence in disaster management, which is largely handled by the provinces through applying their own legislation (Lindsay 2014).

The formal mandates of EMOs are to ‘mitigate, prepare for, respond to, and recover from emergencies and disasters,’ or a slight variation of this phrase. In practice this usually means dealing with ‘non-routine emergencies,’ which are those events that are “generally anticipated, and for which there may be generic plans; but they stretch the emergency system, and require some shifts in operational procedures and thinking through more than expected scale, complexity and/or uncertainty” (Handmer and Dovers 2013). Examples include large fires, major storms, intense flooding, epidemics of known diseases and multi-vehicle accidents. In legislative terms, ‘non-routine emergencies’ largely fit the description of ‘major disasters’ in the American Stafford Act. ‘Routine emergencies’ are lower in intensity, higher in frequency, and largely handled by hazard-specific and frontline emergency response organizations, such as police, fire, and emergency medical services. ‘Complex emergencies,’ such as the impacts of climate change, or severe and

⁴For example, state EMOs qualify for funds if they establish FEMA backed guidelines, such as the Incident Command System.

widespread socioeconomic decline, transcend any particular agency and demand the attention of the highest political authority. Responses to 'complex emergencies' generally entail the entire social, cultural, economic and political system.⁵ While EMOs can be involved in routine and complex emergencies, they are the main players in non-routine emergencies.

The last word in this section is reserved for how EMOs fit into organizational theory. In his classic typology, Dynes observes four types of organizations that are involved in American disaster response (1970): 'established' organizations that carry out their regular tasks (e.g. police department directing traffic around a tornado impact zone), 'expanding' organizations established to meet regular tasks during a disaster (e.g. Red Cross volunteers providing shelter after a hurricane), 'extending' organizations that undertake non-regular tasks (e.g. construction company using its equipment to clear debris during rescue missions), and 'emergent' groups that engage in non-regular tasks (e.g. an ad hoc group of leaders overseeing general response effort).⁶ Scanlon has replicated this work and demonstrated that the categories largely hold in a Canadian context (1999). It is not immediately clear, however, where EMOs fit into Dynes's framework. While an ad hoc body that coordinates response could be an 'emergent' organization, EMOs are far from ad hoc, and are established into a structure, which suggests an 'established' organization. Yet EMOs in their disaster response function are only activated during a disastrous event, which suggests an 'expanding' organization. EMOs may 'extend' to fulfill other more-frontline functions during a disaster that severely taxes many organizations' resources, but at that point an EMO is no longer purely a 'coordination agency,' and so any 'extending' functions are not under investigation in this chapter. EMOs within Dynes's framework, then, are 'established' *and* 'expanding' organizations. This is not a fundamental conceptual problem; Scanlon usefully applies Dynes's framework even while noting that organizations need not fit into only one category (1999, 33).

The Perceived Importance of EMOs

While still in its infancy, disaster sociology identified lack of coordination among organizations as a central problem to effective disaster response (Rosow 1955; Williams 1956; Form and Nosow 1958).⁷ Coordination occurred when the actions of more than one organization improved outcomes. Lack of coordination, in turn, occurred when the actions of more than one organization did not improve, or even

⁵For an extended discussion on frameworks used to categorize emergency and disaster types, see Handmer and Dovers (2013).

⁶These are the Dynes's own examples.

⁷Programs of disaster research took hold in American sociological departments in the decade after World War II as concerns about nuclear disaster due to atomic weapons became widespread (Baker and Chapman 1962, 4).

worsened, outcomes. While not a logical requirement of such basic definitions, the analytical leap made by this early work was that ‘coordination’ necessarily meant ‘formal coordination,’ while ‘lack of coordination’ meant ‘lack of formal coordination’. Desirable disaster response outcomes, such as quickly delivering the right amount of resources, the speed at getting individuals to safety, and generally matching the supply of relevant organizational expertise and capacity with corresponding ‘on the ground’ demands, was argued to be negatively affected by the lack of an official agency empowered to organize the variety of frontline organizations involved in disaster response. These frontline organizations could range from non-profits like the Red Cross to law enforcement agencies like a local police force to private sector companies providing anything from food to bulldozers. The academic solution posed to remedy this lack of coordination was an organization tasked solely with providing a “central communications system” during a disaster (Form and Nosow 1958, 224). Extensive planning for disaster by individuals in ‘the disaster business’ was not enough; their crucial role would be running an organization that coordinates the other organizations involved (Barton 1969, 239). In other words, an EMO.

A prominent early and influential finding emphasized the need for EMOs. In 1957, Fritz and Mathewson observed a general phenomenon during disaster events: an array of resources made up of people, information and materials flood *into* disaster zones. The authors characterized this *convergence* as a problem because it made coordination of disaster response more difficult. They posed two main solutions to the problem: (1) greater control of information acquisition and distribution and (2) greater control of the disaster site itself. Both of these suggestions warrant some type of EMO that coordinates people, information and material (or the organizations that channel them) so as to minimize ‘unnecessary’ convergence.⁸

The theme of interorganizational disarray as problem, and central coordinating organization as solution, echoes throughout the subsequent literature. In a 2010 overview of disaster sociology, Drabek stressed that while it is not uncommon to find sophisticated coordination and communication mechanisms *within* response organizations, “the thing that hits like a freight train is the marked disorganization among the agencies responding” (2010, 148). While Drabek did not call for excessively centralized bureaucratic management of disaster response organizations, he did suggest the need for some type of EMO to establish “properly controlled” communication (2010, 161).

The importance disaster sociology placed on the lack of coordination and the resulting need for EMOs was affirmed by new disciplines as they entered disaster research, especially those with strong links to practitioners, such as public administration and crisis management. A prominent and established introduction to emergency management textbook stated that communication among responding organizations is the ‘Achilles heel’ in the field (Haddow et al. 2008, 143). An extensive report in *Homeland Security Affairs* by Donahue and Tuohy on ‘lessons never learned’ in disaster response stressed the pervasiveness of too little coordination

⁸Scanlon, Steele and Hunsberger have since observed that desirable forms of convergence do occur, including a form of ‘invited convergence’ (2012).

among organizations (2006). Criticisms of the (mis)management of Hurricane Katrina prominently included the lack of some type of ‘effective’ central coordination mechanism (Farazmand 2007). In their work on crisis management, Boin and Hart suggested that contemporary citizens expect their governments to play a role during disaster response (2007, 48), from which they build the need for an EMO (2007, 50).

The practitioner side to these disciplines enacted policies, programs and organizations that run parallel to the academic literature’s perspective: the ‘professional model’ of all-hazards emergency management that arrived after the ‘traditional,’ nuclear attack-focused model underscored “the need to integrate activities,” where “the police, fire and [Emergency Medical Services] collaborate with the media, the coroner’s office, and crisis counselors” (McEntire 2007, 99). EMOs were the organizations mandated to spark such collaboration through coordination and were identified as the mechanisms through which disaster response activities could be ‘integrated.’ In 1979 President Carter created FEMA (2007, 96) while Canadian provinces filled their country’s federal void in emergency management by establishing their own disaster response coordination mechanisms throughout the 1970s (Scanlon 1982). Today FEMA and provincial EMOs are salient features in their respective governments’ bureaucracies, and join a host of other coordination-tasked agencies and individuals at higher and lower levels of government.

No strong causal link can be drawn between the need for EMOs expressed in the academic literature and the manifestation of EMOs in the actual bureaucracies of the United States and Canada, but the parallel exists: both disaster research and governments have accepted the coordinative function of EMOs as key players in disaster response. What evidence exists, however, that such organizations are crucial variables in the desirable outcomes of disaster response? Has the academic disaster literature, with its myriad of multidisciplinary inputs, been rigorous enough in overviewing, interrogating and defending the – often implicit – assumption that some form of an EMO is a necessary cog in disaster response? Can governments justify allocating resources to EMOs over other parts of the disaster management system? This chapter turns to these questions in the following sections.

The *raison d’être* of EMOs: How Important is the Formal Coordination of Disaster Response?

The perceived need for EMOs, justified by the problems that ostensibly stem from the lack of (formal) interorganizational coordination, can be found throughout the disaster literature. Yet while research that proposed conceptual frameworks for disaster response, reviewed ‘lessons never learned’ in disaster response, and elaborated on emergency management best practices point to a role for EMOs, analyzing the disaster literature’s extensive range of *case studies* produces evidence to the contrary. There is ample room for doubt regarding the degree to which EMOs

improve or create desirable outcomes in disaster response and, more generally, the degree to which the lack of (formal) coordination among organizations poses a fundamental problem in the first place.

Leaving aside for the moment the degree to which formal coordination is in fact desirable, local EMOs have historically struggled in actually achieving the coordinative function – to whatever result – for which they were apparently tailor made (Tierney et al. 2001). While this was partly due to lack of legitimacy and funding in their infancy, the coordinative ability of local EMOs during disaster response remained uncertain even as their symbolic and financial support grew. The number of tasks an EMO was involved in appears to have increased as a function of its disaster experience, but greater involvement from an EMO did not by itself mean greater coordination among those facing a disaster. For example, EMOs with greater legitimacy and funding may have had the resources to participate in the preparedness and mitigation phase of disaster management through extensive planning, but lack of coordination were “seen even in cases where planning was judged to be of high quality” (2001, 125).

Turning to the desirability of EMO coordination, it should be noted that the criteria established by Wenger, Quarantelli and Dynes in 1986 for ‘effective EMOs’ does not necessarily translate to effective overall response by the disaster response system. An EMO may have good information inputs and outputs, a high-functioning emergency operations centre, enough human and material resources, healthy relationships with the organizations it is tasked to coordinate, and an accepted internal authority structure, but not have any measurably desirable impact on disaster response. The criteria established by Wenger, Quarantelli and Dynes measured a healthy EMO, not a healthy overall disaster response. In a similar vein, an array of introductory textbooks are produced on emergency management ‘best practices’ or ‘principles’ (Haddow et al. 2013; Rubin 2012; Waugh and Tierney 2007; Lindell et al. 2006), but the degree to which these texts described the ‘ideal’ emergency management coordination agency is evidence only that such agencies exist and that there is a demand for academic knowledge on how to structure them.⁹ In general, these texts addressed the ‘second order’ problem of how best to operationalize emergency management, but not the ‘first order’ problem of whether emergency management manifested through a central coordination agency is needed.¹⁰

⁹Kapucu’s recent work on collaborative governmental responses to terrorist attacks included examples of effective interorganizational coordination, but is focused on the particular ‘hazard’ of terrorism (2012).

¹⁰Researchers such as Kuban (1996) and Boin and Hart (2007) argue that government has a key role to play in disaster response. This argument, however, may be perfectly valid without saying anything about the need for EMOs during response. It is also noteworthy that overview articles on emergency management and emergency management policy in Canada barely pay attention to the specific roles of EMOs (Wachtendorf 2005; Henstra 2003). Kapucu and Garayev have noted the positive impacts of mutual aid agreements between emergency management agencies at the U.S. state level, but have stressed that such collaboration does not translate to central coordination (2011).

Ironically, the limits of EMOs can be found in the same early literature that suggested the need for EMOs in the first place. Barton observes that the larger the scale of a disaster the more important grassroots responses become (1962, 223). These responses are bottom-up and by definition uncoordinated in any formal sense. In later work, he adds that when the “onset of stress is sudden and preparedness is low,” which is characteristic of disaster,¹¹ “mass self help rather than activity of formal organizations would be the immediate response” (1969, 46). The nature of disaster, including but not limited to its potentially large scope, can make spontaneous and uncoordinated (in any formal sense) behaviour *functional*. While the early observation of convergence phenomena during disaster (discussed above) may have been characterized as a ‘problem’ by Fritz and Mathewson, the behaviour *types* that arose during convergence are largely desirable: most individuals descended upon disaster zones to help or inquire about loved ones and almost nobody arrives to exploit the situation (Dynes 1968; Quarantelli and Dynes 1972). If the lack of coordination is less problematic than the literature assumes, then the convergence of helpful individuals to a disaster site is not a chaotic phenomenon that requires ‘controlling’ by an EMO. Furthermore, even if convergence *is* a substantial problem in regards to disaster response, there is no reason to assume by default that an EMO would not contribute to convergence. Indeed, ‘official’ organizations can cause as much convergence as informal behaviour (Scanlon 1992).

A vibrant niche in disaster research on spontaneous behaviour, or *emergence*, confirmed the observations by early scholars like Barton that – formally – uncoordinated behaviour during disaster may be profoundly functional (Disaster Research Group 1958; Zurcher 1968; Scanlon 1999; Voorhees 2008). Emergence is the new sets of behaviour – including the formation of new groups – that arise during disaster to deal with its effects. For example, in his case study on volunteer organization during the New York City response to the 9/11 World Trade Centre attack, Voorhees showed that fast forming new groups emerged on the disaster scene before official authorities arrived and formal organizations took control. These groups formed a functional disaster response structure that could efficiently carry out a variety of response functions, from food and shelter provision to finding missing people. Voorhees stressed that desirable disaster response outcomes increased when formal organizations did not try to impose their prearranged response structure on the organic activity that occurred ‘on the ground’. The apparently crucial role of a coordinating EMO that channels appropriate activity from on high appears at least somewhat diminished in light of functional emergent behaviour.

The early disaster literature is littered with case studies where existing organizations perform exceedingly well during disaster response without central agency coordination. One of the early disaster case studies surveyed tornado-impacted communities for their perception of the performance of response organizations (Moore 1958). The United States Army and Air Force received, on average, the best

¹¹ While not all disasters need be unprepared for, all sudden and adverse events that are *not* prepared for can be disastrous. For an overview of the literature on the definitions of disaster, see “What Is a Disaster?” by Ronald W. Perry in the *Handbook of Disaster Research* (2007).

reviews. The disaster response of those organizations with cohesive internal organization received ‘higher marks’ than those organizations charged with the coordination of resources, such as the Civil Defense Office. This finding ran parallel to studies on the Michigan State Police compared to other organizations, which found that minimal dependence on other organizations can be an asset to effective response (Form and Nosow 1958, 226). Similarly, the mining company that ran the response to the severe Springhill, Nova Scotia coal mine ‘bump’ in 1958 appears to have benefitted from its monopoly of the response and its internal cohesion (Beach and Lucas 1960).

It could be argued that these case studies from the mid-twentieth century have little relevance to a contemporary moment with a greater array and variety of stakeholders during a disaster, and a greater expectation from citizens regarding the responsibility of government to ‘manage’ a disaster. However, more recent case studies also demonstrated the success of disaster responses where multiple organizations are involved in the absence of central coordination. Scanlon showed the primary importance geography can play in disaster response independent of an EMO by tracing the inherent functionality of disaster response operations in locations where the ocean can be instrumentalized (1996). His investigation into how Eastern Ontario handled the 1998 ice storm suggested that disaster response in Canada is more a function of that country’s federal structure, which determines the organizations with legitimacy to act, and individual leadership, than central coordination (Scanlon 1998). How Gander, Newfoundland handled diverted flights during the 9/11 terrorist attack on New York City showed that multiple emergency operation centres (EOCs), operating independent of an umbrella EMO, can meet disaster victims’ needs efficiently as long as each EOC has relatively discrete objectives (Scanlon 2002). Other case studies described disaster responses where familiarity with previous disaster experience, not central coordination, appears to be far more important in dictating response capability (Scanlon 1982).

Perhaps the most striking recent work on the efficient ways *uncoordinated* individuals and organizations can work together came from the case study of the successful evacuation of lower Manhattan by water transport during the 9/11 World Trade Centre attacks. Kendra, Wachtendorf and Quarantelli note the following:

[There] had been no planning for this scale and kind of organizational activity. No group was responsible for making such an activity a central part of its disaster planning. No organization or official was in complete charge of the overall emergent evacuation activities. Who went where, where evacuees were disembarked in New Jersey or Staten Island, and how long any vessel operated, were decisions often *made independently by the multiple operators of different vessels who had little direct communication with one another or agencies elsewhere.* (2003, 316 – 317, emphasis added).

Kendra and Wachtendorf also observed that one of the few much-praised responses during the otherwise maligned Hurricane Katrina response was improvisational and uncoordinated in nature. Here again the Coast Guard elected not to play an EMO-role in coordinating civilian boat operators. Water vessels conducted a successful search and rescue operation by converging on “heavily damaged areas [...] on their own initiative” (2005, 3). These case studies suggest that the crucial variable in

desirable disaster response outcomes, then, may not be a central, coordinating agency, but some other variable, such as an internally-cohesive organization with a monopoly of the disaster response, favorable geography, or functional emergent behaviour.

While disaster responses may be successful independent of EMOs, the presence of an EMO may be detrimental to the response effort. In his overview of disaster responses in the context of Canadian federalism, Scanlon noted that the main areas of interorganizational conflict have occurred *within* levels of government, the very areas EMOs should be able to 'coordinate' (1995). Interaction *between* levels of government, where no central coordinating body dictated communication, worked together relatively well across a variety of incidents. The introduction of an extra organization without explicit frontline duties into the disaster response system seems to have increased rather than diminished conflict.

Furthermore, recent surveys have shown that individuals within EMOs may have perspectives that undermine effective disaster response by perpetuating counterproductive myths about how people behave during disaster. Despite dismissing the importance of social science research, almost half of Ontario's emergency managers expressed beliefs regarding widespread panic and looting behaviour that has long been dismissed by the academic literature (Nirupama and Etkin 2009). A substantial number of emergency managers also expressed support for a strictly hierarchical, command and control structure for disaster response. A strict command and control structure is rigorously challenged by disaster research and can have adverse consequences for disaster response. For example, functional and adaptive search and rescue (SAR) during and after a disaster is done by a variety of official *and non-official* individuals and organizations, especially those already on the scene, the survivors of an event (Poteyeva et al. 2007). EMOs working under a rigid 'command and control' structure would allow only the 'right' people to perform SAR activities, diminishing the efficiency of the total SAR operation.

Whether 'command and control'-style or more collaborative, there is a deeper, structural reason why EMOs may harm disaster response. Perrow has identified 'tight coupling' as a characteristic of high-risk systems or organizations (1984, 2007a, b, 2008). Tightly coupling means that variable X is directly linked to variable Y, and that an event in the former will impact the latter in a way that cannot easily be stopped. EMOs may be a mechanism for 'tightly coupling' the disaster response system. The intention may be to ensure effective communication and task-assignment among all engaged organizations, but EMOs may have an inbuilt vulnerability in as far as they become the main anchor to which other organizations are tethered. If an adverse event impacts the EMO, or the EMO contains some undesirable trait during disaster response, it could necessarily impact the entire disaster response system. This is in contrast to a 'loosely coupled' system where individual response organizations build relationships with each other. The failing of one relationship or the undesirable actions of one organization will not necessarily impact the entire system.

The Sign of Successful Coordination: Can a Case for EMOs Be Made?

Desirable disaster response outcomes can occur in the absence of formal coordination and in some cases tentative links can be made between coordination agencies and undesirable disaster response. However, these two outcomes – significant as they appear – may simply be exceptions to the rule. Desirable outcomes in the absence of variable X does not mean outcomes cannot be improved with variable X, and tentative links are not enough to dismiss the ‘ideal version’ of a coordination agency. Perhaps the impact of EMOs on disaster response can be measured with enough data, and a positive picture of EMOs could therefore theoretically drawn. The ability to draw such a picture does not currently exist in the disaster literature (certainly not enough of one to warrant the implicit assumption that formal coordination is important). Furthermore, painting such a picture faces severe methodological challenges.

The impact of EMOs on disaster response outcomes is difficult to measure given ongoing confusion around what, exactly, emergency management as manifested in a coordination agency entails. Despite the formal mandate of EMOs and the types of events they generally address (discussed early in this chapter), Schroeder, Walmsley and Ward noted the following:

[We have not] completely settled how emergency management should be organized [... There] are seemingly intractable problems of organization, administration, and coordination. How can one agency be given the power and jurisdiction necessary for effective disaster planning and coordination of response and recovery operations without giving it more power in times of both nonemergencies and emergencies than other participants in the political process are willing to grant it? (2001, 359)

Schroeder et al. tapped into the political problem of power sharing, policy agendas and empire building inherent to the public policy process. This problem suggests that high value issues will be drawn to the most powerful actors in the process, which is indeed what happens when a disaster reaches a certain scope. The process for declaring a Presidential disaster in the United States, and thereby denoting what counts as a major disaster, is a political process, not one based on consistent criteria (Cutter 2005, 46). The location of FEMA in the federal bureaucracy is itself largely affected by presidential preference (Cigler 2009), and presidential performances during disasters demonstrate the president’s direct link to the emergency management file (Kapucu 2009). Drabek stressed that the ability to perform effective inter-organizational coordination is a function of how tightly an emergency manager is linked to “the key point of authority and power” (2010, 217). In their multi-year comparative study on the effects of centralization in the United States, Japan and Italy on disaster responses, McLuckie and Benjamin noted that the final authority for coordinating response during major disasters automatically moves to the relevant political authority (1977, 78).¹² In short, the president is “the nation’s *de facto*

¹²In his classic study on the infamous Waco, Texas tornado, Moore also observes the link between the intensity of a disaster and the movement of ‘managing’ the disaster up the political authority chain (1958).

crisis manager in chief” (Stern 2009, 189). At a smaller scale, Fritz et al.’s case study on behaviour in an emergency shelter during a snow-storm demonstrated that the coordination function automatically moved to the individuals who arose as political authorities (1958). The problem these dynamics pose for assessing the impact of EMOs is that the moment adverse events reach a point where they need ‘professional’ coordination, they are often salient enough issues for the political authority to take over, rendering null any substantial coordinating authority an EMO might have had.

Schroeder et al. also pointed to an operational problem: even if granting EMOs coordinating power during the response phase of a disaster was universally accepted, is it possible that one agency can effectively coordinate the multitude of organizations involved? Considering that these organizations include the Red Cross, the Salvation Army, other agencies in government, police and other emergency services, effective coordination is far from obvious. Indeed, lack of coordination is identified as a perennial problem for public administration writ large (La Porte 2006), and key insights from the operation of complex systems – as disaster response systems certainly are – is that no single agency contains the capacity to manage large-scale threats (Skertich and Comfort 2012). As just another creature of the bureaucracy, it is not clear how an EMO – despite its official mandate – should solve a problem that transcends its purview and capacity.

Given these political and operational problems, do any bars exist that can be used to demonstrate the degree to which EMOs have positive, negative or neutral impacts on disaster response? Emergency management leaders themselves have noted the positive impacts of EMOs and regularly call for more resources to do what they have stressed are essential jobs (Donahue and Tuohy 2006). It is common, however, for directors of public agencies to call for more resources (McNutt 2002), and such calls can be motivated by a desire to grow the power and prestige of an agency. Organizations can – and often are – used for goals other than their official mandates (Perrow 2007a, b). An example of this can be seen in efforts to tie the EMO’s fate to the fate of government. Hugh and Grant suggested the ‘continuity of government’ as a framework for EMOs (2001), which rooted the EMO function in serving government as an end in itself, not in coordinating all organizations as a means to the broader end of better disaster response. EMOs could therefore mandate government resources because government survival under crisis relies on EMOs. This manoeuvre essentially conflates EMOs with business continuity offices and suggests EMOs should be the business continuity office for government writ large. A more subtle approach generates the very conditions that require the services an agency provides. For example, Kirschenbaum noted the following:

[More] disasters mean the need for more [EMO] budgets, more manpower, and eventually more recognition. The relatively simple task of administratively redefining disasters can by default triple the workload. While floods were formerly part of nature and taken in stride, now they are disasters. (2004, 99)

More disasters – actual or perceived – can be opportunities for EMOs to call for more resources. They have an incentive to do so, and therefore measuring the impact

of EMOs needs to control for this incentive. One way of doing so is to not rely on the characterization of EMO impacts provided by emergency management professionals themselves or even emergency management-specific scholars (both have incentives to value EMOs), but by external monitoring of EMO behaviour and its impact on disaster response by public agencies or public administration scholars that have a less obvious stake in EMO success. Given the nature of an EMO's mandate, however, such monitoring is difficult. Breton and Wintrobe note three characteristics that inhibit effective monitoring of a public agency's actual impact: secret, non-routine, and complex work (1982). While EMOs may not be secret, their work is by definition non-routine. Disasters are unpredictable and will change in nature and scope every year. It will be difficult – although perhaps not impossible – to compare 1 year's work on disasters to another year's work, which is a fundamental challenge to measuring improvement of performance over time. Disaster response is also inherently complex given the array of organizations involved, which allows for accountability shirking or 'blame avoidance' (Moynihan 2012). It is not easy to pin point where a response went wrong, and fingers can always be pointed at someone else.

EMOs could perhaps be primed – if not measured – for success by mandating a certain level of skill set in their employees. Such standardization, however, runs into intractable problems when projected onto emergency management. There does not appear to be a specific set of distinguishable skills that justifies denoting emergency management with the type of professional status given to physicians and lawyers (Drabek 2010, 214). Furthermore, there appears to be incredible divergence among emergency managers themselves on what successful emergency management entails (Nirupama and Etkin 2009).

Perhaps the measurement of EMO impact on disaster response is clouded by a preoccupation with what EMOs *should* be doing versus what they are actually doing. If all normative assumptions are left aside, what functions do EMOs fulfil? Answering this question may lead to the sort of analysis employed by Clarke on disaster and emergency plans. Clarke did not assume that the officially stated goals of such plans are synonymous with their actual function. The results of his study demonstrated that the actual functions of these plans were to act as 'fantasy documents' meant to assure external stakeholders and competitors that the organization in question is competent, sophisticated, and prepared for disaster (1999). Emergency plans, then, can be more about interorganizational competition than about preparing for the worst. The degree to which EMOs are 'fantasy agencies' meant to assure the public and non-government organizations, from non-profits to companies, that the government is ready and able to protect them from a variety of hazards is an avenue of inquiry not explored in the disaster research. The official mandates of EMOs and their actual function are assumed to be one and the same.

The assumption that the outcomes of EMO behaviour is a function of its formal mandate – the effective coordination of disaster response – casts a blind eye to substantial work in public administration that assesses the outcomes of bureaucratic behaviour. Conflating formal bureaucratic mandate with policy outcomes ignores a variety of mechanisms that could in actuality be driving the outcomes, including:

the incentives faced by individuals within an agency and how they perceive their roles (Allison 1971), whether such individuals are driven by day-to-day situations, expectations from colleagues, ideology, or professional values (Wilson 1989), the degree to which an agency is representative of the public it serves (Meier 1975), and the institutional context of EMOs and the programs they provide (Seidman 1998).

Conclusion: Future EMO Research

The widespread use of 'coordination agencies' in American and Canadian bureaucracies and the assumption of their importance to disaster response systems is not justified in the case studies of actual disaster events. These studies suggest that a public agency specifically mandated with coordinating other organizations during disaster response may be an ineffectual solution to a problem that a.) does not exist (i.e. formal coordination is not a problem) or b.) transcends the solution provided (i.e. lack of formal coordination is a perennial feature of public administration in particular and collective action in general, the solution to which will not be another creature of the bureaucracy). However, the literature as it currently stands focuses heavily on sociological outcomes of disaster and the disaster response system writ large. It does not include extensive research where EMOs are the primary object of study. A wholesale rejection of EMOs as important to the disaster response system and worthy of public resources is therefore not in order. Rather, the expected call for 'more research' is in this case far from perfunctory: future research needs to ascertain if and when the formal coordination of disaster response by a public agency has a measurable impact on such response, and whether such impact merits the academic assumptions and public resources that support the coordination function of EMOs.

Future research can include: comparative case studies of similar disasters with and without an active EMO; assessments of relationships between disaster response outcomes and the bureaucratic location of EMOs; cross-jurisdictional, historical and cultural analyses of what coordinating bodies look like and which of them have desirable impacts on disaster response; and meta-analyses of EMO responses to allow broader empirical claims. In order to answer the question of actual EMO impact, this research must be distinct from the existing disaster literature in at least two ways. First, the object of study for all this research should be EMOs themselves. The hazards, sociological response, socioeconomic outcomes, legal frameworks, media attention, the disaster response system writ large and other phenomena related to disasters are of secondary importance, and only to the degree that they tell the researchers something about the role of EMOs. Second, careful attention should be paid to the methodological approach used to study EMOs. As EMOs in the United States and Canada are government-mandated public agencies, public administration scholars in particular should apply frameworks from their field to delineate EMO impacts, including theories of bureaucratic politics where particular attention is paid to incentives faced by agencies and individual bureaucrats independent of their formal mandates. The current research on EMOs is replete with assumptions

that the primary driver of emergency managers and emergency management agencies is the management of emergencies. Such assumptions at best naively take official mandates at face value and at worst conflate normative with objective assessments. Even frameworks established on the border between disaster management and public administration – e.g. the highly developed concepts of ‘high-reliability’ and ‘complex adaptive’ systems (see La Porte 2006; Comfort 2007) – prioritize the disaster management system writ, and all its constitutive parts, over the specific bureaucratic agencies mandated to coordinate disaster response. In these frameworks the – potentially perverse – incentives faced by individuals within such agencies, and the way such agencies are constrained by their particular institutional contexts (i.e. a Westminster parliamentary versus presidential system), are not salient features of analysis.

Interesting and new hypotheses can be created once EMOs become a primary object of study. For example, while the disaster response system may be “‘highly prepared’ for a given type of stress if it has well defined roles for individuals, for which they are adequately trained, and with these roles integrated in workable organizations and plans” (Barton 1969, 41), such a hard structure may not be flexible enough to meet novel adverse phenomena. Entrenched roles may improve response for specific types of disaster but increase vulnerability for disasters that diverge from expected patterns. Frequent response to routine emergencies can lead to a ‘trained incapacity’ that is blind to “the unique needs of situations that are qualitatively different” (Drabek 2010, 149). It could be posited that EMOs, with their all-hazards approach, and by not being entrenched in a specific department, or a part of conventional fire, police or medical response, are well positioned to guard against such ‘trained incapacity.’ EMOs could also work against disaster subcultures that prime communities for one type of hazard, a problem identified by Anderson in 1964. These are ways that EMOs may complement and improve ‘high reliability’ or desirable systems. Other hypotheses could posit that the ‘all-hazards’ status of EMOs provide unique avenues to them for growth through the ‘swallowing up’ of other agencies’ mandates, such as welfare distribution post disaster (Social Services), epidemiological studies of epidemics (Public Health), or anti-terrorism (Public Safety). All these, however, are only hypotheses, ones that require rigorous study and that should not be assumed to be important in the way the EMO role in coordination has been. In general, disciplines involved in disaster research need to understand whether the prescribed mandates of EMOs align with the actual role they play in the disaster response system.

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Categories of Success: How Do We Make Who Listen?



Rachel Dowty Beech and William Wallace

Abstract Definitions of risk vary widely from person to person and from group to group. How then can disaster researchers prescribe effective actions and relevant information sources for all who seek to avert risk and disaster? Traditional strategies for matching particular “types of people” and/or “types of groups” to information they might find relevant to themselves have included, but are not limited to age, race, gender, and socioeconomic status. This chapter challenges the traditional group categories used to assess who will find what information relevant, the manner in which information is presented, and the places the information can be found by those seeking it. We propose that the four cultures presented by social anthropologist Mary Douglas can not only shed light on the failures to deliver salient information on averting risk and disaster to those who seek such information, but also help shape (1) which information is pertinent to whom, (2) how the information can be shaped to prompt action, and (3) where to post such information so that it reaches those who are interested. These four cultures are described as “Hierarchist,” “Individualist,” “Fatalist,” and “Egalitarian.”

Keywords Risk perception · Risk communication · Warning

Traditional Strategies

Models used by researchers to examine how people respond to disaster warnings vary widely, to the extent that generalizations and replicable tests of study conclusions remain elusive (Mileti and Peek 2000; Tierney et al. 2001; Tyshchuk 2014). Researchers frequently reinvent the wheel of warning response models because definitions of risk vary widely from person to person and from group to group. How

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then can disaster researchers prescribe effective actions and relevant warnings for all who seek to avert risk and disaster?

Sending out a warning, such as an evacuation warning, may at first glance seem direct: tell people to get out, or stay put, give them the reasons, and seek out the best possible ways to deliver the message so the most people will act upon it. However, each step of this process is fraught with complications. Through what channels should people be told? What reasons are the best to give? In what manner should the message be phrased, such that people will take it seriously and heed the warning? Each party, however, has his/her/their own definitions of risk through which the warning will be filtered once received.

Take, for example, the evacuation warnings sent out in the days preceding Superstorm Sandy in 2012 in New York City. Evacuation orders by Mayor Michael Bloomberg for the Lower East Side, which sustained some of the worst damage, were heard by nearly 90% of Lower East Side residents, yet only 36% of residents evacuated before the storm (LES Ready 2014). They had received the warning through fliers, New York City Housing Authority (NYCHA) staff going door to door, or police driving with loudspeakers up and down Avenue D. Reasons residents gave for not evacuating were varied, but many cited their efforts to evacuate for Hurricane Irene the previous year, during which the Lower East Side had received no impact. This jibes with a Harvard School of Public Health poll taken the year after Hurricane Katrina's impact: 68% of the 2,029 adults surveyed in eight states, who lived within 50 miles of hurricane-prone coastlines, said they would not evacuate or were unsure if they would evacuate if given an evacuation order. They cited confidence that they would be safe at home (Blendon et al. 2006). But why did they feel they would be safe at home? Is it because they were safe there the last time? If so, then how can the message send out the warning so that people take it seriously each and every time? Hassle and expense are certainly consistent factors, but what would get them to take action? The survey data from which these results were drawn, just as most other reports, group respondents into demographic categories: age, race, gender, and socioeconomic status. But these groupings can often give conflicting information when it comes to who heeds warnings and why.

Some results are almost always clear: if an evacuation warning goes out in a language not spoken by the target audience/receivers, then the message will not be received clearly. Culture, in this respect, is taken into account in the warning literature. But what about other aspects of culture? Are they relegated to the ranks of demographics? Will people who make a certain amount of money find one message more palatable than another? Will African-Americans really take one warning message to heart less than or more than Asians? Will a 59-year old take action more often than a 65-year-old? Research shows that the answers are more complicated than that, so why are these categories still so pervasive in the literature?

This chapter challenges the use of demographic categories used to assess who will find what information relevant, the manner in which information is presented, and the places the information can be found by those seeking it. We propose that the four cultures presented by social anthropologist Mary Douglas can not only shed light on the failures to deliver salient information on averting risk and disaster to

those who seek such information, but also help shape (1) which information is pertinent to whom, (2) how the information can be shaped to prompt action, and (3) where to post such information so that it reaches those who are interested. These four cultures are described as “Hierarchist,” “Individualist,” “Fatalist,” and “Egalitarian.” We discuss how the same message or the same information should be phrased differently to appeal to people who most closely identify with each of the four cultures.

The Four Cultures

Numerous studies have shown the difficulties inherent in communicating disaster warnings and information in languages not spoken by those meant to receive them (Wachtendorf et al. 2013; Mathew and Kelly 2008; Villagrán de León 2014). But there’s more to understanding an evacuation warning and information about a forecast disaster event: it has to speak to the target audience in a way that makes it important to them, in a way that prompts the action that the message intends. This art of persuasion encompasses complicated nuances of communication. This applies across languages and cultures. “Culture,” in this traditional sense, usually refers to ways people know and do things in different world regions. However, we adopt Mary Douglas’s approach to culture (Douglas 1978, 1999; Douglas and Wildavsky 1982; Thompson et al. 1990) because it transcends the cultures of world regions and taps into the ways humans know and do things across regions. Thus, we believe that it may enable practitioners and researchers to “speak” those different “languages” to send out more persuasive evacuation and other disaster warnings. In a world where international borders are crossed back and forth every second with messages through the Internet and other technological means, this redefinition of culture becomes increasingly important.

In Mary Douglas’s model, there are four cultures (hierarchical, individualist, egalitarian, fatalist), based on two mutually exclusive dimensions (grid and group). The “grid” dimension refers to rule rigidity, and the “group” dimension refers to the social ties that bind people together in terms of their ideas set in motion. So a culture with “high grid” will prioritize actions that follow rigid rule structures, and a “high group” culture will prioritize community well-being and defend against outsiders threatening their ties that bind them together. Each of the four cultures has a low or high level of “grid,” and each of the four cultures has a low or high level of “group.”

An example of a traditional hierarchist (“high grid, high group”) culture is that of the military: people live in close quarters with one another, defend their group boundaries (“high group”) and live by highly rigid rule structures (“high grid”). Those who live in close quarters with each other and defend themselves as a group, but do not require a highly rigid rule structure to sustain the group are egalitarians (“low grid, high group”). Many closely-knit neighborhood activist groups could be considered egalitarian groups. Individualists (“low grid, low group”) depend less on rules and more on making themselves stand out to get ahead (“low grid”), and see

themselves as self-reliant (“low group”), such as financiers or others who consider themselves “self-made.” Fatalists (“high grid, low group”) live by rigid rule structures with few close bonds to others, thereby mostly relying on fate to deal them luck or doom.

These are the extremes. The four cultures exist as a continuum of “grid” and “group,” and it is on this continuum where we all live and continuously construct our world. There are, therefore, plenty of “shades of grey” that lie between these extremes. However, when it comes to disasters, extremes are where we need to look. Disasters are, by their very nature, extreme. Research shows that, accordingly, people exhibit more extreme tendencies of the four cultures in times of disaster. The anthropological research on famine by William Torry shows how “normative principles of exclusion from privilege or security – whether by birth, or office, or sex, or age, or by definition of deviancy and criminality ... point to who will get less as resources diminish and who will finally be turned out or left to starve” (Douglas 1986, page 123). Torry was surprised to see that these “preordained victims” accepted their fate, with no anger or resentment showed by survivors, who recognized “the doom of their families as fitting and as a normal part of crisis conditions” (Douglas 1986, page 123) Those who were left to starve understood that the elite would not starve, and resumed their normal positions once the crisis had ended. In other words, they were fatalists, and became more so during the famine. However, this did not dissuade them from being fatalists after the famine: Torry describes them as grateful for having a return to normalcy. This, as Douglas points out, is an affirmation of social order through disaster, not its destruction. Such profound decisions as who will eat and who will starve “are not made by individuals as such, but by individuals thinking within and on behalf of institutions” (Douglas 1986, page 124).

Institutions are at the heart of decision-making regarding risk and the four cultures. Dowty et al. (2011) show how organizations exhibited more extreme “grid” and “group” characteristics during the federal response to Hurricane Katrina. The White House exhibited an individualistic tendency prior to the storm, but representatives during the response increased that individualistic tendency to create new rules and blur group boundaries in their actions and statements. The Federal Emergency Management Agency (FEMA) was drowning in rules (increased “grid”) while having less and less of a group bond on a national level (decreased “group”), thereby becoming even more fatalistic than the agency had been after being absorbed into the Department of Homeland Security after 9/11. The Coast Guard relied on tightening its hierarchy as much as possible, increasing both “grid” and “group” to resolve tasks (such as rescue operations) as quickly and efficiently as possible while taking care of their own. Not only did existing neighborhood groups increase their “group” and decrease dependence on rules (“grid”), but new neighborhood groups formed in the wake of the storm (Dowty et al. 2011).

These examples show how individual representatives of organizations think within and on behalf of institutions, and how the dimensions of “grid” and “group” characterize tendencies of people to adopt even more extreme cultural tendencies during disasters to ensure their institutions weather the storm.

Risk and Warning in the Four Cultures

If we assume, as we have shown above, that people tend to exhibit more extreme versions of the four cultures during disasters to better uphold their institutional systems, when do they start? Is it when the warning is issued? Or is it when they see and feel the event upon them? As William Torry’s research on famine showed, people do not change which institutions they uphold during disaster, rather, their efforts to uphold their culture’s “grid” and “group” simply intensifies. Therefore, to appeal to all four cultures when issuing a warning, each of the four cultures must be addressed accordingly.

For example, people who are highly Hierarchist can be expected to identify most strongly with information that identifies particular resources and is ranked in terms of group priority (e.g., ‘to properly be prepared, consider water, food, and shelter for your family first’). Individualists will best respond to information that emphasizes a single person’s dependence upon his/her own abilities to avert risk, especially concerning financial matters (e.g., ‘make sure you have enough money to pay for water, food, and shelter’). A fatalist in search of averting risk ultimately views risk as an inevitable disaster, with the question only being when and what form it will take. Therefore, prompting a fatalist to action requires accepting doom as a certainty (e.g., in the face of certain disaster, your feelings of helplessness and powerlessness must take a backseat to thoughts about where I am, who am I with, and what will we

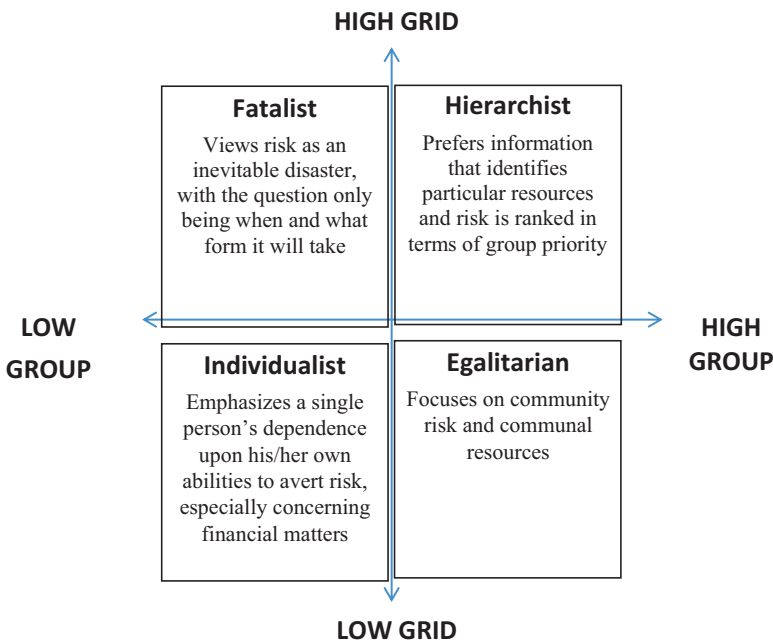


Fig. 1 The four cultures of warning response

have there'). Egalitarians overwhelmingly focus on community and communal resources, so they will find information with such foci most relevant to their needs (e.g., 'make sure you, your family, and your friends collectively know where to meet and what resources each should possess to ensure everyone has enough'). Figure 1 summarizes these approaches to risk and warnings according to "grid," "group" and the four cultures.

An important aspect of risk communication involves the message's source (i.e. who sends the warning message), not just the receivers (i.e. the audience to whom the warning is sent) (Laswell 1948). In this case, the cultural inclination of the message's source will determine the cultural tone that pervades the message sent. For example, warning messages sent out by a hierarchist agency or individual will be phrased in such a way as to appeal to other hierarchists. Although most governmental organizations from which warnings originate operate with a clear hierarchical structure, it's important not to confuse traditional hierarchy with the hierarchist culture. For example, while many hierarchically-structured organizations do exhibit a predominantly hierarchist culture, some may function more as fatalists if the "group" begins to lower while upholding a plethora of rules and regulations. So "official" warnings sent out from an organization/agency may potentially be from the perspective of any of the four cultures, even if it operates using the traditional notion of hierarchy. And every message, be it a warning or otherwise, is uttered from a cultural perspective seeking to uphold institutions. This phrasing of warning message content is what we will focus upon in the rest of this chapter, as well as how the medium used to deliver the warning can affect the dynamic interplay between warning content and evoking the target audience's actions.

Demographics Versus the Four Cultures

Here, contradictory conclusions abound. In some studies, women/females respond to warnings more frequently than men/males (Flynn 1979; Fothergill 1996; Drabek 1994; Dooley et al. 2006), in others, there is no difference in response to warnings between men/males and women/females (Mileti et al. 1993; Duval and Mulilis 1999; Bourque and Russell 1994; Arklikatti et al. 2006). In some studies, older persons understand and respond to warnings more frequently than younger persons (Cutter and Barnes 1982; Blanchard-Boehm 1998; Aguirre et al. 1998), in others, older persons respond less frequently (Flynn 1979; Dynes 1979; Grunfest 1997; Baker 1987; Dooley et al. 2006), and in some age makes no difference (Baker 1979; Bateman and Edwards 2002; Bourque and Russell 1994). In some studies, race has been found to be a determining factor in response to disaster warnings in that minority populations (usually African-Americans or "non-Anglos") respond more frequently to disaster warnings (Aguirre 1991; Dooley et al. 2006), but in others, they respond less frequently (Edwards 1993; Mileti and O'Brian 1991), and some find no difference (Bateman and Edwards 2002; Arklikatti et al. 2006). The same problem applies to socioeconomic categories: in most studies, low-income populations hear

and/or respond to warnings less frequently than others (Flynn 1979; Edwards 1993; Fothergill and Peek 2004), but even so, there exist data to contradict that finding (Aguirre 1991), especially in that there is no difference in low-income populations and response to disaster warnings (Bateman and Edwards 2002; Arklikatti et al. 2006; Bourque and Russell 1994; Mileti et al. 1993).

These contradictory conclusions were found in studies that mostly examined warnings broadcast via traditional media outlets such as newspapers, radio and television, along with neighborhood and local community broadcasting via word of mouth and/or pamphlets. What about warnings disseminated through less traditional social media outlets such as Facebook and Twitter? Categories that are unique to social media users such as “blog followers” and “non-blog followers” (Jin et al. 2010) are starting to enter the literature. Despite the entry of these new social media outlets on the disaster warning scene, studies so far suggest that people still rely on the more traditional outlets to gain and confirm information, then disseminate that information via social media (Schultz et al. 2011). For example, a person at work might overhear talk about a hurricane headed their way. S/he is likely use the computer and/or cell phone with Internet to access a television news outlet or newspaper to confirm the warning, then turn to Facebook and/or Twitter to spread the news and seek confirmation from others in their online social networks.

Given that social media use does not come at the expense of more traditional media outlet use, but rather adds to it, disaster warnings need to be phrased and sent with this in mind. Add to this the well-documented tendency of people to seek confirmation of warnings before taking action (Cutter and Barnes 1982; Berry 1999; Aguirre et al. 1998), message formulation and dissemination channels must balance redundancy with personal and familial relevance for those in the warning area. How should we best determine personal and familial relevance?

Using demographics to determine such relevance and appropriate dissemination channels has the advantages of convenience and comparability. For example, if an organization deems it necessary to send out a warning to all flood-prone households in a given area, they can identify the area with flood-prone housing, but what about determining the personal and familial relevance of the warning? Are all people who live in low-income housing going to have the same preferences when deciding what to do about a warning message? Demographics are used so frequently in many research fields to determine so many things that information can be readily found about these groups for the purposes of making comparisons. The same cannot be said about cultural biases, because there are not as many studies out there that utilize them. But what is the use of comparability if the comparisons yield inconsistent conclusions?

Cultural biases are based upon institutional beliefs and the actions that serve to uphold those institutions. They are very difficult to change. Although one may act according to a different cultural bias in different contexts, such as a hierarchist at the workplace and an egalitarian at home, the biases tend to stay the same for the same institutions (in the case of this example, work and home). And, although the intensity with which an individual or group displays characteristics of one or another cultural bias may vary, that bias tends to stay the same and become more intense in

times of crisis. Therefore, using cultural biases to determine personal and familial relevance introduces consistency to formulating effective warnings. There are four different types of phrasings with which to send out the warning, one to address each of the four cultural biases.

A disadvantage of demographic categories is that they can be added upon and redefined in different studies: one study, for example, may include four different racial groups but another may include ten. Also, even if the warning formulated by racial stereotyping is effective, formulating a warning message to appeal to one or another racial stereotype may not appeal to people who are of mixed races.

Cultural biases, on the other hand, are mutually exclusive and jointly exhaustive. If a person or group exhibits a cultural bias to support a particular institution, the person/group cannot exhibit another cultural bias for that institution at the same time. In other words, unlike demographics where an individual may belong to more than one (racial, gender, etc.) category simultaneously (regardless of context), an individual can only belong to one cultural bias category for each institutional context. Cultural biases are also jointly exhaustive: there are no other categories missing, all belief is encapsulated in these four ways of life.

The remainder of this chapter will outline the ramifications of these assertions when formulating and disseminating warning messages to appeal to each of the four cultures.

Which Warning Information Is Pertinent to Whom?

Superstorm Sandy challenged the way storm warnings are issued. Although it began as typical hurricanes begin, its characteristics changed as it trekked up the eastern U.S. coast. It could no longer be categorized as a hurricane, or even as a tropical storm, because it no longer drew its heat from the ocean, along with a loss of other defining characteristics. It became a nor'easter wrapped in a post-tropical cyclone (NOAA 2013).

These meteorological categories affect the way warnings are issued and by whom. The National Hurricane Center (NHC) is part of the National Oceanic and Atmospheric Administration's (NOAA's) National Weather Service (NWS). Once Sandy could no longer be classified as a hurricane, the NHC could no longer issue hurricane warnings according to NOAA rules, even hours before the colossal storm came ashore. NHC warnings are strictly formatted and delivered through private companies such as The Weather Channel, AccuWeather, and local meteorologists. This streamlined delivery of computerized warnings through the entire system run on deeply institutionalized rules and definitions. Despite deep concerns by NHC officials, the rules forced them to remove hurricane warnings at a crucial time, leaving warnings to be disseminated by local meteorologists (Lubick 2013). While the local organizations certainly made grave warnings about the storm, there was no unified message coming from NOAA and locals. People heard different terms such as "hurricane," "nor'easter" or "big storm" and prepared for more wind than flood (Baker et al. 2012).

In the aftermath of Sandy, NOAA changed the rules to allow hurricane warnings to be issued for a wider variety of storms. In 2013, the U.S. Congress passed the Sandy Supplemental Appropriations Act, giving NOAA an additional \$48 million to “strengthen the National Weather Service” (NOAA 2013). The assessment found problems in communicating the impact of the forecast storm surge for Sandy, and NOAA aims to improve communication of warnings with local organizations.

This case highlights how the birth of warnings can be complicated, and are not simply disseminated from an authoritative source to the public – the message content and path to the public can be much more convoluted. Therefore, the formulation and dissemination of warning messages must consider the institutional forms through which warnings travel, in addition to the targeted receivers (public).

The first step must therefore address the source. What is the dominant cultural bias of the organization issuing the warning? That is not to say, however, that egalitarians, fatalists, and individualists would not act upon a warning from hierarchists, merely that they may interpret the warning and act to best uphold their own institutional forms (cultural bias), which may or may not help prompt actions desired by the organization issuing the warning.

Once the cultural bias of the source is identified, the cultural biases of agencies with which the source communicates must also be identified, for they act as additional filters. If they simply pipe the same computerized message (as is typical with the hurricane warning system), one may assume no change in cultural bias has occurred. But once the warning message gets translated into calls for specific actions/behaviors, the language of each bias can better reach the intended audiences/publics.

How Information Can Be Shaped to Prompt Action

Hierarchists

Prefer information that identifies particular resources and risk is ranked in terms of group priority.

To be properly prepared, consider water, food, and shelter for your family first.

The high GRID, high GROUP characteristics of hierarchists dictate that they guard the group and they guard the rules, so during times of crisis, those group boundaries and rules will be tightened. This arrangement, so characteristic of military organizations in which people not only work together but also live and sleep in the same quarters, is the mark of many disaster response organizations. However, as noted previously, just because an organization is structured as a hierarchy (high GRID), does not mean it functions under a hierarchist cultural bias (both high GRID and high GROUP). It may sport a rigid rule structure but lack a functional, tightly knit brother- and/or sisterhood-type group (see “Fatalists”).

Considering that hierarchists will be most interested in resources and people according to rank (“rank” defined by the particular institution the person or group is upholding), warning messages should also use a ranking system to address which resources and which people should be where and why. Starting with the meteorological definitions of risk allows a clear path into other ranked areas of concern. Therefore, important elements of a hierarchist warning message include:

1. Definition of risk (i.e. category of storm).
2. Which geographic locations are at a certain percentage of which risk (e.g. wind, storm surge, etc.).
3. Direct or indirect suggestion of taking leadership role in household.
4. Ranked listing of material supplies needed and how long they should last and/or ranked listing of evacuation priorities (e.g. take this route, identify hotel, shelter, or friends’/relatives’ house at which family will stay that is outside the risky geographic boundary).

Egalitarians

Focus on community risk and communal resources

Make sure you, your family, and your friends collectively know where to meet and what resources each should possess to ensure everyone has enough.

Egalitarians share the high GROUP of hierarchists, but lack the desire for strict ranking and rule structures (low GRID). Context for group membership is of the utmost importance for egalitarians, who may be members of neighborhood organizations (either official or unofficial) or who may volunteer to help others. Transparent lines of communication are also important for upholding an egalitarian cultural bias, as a lack of transparency signals questionable rule structures that may introduce inequality or untrustworthy authority.

As such, warning messages directed toward egalitarians should lack rankings and suggestions of leadership, and focus more on group cohesion and preservation. References to community groups and/or volunteer organizations may help prompt action, but must be used cautiously in case people have had bad experiences with particular organizations. Equitable distribution of resources and equitable consideration of different group needs will also appeal to most egalitarians. Thus, a warning message to prompt egalitarians into action would include:

1. Definition of risk (i.e. flooding, wind, tremors, etc.)
2. Neighborhoods at risk (neighborhoods grouped according to local language used)
3. Non-profit and local volunteer groups who offer services that can help neighborhoods named prepare and mitigate the risk in a timely manner.
4. Which services people in those neighborhoods are most likely to need (e.g. evacuation assistance, shelter, food, etc.)

Fatalists

View risk as an inevitable disaster, with the question only being when and what form it will take.

In the face of certain disaster, your feelings of helplessness and powerlessness must take a backseat to thoughts about where I am, who am I with, and what will we have there.

Fatalists are a difficult bunch to spur into action. Since they accept doom, why should they do anything to avert risk? Their low GROUP is trampled by oppressive high GRID rule structures. This cultural bias dominated FEMA during the early days of the Hurricane Katrina response in New Orleans (Dowty et al. 2011). Leaders thought someone else was doing one job or another and, when that didn't pan out, blame was placed on the Fates dealing folks a bad day. Uncertainty rules the fatalist cultural bias, and what happens under the rule structures defined and maintained by others is largely out of their control.

Accepting (as fatalists do) that any action or inaction taken as a result of receiving a warning message may lead to doom or luck, uncertainty becomes important in warning messages directed toward fatalists. Emotional affect, in all its uncertainty, also becomes important to evoke. This is because, like many other things, emotions are out of a fatalist's control but likely to be affected upon receipt of a warning message. Metaphors suggesting loss of control and its consequences may help reach fatalists, as may images of poorly defined circumstances during and after the disaster. Considering these challenges, a warning message to fatalists should reference:

1. Uncertainty of risk (e.g. percent likelihood of devastation and in which geographic locations)
2. Range of conditions expected, highlighting specific examples of possibilities (e.g. flooding higher than a standard bed height, waves higher than a one-story house, winds strong enough to have specific effect on specific structures, etc.)
3. Proposed action (e.g., evacuation, shelter in place, resources necessary, etc.)
4. People/places available for assistance considering likely emotional upheaval (e.g., consider who you will be with, what you will have, what it takes to stay safe in prescribed location).

Individualists

Emphasize a single person's dependence upon his- or her own abilities to avert risk, especially concerning financial matters

Make sure you have enough money to pay for water, food and shelter.

Just because individualists are not necessarily moved by rules (low GRID) or group boundaries (low GROUP) does not mean they are senseless of their need for others. They trust others to do what they think is best for themselves. This applies to family

members, friends, meteorologists, local television and radio station announcers, grocery store employees, or anyone else. According to the individualist, individuals are born as individuals, and their affect is borne from their individuality. Thus, resources are defined in terms of individual holdings and rationality stems from individuals' decision-making.

Warning messages aimed toward individualists should therefore emphasize an "every man for himself" type approach to prescribed actions. Value should be placed on the ability of each person to give him- or herself the best chance of not only surviving but thriving through a forecast disaster. Knowledge held by the individual should also be highlighted, as such knowledge can lead to better chances of getting ahead and staying ahead of the rest. In sum, the elements of a warning to appeal to individualists include:

1. Definition and geographic range of risk (e.g. category of storm and forecast impact areas)
2. Associated probabilities of damages (e.g. property damage, financial risks associated with the storm, etc.)
3. Proposed action (evacuation, shelter-in-place, etc.)
4. Comparison of forecast disaster with a past disaster likely known to those in warning area (e.g., a hurricane like Katrina, an earthquake like Loma Prieta, etc.)

These are generalizations for recommended content to direct warning messages toward each of the four cultural biases. A trickier question is how to issue this information to target audiences, that is, get the fatalist's message to the fatalists without making him/her trudge through warnings geared toward the other cultural biases.

Where Should Information Be Posted?

Simon et al. (2015) refer to a "traditional disaster management model" in which information flows from emergency management organizations to the public. They challenge that one-way directional flow based on the rising use of social media. Mitchell et al. (2012) found that most people still rely on newspapers, news sites or apps (71% of Facebook users and 76% of Twitter users) to receive news. They note that users on Facebook get news mostly through family and friends, but interact with a broader range of associated users on Twitter. Accordingly, a Princeton-led survey found that Twitter users considered news they received more unique than news they received through Facebook (Mitchell et al. 2012). Prior to and during Sandy, New York City and FEMA utilized Facebook, Twitter, and Tumblr to disseminate timely information and respond to questions from users directly. New York City's Mayor's office made it possible for residents to sign up for text alerts through Twitter as an alternative means of information once electricity and Internet services were lost (Cohen 2013). Crowdsourcing is another new consideration with the rise of social media, where Tweets and Facebook posts from people on site and people monitoring the situation remotely can generate maps. During the warning period,

the impact and effect of the disaster is frequently still unknown, so thus far crowd-sourcing has been used more for post-impact evacuation orders (Simon et al. 2015).

Regarding cultural biases and warning messages, the implications for using social media versus the traditional warning model involve (1) how many individuals and organizations through which warning messages are filtered and (2) wording and language requirements for posted warnings that differ across media types. Word of mouth takes on a whole new dimension when considering how social media interaction transcends face-to-face interactions. It also transcends some of the usual hierarchical boundaries. For example, how many people can readily get an answer to a question directly from the NYC's Mayor's office without the use of social media? With fewer filters, messages can be more readily formulated and delivered according to the suggestions in this chapter. However, limitations and changes must be made to accommodate different requirements on social media sites. For example, Twitter posts ("tweets") cannot exceed 140 characters, and the use of hashtags (denoted by the # symbol before a word) categorizes tweets such that people searching for or posting specific warning information can more readily achieve their goals. Communicating the nuances associated with each cultural bias-focused warning message in 140 characters would take particular skill at tweeting.

Despite a host of confounding social media factors, communicating warnings according to cultural biases may not be much more complicated on social media sites than it is through traditional channels. Hierarchists will gravitate toward other hierarchists, egalitarians will gravitate toward other egalitarians, fatalists will gravitate toward other fatalists, and individualists will gravitate toward other individualists. How each person or organization uses the language and limitations of Twitter, Facebook, blogs, or other interactive online opportunities may not be so different from whatever limitations are posed by face-to-face, newspaper, radio, or television warning dissemination. Such postulations, however, require exploration and research, to help initiate a basis for comparison and a literature on using cultural biases for disaster warning formulation and dissemination.

Conclusions and Future Directions

The pervasiveness of demographic categories frequently hides the assumptions implicit in their use. When considering the connections between warnings, decision-making, and behavior, we ask "Do demographic categories capture the beliefs that drive response to disaster warnings?" Our answer is no, they do not. We therefore propose an alternative set of categories, based on beliefs about the way the world works, to better communicate warnings to target audiences. Cultural biases, as described by Mary Douglas and those who further developed her theory of cultural biases, use categories based on how people use their beliefs and actions to uphold the institutions they depend on to make sense of their world. Cultural biases are defined by two dimensions: GRID (rigidity of rule structures) and GROUP (rigidity of group inclusiveness). These two dimensions give rise to four mutually exclusive

and jointly exhaustive cultural biases: hierarchist, egalitarian, fatalist, and individualist. We believe these cultural biases, unlike demographic categories, do indeed capture the beliefs that drive response to disaster warnings.

We have shown how these cultural biases can be used to formulate disaster warning content that specifically appeals to each way of looking at the world. Because cultural biases exist across internationally-defined cultures, we postulate that these strategies could be effectively used to formulate disaster warnings worldwide. Language barriers are always challenging in formulating and disseminating disaster warnings, and they remain challenging when translating the nuances of cultural biases. Language barriers exist not only across nations but also across social media sites, where messages are limited to a certain number of characters and are sorted into categories using hashtags. But these challenges are surmountable, so long as the interest and motivation to improve warning messages remains a priority in research and in practice.

Improving warning messages as addressed in this chapter has three implications for ensuring more people reach safety faster: (1) enhancing effective communication readiness for organizations that issue warnings, (2) eliciting prompt attention to a warning message with less post-message confirmation time before action is taken, and (3) taking appropriate actions that reflect accurate understanding of actions prescribed in a warning message. First, organizations that issue warnings must be ready to communicate to each of the individual cultural biases increase the probability of people paying closer attention to the warnings they send. Such warnings would also elicit a prompter response on behalf of the target audience(s) because the message would be sympathetic to the institutional scaffolding that each person individually and collectively uphold(s). Last but not least, closer attention and a fuller understanding of the warning message and impending threat would prompt appropriate responses and thus ensure more people reach safety and more people effectively protect property to weather the disaster.

Thus, a methodology would have to be formed to categorize tweets and other social media posts to sort the posters into the four cultural bias types. Dehghani et al. (2016) found that tweets can be successfully sorted according to homophily (love of same) such that a social network can be predicted on Twitter based on perceived moral difference and similarity. Such a method could be adopted to sort tweets according to cultural biases, because cultural biases are defined through perceived moral differences. To make this moral difference specific to differences in risk perception for the purpose of identifying social networks that can be targeted for warning messages, a scale of risk would be used.

Gardoni and Murphy (2014) proposed a scale of risk based on (1) perceived consequences (2) perceived probability and (3) perceived source of a given risk. We propose applying Gardoni and Murphy's scale of risk, such that a risk will rank higher on the scale for each cultural bias the larger that people holding that cultural bias perceive the consequences to be, the greater the perceived probability of those consequences occurring, and the more morally culpable the source of the warning is deemed to be by each particular cultural bias. Therefore using this scale and Twitter and/or Facebook posts, people may be sorted using their posted content to determine risk perceptions

that can be scaled and sorted according to cultural biases. Then, a social network of those tweeters can be identified that would enable warnings to be targeted to a social network of hierarchists, or a social network of egalitarians, or a social network of fatalists, or a social network of individualists. Once a warning, tailored to suit each of the cultural biases, is disseminated in its appropriate social network, responses can be tracked and also sorted accordingly to track warning effectiveness.

The greatest challenge is perhaps that of comparability: demographics have been used for so long in so many different research areas that a new set of categories must be tested repeatedly to gain ground. Future studies need to delineate ways of sifting through social media sites to identify characteristics of each cultural bias, so that we might identify particular phrasing strategies to prompt individuals and groups upholding each of the four cultural biases into action. Additional research needs to be done to test the efficacy of what is proposed here: how does formulating warning messages according to cultural bias improve evacuation rates? Is there a significant difference in how the target audience takes action when cultural biases are used to formulate the warnings? In a more connected world of increasing environmental risks, different ways of looking at that world become increasingly important. Cultural biases can provide a lens through which to view the institutions that create our world.

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The Emergency Manager as Risk Manager



Patrick S. Roberts, Kris Wernstedt, Joseph Arvai, and Kelly Redmond

Abstract Emergency management as an institution has grown in size and scope in recent decades, but has this emergent profession brought better public decisions about managing hazards and risks? The evidence is mixed because though emergency managers have acted wisely and heroically, they are subject to institutional constraints as well as the same decision biases and barriers that affect other experts and professionals. We propose that emergency management can be improved and hazard vulnerability lessened more readily through better decision processes than through the traditional approach of incremental improvements in the quality of information. The current fascination with “big data” focuses on more and better information, but emergency and hazards managers should ensure that they use the data they already have access to well.

Keywords Emergency management · Professions · Institutions · Decision making

Introduction

Emergency management as an institution has grown in size and scope in recent decades, but has this emergent profession brought better public decisions about managing hazards and risks? The evidence is mixed because though emergency managers have acted wisely and heroically, they are subject to institutional constraints as well as the same decision biases and barriers that affect other experts and professionals. We propose that emergency management can be improved and hazard vulnerability lessened more readily through better decision processes than

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through the traditional approach of incremental improvements in the quality of information. The current fascination with “big data” focuses on more and better information, but emergency and hazards managers should ensure that they use the data they already have access to well.

The term emergency management arose in the 1980s as the elements of civil defense associated with preparation for foreign attack ran out of steam and existing terminology no longer encompassed what a new breed of emergency managers actually did. One oft-cited definition describes emergency management as, “the discipline and profession of applying science, technology, planning and management to deal with extreme events that can injure or kill large numbers of people, do extensive damage to property, and disrupt community life” (Hoetmer 1991, xvii). Emergency management is both a job function and a body of knowledge in support of that function (Phillips 2003). The field has increasingly developed the characteristics of a profession, such as certifications, degrees, associations, and a shared, specialized body of knowledge (McEntire 2006; Jensen 2013; Wilson and Oyola-Yemaiel 2001). According to a survey of county level emergency managers published in 2009, 13.5% of EMs have postgraduate degrees, 44% have a state certification, and 41% have participated in training from FEMA. Seventy percent had received training in the National Incident Management System (NIMS) (McGuire 2009, 80).

Professions accumulate, transfer, and certify knowledge, but they also create boundaries to knowledge as a way to define themselves. As it professionalized and developed its own vocabulary, institutions, and knowledge base, emergency management has become isolated from developments in psychology and environmental management that could apply to its distinctive tasks. This chapter makes the case that emergency management would benefit by adapting structured decision making tools from other fields to help emergency management scholars and practitioners prepare for uncertain events given limited resources and conflicting values.

Today’s Emergency Manager

The emergency manager’s chief institutional constraint is that she operates as a coordinator rather than as the top official in a hierarchy, and does so with limited resources but wide responsibilities. The job of emergency manager exists at all levels of government, and it ranges from a part time position to a supervisory position overseeing multiple staff members in the largest jurisdictions or at the state level. “Emergency” is a misnomer since her duties extend far beyond the scene and timeline of a single event. Responders from police, fire, and medical services are the first ones dispatched to the scene of an emergency (McEntire 2007, 169). In contrast, the emergency manager is better suited for planning for acute yet prolonged harms—disasters, in other words—and for dealing with their consequences once the initial crisis has passed. In some jurisdictions the emergency manager leads the response to a fire, flood, or hurricane, but in most cases local elected officials, city managers,

and police and fire chiefs step in. During a crisis, the emergency manager is often put in the unenviable position of the hapless Michael Brown during Hurricane Katrina – all eyes are on the EM, but she has none of the authority needed to mount an adequate response. At the federal level, FEMA does not own most of the assets used in disaster response, and states and localities face a similar problem because the equipment, vehicles, and personnel, as well as the necessary legal authority, often reside in other agencies, if in the government at all.

Despite greater attention to the response phase of a disaster in both scholarship and in the public eye, an emergency manager's responsibilities are much broader, usually structured around the cycle of preparedness, mitigation, response, and recovery (Fogli and Guida 2013; Thompson et al. 2006; Van Wart and Kapucu 2011). At the local and even state level, much of an emergency manager's day is spent understanding more about a community's hazards, planning what to do when the inevitable strikes, and bringing together government officials and community members to prepare for the next event or to recover from the last one (McEntire 2007, 173–174; Murphy 2007). Emergency managers are busy people who face a long list of “what ifs” (Paton and Flin 1999).

Beyond their normal duties, some EMs are assigned a grab bag of other tasks such as code enforcement, building inspection, public works, or facilities management. Beyond the sheer number of responsibilities, emergency managers face substantial political and institutional constraints, including long time horizons for action, uncertainty about whether a major disaster will happen on their watch, and limited budget and staff resources that may be sacrificed to higher priority needs of other agencies (Donner 2008). To do the work of planning for disaster, the EM remains “heavily dependent on other departments, preparedness councils, mutual aid partners, regional consortiums, and emergent groups” (McEntire 2007, 168). Without substantial resources, the emergency manager is left to lead by collaboration and by calling attention to a problem, rather than by command and hierarchy (Cole and Murphy 2014). Numerous studies have pointed to the need for more attention to how EMs can collaborate with government agencies and public groups (McEntire 2007, 168–169; McGuire 2009; Waugh and Streib 2006).

For example, the shared-governance environment of flood planning and management amplifies the need for collaboration, yet many emergency managers are housed in local public safety entities (e.g., sheriff's office) that rely on strong, centralized authority in daily operations. A survey of 30 county-level emergency managers in coastal Oregon and Washington conducted in 2001 and reported on in Wernstedt and Hersh (2004) highlights this dilemma. When asked to assess the reliance of their county on promoting compliance with zoning and building codes aimed at flood protection and mitigation—on a “sticks and carrot” scale of 1 representing complete reliance on sticks (inspections, penalties, stop-work orders) and 10 complete reliance on carrots (use of incentives, discretion to relax requirements in certain situations, negotiation)—responses from emergency managers ran the gamut. Thirty-eight percent of the 30 surveyed indicated largely a reliance on sticks (a 3 or below on the scale), 13% largely a reliance on carrots (an 8 or above on the scale), and the remaining 49% indicated a reliance on a mix of carrots and sticks.

In the face of so many demands and needing to engage a wide range of stakeholders in diverse political settings, scholars of public administration have called on emergency managers to embrace strategic management as way to organize their many tasks and efforts to promote compliance. Strategic management is defined as “forward thinking, professionalization, capacity building, goal identification and achievement, increased public support, increased funding, and greater accountability” (Choi 2008). At its best, strategic management focuses attention on what is most important, but at its worst it offers another to-do list.

Beyond institutional constraints, emergency managers face the same cognitive constraints on their decision making process that other leaders face. These constraints follow from the use of rules of thumb that people employ in assessing probabilities. In many situations, these rules might work perfectly well, but in new or non-routine contexts they may distort decision making. A large literature in the psychology of decision-making has explored the promises and pitfalls of such decision shortcuts or “heuristics” in undertrain and non-routine conditions (Gilovich et al. 2002; Kahneman et al. 1982; Kahneman and Tversky 2000) in a variety of contexts, including weather and climate (Baker 1995; Gigerenzer et al. 2005; Konold 1989; Sink 1995). For example, when presented with hypothetical scenarios, Wernstedt et al. (2019) found that emergency managers took different actions in response to weather forecasts when the projected outcomes were framed as gains than when they were framed as losses. When a decision is framed as a gain, emergency managers are more likely to prefer a sure outcome. When a decision is framed as a loss, they are more likely to gamble. Neither choice is superior to the other, but the different responses show that even expert managers use heuristics that are subject to the effects of framing (Wernstedt et al. 2019).

Group decisions often share and, in some cases, exacerbate these types of individual-level biases (Kerr et al. 1996; Kerr and Tindale 2004). Research shows that individuals may be perceived as more competent, knowledgeable, and credible when they share information others already know to be true rather than offer alternative perspectives (Wittenbaum et al. 1999). As a result, ad hoc or unaided judgments may not yield informed or sustainable decisions. A literature on group decision processes outside the emergency management realm suggests that some groups may maintain conformity at the expense of alternate and possibly useful positions in order to maintain group cohesion (Gregory et al. 2001; McDaniels et al. 1999).

There is no reason to believe that emergency managers behave any differently in either individual or group settings. Nicholls’ (1999) study of climate forecasts warns specifically about group conformity among weather and climate experts, noting that groups can strive to maintain cohesion among group members, rather than promote creative problem solving. In crises, this privileging of cohesion, and the insularity of group thinking it can encourage, can exacerbate stress and decrease the quality of decision making.

Conflicts over alternative courses of action pose another challenge to decision-making. Wernstedt and Hersh’s (2004) survey of emergency managers suggests that many of the most cost-effective flood planning and management measures—

development and enforcement of building codes, zoning, and implementation of a repetitive loss ordinance—attract the most opposition from local community members. Emergency managers report numerous political obstacles to reducing natural hazard risks, such as concerns over litigation, residents' resistance to higher taxes, developers' opposition to new restrictions, advocacy for private property rights, and fear of home condemnations.

Finally, media and political attention can refocus emergency managers' attention to the latest or most spectacular event and away from the most serious hazard that a community faces. Ferrier and Haque (2003) propose a measure of the number of disasters in a community multiplied by a measure of magnitude as a more objective measure of what disasters deserve attention than the more newsworthy event that the media typically provides. This “fast and frugal” metric can serve as a starting point for discussions about how to respond to risks.

Better Decision-Making Rather Than Just Better Information

Much of the focus on improving emergency management has been on providing better, more accurate, and timelier information about warning and hazard vulnerability (Carver and Turoff 2007; Cutter 2003; Van De Walle et al. 2014). The scholarly literature advises the “emergency manager of the future” to master decision support systems, software, big data, and communications technologies (Gadomski et al. 2001; Pine 2004; Tufekci and Wallace 1998). In reality, however, emergency managers have trouble interpreting nuanced data such as storm speed and intensity, and with reconciling information from multiple sources (Baumgart et al. 2006). Making choices under conditions of uncertainty also poses difficulties to emergency managers, as it does among the general public. For example, the so-called numeracy problem—an inability in the general population to interpret basic numbers and probabilities correctly in decision contexts (Peters et al. 2006)—appears in the expert community of emergency managers, as well. For example, a recent survey of more than 200 emergency managers around the country revealed conflicting responses to flood likelihoods when expressed as frequencies (e.g., 1 in 10) vs. as probabilities (e.g., 10%) (Wernstedt et al. 2019).

While better quality information that is communicated clearly can mitigate this problem, the focus on information quantity and quality ignores much of the contemporary literature on decision support from the decision sciences. This literature has found that the process by which decisions are reached can matter as much or more than the fidelity of the information that goes into the process. The best information can feed into decision processes that come undone because of the way in which the decision is reached. The rush to search for agreement can lead to downplaying conflicts and finding a solution that is not widely supported or sustainable (Kenney et al. 2015, 3). Good public management practice allows for consultation, community engagement and collaboration with stakeholders (Emerson et al. 2012). Open dialog can run into predictable problems when it is time to make a decision, however.

How information is framed, and how intuitive mental shortcuts are used can impact decision processes and short circuit more thorough analysis (Wilson and Arvai 2010). Simply improving the amount or quality of information is particularly ill-suited to complex decision scenarios requiring trade offs among different values (Arvai et al. 2012). Emergency managers routinely face complex situations, since they chronically need to decide how to allocate finite time and resources among different hazards, different timescales, and different geographic regions and communities. The decision of how, whether, and when to prepare is not an automatic one that is determined by science and only immediate needs, but instead a decision process informed by science and a desire to satisfy competing values in a particular place and time and with an eye to future contingencies.

For example, emergency managers regularly use weather forecasts. Such information can decrease the uncertainty endemic to many decisions—for example, a 72-h forecast of heavy precipitation may increase the justification and allow time for positioning sandbags or putting emergency personnel on high alert, thus improving flood response. Deciding what to do is not straightforward, however, because financial and reputation risks suffuse any decision to act. In particular, emergency managers face two kinds of potential regret.

First, the emergency manager may choose to act on a forecast and encourage a response from community members, thus incurring costs, which some will see as wasted resources if the forecasted event does not occur or is less damaging than anticipated. For example, one emergency management blog warns about the dangers of predicting a “snowmageddon” in Colorado (Baron 2013). After all, Coloradoans are used to large snowstorms. Predicting such a dire event could aid preparation, but if the preparation requires the expenditure of financial and other resources and the big event doesn’t occur, citizens may blame the messenger, criticize the waste of resources, and/or be less likely to believe the next forecast. We call this an “error of commission,” committing to an action that in hindsight proves unnecessary.

Second, the emergency manager may choose to forego action in response to a forecast, not giving the forecasted event enough credibility to risk an action. If the forecasted event occurs and the emergency manager failed to take actions that may have reduced impacts, an “error of omission” occurs. The most famous example of an error of omission is the case of the Italian scientists who, in 2012, underestimated the threat posed by tremors that preceded the deadly L’Aquila earthquake. The scientists were convicted of manslaughter for their role in giving false reassurance, though they were later exonerated.

Wernstedt and Hersh’s survey results from Oregon and Washington show, not surprisingly, the emergency managers worry more about errors of omission. Eighty-one percent of the emergency managers indicated a “very high concern” with committing such an error by not sharing information with the public about a forecast of high river flows, and then having the high flows occur. The remaining 19% indicated a “high concern” with such a situation. Yet, 36% of the emergency managers also expressed a “very high” or “high” concern with an act of commission, wherein they shared information about a long-range forecast of high flows but the high flows did

not occur. Most surprisingly, 59% of emergency managers expressed a “very high” or “high concern” with sharing information about a long-range forecast of average flows, and then having high flows occur. For these emergency managers, the very presence of forecast information presents risks to consider.

Structured Decision-Making and Emergency Management

Structured decision making (SDM) processes offer an avenue to improve how emergency managers lead community decision processes. SDM approaches divide a decision problem into stages and use facilitators to allow participants to more explicitly define objectives, detail performance metrics, construct alternative courses of action, and confront trade offs. Empirical studies of SDM show promise for mitigating some of both individual and group-level decision constraints in environmental resource management contexts in particular (Arvai and Gregory 2003; Gregory and Long 2009; Hammond et al. 1999; Gregory et al. 2012)

Some of emergency managers’ decisions are routine, such as setting annual budgets or attending meetings, while others are driven by crisis and an immediate response to an event. Another part of the emergency manager’s job, however, is to guide community planning processes for how to prepare for disaster, ideally bringing together diverse perspectives on risk from emergency management, hazards planning, floodplain management, the general public, resources agencies, public safety officials, and other stakeholders. Where should a city locate infrastructure? How should the community aid residents living in flood-prone areas? What should the city do to monitor stream flows and snowpack? How much time should schools devote to planning for emergencies? City or county level emergency managers are involved in all of these decisions, although they help guide stakeholders to a decision rather than making the decision on their own. SDM could play a role in all of these elements.

SDM processes come in many shapes and sizes, but they all address four principal issues (Keeney et al. 2015, 4–9; Arvai et al. 2001). First, the **scope** of the decision must be arrived at before generating decision options, otherwise the set of options may be too narrow or too broad. Should the decision process arrive at a single best option, or should it generate a range of options? Sometimes, the job of the emergency manager is to clarify the choices that elected officials can make in preparation for a disaster. Understanding the scope of the decision will require identifying the stakeholders (Gregory et al. 2013). Are particular neighborhoods involved in a decision to invest resources in preparing for a flood? Will the schools need to be altered because the community will rely on their buses for evacuation? Is equity among socio-economic groups a concern and, if so, are the groups affected represented in the process? Narrowing the scope of the decision also requires identifying apparent and fixed constraints (Hammond et al. 1999). Apparent constraints are real, but more flexible than they might appear at first. For example, a budget constraint can be moved within certain bounds with the consent of top officials.

Fixed constraints cannot easily be changed. These might be the land area above a flood plain, or the amount of time and attention particular officials have.

The scope of the decision should recognize which constraints can be loosened, and which are fixed. In addition some decisions may be linked. For example, increasing the number of tornado shelters in a community might depend upon building a new public school with a basement that could house people. The decision process should recognize that tornado preparations and the schools budget are linked. And an information base that provides the stakeholders with a consistent set of information must undergird all of this. This seems obvious, but may be less common than assumed in some longer range emergency planning. In our survey of participants in the 2008 FEMA Higher Education conference, for example (Wernstedt et al. 2009), one of our respondents observed, "Communication between the emergency preparedness and state climatologists occurs only on an event-by-event basis. As far as I know, the state climatologist does not participate in emergency planning." Absent such communication, the scope of the decision under consideration may be distorted.

Once the scope of the decision has been identified, the next step is to determine the **range of objectives**, and then to operationalize these objectives. When people are asked what their objectives are, they often give broad answers such as sustainability, resilience, or prosperity. One way to elicit more specific objectives is to ask why particular broad objectives are important. A group might say that they want a resilient neighborhood because they want to preserve the neighborhood's historic architecture. The manager can take the statement about preserving the neighborhood and separate ends objectives such as preserving a neighborhood's character from means objectives such as preserving a particular building or streetscape or building a barrier around a historic structure. Visual diagrams can show a hierarchy ranging from means objectives and possible means ends to universally agreed-upon ends objectives. It is important to make objectives as specific as possible in terms of their direction (more or less) and measureable amount. For instance, a community may want to preserve a historic school and church in the face of rising storm surges, or it may want to raise a road so that it is protected against a 100-year flood.

The next step is to identify a **range of alternatives** to achieve the objectives. At this stage, it helps to be open to creative solutions, even unpopular ones, since the point is to compare the full range of alternatives. Emergency managers might hold a meeting focused on alternatives, or they might simply collect alternatives in conversation with various stakeholders and later present them at a problem-solving meeting. Sometimes the emergency manager's role is to bridge a network of people involved in preparing for hazards and disasters. In developing alternatives, it is important that everyone involved identify and agree upon how to measure them. Building a dam carries a financial and perhaps environmental or land use cost. Leaving a shoreline unprotected also has potential costs in the future as well as benefits for recreation or amenity value. Considering alternatives also requires thinking about their consequences and the role of uncertainty. People can have difficulty quantifying or understanding how uncertainty impacts their decisions. Emergency managers may want to bring in outside experts to help explain uncertainty, such as in climate or weather forecasts.

Once alternatives are specified, the final stage is to identify the **trade offs** that stakeholders and decision makers will need to make. Managers often want to turn zero sum games into win-win solutions, but sometimes making a decision requires making trade offs. The goal of identifying trade offs is to get a group to consider how much of one objective they are willing to give up to accomplish another. Trade offs might be sacrificing one objective for another, or they might be tolerating a particular degree of uncertainty. In other cases, trade offs are simply costs of time and attention. One way to visualize trade offs is to portray them in a consequence matrix where various attributes can be compared directly (Arvai and Post 2012; Winkler and Clemen 2004). Attribute-by-attribute comparisons are preferred to simple rankings because they make clear the trade offs involved along multiple dimensions. Decision science research shows that people are at best only adequate rational maximizers of multi-attribute utility (Kahneman 2011). There is reason to believe that people more typically develop their preferences non systematically in response to various stimuli and associations rather than arriving at coherently ranked alternatives measured by general utility (Slovic 1995).

When conflict levels are high, conflict resolution and alternative dispute resolution techniques may be applicable. When conflict is low, pointing out trade offs can help bring to the surface things that people take for granted. As an example, a traditional approach to creating a historic preservation district might focus on architectural details and materials. A structured decision process for making trade offs would compare the benefits of a historic preservation district with the effects on the speed and cost of disaster recovery. Historical preservation and recovery might be in tension, or there might be ways to lessen the financial and recovery timeline effects of preservation districts during a recovery period. Without making the trade off explicit, though, decision makers may not weigh alternatives with a full view of the impact of their decisions.

Emergency managers might lead groups through all four steps in a collective process, or they might build a range of objectives, alternatives, and trade offs through separate conversations and present the results to stakeholders as part of a deliberative process. Either way, the SDM process has the potential to mitigate individual and group decision biases, while at the same time incorporating the input of stakeholders with different perspectives on risk. People tend to settle on an available alternative that is reasonably acceptable rather than sorting through all options, what behavioral scientists call “satisficing” rather than fully satisfying their wants. An explicit deliberative process allows for more consideration of more alternatives than they would normally attend to. Furthermore stakeholders from one group, such as golf course resort owners, might not see the trade offs involved in reducing their water consumption while maintaining the water consumption of agricultural concerns. A formal process allows groups to see things from the perspective of others. If groups sometimes rush to consensus to maintain harmony and speed up the decision process, the SDM process adds speed bumps and makes clear trade offs so that minority or quieter views are less likely to be left out than if the process were rushed in an attempt to jump to ranking outcomes.

SDM in Practice? Preparing for the Oregon Floods

Formal structured decision-making processes have been employed in environmental resource management settings, from making decisions about where to begin logging operations, to decisions about how a community can balance energy needs with environmental sustainability. Emergency management has not adopted SDM techniques in a formal way, but the best emergency management decision processes share some of the basic features of SDM, such as collectively defining the scope of a problem, considering objectives, constructing alternative courses of action and attaching performance metrics, and confronting trade offs. We argue that emergency management could benefit from a greater use of SDM, whether a highly formalized process or a more informal use of a conscious decision process to make the best possible use of information.

Emergency managers are awash in scientific and technical information about hazards, but making use of the information in an efficient and effective manner presents challenges. In the search for more evidence-based decisions, many managers focus on more and better information, but they would do well to devote some attention to the process by which they make decisions using that information. In almost all situations, this decision process will not take place solely among emergency management staff, but rather it will engage a wide range of emergency management stakeholders from across the community.

To understand how emergency managers might better use scientific and technical information, we examined the use of seasonal climate forecasts produced by the National Oceanic and Atmospheric Administration and distributed to emergency management agencies. These forecasts are important because they measure the strength of seasonal climate phenomena, such as the El Niño and La Niña anomalies, which are associated with a greater likelihood of extreme events such as droughts and floods in particular areas. Such forecasts hold out the potential for emergency managers to know more about the likelihood of floods in particular regions, yet they are rarely used. Wernstedt and Hersh (2004) suggest that this does not reflect a lack of familiarity with seasonal forecasts. To the contrary, only 12% of the 30 emergency managers they surveyed indicated that a lack of awareness or access to seasonal forecasts was a critical or near critical constraint to forecast use. Rather, the principal constraints their respondents noted related to making decisions under uncertainty, both with respect to whether the forecasted event would occur and whether the event would occur in a vulnerable location.

More recently, Roberts and Wernstedt (2016) contacted 62 Oregon emergency managers in 2012 and found that while many were familiar with seasonal climate forecasts, only two reported using climate forecasts that led them to take action before a flood. In those two cases, the presence of a conscious decision process was important in attaching the information to actions that people responsible for preparing for flood hazards could take. While no one used formal SDM processes in these two situations, the utility of a formal decision process suggests that emergency managers could do more using similar processes or even more formalized ones in the future.

In one of the cases in fall 2010, Lane County, Oregon local emergency manager Linda Cook (2012) learned that the winter and spring would bring La Niña conditions to western Oregon. Winter weather is of perennial interest in Oregon, and a strong La Niña is associated with a greater than normal likelihood of precipitation in the Pacific Northwest. Each October, Cook organizes a winter weather meeting to discuss how to prepare for the season with county officials. The group is in broad agreement about the scope of the decision: to figure out what to do over the next 3 months to prepare for winter weather, and to coordinate plans. At each meeting, the group revisits the range of objectives they will pursue. Everyone wants to keep residents of the country safe, and everyone wants to minimize the damage to property that floods cause. The alternatives for achieving these objectives depend on the weather and climate conditions that season as well as the competing priorities in each of the city's agencies.

Faced with rising rivers, Cook (2012) told 54 attendees from the county's public agencies at the October 2010 meeting to be on the lookout for heavy snowpack followed by a warming trend and eventual flooding. She delivered some of the forecast presentations herself, and relied on National Weather Service briefings for others. What to do? The county could decide to proceed as usual, or they could shift some attention and resources to preparing for the wet season. The group reached a consensus that the danger of floods was greater that year than normal, and they decided to increase their preparations. Some agencies updated maintenance of river gauges, while others cleared stream course debris. The school district promised to lend buses and equipment if needed. Still other agencies stocked sandbags. All were more attentive to developing winter conditions. The trade offs were primarily reduced budgets and decreased attention for other activities, but making these trade offs was easier after the group deliberately reviewed the forecast information, deliberated, and reached consensus as a group about how to prepare.

In the end, the rains fell during the winter of 2010–2011, but Lane County was spared severe flood damage. The county had taken a number of steps that paid off, from checking river gauges to monitoring the weather more closely so that people could shore up defenses or move out of harm's way before the flood.

Conclusion

The decision-making challenges of the emergency manager are similar to the challenges in other professions. The solutions, however, must be tailored to the resource-constrained and highly collaborative EM environment. What to do? One emergency manager told us that, "After 9–11 we had a lot of meetings and relationship building, but now we don't have as much time for relationship building" (Roberts and Wernstedt 2016). Improved decision making processes, borrowing from structured decision-making techniques, will require a modest investment of time and resources,

but they have proven benefits. When resources are scarce, standardizing processes across decision contexts can be especially valuable. Evidence shows that experts and the public are happier with the quality of their decisions when they use structured techniques. In addition, standardized decision processes will require modest investments in the capacity of emergency management agencies. Finally, the career trajectories of emergency managers will need to reward participation in decision processes and leadership in taking decisions that may not bear fruit immediately.

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Disaster Response as Secondary Hazard



Malka Older

Abstract Disaster responses are not always positive experiences for those affected. They can be seen as a separate, if related, event; a secondary hazard following the earthquake, flood, or drought. Existing literature argues that different types of disasters can have different effects on community recovery, with natural disasters triggering a therapeutic reaction in communities while technological contamination tends to have a disruptive effect. External response and recovery programs – led by NGOs, by international agencies like the UN, or by the government – can demonstrate the same characteristics described in human-produced disasters, and lead to the same fragmentation of communities. Like technological disasters, responses produce uncertainty: Who controls aid resources, and what is the best way to access them? Where and how will it be permitted to rebuild? What are the long-term consequences of participating in one aid program as opposed to another? When people believe that the government has the responsibility and ability to perfectly execute a robust, seamless response, anything less than that becomes a disaster: something that was done to them. This is complicated by the fact that domestic governments are chary of standard indicators for response successes. Without any way to define a “good” or an “adequate” response (bad responses are usually self-evident), communities fracture over their interpretations of what is lacking and whose fault it is. Responding to disasters is a humanitarian imperative, but where and to what degree that responsibility is held is not self-evident. Governments need to clarify their goals as well as their limitations.

Keywords Emergency management · Technological disasters · Theories of disaster

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Introduction

As the number and intensity of so-called “natural” disasters increases¹ and technological hazards become more and more pervasive, our responses to these crises become increasingly important, as well as increasingly integrated into the expectations of our lives. National governments are putting greater emphasis on preparedness for disaster response of all types, whether through budget allocations or through the establishment or restructuring of dedicated agencies, departments, or ministries. International agencies, donor governments, and non-governmental agencies (NGOs) continue to professionalize, standardize, and technologize their approaches to dealing with the humanitarian needs of disasters located in countries unable or unwilling to manage the response internally. Responses of both types periodically glut the news media, and are romanticized in film and television.

Despite this growing attention to disasters and responses, the aid provided after catastrophes continues to be problematic. Many larger disasters – the earthquakes in Haiti and Nepal, Hurricane Katrina, the Southeast Asia tsunami, to name a few examples – have become watchwords for international or domestic incompetence or corruption. Even those responses are not known as high-profile failures – Hurricane Sandy, the 2011 Japan tsunami, Typhoon Haiyan, for example – did not, for the most part, live up to expectations, leaving dissatisfaction and opprobrium that exacerbated and sometimes outlasted much of the physical destruction.

For those involved these responses often go beyond disappointing or inadequate. In the aftermath of a catastrophe, it’s common for communities or local authorities to refer to the response as an extension, amplification, or echo of the disaster. The overwhelming influx of NGOs and international organizations after the 2004 Indian Ocean tsunami is often called “the second tsunami” (for example: Fernando and Hilhorst 2006; Lund and Blaikie 2009; IFRC 2013). Oliver Thomas, President of the New Orleans City Council at the time of Katrina, said that “Hurricane levees, hurricane recovery, hurricane neglect and hurricane capitalism were worse than Katrina. And hurricane politics. They were category tens [referring in an exaggerated way to the Saffir-Simpson hurricane wind scale which goes up to five and on which Katrina was, at the time of landfall, a three].”² For those affected, the response becomes a secondary hazard following the earthquake, flood, or drought: something that happens to them, and that can often have a negative impact.

Technical failures certainly contribute to the negative perceptions of such responses: poor coordination leading to avoidable delays, for example, or dangerously inadequate shelters. Although these challenges may seem simple enough, judging the sufficiency of a disaster response is in itself a demanding problem. What constitutes poor coordination when there are no means of communication and no information beyond the operations center? What delays are really avoidable when

¹ See, among others, the International Disaster Database: http://www.emdat.be/disaster_trends/index.html

² Interview, May 30, 2013.

roads, airports, and all other infrastructure in an area are destroyed? Is two days reasonable? Three? When faced with a choice between quality and quantity of shelter, where does the line of adequacy fall?

Frustrated with the continued response problems, practitioners have pointed to a number of more high-level culprits. The idea of ownership comes up a lot, as does accountability. Daly and Brassard (2011) find that even when agencies claimed to be participatory, lack of rigorous participation mechanisms led to significant long-term problems in implementation. Some explanations are even more abstract: after Katrina, the report by the House of Representatives was titled “A Failure of Initiative.”

This chapter offers a new framework for examining the disruptive impact of disaster responses, drawing from sociological research comparing natural and technological catastrophes. Rather than considering poor responses as well-meaning efforts that have failed in one or more aspect, this approach reimagines them as hazards in and of themselves: exogenous, human-generated events that may have a disastrous effect on communities, depending on various social-economic factors. The research explaining why technological disasters tend to be so much more corrosive for communities than the so-called “natural” variety offers new ways of understanding the damage that can potentially come out of a response. While technical failures can cause serious physical or health impacts, the discrepancy between ability and expectations and the uncertainty of long-term outcomes can lead to a more insidious risk. Similarly, disaster responses can change the narrative of the overall disaster event for individuals, households, and communities, often in ways that are problematic. In particular, responses tend to fragment that narrative, giving different groups vastly different impressions of what has happened, why, and how to evaluate it. This uncertainty can have a corrosive effect on communities, undermining any unity that comes out of dealing with the adverse event. Even if individual programs or initiatives aim to “build resilience” or “empower beneficiaries,” the structure of the overall response and recovery may undermine any such gains by disrupting communities.

It should be noted at the outset that this discussion is not intended to equate disaster responses and negligent chemical or radioactive contamination. Most disaster responses are successful at helping at least some people, and perhaps even saving a life or two (although this is generally rare); most disaster responders work hard and take risks to do so. However, the potential negative impacts on communities are widely recognized, at least in the international humanitarian community (see, for example, Hofmann et al. 2004, pp. 11–12). Concerns include such issues as the fostering of dependency (in which those affected become dependent on outside help, reducing their capacity to help themselves), lack of accountability, and colonialist or white-savior complexes (in which aid becomes more about the egos of those providing the assistance than the needs of those affected), to name a few. Without dismissing those valid concerns, the comparison to technological disasters highlights parallels that offer a new framing of this problem. We can do response better, and we should.

Natural Disasters, Technological Disasters, and Responses

Existing literature in disaster studies is clear that different types of disasters can have vastly different effects on communities. Practitioner literature, which is concerned with immediate life-saving or dignity-preserving assistance along with fundraising, tends to distinguish between sudden (earthquake) versus slow-onset (drought) hazards (see, for example, ALNAP 2015). The academic literature in sociology, interested in longer-term impacts on communities, has focused in on natural versus technological³ disasters as a key distinction in terms of the impacts on communities (Kroll-Smith and Couch 1990; Freudenburg 1997). After studying the effects of a chronic underground fire in Centralia, Pennsylvania, Kroll-Smith and Couch write: “There is a wide variance between the way communities respond to natural disasters and the way they respond to technological disasters. The altruistic community that emerges in the wake of natural calamity contrasts sharply with the social hatred that characterized Centralians’ response to their long-term, humanly-produced disaster” (Kroll-Smith and Couch 1990: 158–159). After a chronic technological disaster, “communal bonds disintegrate and are replaced by emergent groups that compete for control of the crisis” (159). While so-called “natural” disasters tend to lead to unity and fellow-feeling, particularly in the immediate aftermath, technological disasters create stress and fragment communities. Conducting a review of similar studies seven years later, Freudenburg states that “the clear consensus of most of the best researchers [...] is that the clear preponderance of evidence points to technological disasters as creating a far more severe and long-lasting pattern of social, economic, cultural and psychological impacts than natural ones” (Freudenburg 1997: 26).

A recent example on a large scale of “community” comes from the 2011 triple disaster in Japan. Aaltola (2012) notes that China provided significant assistance to Japan after the tsunami, perhaps in part reciprocating Japan’s aid after the 2008 Sichuan quake: “Earthquake scenarios involve an affective climate that favours and creates incentives for acts of compassion. That said, the situation between Japan, China, and their neighbours soon became much more complicated when the dangers of the Fukushima nuclear emergency became clearer. The affective climate became radically different: China and South Korea, as well as many other states, reacted with suspicion, accusations and acts of containment – for example, import embargoes” (Aaltola 2012: 62). The same countries, the same timeframe: a perceived “natural disaster” leads to support – a support that was not entirely without risk, given the repeated strong aftershocks – while a technological disaster was met

³ While this is the terminology used by these researchers, it is important to note that 1) some strands of disaster research question the categorization of any disaster as “natural” (it is the hazards that are natural, while the disaster depends on an interaction between those hazards and the built and societal environment); and 2) some studies contrast “natural” with “man-made” disasters, but use “man-made” to refer to conflict, rather than technological incidents. While some of the arguments here could be applied to conflict situations, they have been primarily used about technological disasters.

with blame and isolationism, despite the very limited impacts predicted by experts. While it is too soon for any long-term studies of the effects of these twinned disasters on communities, it is clear that while towns affected by the tsunami face many of the response-related traumas brought up here, those displaced by the nuclear leak have additional, and highly disruptive, sources of stress.

In searching for the reasons for this difference, Freudenburg identifies three broad areas: ambiguity of harm; the emergence of “corrosive communities”; and sociocultural disruption. The first refers to the pernicious effects of uncertainty; Freudenburg reports that “ambiguous probabilities of (physical) harm may actually lead to a more severe form of negative psychosocial consequences” than immediate, obvious damage (27). Uncertainty also plays into the development of “corrosive communities,” which according to Freudenburg has to do with blame; both community divisions over whom to blame, and the stress created when outside forces – typically the firms responsible for the disaster – attempt to blame the victims of the disaster for what befell them. This in turn leads to sociocultural disruption, which comes as disillusionment with once-trusted authorities or institutions brings doubt to bear on the previously unquestioned social fabric.

Similar dynamics occur during disaster responses, even those for purportedly “natural” disasters. While there are obvious differences – responses are purposeful, not accidental or unintended consequences, and they at least attempt and often succeed in having at least some positive effects – the way in which responses are structured – in relation to the problem, in relation to the government, in relation to affected people – provides the context for the mechanisms described above to fragment communities and create long-term stressors.

Ambiguous Help

Rather than ambiguity of harm, we can describe responses in terms of the ambiguity of help. Responses generally present significant uncertainty about how much and what kinds of assistance will be available in general and accessible to specific applicants. Overall budgets may take weeks or months to work out. In domestic responses allocations usually need to be made by the national government, which takes time; international aid relies on a patchwork of institutional and private donors, with no certainty about the pace or timing of reaching the total. Figuring out the modalities of distributing that money takes even longer: even when some frameworks are in place from previous disasters, such as FEMA’s block grants or an experienced NGO’s cash-for-work programs, they usually need to be adjusted or at a minimum calibrated for the situation. In other words, people do not know how much assistance they will receive or when.

The uncertainty generally becomes worse, rather than better, as the response shades into recovery. Rebuilding requires complex planning pitting different interests against each other while timelines and budgets shift. In Japan, for example, the transitional shelters for people displaced by the 2011 tsunami were initially made

available for two years; delays in the construction of sufficient permanent housing led the government to extend the term for the temporary housing, leaving residents continually uncertain about how long that option would remain. Waiting for local governments to raise the level of the land or prefectures to construct seawalls means that the decision of whether to move back to a destroyed hometown or move on is extended by years. As with technological disasters, when lack of information about a potential pollutant can make it more difficult to mitigate the effects, ambiguity about assistance amplifies the problems of rebuilding.

Freudenburg writes that “in the case of many technological accidents, a pervasive uncertainty may be coupled with an intensification of residents’ need to act. The victims need to decide just what kinds of problems they are facing, what their sources are, and whether or not they should take drastic action such as evacuation to respond” (28). Accessing disaster assistance similarly requires proactive persistence and continual choices on the part of the affected. In the international setting, beneficiary populations are often confronted with a plethora of NGOs and agencies, each with different mandates and programs; while individuals may not often have much choice in the matter, community-level leaders may have some say in what kind of assistance they receive and from which source, choices which must be made in the face of a daunting array of partial information (Bennett et al. 2006). Domestic assistance tends to require significant bureaucratic navigation; one of the most persistent criticisms of FEMA after Hurricane Katrina was the amount of paperwork required to participate in their programs.

Making decisions, either as a family or as a community, about these choices can lead to friction and resentments, becoming one of the factors leading to “corrosive communities.” In Japan after the 2011 tsunami communities were faced with a collective dilemma: whether to move back to geographies that had just been proven to be at risk, or rebuild their lives elsewhere. Exacerbating this choice already plagued with uncertainties were the problems of group dynamics and economies of scale. The government’s willingness to fund rebuilding of public infrastructure was likely to fall in proportion to the population, so large numbers of people wanting to move elsewhere could potentially make the original town less habitable for all. As one Japanese academic put it:

Even within one family the father wants to return to the place they used to live, but the children and the wife don’t want to or something like that, even within one family there are various opinions, then say the father at first wants to go back to live in the previous house, but doesn’t have the means to rebuild the previous house, what should they do? [...] If there are these problems within one household, if there are these problems in local area... (Kobe, 2013, Interview by the author)

The uncertainty of changing government policies, concerns about limitations of aid, and the need to make costly decisions among all these unknown factors put significant stress on communities, much as the decisions about dealing with contaminated ground or water do.

While I have framed this section as “ambiguous help,” it is important to recognize that if people believe they are owed a certain degree of assistance, or if they perceive that other affected groups are receiving more aid, then the difference

between that expected level and what is actually received can be experienced as harm. If you believe that your house should be replaced immediately after being destroyed in a hurricane and instead you wait two years for an insufficient cash payment, you perceive that as losing something you are entitled to – above and beyond the harm of the lost time and effort involved in chasing that assistance.

Corrosive Communities

Freudenburg suggests that after the devastation of a natural disaster, “the aftermath tends to be reassuring and restorative. Citizens help one another. The people we call ‘the authorities’ arrive, proclaiming the end of the disaster and working toward the restoration of something like normalcy” (29). While the first claim, of spontaneous mutual aid, is vastly borne out by the empirical literature,⁴ consider the second. What happens when authorities proclaim the end of the disaster when for the affected it is nowhere near over, as when numerous federal officials stated that New Orleans had “dodged a bullet” after Katrina’s landfall (U.S. Senate 2006: 675, 487, 490)⁵? What if “something like normalcy” is a new status quo that excludes some citizens, as in some of the infamous “green-dot” reconstruction plans promulgated after the same disaster (Campanella 2008: 344–350)? Katrina is far from the only example. A 2015 report from the International Federation of Red Cross and Red Crescent Societies notes that “At the end of the response, in an effort to re-establish a sense of normalcy, affected States may risk declaring the end of the emergency phase prematurely” (7) and cites the 2010–2011 flooding in Pakistan as an example.

Freudenburg goes on to suggest that after a technological disaster, “the victims can experience a second victimization, becoming participants in a socially corrosive struggle over affixing blame, and frequently finding that they become the victims of blame themselves” (31). This is a good description of many disaster responses, with Hurricane Katrina again being exemplary. The “blame game” among different levels and agencies of government proved divisive,⁶ while the victims were blamed for not evacuating by politicians as well as academics. Landy (2008), for example, writes that “Those car owners who failed to evacuate in the face of mandatory evacuation orders that, however tardy, still left them plenty of time to leave, do not *share* in the blame, they *are* to blame” (187), ignoring the cost-benefit calculations of leaving, the failures of communication in explaining the risks, and most importantly the breaches of levees that citizens were urged to trust.

⁴as well as by my personal experience

⁵See also: <http://mediamatters.org/research/2005/09/13/media-gave-bush-free-pass-for-repeating-false-d/133805>

⁶The political fighting after Katrina is well documented; for some examples see Stolberg, “A Firestorm, a Deluge, and a Sharp Political Dig,” *The New York Times*, October 27, 2007.

Although Freudenburg does not explicitly draw the link, there is an element of powerlessness here as well. Freudenburg's example describes community members faced off against the highly-paid lawyers for major companies. Experts play a key role in "natural" disasters as well, both at the implementing and at the funding levels, and it can be difficult for locals to have their needs taken seriously. A survey conducted in three different disaster areas for ALNAP's 2015 State of the Humanitarian System report (ALNAP 2015) found that "44% of surveyed recipients reported not having been consulted by aid agencies on their needs prior to commencement of the aid programming, while only 33% said they had been. However, only 19% of those that had been consulted said that the agency had acted on this feedback and made changes" (98). Combined with the need to act described above, this is a recipe for frustration.

The way aid is distributed can also be seen as related to blame. After Hurricane Katrina hit Mississippi, initial funding was available for those who had insurance on their house, but not for those who didn't, often leaving the most needy without assistance. Robertson (2015) paraphrases Haley Barbour, the governor of Mississippi at the time of Katrina, as saying that "critical lawmakers [in Congress] were dead set against giving aid to people who, in their minds, should have been insured against wind damage." It took years, and civil rights lawsuits, to expand housing assistance. While scarcity often makes it necessary to triage assistance in some way, these practices tend to leave unserved gaps, and with them resentment and division among communities. Fothergill (2003) describes a situation in which the aid is distributed in a more or less universal way, and "Emotions were especially strong toward those who were seen as completely undeserving [...] many expressed a disappointment in general about people who came in and claimed to have been victims of the flood so that they could receive public assistance and about town residents who were becoming too greedy, meaning that, while they were 'legitimate' victims of the flood, they were taking more assistance than social norms would allow. Residents quickly formed collective notions about what was deviant, 'greedy' behavior and what were acceptable levels of aid to accept" (665).

Sociocultural Disruption

In these ways aid can divide and, to use Freudenburg's phrase, corrode even a community that has pulled together during the initial impact of the disaster. Finally, Freudenburg points to another element that can cause what he calls "sociocultural disruption": "it may well be that some of the victims' stress results in part from the fact that the legitimacy of existing institutions can no longer simply be taken for granted after such an experience" (32). This is certainly the case after many disasters. Histories of Katrina are riddled with people exclaiming their disbelief that the images from the storm represented the United States, and not some far-away country. Multiple layers of problematic perspectives (racism, jingoism, etc.) aside, this represented a shattering of worldview: it did not seem possible that those conditions

existed in that place. It is telling, as well, that most people's disbelief and outrage seemed to focus on the slowness and inadequacy of the response, rather than the lack of preparedness and mitigation. In international responses, it is often the structure of the aid – external, delivered by foreigners – that highlights the incompetency, poverty, or collapse of the national government in question. While this may be less of a surprise, it continues to be problematic, since, as noted in ALNAP 2010, “Governments are often reluctant to appeal for help because it can be politically difficult for them to declare a disaster for fear of appearing weak and damaging national pride” (12–13).

According to Freudenburg, this undermining of trust in and belief in the legitimacy of institutions can “threaten the very system of agreed-upon meanings that allow a complex social system to function” (34). People expect the government to protect them, to save them from danger, and to recompense them when it has failed to protect or save them; when it does not, they are more hesitant to trust the government in the future. But why do people expect the government to protect them from hurricanes, earthquakes, and other natural events so calamitous that they are still sometimes referred to as “acts of God”?

Other Parallels

Before we turn to that question, it is worth noting a few other theoretical parallels between the characteristics of technological disasters and disaster responses. Kroll-Smith and Couch (1990) write that “chronic technological disasters are very class-specific, being much more likely in areas where the population is largely working or lower class” (160); the attributes of these communities – in terms of lack of education, lack of familiarity with legal proceedings, lack of surplus funds to cover legal battles, social capital linkages with decision makers, and so on – exacerbate their vulnerability in terms of precisely the types of social and psychological disruption the authors describe. Government- or NGO-run disaster responses tend to target similar classes, simply because anyone with more money and connections is likely to have taken more steps to mitigate the disaster (insurance, better construction, evacuation) and have less need of government assistance in the aftermath and/or access to legal or administrative assistance in navigating the bureaucracy in their place. This is not to say that the wealthy are unaffected by the frustrations of the disaster response, but they often have certain bulwarks against total financial ruin.

Kroll-Smith and Couch (1990) put a certain emphasis on the duration of the risk, elaborating on the long-term stress of an underground fire with uncertain effects. The Fukushima Dai-Ichi accident offers a more recent example; although the accident itself was brief and the plants are now more or less under control, concerns about the degree of contamination and the appropriate amount of radiation for residential areas continue to plague governments and communities alike, particularly in the grey area around the exclusion zone. While a disaster response is obviously different from persistent environmental contamination, there are some parallels here

as well, of which perhaps the most obvious is in the example of the formaldehyde-contaminated trailers given to displaced people by FEMA after Hurricane Katrina; it took seven years for the major civil action suit to be completed (in favor of the plaintiffs, but for modest amounts). Even without the contamination, poor building materials that leave people in substandard housing can be a long-term effect leading to internal conflict (stay or invest in rebuilding). On a larger scale is the question of where rebuilding is allowed. Efforts to curtail construction in areas suddenly understood as dangerous – along the Sri Lankan coast after the 2004 tsunami, or in the Lower Ninth Ward of New Orleans after Katrina, for example – often leave communities facing difficult decisions, angry and uncertain about where to place the blame, and with long-term, intangible and unmeasurable impacts.

Path Dependence and the Histories of Disaster Response

There are a few common threads in the theory of how technological disasters, and according to this chapter, disaster responses, create deep, long-lasting disruption in the communities they affect. Uncertainty is one, and related to that is the problem of expectations. To understand disaster response expectations, it is useful to look briefly at the history of responses, and how they have evolved into their current state. Up until now I have mentioned examples from both domestic and international responses in a somewhat ad hoc manner, but at this point it will also be helpful to examine more systematically the differences between the two, in part because they are in many ways opposed and complementary.

Domestic responses are those led and primarily carried out by a government (often with support from other actors) in its own country. International responses are implemented by non-governmental organizations, international agencies, and sometimes private citizens, generally with at least the approval and often the active participation of the affected government, and sometimes with direct support from other governments (usually through the military or other specialized groups). Both are relatively recent phenomena, and both have evolved significantly over the past century, and particularly the last 50 years. The different paths they have taken determine the strengths and blind spots in each type of effort.

The History of International Humanitarian Response

The concept of international humanitarian response is generally traced back to Henry Dunant and the establishment of the International Committee of the Red Cross in 1863; it expanded somewhat during World War I and far more precipitously during and just after World War II (see e.g. Davey et al. 2013; Kent 1987). While these triggering events were conflicts, in between wars the burgeoning humanitarian and volunteer sector began to turn its attention to “natural” disasters

(Davey et al. 2013: 6). In the 1950s and 1960s humanitarian aid focused on development, but “from the early 1960s to the early 1970s ‘relief cells’, specialized agencies, and new departments emerged within governmental, IGO and NGO sectors to give specific attention to the problems of disasters and disaster relief” (Kent 1987: 45). As the aid industry continued to expand rapidly into the 1980s and 1990s, efforts to legitimize, coordinate, and ultimately professionalize the sector intensified.

This urge towards standardization and justification was in part due to donor pressure. Barnett (2005) writes that donors “began to apply ‘new public management’ principles as they expected humanitarian organizations to provide evidence that their money was being well spent” (730). At the same time, the expansion of the industry was causing concerns within the field as well. Barnett explains that “In response to the influx of relief agencies that were operating according to varying standards – a situation made doubly dangerous for agencies in the context of providing relief during conflict – and the growing evidence that different populations were being differentially treated, humanitarian organizations attempted to establish professional standards and codes of conduct” (729). The large number of agencies implied competition, particularly after large, highly mediatized catastrophes, as well as an extreme fragmentation of the response space (see Older, forthcoming). The affected area might be divided geographically as well as sectorally. Daly and Brassard (2011), in their study of housing provision in Aceh after the 2004 tsunami, describe a situation with multiple agencies providing housing within a single village; differences in provision led to a situation in which, according to one of Daly and Brassard’s informants, “the housing development here is all mixed up, because the shapes and types are not the same, and this makes people in the community jealous” (525).

In order to deal with this problem – a serious one in an industry plagued by poor information and misaligned incentives, and competing in part on the basis of perceived virtue – the humanitarian community developed several initiatives to standardize and improve coordination. The Sphere Project,⁷ a voluntary initiative created in 1997 by a group of NGOs and the International Red Cross and Red Crescent Movement, developed standards for humanitarian work and continues to elaborate these into additional areas. Meanwhile, from the top down, the UN has made a number of successive efforts at reforming and reframing coordination during disasters, culminating most recently in the cluster system, initiated in 2005, which defines sectors of intervention around which relevant NGOs meet to coordinate actions and emergency-specific standards. These and other initiatives provide some framework for standardizing humanitarian activity in the field, while at the same time providing mechanisms for greater accountability to donors, beneficiaries, and host governments. However, the system remains far from perfect. Besides the obvious difficulties in a completely voluntary patchwork of coordination, not all the responders in a given emergency are professionals who participate in this system. For example, Fernando and Hilhorst 2006 describe the case of one of the many

⁷<http://www.sphereproject.org>

private citizens who raised money, traveled personally to Sri Lanka, and implemented a relief project after the 2004 Indian Ocean tsunami.

While this elaboration of professional standards was related to accountability to donors and beneficiaries, it was also in part due to a growing awareness on the part of humanitarian agencies of the precariousness of their role. In an international regime focused on state sovereignty and shaped by post-colonialism, humanitarian actors are largely Western-based, non-state actors that enter foreign territory when the host government is in crisis and essentially replace its functions. To continue working, NGOs had to clarify their missions, mandates, and methods. This was largely successful. Attinà (2012) writes that “Over the last twenty years, the humanitarian norm has made intervention as a reaction to widespread human suffering and large-scale violations of basic human rights a legitimate action” (10). However, the continued existence of non-professional actors, the potential loss of face for host governments in requesting assistance, and on-going debates about different aspects of humanitarianism ensure on-going tension between NGOs and their hosts.

The History of Domestic Emergency Management

The increasing hesitance of states to allow NGO responses is also tied to the growing consensus that governments should be responsible for managing disasters on their territory. While this now seems obvious, it is in fact a fairly recent development for national governments to take on disaster response as part of their mandate. To take the United States as one example, Steinberg (2000) writes that “It is not often realized that no permanent means of government disaster assistance existed in this country until very recently. Only in 1950 did Congress pass legislation allowing the president to make disaster declarations to aid state and local governments in repairing public facilities (prior to this it required a special legislative enactment to receive such aid). Even as late as 1969, no formalized means existed to help individual citizens in the wake of catastrophes” (175). Landis (1997) traces the early development of federal assistance, which began with individual, named grants, often very different from our current conception – to take one painful example, “a \$15,000 grant of poor relief for the white refugees fleeing St. Domingo following the slave revolution” – and shifted over time in terms of eligibility assessments, administrative apparatus, and mechanism.

In the late nineteenth century, according to Steinberg, “Cities commonly offered one another financial support in the years before the federal government became a major provider of relief” (17). There was no expectation that the federal government would step in, and indeed some wariness of any kind of outside assistance; Steinberg writes that according to some perceptions “accepting such money could compromise a city’s rugged, self-reliant image, [so] some urban leaders were willing to risk the possibility of additional suffering” (17). It wasn’t until 1934 that “Congress authorized the Reconstruction Finance Corporation to begin making disaster loans to rebuild public facilities” (67); in 1950 this was facilitated by a law that “allowed

the president to authorize disaster relief for reconstructing public facilities without seeking congressional approval” (86). Beyond the municipal level, “the needs of private individuals were to be tended to by the Red Cross, officially sanctioned by Congress in 1905 to deal with such matters. Not until Bayh sponsored the Disaster Relief Act of 1969 did such aid become more people friendly.” (175–176).

The Federal Emergency Management Agency (FEMA) was created in 1979. Its primary role is designated as to coordinate the resources of other government agencies, rather than stockpiling and deploying its own, and as a provider of expertise and a grants manager, rather than as a first responder. One of the agency’s main talking points after Katrina was that it was not and never had been a “first responder” (Senate 2006). However, this is often misunderstood by the public and by other arms of the government alike, and over time FEMA has become more involved. A long-term FEMA official told me, “It is mission creep to a certain degree. There is an expectation that in a big disaster the federal government will have a role operationally as well as providing funds.”⁸ Although United States disaster legislation is clear that local governments have primacy in disaster response, variation in local capacity and expectations of federal assistance means that FEMA cannot depend on maintaining its limited role. In the words of the same FEMA official, “you build capacity to pick up the slack, at the same time you’re encouraging the locals to take care of themselves.” A different FEMA official explained that “For everybody’s... for the perceived railing of society against the federal government, at the end of the day, everybody still believes that if it’s a genuine crisis, that Uncle Sam will somehow be able to help.”⁹

This long-term shift in the government’s role in disasters has two effects: the discrepancy between expectations and legal and operational reality; and a lack of clarity about the overarching rationale, the goal, of national disaster response. The assumption today tends to be that the federal government has a responsibility to protect its citizens from disasters, and the government both accepts and encourages this assumption through its actions. However, the terms and limits of this protection are left implicit and vague. Is the government responsible for replacing property? Helping the most affected? Helping the most vulnerable? Rebuilding in a better way? While individual NGOs have had to answer these questions to clarify their intentions to sovereign states and donors, governments tend to leave them to be decided in an ad hoc manner, furthering uncertainty and questions about fairness.

Contrasting Strengths, Contrasting Weaknesses

These two distinct paths have led to response approaches that create the conditions for the kind of community disruption described above in different ways. Despite the efforts at standardization, international responses, carried out by a wide range of

⁸Telephone interview, January 24, 2014.

⁹Interview, April 2, 2014.

actors with no common mandate, authority or legal system, continue to struggle with the challenges inherent in such a multiplicity of responder organizations. The phenomenon of convergence, in which the catastrophe triggers an unplanned and uncontrollable flood of human and material resources, can lead to an overwhelming number of actors (see Dynes 1970; Fritz and Mathewson 1957). This has certain benefits. The international system can be considered something of an almost unregulated free market, if one with a very skewed incentive system (see Older 2016, for a more thorough discussion). Competition and specialization led to a certain degree of representation among NGOs; in a large enough disaster, a coordination meeting is almost guaranteed to have representation from organizations specializing in gender, people with disabilities, children, and other marginalized groups, something that is far rarer in domestic responses where representation is shaped by the limits of democracy. However, this diversity at the coordination level can be problematic at the community level, where the fragmentation of implementation by geography or sector tends to leave beneficiaries under very different regimes based on decisions they have no part in and are not informed of.

Although the humanitarian community claims “double accountability” – to the donors who fund projects as well as the affected people who benefit from them – in practice both types of accountability tend to be weak, and the downward accountability to beneficiaries near non-existent. Donor funding exerts a strong hold on decisions and project design, and despite a number of innovative initiatives in participatory monitoring and evaluation, there is little holding agencies accountable for their work from a beneficiary perspective. NGOs and UN agencies are unelected. At the personnel level there tends to be high turnover in emergencies, and even at the organizational level many of them are in country only temporarily, leaving limited recourse. As Daly and Brassard (2011) document, even in real time complaints are often ignored.

Domestic response agencies, which have not had to explain their rationale or prove their professionalism (as opposed to volunteerism) in the same way as non-profits, present a different set of issues. While the international humanitarian community has worked hard on standards and results-oriented, evidence-based evaluations, domestic responses do not use Sphere or an equivalent and tend not to have standards for evaluations. While FEMA has been making efforts to standardize their practices, these standards revolve around process – terminology for requesting different types of assistance, interoperable communications, and so on – rather than outputs – the minimum amount of water per person per day, the number of square feet per person in a shelter. Similarly, evaluations are often conducted by political entities (the White House, the Senate, and the House of Representatives all produced reports on Hurricane Katrina) with no common method or agreed set of indicators, objectives, or benchmarks. This means that even though accountability is theoretically possible through the ballot – and indeed, disaster response failures are said to have contributed to the fall of many politicians – the lack of benchmarks for performance or agreement on overall goals means that there is no standard to hold politicians accountable to, or objective answer on which politicians – from which level, branch, or department of government – should be held responsible.

Conclusion

There is an important distinction in the positioning and aim of the two types of response. It is not insignificant that international responders call themselves “humanitarians,” while those in government are more likely to have titles like “emergency manager.” International response is seen as stemming from a humanitarian imperative, an impulse of solidarity, a desire to help those who need it most. Humanitarians tend to be positioned as outsiders, working to help affected people in any way they can. Governments, on the other hand, are fulfilling a responsibility, even if one that is poorly defined. As the holders of power and authority in the status quo, one of their priorities is to protect that status, “managing” the emergency in a way that promotes a return to normalcy. This distinction is hardly absolute: most of the domestic emergency responders I have interviewed during my research are motivated by deeply held humanitarian impulses; on the other side, many NGOs are multi-million dollar enterprises with a large stake in the continuing status quo. Nonetheless, it does point to an overall difference in approach that is largely undiscussed.

As a humanitarian practitioner with a decade of experience who now studies studying domestic disaster response, my tendency is to see the former as “normal” and the latter as deviant. To me, emergencies are about humanitarianism: they are about threats to people’s lives, livelihood, and dignity. However, I can recognize that managing chaos is a legitimate objective for a government. What seems problematic to me is the lack of clarity.

It is a truism in disaster studies (of a certain slant, at least) and disaster risk reduction practice that there is no such thing as a natural disaster. Under this conception, while the hazard – earthquake, hurricane, drought – is natural, it is only when it interacts with human settlements and their physical and social attributes – poorly constructed housing, poverty, lack of information – that it becomes a disaster.

This chapter suggests another interpretation of that phrase. If it is expected that someone – usually the government – can and should protect citizens from every calamity, then disasters are not random uncontrollable events or acts of God but somebody’s fault. Uncertainty about what is a reasonable standard of protection and what to do to improve one’s odds leads to division within communities. Questions over whom to blame furthers that fragmentation, and the answers, which usually include the bedrock institution of government, lead to disillusionment with authorities and overall the social structure.

The intent here is not to put the blame (once again) on the affected community by suggesting they are expecting too much. Rather, it is to suggest that addressing disasters as any other public policy issue – with standards, comparisons, and, ideally, transparency – protects both disaster managers and the disaster-affected.

Postscript

Since the writing of this chapter, the lead contamination of the municipal water of Flint is (finally) in the national news, and in an interview with *The National Journal*, the Governor of Michigan “conceded [...] that his administration’s handling of the Flint water crisis [...] is aptly compared to President Bush’s mishandling of Hurricane Katrina.”¹⁰ The response to Hurricane Katrina has long been shorthand for government failure, but it is striking that it should be used in a case where the government was at fault not only in its response, but for triggering the disaster. This comparison, however facile, inverts the argument made in this chapter: the government’s active perpetration of a technological catastrophe is a political error equivalent to the failure to respond to a (more or less) natural disaster.

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Compromise and Action: Tactics for Doing Ethical Research in Disaster Zones



Jennifer Henderson and Max Liboiron

Abstract Research methodologies across disciplines are often based on hands-off observation for short-term research projects. Yet in active disaster zones, the imperative to do no harm has less meaning, since harm is already ubiquitous, and the imperative becomes to do *good*. In this case, a hands-off approach is unethical. This is true whether disasters are “fast,” such as when tornadoes move through rural communities, or “slow,” such as when food sources are contaminated. This chapter responds to a call from Science and Technology Studies (STS) to “make and do politics,” to reconsider research methodologies and ethics that “explore the full spectrum of problem definitions and suggested responses” in a world increasingly characterized by disasters (Castree 2014: 474). The problem is how to do actionable research when disaster researchers find themselves faced with dilemmas that challenge the institutional norms for ethical conduct and production of sound science. Based on two cases of fieldwork conducted in disaster zones, we argue that research is necessarily “compromised” when it remains faithful to doing good and making change in disaster zones. We extend anthropologist Charles Hale’s framework of “activist research” and the “contradictory and partly compromised path [researchers take] toward their political goals” in action-based research (2006). Our chapter offers a framework for thinking through tactics in this high stakes research contexts. We conclude by suggesting that doing practitioner-oriented, action-oriented research is always “compromised” research, even as these tactics are simultaneously the very condition for doing ethical research that matters to disaster survivors on the ground.

Keywords Disaster research ethics · Community · Engagement

The original version of this chapter was revised: This chapter was inadvertently published without MOU (Memorandum of Understanding) which has been inserted now. The correction to this chapter can be found at https://doi.org/10.1007/978-3-030-04691-0_15

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Introduction

This collection of essays seeks to go beyond the usual recommendations that follow from disaster research, a goal that mirrors a wider trend in academic disciplines, including science and technology studies (STS), for action-oriented research. Various called making and doing (Downey and Zuiderent-Jerak 2017), an engaged program (Sismondo 2008), or a reconstructivist agenda (Woodhouse et al. 2002), the goal of action-oriented research in STS is to “improve the effectiveness and influence of [...] scholarship beyond the field and/or to expand the modes of [scholarly] knowledge production” (4S 2016). STS disaster research is particularly well suited to this task because it attends to the externalizations of socio-technical systems that result in high-stakes situations where we can potentially intervene to reduce harm and body counts. Even outside of STS, most disaster research looks to create action that affects material change on the ground, whether through triage, policy change, transformations to infrastructure or management practices, or collaboration with communities.

Despite a cross-disciplinary push for what we collectively call action-oriented research – a collection of practices that aim to move material conditions from an “is” towards an “ought” – we argue that traditional research ethics and methodologies do not help us navigate the contradictory positions we often find ourselves in when doing such work. On one hand, as disaster researchers we aim to account for dominant modes of expertise, representation, and political economy that are often discounted and disavowed in disaster zones (Fortun et al. 2016). On the other, if we are trying to effect changes in material conditions on the ground, we are necessarily using the very modes of expertise, representation, and political economy we problematize. As academics, we might well be able to provide a dulcet cultural critique of the power relations inherent in top-down disaster relief, in the construction of risk assessments, or in the assumptions of expert disaster communications, but as action-oriented researchers in the field who want the people around us to be warm, safe, and healthy, we also need to engage with top-down disaster relief agencies, use risk assessments, and listen to and convey expert disaster communications. That is, we work within systems we have already deemed deeply problematic, or what activist-anthropologist Charles Hale calls “compromised” (2006).

Hale argues that this contradictory position has positive effects for researchers: as action-oriented researchers we are “inevitably drawn into the compromised conditions of the political process. The resulting contradictions make the research more difficult to carry out, but they also generate insight that otherwise would be impossible to achieve” (Hale 2006, 98). For example, when canvassing New York City residents about their needs in the immediate aftermath of Superstorm Sandy, community-based organizations found that data was patchy and so would normally be thrown out if traditional sampling and data-cleaning techniques were followed, but that using un-sampled and un-cleaned patchy data painted a very different picture of the storm for residents residing in the disaster zone compared to official accounts that “cleaned up” the data (Liboiron 2015). This insight led to academic and policy papers that differed from official accounts (Alliance for a Just Rebuilding et al. 2014; Superstorm Research Lab 2013). Even as we are aware of these contra-

dictions, tensions, and compromises, the question remains: how can we make decisions that lead towards what we as researchers see as positive action from within the “compromised conditions of the political process” we are seeking to change? How, in short, do we do action while compromised? And how do we do so in a way that is driven by research ethics that takes into account the unexpected situations and high stakes so common in disaster zones?

Most social science research about disasters is conducted based on an assessment of the problem to be addressed (literatures review and statements of problem) followed by a deployment of methods appropriate to the research question (field or archival research). In this work, methods are aligned with particular ethical imperatives that guide their use. Interviews, for example, often come with Institutional Review Board (IRB) requirements for consent forms and to anonymize data. Ethics follow from methods. We argue that in action-oriented disaster research, it is the researcher’s ethical commitments that should shape and refine methodological strategies and decisions. Ethics ought to drive methods.

This chapter starts with two case studies of “compromise” during disaster research, and then provides tactics for making decisions in the context of intractable problems within compromise using ethics as a guiding principle. The two case studies are drawn from our own experiences as disaster researchers to begin a pragmatic discussion about how to be as ethical as possible as a generator and holder of knowledge – a researcher – when institutional and employment affiliations, IRBs, nondisclosure agreements, intellectual property agreements, publish or perish, disclosure of research, and other binding frameworks might imperil, under-serve, or replicate unjust power dynamics for people in disaster zones.

Red Sandstorm on an Extraterrestrial Planet: The Inadvertent Censure of Knowledge

In disaster zones, triage is immanent, not just in terms of the actions one might feel obligated to take in the immediate aftermath of a disaster, such as helping people find loved ones, cleaning up homes, or making peanut butter sandwiches to feed survivors and volunteers, but also in terms of how it can reframe how a researcher prioritizes what she studies. Triage is an apt metaphor for compromise, a re-evaluation of priorities, stakeholders, and outcomes in disaster research; it is emergent, responding to immediate needs as they arise. The case study below, told to me by a friend I’ll call “the plant,” illustrates how the institutional bodies that govern disaster research required a document that clearly defined the scope and stakes for her research ahead of her arrival at a field site. That is, it required anticipatory ethics (Elwood 2007). Yet her experience in a disaster zone revealed a need for a more emergent and relational ethic that would permit her to tell the story as it actually occurred rather than as she and the IRB predicted it might.

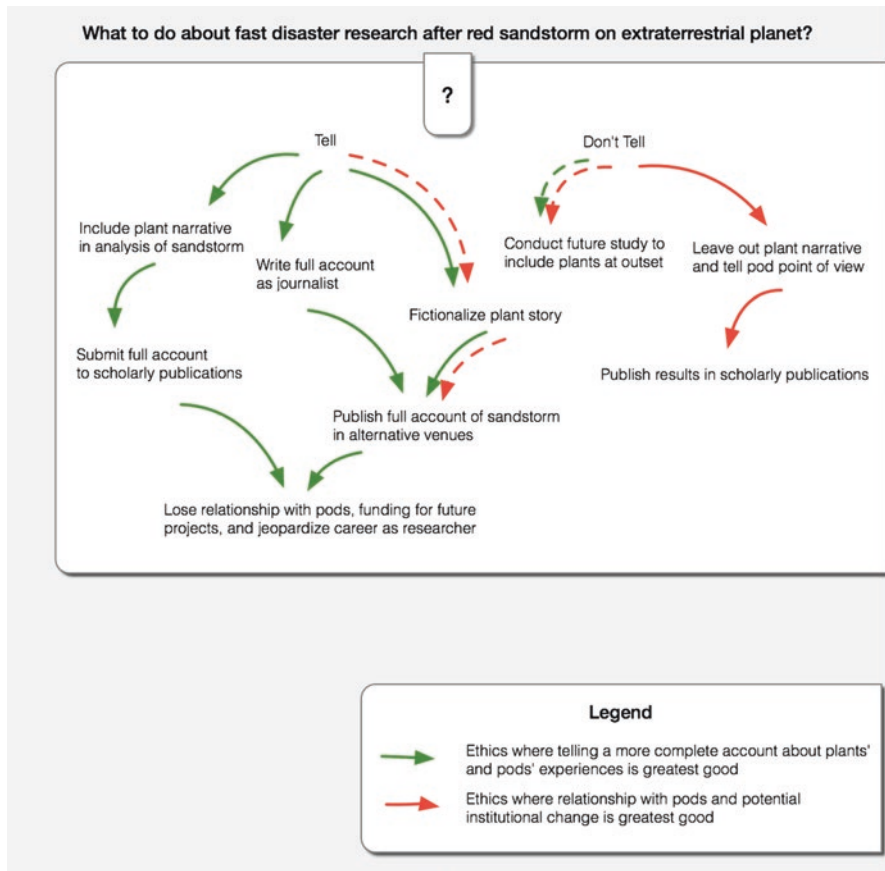
Like my friend, I work with expert forecasting communities who warn their publics about extreme weather by creating text and visual products that are transmitted through websites, cell phones, and social media, among other mechanisms. I’m

especially interested in the sociotechnical challenges these experts face in their decision making process when issuing warnings for high risk, high uncertainty weather, such as flash flood and tornadoes. Forecasting experts conceptualize the main problem in weather disasters as one of communication: finding the right words and images to convince “the public” to act on their advice and take life-saving actions during a storm (Daipha 2015). My work challenges this deficit model, which assumes a “scientific sufficiency and public deficiency” that is “asymmetrical: it depicts communication as a one-way flow from science to its publics” (Gross 1994) and reflects a common scientific account of how laypeople ought to operate in response to expert prescription. Rather than simply offer critique from outside the institutions that use this framework, however, I have spent 14 months in several forecast offices observing and interviewing meteorologists and their stakeholders with regards to their individual and collective weather warning practices. By “studying up” (Gusterson 1997) at key sites of power in the weather prediction community, I am able to access issues of urgent concern that have material consequences for those in harm’s way. Some action-oriented researchers have called for “studying up,” and working with and on institutions and systems of power rather than only with those most affected by institutions and systems of power in action-oriented research because it is an ideal place to create change in larger systems (Nader 1972; Nygreen 2006). I join scholars across the disaster research community who suggest the warning process itself is beleaguered by multiple and complex challenges, including the omission of certain groups and their unique needs in the consideration of warning technologies (Wood and Weisman 2003), problems in conveying uncertainties of hazard information (Morss et al. 2010), definitional issues that complicate warning success (Barnes et al. 2007), and lack of knowledge about vulnerable populations and their inability to access resources or information (Phillips and Morrow 2007; Anderson et al. 2016; Gall et al. 2015). Moreover, as fast disasters with discrete temporalities, these weather “events” are framed by their atmospheric occurrence (e.g. tornado) and, as such, lack an accounting of the sociopolitical underpinnings that shape material conditions in the communities in which they occur (e.g. poverty) (Fothergill and Peek 2004; Knowles 2011). A valuable site of intervention for disaster researchers, then, is a bureaucratic system where warning practices and policies are largely taken for granted but if transformed for the greater good, may have the potential to effect systemic change.

Yet, even if we are in the right place to effect change, in the actual practice of action-oriented disaster research, the unexpected can call into question strategies for conducting ethical research in these disaster zone-adjacent communities. Imagine yourself on a planet not far from Earth where a large population of green plants have just experienced a red sandstorm that spit fire and ice into their growing area. Earlier that day, the purple pods responsible for throwing shields around the community captured a gust of wind as it developed outside of the main population of green plants. However, in the chaos of putting out fires and cleaning up the shards of frozen water in the arid desert, the pods missed that another sandstorm had bloomed over a smaller patch of plants nearby. The sandstorm sent fire and ice down on the plants. The plants sent messages to the pods to tell them about the fire, but the pods didn’t believe them until they saw the fire themselves, and they dispatched their

shields too late. The next day, the pods visited the plants to count the number of fires started for their official records. One researcher plant accompanied the pods as a visitor from another town; she wanted to talk to the plants about what they saw and experienced, but she didn't have the right passport. She could watch and learn the full breadth of what occurred but was told by those who governed her activities that she couldn't tell what she knew. In the official write up, the pods talked about the sandstorm, the number of fires they counted, and how they had thrown their shields across the plants. The visiting researcher plant longed to tell the other side of the tale, how the plants caught fire before the pods acted, how and why the pods missed the fire, and how the plants were faring. However, in this fantastical case, mistakes made by those who were given the responsibility to protect the plants went unexamined because the research process created by the passport office governed what should and should not be said.

The researcher plant is in a compromised system, where she owes her presence in the disaster zone to the passport office, but the rules set out by that same office means that she can not act the way she thinks is right. What can she do?



As the flow chart above illustrates, ethical dilemmas stemming from a choice of methods can leave the researcher in the intractable position of being beholden to multiple stakeholder groups with mutually exclusive expectations of conduct; in this case, my friend felt as though she had split loyalties between honoring the passport control that limited her ability to tell the side of plants on the planet, or her commitment to the relational ethics that dictate accountability to those affected most by disasters. In disaster zones, relational ethics suggests that we build reciprocal relationships “that are attentive to the social context of the research, the researcher’s situatedness with respect to that context, and the responsibilities which researchers and research participants have toward each other” (Brun 2009: 204). Yet IRBs and other structures can keep this from happening.

Disasters occur when normal modes of life are suspended. As such, surprises and unexpected issues are inevitable, which necessitates that the disaster researcher be flexible and open to situations as they arise. Yet institutional research ethics are anticipatory in how they assume risks, norms of consent, and notions of benefit and harm into our protocols before we conduct research. What we anticipate, however, is always exceeded by what is on the ground. Thus, disaster research requires an ethics that can handle emergent cases.

What the chart cannot represent is the internal turmoil my plant friend felt as she entered the field and experienced the unexpected. Knowing that her research could unintentionally make the complexities and injustices that surround sandstorm disasters invisible has made her question her ability to transform those bureaucratic systems within which she’s worked so hard to build networks of trust. Like me, my friend believed that changing the system from within would allow her to offer insights and prescriptions that redress sociotechnical and political challenges faced by both experts and publics. Yet this case offered a situation to do the right thing in social and political terms and my friend could not participate. Her compromised situation has left me wondering about the potential of my own research methods to effectively mirror my ethical commitments. That is, will my compromised position as a disaster researcher and my initial choice of methods harm the communities I care about?

In the flowchart above, which tracks some of the options my friend has in terms of reporting the full breadth of her knowledge, she can remain silent but in violation of deeper ethical responsibility to communities in disaster, or find loopholes or create strategies to reveal what has not been approved by traditional ethic boards. These loopholes may cause her to lose or imperil her job, the trust of her research participants, and potentially have to abandon hard-won access to field sites. These personal consequences in no way reflect the scale of consequences communities face in environmental disasters. In this fantasyland on an extraterrestrial planet, no one died, but they could have. In the future, they likely will. It is this fact that drives me to operate within the expert weather and climate communities where systemic structural changes might be transformed, but that simultaneously put me in intractable dilemmas.

Toxic Exposures: Community Consultation for Cases of Unknown Harm

In the example above, withholding knowledge was a primary ethical issue. In the example that follows, sharing knowledge is the problem. I research marine plastic pollution in Newfoundland in northeastern Canada. Plastics attract toxic substances and can absorb up to a million times more of a chemical than in surrounding water (Mato et al. 2001); if you've ever had curry or spaghetti and put your leftovers in plastic tupperware, the difficulty scrubbing the orange colour out of the plastic is a manifestation of this material tendency to absorb oily chemicals. In the ocean, when these plastics and their absorbed chemicals are ingested by fish, accumulated industrial chemicals move into fish's bodies (Colabuono et al. 2010; Rochman et al. 2013; Tanaka et al. 2013). Most of these chemicals are endocrine disruptors, which have been correlated with infertility, recurrent miscarriages, feminization of male fetuses, early-onset puberty, early-onset menopause, obesity, diabetes, reduced brain development, cancer, and neurological disorders such as early-onset senility in adults and reduced brain development in children (Grün and Blumberg 2009, 8; Halden 2010, 179–194; Bergman et al. 2013). Their effects are hard to track because they are caused by other factors as well, and can only be correlated with exposure in laboratory settings (Liboiron 2016; Langston 2010).

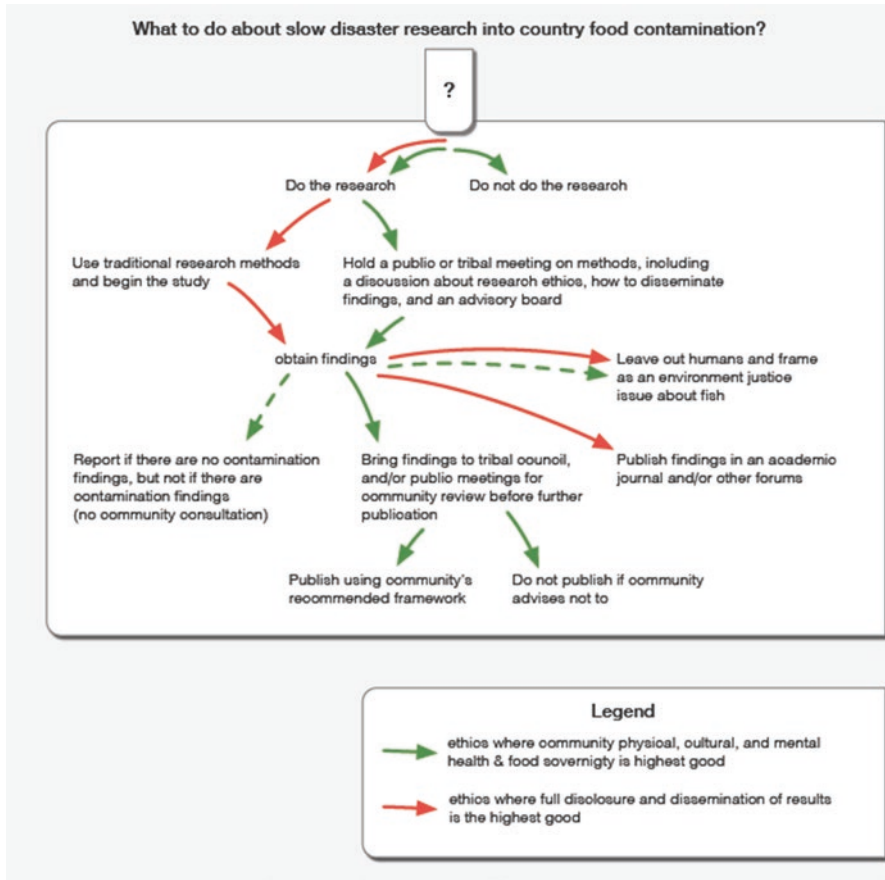
Many Newfoundlanders, particularly those in remote outport and Aboriginal communities, depend on fish for sustenance and livelihoods. Marine plastics in food webs are a slow disaster produced by routine, rather than exceptional or explosive, exposures to toxic chemicals. Rob Nixon's work on slow violence describes these sorts of disaster, as they are "neither spectacular nor instantaneous, but rather incremental and accretive, its calamitous repercussions playing out across a range of temporal scales" (2011, 2). If I find that fish species used for food in Canada are highly contaminated with plastics (or their associated chemicals), then my research would describe a slow disaster in progress, but it may also impact communities *beyond* the harm chemicals are doing.

This has happened before. Between September 1987 and September 1988, breast milk was collected from lactating mothers who lived on the east coast of the Hudson Bay in the arctic. Unusually high levels of polychlorinated biphenyls (PCBs), a known carcinogen found in coolants, were found in their breast milk, likely due to the mothers's diets of marine mammals that are often contaminated with the chemicals (Dewailly et al. 1989). Journalist Maria Cone recounts that, "Before the data could be analyzed, and before people in the villages were notified, the discovery leaked to the press. On December 15, 1988, Toronto's *Globe and Mail* published a front-page story, quoting an Environment Canada official saying that the Inuit were so contaminated that they may have to eat beef and chicken and give up whale, seal, and walrus. The Inuit were terrified and some stopped eating their native foods" (Cone 2007, 114). Breast feeding also became taboo, which had long term effects

on health and culture (Cone 2007, Boswell-Penc 2012). I do not want a similar incident to happen in Newfoundland.

In addition to the cultural violence that withdrawing traditional foods would entail (Reinhardt 2015; Waziyatawin 2005; Wiedman 2012), sociologist of disaster Kai Erikson warns of the tolls of chronic dread and vigilance for those who live in contaminated landscapes “alive with dangers, a terrain in which [...] benevolences of creation are to be feared as sources of toxic infection” (1994, 155). Likewise, *Communicating about Contaminants in Country Food: The Aboriginal Experience* warns that “[w]hether or not individuals are exposed to or actually ingesting injurious levels of contaminants, the threat alone leads to anxiety over risks to health, loss of familiar and staple food, loss of employment or activity, loss of confidence in the basic food source and the environment, and more generally a loss of control over one’s destiny and well-being” (Usher 1995, 113). I am faced with the possibility that even my provisional findings may cause harm, regardless of my intentions, caveats, and my overall research goal of working towards environmental justice. This is not to say that publics panic when they learn of contamination in their food or bodies; there are ample findings to the contrary (Brody et al. 2014; Morello-Frosch et al. 2015). Rather, it is to say that there are real types of harm that research findings can do, particularly in disaster zones, and I am trying to figure out how to be accountable to those possibilities.

My job as a researcher is not to simply record, describe, and report slow disasters. I am a community member in a slow disaster. This intersectionality is not compartmentalized so my responsibilities in my role as a local citizen versus a university researcher are mutually exclusive. I am always both at once, so cannot detachedly report contamination while living, working, and eating in contaminated zones, especially in a place where cod is so central to culture, and has been a primary source of food and livelihood for settlers since colonization, and for Aboriginal groups before and after colonization. In Newfoundland, cod is life. The cod fishery collapsed in the early 1990s (Bavington 2011) and the government’s cod moratorium resulted in the largest job loss in Canadian history, exacerbating the already high unemployment and poverty rates in Newfoundland (Schrank and Roy 2013). I have been to diners in outport Newfoundland (they mostly serve cod) where the newspaper announcing the moratorium is laminated to the wall. Cod has been through a lot here. The stakes of telling Newfoundlanders of yet another threat to cod has potentially far reaching effects for health, culture, and economics. So what can I do?



This flowchart, and the preceding narrative, make it seem as though I have a series of well-defined decisions to make after thoughtful consideration, and I can choose between different unifying ethics to guide me through the research. In reality, I had already used traditional research methods to gather cod fish guts and had started dissecting them before I realized that if I found a high amount of contamination, I had a problem. I was over a sink with the partially digested contents of a cod's last supper running through my fingers when I thought, "Holy shit. This might be bad." A feeling of dread and foreboding stole over me long before I could articulate the problem in the way I have described above, even though I was already well-acquainted with the breast milk contamination story and am well-attuned to the importance of traditional foods to local cultures.

What happened? I finished the study. I found some of the lowest plastic ingestion rates ever recorded (Liboiron et al. 2016). Before my students and I started writing up the findings, I held a public meeting hosted in one of the fishing communities I gathered cod guts from to discuss the research. The meeting was well attended, and the room was palpably tense as I spoke about how marine plastics and contamination worked, and

about our methodology of gathering cod guts from local fish harvesters. The moment I shared our findings – that we’d found the lowest plastic ingestion rates ever recorded – people’s arms uncrossed, they started laughing at my jokes, and talking out of turn. Many meeting attendees celebrated the low plastic ingestion rate of their fish. Yet a low plastic ingestion rate is not a harmless rate. The problem of plastic ingestion is likely to get worse as increasing amounts of plastics are produced and flow into oceans.

My decisions about publication and future research are still not as clear as the chart above might indicate, and I realize there are myriad options that I have not anticipated and are not on the chart. However, the chart does provide guidance, and gives me the space to think about my options rather than automatically following methodological courses of actions common to university research (data collection > findings > publish > repeat). I intend to form a community-based advisory committee that recommends what kind of research questions are the most important to consider, what aspects of the slow disaster to focus on, and how to best mobilize and disseminate our findings (or not). But even this strategy does not result in a lack of compromise. In fact, it will put me in a more compromised position if my university, my funders, and my advisory board disagree, which seems rather inevitable given different priorities and values. What will happen if my advisory board thinks I should not publish or disseminate findings? What about my responsibilities to people who eat our fish? Thinking through, and even leveraging, the tensions that arise when working from within an academic institution with research ethics that come from outside forums is not new (Elwood 2007; Halvorsen 2015; Russell et al. 2011; Russell 2015; Taylor 2014; Schrag 2010; Saxton et al. 2015), but it is a key context through which to think about compromise and action.

Living and Working in Compromise

Anthropologist Charles Hales makes a sharp distinction between cultural critique, where “political alignment is manifested through the content of the knowledge produced” and activist research (his term), where politics happen “through a relationship established with [...] people in struggle” (2006, 98). The latter “requires a substantive transformation in conventional research methods to achieve these goals” (98). We, and many of the authors we have cited throughout this chapter, agree. Action-oriented research has a different set of ethics, and so requires different methods and methodologies. Compromise occurs through this difference, such as when a disaster researcher has to take account of different facets of her intersectionality or has commitments to different parties.

In both of our case studies, researchers came to an ethical dilemma in the middle of research in spite of previous experience in disaster contexts. This will continue, even if we try to anticipate the unexpected. It is clear that a step-by-step guide for action-based research in disaster zones is impossible because action is context-dependent and every disaster is unique. But ethics can carry across contexts and, once we know what the “greatest good” or highest commitment in our work is, it can guide actions in a variety of situations. We suggest that Disaster STS can be a leader in thinking through these issues because of its high stakes; while many

research areas include action-oriented research that will put researchers in difficult positions, disaster research does so immediately and often.

This is not to say we should throw away IRB ethics. Our research ethics align with the basic principles of justice, beneficence, and doing no harm; our methods will always entail informed consent and the option for anonymity. But they can also foreground other ethics. For example, action-oriented researcher Ernest Stringer foregrounds pride (people's feelings of self-worth), dignity (people's feelings of autonomy and independence), control (people's control over their own researches, decisions, actions, and insights, including data), and responsibility (people's ability to be accountable for their own actions) in his work using Participatory Action Research methodologies (Stringer 2013, 23). Community psychologist Stephen Fawcett calls for guiding values of collaboration, experimentation, and sustainability, among others (1991). Action-based research, particularly in disasters, comes from a different context than the medical context of institutional ethics and so understands the subjects (Denzin and Giardina 2016), methods (Schrag 2010), and goals (Lewis 2012) of research differently from those within which the IRB developed.

We argue that ethics should drive methods, not the other way around. If our greatest commitment is solidarity with vulnerable populations (Nelson et al. 1998) or social movements (Colectivo Situaciones 2003), for example, then these ethics will dictate whether and how we do interviews (paid or unpaid, collaborative or top-down), surveys (community-built and conducted, or not), how and where we draw our samples and the overall boundaries of our research site (see Liboiron (2015) for an example of how sampling techniques can be tied to justice problems in disaster zones). It will determine how (and with whom) we will make decisions when the unexpected occurs. One of our recommendations, for example, is that after researchers think about their own ethical commitments and design their research accordingly, they have them reviewed (formally or informally) by community groups, since one way to tell if your ethics are just for people in disaster zones is to have them adjudicated by those on the ground in a kind of ethics peer-review. We have attached, as an appendix, a Memorandum of Understanding for research in disaster zones developed in consultation with both researchers and disaster survivors in the aftermath of Hurricane Sandy. It was designed to address many of the ethical dilemmas and mistakes experienced by both groups, and draws heavily on tribal research ethics, where research ethics have received substantial scrutiny and revision that go far beyond what IRBs require. This is not the end of a process of peer reviewing ethics, however. It is ongoing.

In an important sense, the *process* of research is a form of action. We are not the first to suggest that data collection is a process of negotiation where our collection techniques have effects in the field. We can arrange our methods so they aim to make positive change at all points in the research process, rather than only at the end once findings are achieved (Stringer 2013). Moreover, it is not only action-oriented researchers in disaster zones who navigate compromised systems; in many ways, compromise is not a choice for any of us who produce and hold knowledge. Even those who don't grapple with ethical dilemmas are compromised because we all are always already participating in a system of power (Rose 1997; Kobayashi 1994). One of the premises of STS is that there is no outside of politics for research, scientific or otherwise. The nature of disaster research makes this especially visible in our own work, and invites us to be accountable to it.

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Appendix

Memorandum of Understanding.

Template of Memorandum of Understanding for Mutual Aid Research in Disasters Superstorm Research Lab & Disaster Collaboratory

A memorandum of understanding is a document designed to coordinate expectations and procedures between groups. It is useful when two groups that have not previously worked together. There are various uses of a memorandum, and the specific purpose is determined by the parties involved: it might be used to indicate good will on the part of both parties or to help them keep track of what they've agreed on. The agreement can be used to help to clarify the relationship between two organizations and to make clear which services or responsibilities each is responsible for. It can also set out clear decision making procedures and approaches to getting work done. It might help to supplement legal documents created with a university or business partner, but it is not a legally binding contract itself.¹

When drafting an MOU, keep in mind the purposes of the agreement. The MOU should be detailed and comprehensive enough that each partner has a clear understanding of the collaboration or partnerships, their role in it, what is expected of them, and what they can expect from the rest of the group. It should also be broad and simple enough to support a nimble, adaptable collaborative effort. That is, the MOU should support the work of the collaboration, not get in the way. Most importantly, the MOU is a framework for ethics; the research ethics supported by academic Institutional Review Boards (IRBs) do not cover many types of challenges encountered in innovative research, collaborations, and unique populations or situations (see, for example, Denzin and Giardina 2007). Thus, it is up to the collaborators to define the terms, scope, and elements of the work.

The MOU provided here is a *template* to help you start your discussions. It is designed to be a resource for a mutually beneficial researcher-community or aca-

¹Note that this MOU should not be used as a substitute for a legal document. It is not intended for this purpose; however, the principles herein may offer a useful supplement to the expectation, practice, and ethical considerations of the collaboration.

demic-activist partnerships. It covers a number of different types of collaborations and partnerships, as well as various issues that might need discussion; it is neither a mandatory nor comprehensive list of ingredients but is meant as a starting point for discussion. In fact, some items in the template are contradictory to others, anticipating a range of possible frameworks and philosophies of collaboration. At a macro level, it is modeled after Tribal Research Ethic Codes, community-based participatory research (CBPR), and participatory action research (PAR) methods. Language and ideas were sampled from the following sources:

- The Canadian Aboriginal AIDS Network MOU on Principles of Research Collaboration
- The Memorandum of Understanding for the Community Organizing Part of Community Action Against Asthma (Between: University of Michigan School of Public Health, Detroiters's Working for Environmental Justice (DWEJ), the Detroit Hispanic Development Corporation (DHDC) and Warren Conner Development Coalition (WCDC)).
- Healthy African American Families Community Participatory Research Collaboration Agreement
- Language Revitalization In Vancouver Island Salish Communities project (<http://www.docstoc.com/docs/135504197/Memorandum-of-Understanding>)
- Collaboration Toolkit: Creating an MOU, from Colorado Collaboration Award (<http://www.growourregion.ca/images/file/Collaboration%20Toolkit%20-Creating%20an%20MOU.pdf>)
- Indigenous Research Protection Act by Indigenous Peoples Council on Biocolonialism
- Model Tribal Research Code by the American Indian Law Center

For questions, information, or to provide input, contact Max Liboiron at mli-boiron@mun.ca.

Memorandum of Understanding

This Memorandum of Understanding made on and effective from
the _____ day of _____, --

is created between
[community group]
and
[researcher or research institution/second group]

I. Background

- Describe the parties, including who is part of them (who this MOU covers)
- Liaison Officials: First and Second Points of Contact for each organization and their contact information and/or full list of participants with contact people specified (specified contact people eases communication efforts during project work)
- Describe the project

II. Shared Goals and Objectives

The Parties have entered into a collaborative project to work towards the following goals and objectives:

- The project seeks to enhance the community's welfare through increasing capacity for the community to address its own issues.
- The project will be designed to increase community knowledge of the issue.
- The project will be designed in ways that enhance research capacity or other information gathering capacities of the community participants in the process.
- The research objectives, questions, and/or methods must not only reflect academic interests but strive to ensure that the research is also relevant, beneficial, and valuable to local communities.
- Community and academic participants will be involved in all project phases, including planning, implementation, research, evaluation, analysis, interpretation, and dissemination; the burden under this code is on the researcher to show that tribal, community, or individual input would be inappropriate rather than the reverse.
- All participating members (academic and community participants) are acknowledged as having expertise and commitment that is relevant to the scope of the project.
- Interested members of the community and community agencies will be provided opportunities to participate meaningfully in the research process, where the mode and scope of participation is proposed and accepted by both groups.
- Project membership is considered to be open or inclusive of those who wish to join and are willing to participate actively, rather than closed or exclusive in membership.
- Community participants and academic participants will be partnered with each other on all/certain specific tasks as a way to work together on analytic issues, including interpretation, synthesis, and verification of conclusions, gathering data and other aspects of methodology.
- For a worksheet on "Indicators for Promoting Equitable Collaboration," see Access Alliance, [2011](#).

III. Process

Roles, duties, and responsibilities of each organization:

Meetings

- Parties will meet a minimum of [number of times per time period].
- [The PI or project coordinator or rotating member drawn from either party] will provide each member of the research team with notes of meetings, including decisions made, within [a reasonable time frame].

Project Design

- Outline roles of each party and/or roles of individuals or groups within those parties.

- Parties will seek to combine traditional and innovative forms of research.
- The project will periodically assess the experience of participating for community and academic participants and attend to their concerns.

Data

Parties should agree on what counts as data in this partnership: photographs, stories, field notes, surveys, interviews, artifacts, local knowledge, etc.

Informed Consent

- The (purpose of) research project will be explained to all stakeholders (participants and community members) in a language that is appropriate to the community. This is part of a wider community consent.
- It is requested that each participating community partner have at least one participating member (i.e., the Council representative) complete a certification of training for human subjects research through the academic partner's institution, whether it is an Internal Review Board (IRB), journalism ethics, etc. This is not to give academic ethics priority, but to ensure that all parties are familiar with the terms and processes academics are minimally accountable for (for integrating community and institutional ethics more formally, see Khanlou and Peter 2005).
- The research team will explain potential risks and benefits in a manner that is appropriate to the community. This includes not only risks of the research to individual participants but also to the wider community and third parties (see Underkuffler 2007).
- Since researchers cannot always anticipate risks of research to the wider community, particularly if they are not familiar with the community, at least one member of the research subject population must be involved to speak to the risks of particular types of research done in that area.
- The informed consent of individual community members must be secured in writing before they participate in research or recordings, including any restrictions the individual community members might wish to attach to the use of this information or recordings. Written informed consent is evidenced by the signature of the individual community member on the Participant Consent Form. In cases where written forms of consent are not appropriate, another method of acknowledging consent with clear indications of when it has been obtained will be decided on by both parties.

Confidentiality Statement

- Unless the respondent waives confidentiality for specified uses, all researchers, both academic and community, shall hold as privileged and confidential all information that might identify a respondent with his or her responses. We shall also not disclose or use the names of respondents for non-research purposes unless the respondent grants us permission to do so.
- All data will be used in a form that will make it impossible to determine the identity of the individual responses. That is, responses will not be integrated, analyzed, or reported in any way in which the confidentiality of the responses is not absolutely guaranteed.

Data Ownership

Parties should discuss what it means to own, hold, or steward data and the responsibilities this entails.

- Originals of all audio/visual recordings (in digital and/or analog formats) and copies of all notes, transcripts, photographs, and other records of the research will be kept by [List parties].
- [List parties] will retain a copy of the full data file, de-identified appropriately.
- Any site owning data, or participating in collecting data for the project, must review its participation and role through their internal IRB and/or other indication of ethical protocols decided by group members.
- All participating sites/partners will receive a summary of the data even if their involvement is minimal and they are not entitled to the full data.
- The parties will ensure that a final, permanent repository for the research materials, to be created by the researchers, will be utilized. Additionally, the researchers will make as a condition of the deposition that the repository will provide access to community members. Further, the repository will adhere to any confidentiality or use restrictions made by the individual community members.
- Parties will outline rules for gaining or granting access to the data by third parties not listed in this MOU.

Community and Academic Validity

- During the life of the project, submitted research papers and abstracts for presentations will be circulated to all parties via lead participants at least [timeframe] and preferably [timeframe] prior to their submission for review and comment. There will be [timeframe] for comments to the lead author.
- Each project deliverable will have one or two lead individuals to permit accountability, preferably a representative from each party.
- It is expected that the first or senior author of each project will review comments from partners, discuss major differences of opinion with the partners involved, and circulate the final version to partners. If substantial disagreements over interpretation remain, then the lead author (first and/or senior) will include a statement in the discussion section, clarifying the nature of the disagreement.
- -or- If there are significant disagreements over interpretation, community members can veto the publication of certain elements or all parties must reach a consensus before such elements are published. This may also be the case if some information ought to not be in the public domain according to community members or non-academic partners, such as but not limited to sacred knowledge.
- -or- Team member(s) or a partner may choose to include a disclaimer if they do not agree with the content or views presented in a publication.

- Products for community release and presentation will be circulated for comments to community and academic partners, providing a [time frame] turn around time. These comments can be held in a public forum such as a community meeting, and/or in writing.
- Given that all members of the research team will be provided the opportunity to review and comment on findings prior to publication or presentation, any one member of the research team may not, particularly once initial dissemination has occurred, further analyze, publish, or present findings resulting from the above-mentioned research project unless the entire research team reaches a consensus.

Dissemination

- Communication strategies to present aggregate data to the community at large shall be described with in-progress updates where appropriate.
- Dissemination of the research results will be the responsibility of all project participants, and academic and community partners will have opportunities for presentations and publications.
- Research projects will produce, interpret, and disseminate the findings to community members in clear language respectful to the community and in ways that will be useful for developing plans that will benefit the community.
- Research shall be disseminated for public benefit, either freely (including open access) or at nominal charge to cover distribution/processing fees.
- The researchers will ensure that two copies of all publications, conference papers, and other educational and scholarly materials produced in the course of the project be deposited with the [community group, institution, etc].
- In addition to academic papers, accessible formats of research findings will be produced and distributed, such as webinars, public presentations, videos, websites, leaflets, white papers, manuals, blog posts, etc.
- All academic publications should be open access.

Publication

These guidelines can be used for traditional academic publications as well as other formats for disseminating research findings.

- Due to the fundamentally collaborative nature of this partnership, party affiliations, rather than author names will be used to designate authorship of publications.
- -or- Due to the fundamentally collaborative nature of this partnership, (1) *All* participants who made this research possible through conception, design, analysis, collection, provision or interpretation of data will be listed as an author, even when these contributions do not include writing; and (2) authors must approve the final draft and be able to defend the published work.
- -or- Criteria outlined by Huth (1985) will be used as guidelines for authorship of publication (both academic and non-academic) based on the find-

ings of the research. The criteria recommend that: (1) all authors must make a substantial contribution to the conception, design, analysis, or interpretation of data, where “substantial” is defined by parties ahead of time and updated as needed; (2) authors must be involved in writing and revising the manuscript for intellectual content; and (3) authors must approve the final draft and be able to defend the published work. Those who have made other contributions to the work (e.g. data collection without interpretation, etc.) or only parts of the above criteria should be credited in the acknowledgements, but not receive authorship.

- -and/or- the publication contains a section outlining what each author contributed, acknowledging that “authorship” can include the collection and interpretation of information as well as actual writing up of results.
- The explicit permission of an individual or organization must be sought prior to acknowledging their contribution in a paper or presentation.
- Parties should agree on publication venues together.

IV. Communication

- Include any standard or shared terminology, including consistent ways that partners are identified in written and verbal communication.
- Consider and decide on processes for reaching out to – or receiving requests from – third parties, such as the press, other groups and institutions, interested members of the public, etc.
- Consider and decide on general communications policies (social media policies, communications calendar, branding, graphic standards, etc. as applicable)
- Include any information flow practices that will help guide how data, ideas, and needs are shared between groups.

V. Resource Allocation

Payment, fees, and funding

Include budget, if appropriate. Note that when money exchanges hand, a contract, rather than a memorandum of understanding, is likely more appropriate. For information on when to use a binding contract vs a MOU, see: http://ctb.ku.edu/en//tablecontents/sub_section_main_1873.htm

- Both parties shall contribute in-kind, including the following funding, labor, equipment, and space [list]
- [List partner] will handle all financial transactions on behalf of the collaboration. The following [reports, procedures, or financial controls] are required of [the partner]
- Expenses inclusive of [list types] will be handled by [outline procedure & responsibilities]

Also consider:

- Gift acceptance policies: these should describe how gifts are accepted, recorded, and acknowledged. In addition, the MOU should describe the circumstances under which a gift would be declined.
- Policies around sharing fundraising information externally and among partners, and responsibility of fundraising
- Payment. Which partners or individuals will be paid and from what source?

VI. Decision Making Processes

- Things to specify:
 - Whether the collaboration uses a consensus model, majority vote, or another system to reach decisions.
 - What constitutes a full group meeting or quorum (minimum number of people required), and what types of discussions or decisions may or may not take place without the full group/quorum.
 - How partners will be informed in advance about decision-making discussions & what alternative voting systems may be used (voting via email, sending a proxy to a meeting, etc)

VII. Risk

- The MOU should address key areas of risk for the collaboration. Partners may be expected to maintain certain types or levels of insurance coverage, conduct background checks on employees and volunteers, maintain security of electronic data, etc.
- Since researchers cannot always anticipate risks of research to the wider community, particularly if they are not familiar with the community, at least one member of the research subject population must be involved to speak to the risks of particular types of research done in that area.

VIII. Terms of Agreement

- This agreement may be amended at any time by signature approval of the parties' signatories or their respective designees.
- The term of this Memorandum of Understanding is from _____ to _____ and may be renewed. The Parties will review this agreement [annually/timeframe].

IX. Termination

- In case of a dispute arising from the implementation of this Memorandum of Understanding, the Parties shall exhaust alternative dispute resolution models, such as negotiation and mediation, before employing other forms of dispute resolution, such as arbitration or adjudication. Parties shall act in good faith to resolve the dispute.
- Any Party may withdraw at any time from this MOU by transmitting a signed statement to that effect to the other Parties. This MOU and the partnership created thereby will be considered terminated thirty (30) days from the date the non-withdrawing Party receives the notice of withdrawal from the withdrawing Party.

X. Execution and Approval

- The persons executing this MOU on behalf of their respective entities hereby represent and warrant that they have the right, power, legal capacity, and appropriate authority to enter into this MOU on behalf of the entity for which they sign.
- Signatures _____
- Date _____

Works Cited and Other Resources

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Ethics in Disaster Research: A New Declaration



James Kendra and Sarah Gregory

Abstract The opening chapter in this volume portrayed the growing urgency of disaster research, as the nature and scope of hazards shift. People already familiar with their local environment may find that a changing climate changes their risk for certain kinds of hazards (Relf, G., Kendra, J. M., Schwartz, R. M., Leathers, D. J., & Levia, D. F. (2015). Slushflows: Science and planning considerations for an expanding hazard. *Natural Hazards*, 78(1), 333–354). People moving from place to place in search of better jobs or housing may move into a hazard milieu that is new to them. Political transformations with an authoritarian bent will probably increase vulnerability amongst populations already at greater risk for experiencing a disaster and for recovering more slowly, such as those in poor housing, those with chronic illnesses, and those with Functional and Access Needs. Robust research is needed, but some critics have emerged to challenge the practice and propriety of disaster research, especially quick-response research. This chapter argues for an affirmative right to conduct research.

Keywords Disaster research ethics

Introduction

The opening chapter in this volume portrayed the growing urgency of disaster research, as the nature and scope of hazards shift. People already familiar with their local environment may find that a changing climate changes their risk for certain kinds of hazards (Relf et al. 2015). People moving from place to place in search of better jobs or housing may move into a hazard milieu that is new to them. Political transformations with an authoritarian bent will probably increase vulnerability amongst populations already at greater risk for experiencing a disaster and for

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recovering more slowly, such as those in poor housing, those with chronic illnesses, and those with Functional and Access Needs. Robust research is needed to build the knowledge base for confronting these transformations.

Yet, just at the time that robust research agendas are needed in all areas of disaster inquiry, a number of critics have emerged to question not just the practice of disaster research, but even its propriety. Recent scholars, especially in some areas of anthropology, sociology, geography, and international public health and humanitarian affairs, are assailing much disaster research, especially quick response research (e.g. Gaillard and Gomez 2015), with the argument that it should be more heavily regulated or even curtailed. The argument in general is that disaster research, particularly in cases where the researcher is not from the affected area, is disrespectful, exploitive, and deviant. An especially paternalistic strain of this growing moral panic asserts the vulnerability of people in a disaster area, in spite of the abundant evidence to the contrary. In an egregious move, New Zealand implemented a 90-day moratorium on social science research after the Christchurch earthquake, an astonishing infringement on liberty. Because ethics is an important dimension of understanding the appropriateness and suitability of scientific methods, and because of growing dialogues that call into question the propriety of disaster research (O'Mathúna 2012), it is important to discuss these in some detail. The main purpose of this chapter is to rebut the assumptions underlying this moral panic and assert an affirmative right to conduct disaster research anywhere, on any topic.

This chapter had its genesis in a workshop that was funded by the US National Science Foundation (NSF) in 2012. NSF funded the **“Workshop on Deploying Post-Disaster Quick-Response Reconnaissance Teams: Methods, Strategies, and Needs,”** focused on the state-of-the-art of quick response disaster research, which was designed to provide stakeholder feedback to NSF on their funding mechanisms for the RAPID grant program, one of the main mechanisms in the United States for funding quick-response research deployments. Participating scholars were US and international researchers who had extensive disaster research experience, and represented the social, engineering, and physical sciences. Although much of the workshop focused on the administrative details of the RAPID program and other funding mechanisms, such as timing of grants, assessing the effectiveness of the programs, and so on, ethical concerns suffused many of the subjects that were covered at the workshop. Some participants thought there should be an explicit ethics statement in every funding proposal, and that scholars should work toward a code of ethics for disaster research. Others sharply rebutted these assertions, and in general the views presented were diverse and contradictory. In breakout and general sessions as well as at breaks and at meals, participants engaged in a robust debate on ethical matters that centered on several major points of contention: (1) access to the disaster site; (2) the responsibility of researchers to the affected population in terms of providing data, analytical reports, or other products; and (3) issues pertaining to human subjects review by Institutional Review Boards. These three broadly based topical areas encompassed a number of ancillary concerns and redounded on other matters emerging in certain literatures, such as the possible vulnerability of

the affected population and their ability to provide informed consent. Together, the comments at the workshop and the growing literature on research ethics provide a view on the research ethics landscape and provide the starting point for the comments in this chapter.

Overview of Quick-Response Research

Scholars in a number of disciplines have long recognized the importance of deploying research teams to the site of a disaster to gather perishable data (Stallings 2007). Natural and environmental scientists are interested in understanding the natural processes that produce hazards in the human environment. Engineers seek to improve the built environment and benefit from knowledge of hazards that affect and are affected by man-made structures (Restrepo and Zimmerman 2003). Social scientists conduct reconnaissance research for exploratory, descriptive, and explanatory purposes (Michaels 2003) with the hope of building upon society's adaptive capacity to withstand disaster events. Data collected in reconnaissance research provide insight into linkages between the causes and effects of disasters, which are valuable in terms of developing scientific theory and useful in their potential application.

These research trips are a particularly demanding form of data-gathering that require on short notice:

1. a swift comprehension of a developing disaster situation, typically from media sources and with scanty or ambiguous information;
2. an assessment of the likely theoretical or scientific questions that can be tackled on an expedient basis;
3. if funding is needed, an urgent conceptualization of a proposal;
4. recruitment of a research team, and especially making, continuing, or renewing contacts with colleagues in the affected area;
5. completion of human subjects protocols;
6. preparation and submission of a proposal complete with budget;
7. completion of travel arrangements, including necessary documents and entry permissions, purchase and transport of equipment, and securing food, accommodations, appropriate vaccinations, and other wherewithal;
8. gaining entrée to the disaster site and relevant organizations and facilities

Quick-response or reconnaissance research probes an evanescent realm where circumstances are characterized by risk and a high degree of uncertainty, and where emergency management decisions are often made with haste and confined to the realm of bounded rationality. Perishable data, data only available for a short period of time in the immediate aftermath of an incident, are invaluable to scientists in understanding the characteristics of a burgeoning crisis (Michaels 2003).

Social scientists are interested in a wide variety of research topics, such as the entry, growth, evolution, and exit of organizations from the disaster scene, emergent

activity within the disaster affected community, disaster preparedness, influences on decision making, and social vulnerability to name a few. They collect perishable data to understand the processes that underpin the social context of disasters. Perishable data valuable to social scientists may include observations of the different activities taking place in context; unalloyed or unreserved individual accounts of these activities expressed in the moment they occur; the design and evolving configuration of facilities and personnel; instances where improvisation was necessary; volunteer and emergent non-official activities; or the names of individuals or organizations who might be contacted in a more thorough study later.

Likewise engineers are interested in obtaining perishable data to understand the context of the disaster, the causes of infrastructure failure, and the challenges of response. Such data may include observations and measurements of infrastructure damage or evolving logistics and supply chain networks. Physical scientists may also collect perishable data to develop cause and effect relationships for future application. For example, in the dynamic natural environment, subsequent meteorological or geomorphological forces may obscure geophysical evidence. Such data could, therefore, only be collected through reconnaissance research.

Reconnaissance deployments are typically inaugurated upon receipt of media reports of a disaster, whereby a research trip or proposal is developed on short notice. This demands comprehension of the disaster situation from information that can be ambiguous and/or contradictory. What limited information is available must contain transformative potential for exploratory research, or must have the potential to develop theories and understanding for application from the existing body of scientific disaster research on a given topic.

The researcher must then recruit a research team, complete human subject protocols, prepare a budget, make travel arrangements, and find accommodations. Ideally, reconnaissance teams arrive on-site, size up the situation, and make decisions as to which areas are suitable for research. Following these preparations, the team then generally spends at least a week actually engaged in observation, photography, informal interviews, document collection, engineering and geophysical measurements, attending disaster management planning meetings, and other activities. After some preliminary analysis, disaster researchers may return to the site to conduct follow-up visits and interviews and then produce a preliminary report of the team's findings. The work can be physically, intellectually, and emotionally demanding, putting a premium on qualities of patience, stamina, and resourcefulness. In the best cases, the field team has local contacts, but even they are frequently limited in their ability to introduce the team to others. Sometimes the best data emerges in unexpected encounters with agency officials, volunteers, emergent groups, and others operating in the disaster response milieu. Often, the art of blending in becomes key; the art of standing around; skills of conversation and chitchat; the art of talking one's way into places. "You can observe a lot by watching," said Yogi Berra, whose remark applies directly to disaster field research.

As an example of what can be involved, Kendra and Wachtendorf (2003a: 38–39) reported on their work that began within 2 days of the attacks in New York on 9/11:

During that time the field team conducted over 750 collective hours of systematic field observations. These included close observation of key planning meetings at secure facilities, including the EOC, the Federal Emergency Management Agency's (FEMA) Disaster Field Office and incident command posts near the 'Ground Zero' area. The field team spent extensive periods observing operations at Ground Zero; respite centers established for rescue workers; family-assistance centers established for victims' families; and sites for marshaling volunteers, supplies and food. The field team also observed activities at major security checkpoints in lower Manhattan and at other locations that were important in the emergency response. The team wrote voluminous notes that provide a rich description of observations and experiences; it took over 500 photographs; and sketched and collected floor plans of various facilities to chart the spatial and organizational changes over time. We were thus able to track the evolution of the reconstituted EOC, and other facilities, from very early stages... In addition to direct observation in New York City, we collected numerous documents produced by local, state and federal agencies as well as by individuals and organizations with less formal ties to response efforts. These documents included internal and public reports, requests for information or resources, informational handouts, internal memos, schedules, meeting minutes and agendas, maps and internal directives.

While experienced disaster researchers follow well-understood procedures, each disaster is a unique event and requires a creative, improvised approach in carrying out the various elements of a project. Physicist Alvin Weinberg (1985: 60), for example, has said that "Science deals with regularities in our experience; art deals with singularities." Silvio Funtowicz and Jerome Ravetz (1990), a mathematician and philosopher of science, respectively, have argued that much scientific work, especially work outside the controlled environment of a laboratory, entails elements of craftsmanship, experience, and judgment.

The unique circumstances that characterize crisis present the disaster researcher with many considerations that include the moment-to-moment tasks of data gathering and extend to the expectations of the researcher's discipline, their university affiliation, and the affected community. Post-disaster field research necessitates an ability to navigate the academic, political, and legal institutional universe as well as the territory of interpersonal communication and ethical dilemmas. Indeed the art of reconnaissance research design is a creative extension of well-established methodologies blended on a palette of uncertain or unique circumstances, all directed toward theoretical and practical understanding of disaster for the benefit of the field of emergency management as well as disaster science.

Much of what is known about disaster management has been learned in quick response research or in projects that were initiated subsequent to quick response deployments. Auf der Heide (1989: 8-9) has discussed the importance of disaster research and makes a number of arguments for why systematic research by observers other than those who were involved in the event is important:

Many published articles are narratives of a single disaster written from the perspective of one individual. Frequently, the author is one who was actually involved in the incident or was in charge of some aspect of the disaster planning or response. It is never easy for one to impartially evaluate the actions of his own organization. Too often, post-disaster critiques turn out to be defenses or justifications of what was done, rather than objective assessments of problems and mistakes.... In addition, published accounts may delete material that may cause political embarrassment or increase the liability of the response participants. Finally, many disaster critiques are assembled solely for "in-house" use aimed at correcting internal shortcomings and are not meant for others' benefit.

The recounting and evaluation of a disaster by a person involved in the response has another inherent limitation, that is, the narrow perspective available to any single participant (especially if his attention is focused on action rather than observation).

For these reasons, on-site research by disaster scientists offers the best hope for understanding aspects of disaster response. In that sense, there are clear social benefits to quick-response research.

Nevertheless, in spite of the well-established importance of quick-response research, some scholars criticize the approach. These criticisms generally focus on rights of access to the disaster site, the responsibility of researchers to the affected community, and the vulnerability of research participants.

Access to the Disaster Site

Critics such as Gaillard and Gomez (2015) and Citraningtyas et al. (2010) question the propriety of quick response research undertaken without the approval of some sort of local stakeholder or the buy in of local participants. We can approach the matter of travel to disaster-affected areas from several directions. At one level, there is a fundamental right to seek knowledge and to ask questions on any topic (a right held under the First Amendment of the US Constitution as well as under Article 19 of the Universal Declaration of Human Rights, which asserts, “Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers.” Thus, we would argue that there is an affirmative right to knowledge about the environment and about changing conditions in it.

At another level, the character of disaster—and therefore who is and is not a relevant stakeholder—can vary widely, inasmuch as disasters have a strong affective dimension. For example, Mitchell (2006) pointed out:

Multiple interpretations of hazard events may be held by a single individual or by different groups or institutions. For example, among others a hurricane like Katrina may be simultaneously regarded as a disaster, a natural experiment, an aesthetic spectacle, a manifestation of divine power, an indicator of anthropogenic climate change, a mechanism of societal differentiation, a test of societal resilience, a device for redistributing economic and political resources, a fortuitous opportunity for mischief making, and an entertaining or cathartic diversion.

Given the view that a disaster can mean many things to many people, or even hold multiple meanings for the same person, there is no one person or even stakeholder group who could give “permission” for entrée. Because a disaster as an object of study is no single thing, any of Mitchell’s interpretations could be a jumping-off point for inquiry.

One official in attendance at the workshop asserted the necessity of contacting the incident commander prior to entering the disaster area. Others forcefully contradicted this assertion. For one thing, experience shows that there are many “incident

commanders,” and that the notion of a single person in charge is largely fiction. Again, such obeisance raises the possibility of the research team being rebuffed or directed toward sources that are not useful or that are restrictive. Certainly, it is wise to be in touch with a helpful incident commander who respects the research function and is comfortable with the presence of researchers, but in order to include and account for the views of other participants researchers cannot allow the research task to be obstructed by the disapproval or trepidation of officials.

Moreover, as Kendra and Wachtendorf (2003b) observed, even identifying a “disaster area” is a challenging task, a point carried further by Aguirre et al. (2005) who argued that future disasters may be characterized by diffusion and ambiguity with regard to causes, borders, and affected populations. Couch and Kroll-Smith (1985) in their discussion of chronic technical disasters, noted that pollution incidents have ambiguous beginnings, endings, and impacts. Peacock and Ragsdale (2000) contend that a disaster is a disruption in a field of social networks linked to one another through an exchange of information, members and resources. There is no real centralized governing body, *per se*. Instead, community functions are coordinated through mutual contingencies, competition, coalitions, and control over resources.

Given these characteristics of certain kinds of disasters, who, then, is a “stakeholder” that might be consulted? And for an event such as Hurricane Katrina, where the whole of the US was involved, or for one such as Hurricane Sandy that affected a highly-populated region, large areas were declared as “disaster areas” owing to their roles in disaster response but where few people were directly affected by the agent-generated or response-generated demands. In such circumstances, no one is able to give permission for *entrée*.

While in some circumstances, permission may be needed for gaining access to places and organizations, and local contacts are nearly always beneficial and indeed to be welcomed as part of building genuine scientific collaborations and exchange of ideas (also, these are virtually mandatory in the international setting where local cultural predilections and language differences can trip up the unwary scholar), it is easy to imagine situations where researchers may need to function in a more insurgent or clandestine way. This is particularly true in situations where there may be forthcoming litigation, as in industrial accidents. Moreover, any deference to local authority may have the effect of hiding from view marginalized, subordinate, or threatened populations—populations that local formal or informal authorities might prefer remain invisible but whose experiences are important to document. In these respects, we would argue that disaster research is not inherently tainted and therefore does not require cleansing through any such purification rituals as seeking permission from authorities or soliciting buy-in from local stakeholders.

Some scholars have asserted that convergence can diminish the potential benefit of the research by adding to the chaos of the situation. In this view, overlapping studies may produce fatigue among interviewees; researchers interviewing the same people asking similar questions may inflame frustrations and consequently strain the willing participation of research participants (Killian 1956). Furthermore, the scarcity of resources and duplicated research efforts prop up the argument for a

more coordinated research effort. Some of the members of the workshop concurred that an awareness of other researchers in the field is needed to bridge research gaps and circumvent issues in the field, such as fatigue among participants. In fact, after the Murrah Federal Building bombing in 1995, the state of Oklahoma adopted an aggressive approach, driven by the University of Oklahoma's Department of Psychiatry and Behavioral Sciences, which "petitioned the governor's office to designate the department and the OUHSC [University of Oklahoma Health Sciences Center] Institutional Review Board (IRB) as the clearinghouse for all mental health research related to the bombing" (American Psychological Association 1997: 53). Again, this was driven by concerns about research fatigue amongst the victims, but mental health research, and again any type of research, could go far beyond the survivors of the Murrah Federal Building and their families. This proposition, however, raises a number of other concerns, such as how this endeavor could be justly coordinated and what entity should properly be responsible for managing the effort.

The Oklahoma restriction, mandated by political officials and driven by state agencies, constituted a serious usurpation of usually-recognized Constitutional guarantees of free speech. At a recent conference on Hurricane Sandy research, where a similar concern was raised about research saturation, one scholar pointed out that even studies that seem similar are rarely exactly duplicative. Scientific advances, especially in the social sciences, may come most reliably from a number of similar studies whose findings might be broadly convergent. And there is a strong craft element to science (Funtowicz and Ravetz 1990), which means that some scholars may be better positioned at one time or another for a particular study.

An even more appalling instance of the restriction of research occurred in New Zealand after the Christchurch earthquake in 2011. Beaven et al. (2016) described the "social science moratorium" that was implemented by emergency officials. Emergency workers had reported being deluged with requests for visits to impacted areas, and members of local organizations and agencies similarly reported receiving many requests from international researchers seeking contacts or other information. According to Beaven et al., emergency workers and New Zealand scholars felt overwhelmed by the number of inquiries, and emergency officials were worried that researchers would contact and further distress people affected by the earthquake. Thus only research that was construed as directed toward supporting relief efforts was allowed. Beaven et al. further stated that the moratorium was a relief, since it relieved people of the burden of refusing. Nevertheless, the moratorium, and proposed efforts of its kind, are an abridgement of usually-accepted rights to speech and inquiry. To begin with, it singled out a particular kind of speech—social scientific speech—for particular repression. Second, it deprived local residents of their autonomy, either to decline to participate or to choose to tell their stories. It deprived local researchers of the capacity to understand social phenomena in their environs, and it blocked new entrants to the disaster research field. Paradoxically, the case demonstrates something else, too: it can be better for field researchers to eschew contacts with officials, since it was these contacts that officials found burdensome. The case also shows the consequences that can occur when research is regarded as an institutional or professional activity that is decoupled from basic human rights.

Curiously, as Beaven et al. (2016) explain, the moratorium was directed at *all* research not being coordinated through the formal disaster response system, and in fact it was mostly engineers who were requesting access. Nevertheless, according to Beaven et al., the directive was logged in as specifically referring to social science, and thus the label of “social science moratorium” crystallized. It is beyond the scope of this chapter to address this moratorium in full detail, but it must stand out as a noteworthy example of the suppression of research.

Some scholars have argued that the merit of disaster research is compromised by its potential to interfere with disaster management activities, jeopardize the reputation or wellbeing of research participants, or produce unintended consequences without accountability (Kelman 2005). Kelman (2005), for example, flipped the conjecture that disaster operations affect the pursuit of research to consider the impact research might have on disaster operations. Kelman posed questions as to whether or not disaster research interferes with disaster operations and whether or not scholars owe some accountability to decision makers that may have been influenced by the researcher’s findings and taken actions that proved harmful.

While it may be possible to find instances where researchers can get in the way (Kelman 2005), plentiful disaster research shows that actions leading to such concern are easily mitigated. Much quick-response research is observational, involving walking around, taking photographs, chatting informally with officials or residents of the affected area, and other such low-impact activities where the researcher blends into the surroundings and is soon not noticed. Moreover, while the most acute part of the response phase has a surge of considerable activity (almost always before researchers arrive), in a very few days normal human routines begin to reappear, including meals, rest breaks, and so on. In other words, someone always has time to talk and often the enthusiasm to do so. Clearly there is a research skill involved, that might derive from qualities of compassion and empathy that enables a scholar to see who might be able and willing to talk for a few minutes, but there are no grounds to assume the research is distracting or disruptive to operations.

As to Kelman’s other concerns, standard precautions for anonymizing findings and shielding individuals from identification are well-known for protecting human subjects. Whether researchers should be accountable in some way for the recommendations stemming from their work is a large question. Owing to the normative orientation of much disaster work, scholars would surely want their findings to lead to salutary policies. However, this concern would relate to any form of research in any area; while scholars should be concerned about the validity and usefulness of their research, it is a challenge that extends across all of science and is not confined to this one area.

The Responsibility of Researchers to Their Study Participants

Some discussion at the workshop shifted toward what obligation—if any—is owed to affected places. Scholars argued for such an obligation, and some scholars assert that obligation as an affirmative duty (Citraningtyas et al. 2010). Scholars who subscribe to a normative ethos toward science as the basis for disaster risk reduction would consider the value of the work generated as a necessary consideration in research design and implementation. At the quick-response workshop, they suggested that there should be funding for follow-up trips to the affected communities for disseminating results. Many participants desired that some provisions be made for sharing results or findings with the affected community. The view was that such sharing would serve broadly as recompense for the time that participants shared with the researchers. Sharing research findings may ease the ethical dilemma—sensed by some—of data extraction by providing the affected community the opportunity to participate in their recovery through an open system in disaster research. A number of workshop participants asserted that there was an ethical obligation to ensure that research findings should benefit the affected community.

Most disaster scholars identify a normative quality to their work, with knowledge disseminated broadly. In arguing for the development of improved disaster theory, Alexander asserted that:

...I hope that one day there will be a sufficiently large body of theory to permit us to inaugurate a new “interdisciplinary discipline” dedicated to the understanding of disastrous natural phenomena and their effects, and hence to the service of humanity (Alexander: 1993: xvii).

Returning findings to the affected community is part of the normative quality of this work and might be more of a consideration with very long-term projects that involve substantial community contacts. Yet even this suggestion was met with certain cautions: what if the findings of a particular study reflect negatively on local efforts? Citraningtyas et al. (2010) based some of their arguments on the Helsinki Declaration for medical research, and assert that the community should benefit from research. However, social science research is different from medical research. There is always the possibility that findings may call local political systems into question, or highlight deficiencies or injustices that some in the community would prefer remain hidden.

Benefits to the affected community or population can certainly accrue directly, if the research is converted promptly into practice, but also indirectly. Imagine someone who evacuated to Texas from Hurricane Katrina. What if they were interviewed by researchers, who published their study? That study might then form part of the knowledge base that is taught in emergency management educational programs. When that person evacuates again, they may well be cared for by emergency managers who were trained using the latest Katrina-related research. People in New York City will benefit from research conducted after Hurricane Sandy, and some people will benefit from research conducted elsewhere. Nepal, for example, benefited from experience accumulated in other places. Learning from Kobe was available to people affected by the Tohoku earthquake and tsunami. There is an inevitable pay-it-forward quality to disaster research.

Vulnerability

Although not covered in detail at the workshop, the many concerns that were raised connected with one that Stallings (2007) briefly touched on: that disaster victims are vulnerable. There is a growing body of literature on the mental health of disaster victims. Foa et al.'s (2006) study on the risk factors associated with post-traumatic stress disorder after exposure to a disaster, North et al.'s (2002) study on psychiatric distress after the Oklahoma City bombing, and Norris et al.'s (2006) book, *Methods for Disaster Mental Health Research*, provide some examples of the growing interest in this topic.

There is a concern among some in the academic community that, due to stress induced by the disaster, research participants are vulnerable to harm or exploitation or are not able to give informed consent and, as such, the risks and benefits of conducting disaster research should be carefully weighed before entering the field (Levine 2004). We do not argue that disasters have no psychological impact on people. Norris and Elrod (2006: 27–28) reviewed extensive literature, finding that

The majority of the samples (50%) showed moderate effects, indicative of prolonged stress but little psychopathology. In these samples, depending upon the study's design, there were significant differences between exposed participants and some comparison group, changes between predisaster and postdisaster mental health measures, or significant correlations between exposure measures and mental health measures. The remaining sample showed severe (24%) or very severe (17%) effects, indicative of a high (25–49%) or very high ($\geq 50\%$) prevalence of clinically significant distress (determined on the basis of percentages scoring above established cutoff points on standardized scales of criterion-level psychological disorder (determined on the basis of diagnostic instruments).

However, sometimes writing on the topic is contradictory. For example, Rosenstein (2004) argues that there are no data that traumatic experiences reduce decision-making capacity (DMC). He goes on, though, to argue that people in traumatic situations show responses that call their decision making ability into question: his paper exhibits the overall equivocal character of most writing on the topic, pointing out that though there is no evidence of decision making impairment, the question has never been specifically studied, and thus we can deduce that some people must be impaired or at least vulnerable to being pressured to participate in a study (p. 376). His conclusion reflects this (p. 379):

One of the major conclusions to emerge from a decade of debate regarding research with individuals with mental disorders that may affect DMC was that it is both inaccurate and stigmatizing to conclude that all or most individuals with a psychiatric diagnosis are unable to make decisions for themselves. In considering this question in the context of research in the aftermath of disaster, our main conclusion ought to be the same: that most victims of a disaster would be expected to retain DMC despite expected degrees of extreme upset. Nonetheless, for certain types of studies involving victims of disaster, there may well be compelling reasons to consider the subject population under study as being vulnerable in this regard and therefore in need of additional safeguards.

The key consideration is “certain types of studies”, and the conclusion that there are no grounds to consider *everyone* in a disaster as vulnerable.

In fact, Levine (2004) criticized the expanding ambit of vulnerability. Newman and Kaloupek (2004) reviewed a number of studies of people who had experienced various kinds of trauma, including the 9/11 attacks, domestic violence, and traffic accidents. Some participants in these reported feeling upset, but even those who were upset for the most part did not express regret at participating. Domestic violence studies elicited the most distress, situations very different from the collective stress of a disaster. Moreover, much of the concern about research participation is conceptually anchored in medical research. Rosenstein states (p. 373): “The extent to which victims of a disaster are able to make capacitated and voluntary decisions to enroll in a clinical research study is an important and virtually unexplored question,” but quick-response research is not “clinical research.” His arguments are related to clinical research, interventions, and interventions with a research dimension. Quick response research, especially of the character discussed in this chapter, is in a wholly different realm—as is, in fact, much disaster research, making this entire body of writing unhelpful. Some people in disaster might be vulnerable; some might find answering questions upsetting; some might be impaired—all are possibilities in any research. There are no grounds for singling out “disaster” as a special kind of research. What appears to be happening is a sort of creeping spread of concerns about medical research out into other domains of inquiry. Psychiatric research in a disaster gets called *disaster research*, and then anxieties get grafted onto other kinds of disaster research, but in fact, the entire concept of disaster management rests on an assumption of survivor capacity: that they should be able to take care of themselves for at least 72 h, and phrases such as the “first first responder,” referring to community self-help activities, celebrate local capacities for problem-solving and adaptability.

Moreover, people affected by disaster continue with every facet of their lives. They work, including at responsible jobs. They make purchases. They sign contracts, including for Small Business Administration loans and other post-disaster financial assistance. Some of them are public officials who continue their duties in the fire and law enforcement services or other areas of government. Indeed, the presumption of diminished capacity is especially disturbing given strong research trends over the last quarter-century that have identified the adaptive and resourceful capacities of local populations. Only a strong sense of metaphysics allows one to presume that people can act responsibly in all areas of life *except* when it comes to giving informed consent. We cannot say that an official who can make arrests and carry a sidearm, or a householder who can replace a home and car, is too vulnerable to participate in an informed way in a disaster project, or is incapable of refusing to participate in an interview.

In one study, researchers sought to assess the psychological consequences of participating in disaster research. A cross-sectional study of New Yorkers that lived in the city when the September 11th attacks took place were surveyed to assess if research inquiry posed any psychological stress on research participants.

Altogether, 2,368 people completed the surveys, including a random sample of 1173 respondents who received mental health services after the attacks. Results indicated that 15% of New Yorkers found some of the survey questions stressful, whereas 28% of those

who sought treatment found this to be the case. However, less than 2% reported being upset at survey completion, and among these persons, only four people consented to speak to the study's mental health consultant. (Boscarino et al. 2004:515)

Furthermore, stress arising from participating in a study may stem from many factors, including the nature of the event and characteristics of personal exposure, where "mass violence" usually yields greater stress than other events (Marshall et al. 2003: 86. See Peek and Sutton 2003 for further comparisons of the differences and similarities of event types). While it can be argued that most disasters have human origin, the perception of who is to blame for loss may have an effect on the level of anxiety that study participants feel after their disaster experiences (Marshall et al. 2003). Studies also suggest that psychological issues present before inquiry pose the largest risk. According to Boscarino et al. (2004: 515), "Although the majority of those expressing adverse reactions had sought postdisaster treatment, even among these subjects, only 3% were still upset at survey completion, and 2% wanted more information about counseling services."

In order to avoid risk of imposing stress on these individuals, some have suggested to exclude these people from the interview or include a trained counselor on the research team (Levine 2004; Rosenstein 2004). However, in their study of World Trade Center evacuees, Qureshi et al. (2007: 491) had a psychiatrist for referrals if any of the study participants displayed signs of severe stress from the study. They report: "Of the >1,500 participants in the study, only six participants were identified as potentially requiring referral for follow-up. Of these, only four were known to have directly made contact," a result paralleling Boscarino et al. (2004).

Qureshi et al. (2007: 491–492) were alert to the possibility of psychological distress amongst their research subjects, but they found:

That significant increases in PTSD symptoms did not result from participation; in fact, participation may have been beneficial to some individuals. Participation was viewed as a positive and uplifting experience. Visible signs of improvement could be detected in subjects after participation, as if "a weight had been lifted from their shoulders". Participants felt their input would have an impact on the safety of high-rise buildings and that from their experience, something positive would result. Participants felt their "story" held important facts that could help others, and they welcomed the opportunity to share their experiences. This especially was important before the survivors had organized themselves into a more formal collective group (WTC Survivors' Network). That group now plays an activist role in high-rise safety. The study also provided many participants with an opportunity to channel their rage, anger, disbelief, and helplessness onto a target area, namely high-rise safety, thus providing a focus for these feelings and a sense of control.

As a caveat, the authors noted that (p. 492):

The passage of time (the study began nearly 18 months after the event occurred) may have provided sufficient opportunity to process the experience; many participants reported that they would not have been able to revisit the experience in such detail at an earlier point in time. However, it should be pointed out that these findings are subject to several limitations. Namely, the fact that persons with potentially very high PTSD levels were screened out may have led to a sampling bias.

Nevertheless, the conclusion to be drawn was that participation in the study was not harmful, even with the population that had been exposed to some of the most

direct terror of that day- actually escaping from the burning towers- and when the study was focused exactly on those experiences. It should be noted too, that quick response research does not typically involve gathering the detail assembled in Quereshi et al.'s study or intensive interviews. Rather, the contacts are far more incidental.

The key consideration, in other words, is not whether people are under stress, but whether research is harmful. Fleischman et al. (2006: 85) assert that "Available evidence demonstrates that negative emotions are experienced by at least some individuals during research posttrauma." However, this is not the same as harm. They stated:

Research participation may upset participants, but it does not traumatize them as a disastrous event would (Newman and Kaloupek 2004). Trauma-inducing events involve unpredictable and uncontrollable experience, whereas disaster-focused research should be both predictable and highly controlled. The use of the term *retraumatization* is inappropriate in the disaster-research context and may lead to exaggerating the risk involved in participation.

Out of over 60 formal interviews conducted by the Disaster Research Center approximately 1 year after the World Trade Center attack and in many dozens of informal meetings and conversations in the immediate weeks after the attack (including at Ground Zero in the 1st days), only one person wept and it was sufficient in that instance to express support and condolences, let the person recover, and shift the direction of the discussion. This official provided vital insight on the management of decedent affairs, which was among the most sensitive topics. Moreover, as Paton (2003) has argued with respect to disaster responders, participating in disaster response is often a satisfying, even exhilarating, experience, not a pathological one. In that sense there's no reason to assume that everyone is a victim. Kendra and Wachtendorf (2003a, b, 2007, 2016) have conducted numerous interviews with participants in the waterborne evacuation of Manhattan on 9/11. In nearly 100 interviews, including with people who were very close to the Twin Towers and who were showered with dust and debris, they recalled their role with pride, were glad to share their stories, and—far from being traumatized—clearly considered their participation to be their finest hour (See Linley and Joseph (2004) for discussion of growth following trauma. See Walker et al. (1997: 403) for a study on sexual abuse survivors that found that "the women who participated generally found the experience to be a positive one. Only a small number of women were more upset than they had anticipated, but the vast majority felt they would have completed the survey even if they had known in advance how they would feel").

While a further review of the literature in this area is beyond the scope of this chapter, these examples suggest that (1) there are particular risk factors for mental health disorders associated with disaster; (2) there is a lack of empirical research on the long-term adverse effects of disasters on mental health; and (3) there is a lack of evidence of re-traumatization among those that participate in disaster studies.

The different aspects of this problem can be divided into two distinct perspectives. On one side of the debate, some researchers consider disaster survivors to be vulnerable, raising the question of what is considered "real harm" and how the risks

of research are weighed against the benefits. Contrasting this view is one grounded in an ethical orientation that celebrates people's capacity to make their own decisions, and that they should be offered the chance to participate in, or to decline to participate in, any study.

There is also the danger of overconcern. Fleischman and Wood (2002: 317–318) state that “at a minimum, those who are injured, their families, those who escaped the disaster, direct observers, first responders, rescue workers, recovery personnel, and others directly affected by the terror should be afforded additional safeguards and protections.” In New York City on 9/11, this could well be millions. In an egregious overreach, Chung et al. (2008) argue that “The individuals and communities affected by declarations of a state of emergency or disaster should be considered “vulnerable subjects” for the purposes of human subjects research and enhanced strategies for protecting their interests and well-being should be designed into any proposed research.” To take but one instance of the impracticality of this guidance, detached from actual disaster principles, all 254 counties in Texas received FEMA disaster declarations for emergency measures after Hurricane Rita, 29 for public assistance, and 22 for Individual Assistance (State of Texas 2007). We cannot stop all research in Texas owing to these declarations. Or what if it is only the governor who declares a disaster? Does that count?

The overall research base, and mental health researchers themselves, are equivocal at best. None will make a blanket statement on vulnerability or diminished capacity to provide informed consent. The unsurprising conclusion one must draw is that disasters are highly stressful and miserable experiences. Some people—we can't be sure how many—will experience some symptoms of PTSD but most will not go on to develop long-term psychopathologies. A small fraction of disaster survivors—we cannot be sure who or how many—*may* be upset at the end of an interview but this is not the same as retraumatization. And being in a disaster does not mean diminished capacity for giving informed consent. Moreover, even among participants exposed to the most acute and dramatic violence, some will find their research participation to be a positive experience.

Human Subjects Review by Institutional Review Boards

Scholars who work in the international arena are calling for increased oversight by ethics review boards, sometimes citing the US process for evaluating the scientific quality and ethical character of a proposed project. Such calls should be treated with great caution, because the record of institutional review in the US is mixed at best, and is replete with oppression and malpractice. On the topic of ethics review, some workshop attendees stated that human subjects review by Institutional Review Boards can delay deployment. While few would argue the need for some institutional guidance with legitimate authority to enforce standards of ethical conduct, others strongly argue that the standards lack consistency and pose potential impediments to deploying to the field. The Federal regulations for the protection of human

subjects, contained in the Code of Federal Regulations (45CFR46), provide the intellectual and institutional foundation for ethical conduct in research involving human subjects. In turn, those regulations are the implementation of the Belmont Report, which emerged from a conference that was convened to consider ways for protecting research participants in the wake of some notorious breaches in ethical conduct, such as the experiments conducted by Nazis and the Tuskegee Syphilis study. The Belmont Report establishes a code for evaluating the ethical propriety of research, that stresses (1) *respect for persons*: that people have autonomy, and protection for those who do not; (2) *beneficence*: the idea that research should emphasize people's well-being; and (3) *justice*: a consideration of how risks and benefits extend from the study and implicate participants and the society at large. While these have become broadly-accepted ethical guidelines, at least as starting points, they are by no means uncontested in their extent, import, and interpretation.

In the US system, adjudication of these principles has fallen to Institutional Review Boards, commissions established in universities, government agencies, hospitals, and other research-oriented organizations under the auspices of 45CFR46 and the US Department of Health and Human Services. The oversight of these entities ensures that research conducted with Federal funding meets the ethical standards of the Belmont Report and regulations deriving from it. Most institutions extend these principles to all research regardless of funding source. In order to proceed with research, scholars must apply to their IRB and explain the nature of the project, the methods to be used, the anticipated study population, and submit evidence of how they will obtain informed consent, which is typically through a written document signed by the participant but can be in other ways as well.

Over the last decade or so, scholars have increasingly criticized the IRB process, noting inconsistencies in interpreting the regulations across institutions, protracted review timeframes, and ever-broadening interpretations of what might constitute risk to a participant (Hamburger 2007; Bledsoe et al. 2007). For example, according to the Illinois White Paper, a report on IRB excesses, "One IRB, for example, told 'a Caucasian Ph.D. student seeking to study career expectations in relation to ethnicity that African-American Ph.D. students could not be interviewed because it might be traumatic for them to be interviewed by the student.'" In another case, reported by Dr. Zachary Schrag (www.institutionalreviewblog.com), a doctoral student was required to get 80 IRB approvals in order to send her survey questionnaire to faculty at 80 universities. At the same time, others have found no evidence that IRB's provide meaningful protection (Hamburger 2007; Bledsoe et al. 2007).

Rigid and inconsistent protocols of a university's Institutional Review Board can create delays in deployment. The process of acquiring IRB approval may take weeks after a proposal is submitted; moreover, international research may require additional steps to acquiring approval to conduct the study. The process of attaining approval has the potential to extend beyond the window of opportunity to conduct the study. Some scholars argue that Institutional Review Boards exaggerate the meaning of "real harm" imposing upon the researcher's freedom to conduct science (Haggerty 2004; Stark 2007). Moreover, the process of obtaining informed consent sometimes arouses anxiety among parties that may not have been concerned other-

wise (Tierney 2002). Some attendees at the workshop suggested that NSF develop a letter or guidance circular that could be presented to IRBs notifying them of the importance of disaster research and its overall lack of harms to participants.

Strong views on ethics were held in all directions at the workshop, and no consensus was reached. It appears that this is likely to be a topic requiring much more consideration. For example, ideas such as the duty of researchers, if any, to the affected community, returning results to the affected area, and other such matters were raised by some participants but strongly contested in their desirability, practicality, or import by others. Indeed, Institutional Review Board processes, in the context of the entire human subjects protection enterprise, have been the subject of much scholarly discussion, far too much to expound upon here. In 2011, the Department of Health and Human Services issued an Advance Notice of Proposed Rulemaking, containing many pages of potential modifications, for consideration by the research community. Implementation is in progress, but there are many shifts and delays as this is written. In January, 2014, the National Research Council issued its own review, containing many recommendations for simplifying procedures and for withdrawing some forms of research from IRB consideration (*Proposed Revisions to the Common Rule for the Protection of Human Subjects in the Behavioral and Social Sciences*. Washington, DC: The National Academies Press, 2014). Many of these changes would enormously facilitate quick response field research—indeed, some quick response research would no longer be within the IRB purview if those recommendations were implemented—and major research stakeholders should consider those recommendations closely, along with ways in which to support them.

Right to Speech

Finally, the view that some local stakeholder should be consulted prior to initiating disaster research appears to be grounded in an exceptionalist view of disaster: that disaster creates conditions wherein previously acceptable behavior or inquiry is now inappropriate or even deviant (Kendra and Wachtendorf 2005). There is no doubt that disaster conditions are stressful, and that disaster research presents scholars with ethical dilemmas. Browne and Peek (2014) have comprehensively documented potential ethical dilemmas, drawing on their post-Katrina research. Nevertheless, all research—and indeed all human interaction—presents potential ethical dilemmas. But in the US political and cultural system, freedom of thought and inquiry are among the most highly valued rights, and are themselves of moral significance. These rights are similarly held under Article 19 of the Universal Declaration of Human Rights, quoted earlier.

In a special issue of the *Northwestern Law Review*, covering human subjects regulations and Institutional Review Boards, Hamburger (2007) argued that human-subjects regulations as contained in 45CFR46 constitute an unconstitutional “prior license” of speech. Opponents, such as Weinstein (2007), contradicted Hamburger’s

ultimate constitutional argument. But, Weinstein too recognized the constitutional difficulties that are inherent in regulating speech-based research. The entire academic enterprise depends on free inquiry, speech, expression, and publication. Somehow, a distaste for journalistic methods and a belief in the rational superiority of science has lulled academics into thinking that the protections afforded in a free society do not apply to them or that they do not need them within their rather restricted circle. This complacency is dangerous.

A rights-based approach to disaster research extends from one of our fundamental concepts of disaster. Disasters are not merely geological or meteorological phenomena, but are also political events. Whether in the jurisdictional or legal sense or in the informal meaning of power generated by the exchange of resources and information, disasters are social. And where there are social phenomena, there are politics. An examination of disaster recovery reveals the influence of social processes that begin before the disaster event and extend throughout long-term recovery (Nigg 1995). The dynamics of family, social class, race and ethnicity, and gender are all shaped by the exchange of resources and flow of power. Politics are conclusively implicated in the preconditions for disasters and in the trajectory of disaster recovery. The sociopolitical ecology model (Peacock and Ragsdale 2000) helps us understand the interactions of people and place, which is the bedrock principle in hazard and disaster research.

Disaster research, published and presented, is political speech. While the right to speech is regarded to include responsibilities, that right is among the most cherished in the US political system, where the right is virtually a social default setting. It is of no less ethical significance than any of the assertions made by the new critics of disaster research. Seeking to limit, or to compel people to self-police, their political speech is itself ethically dubious.

Those who would restrict research based on the supposed harms to the subjects are therefore cautioned of the ethically dangerous implications of their arguments. In a panel focusing on this subject at the 2009 Natural Hazards Workshop, one of the attendees suggested an embargo on research travel to an affected area. The implications of an embargo are, therefore, worth consideration. At least in the context of the US social, cultural, and political setting and in particular the context of political rights as generally understood, people in the US have the right to go wherever they want, within the scope of US territory. Restrictions are customarily grounded on only the most compelling justification, such as established domains of locational tenure (property rights) or temporary interruptions of passage for life safety, traffic control, etc. Constraining the right to space is, in fact, an attack on liberty (Mitchell 1995, 2003).

One of the most often-articulated arguments in this direction is that journalists operate freely, asking questions and writing articles on whatever they please, unrestricted by Federal regulations (Haggerty 2004). While their excesses may be at times distasteful, most academics would likely resist serious encroachments on the Fourth Estate, certainly encroachments as severe as they themselves tolerate. Press freedoms are recognized as essential to healthy politics and a just society. The practice of *research* seems to be the key distinction. Research is defined in the regulations

as a systematic inquiry designed to produce generalizable knowledge. Are we then to say that speech that is based on data, actual observations, and systematic methods is *unworthy* of protection? Research thus becomes a kind of thought crime: *how* one thinks about one's inquiries is the problem. It's the special kind of thinking that scientists do that makes their speech dangerous, and this is a dangerous proposition.

Schrag (2014, www.institutionalreviewblog.com) makes an explicit connection to freedom. He criticizes the NRC (2014) report for being nearly silent on the matter, and he is bold in his statement: "Freedom is a scholarly enterprise. Freedom is an ethical value. Freedom is a social benefit." He goes on to cite Rena Lederman, who was on the NRC panel that drafted the report: "...those of us working in US colleges, universities, news media, and research institutions have inherited traditions of free inquiry whose continuation is vital to this country's political, economic and social life. It would be deeply ironic if a regulatory system put in place to protect human beings were transformed into a device focused on restricting their power to know the world."

In conclusion, we have the following: a right to research that can be stated in constitutional language, rebuttal of which is equivocal; other rights which need research for their exercise; and a plain-language reading of certain fundamental texts that allow freedom of speech, inquiry, and political participation. We have no evidence of risk from participating in talk-based research of any sort, even in post-disaster mental health research, which might be supposed to be the most likely scenario to lead to harm. There is even evidence that it may be helpful. Therefore, there can be no grounds for restricting speech via any governmental or governmentally constituted body.

The entire human subjects protection enterprise, as relates to the social sciences and humanities and as currently construed in law, regulation, and local IRB interpretation, is now so hopelessly dysfunctional that no patchwork amendment to the regulations will rectify it. Instead, the system needs to be switched off and restarted, from scratch. This rebooting should begin with reconsidering the assumptions underlying the Belmont Report, a document which as scholars such as Hamburger (2007) have argued, uses as its "moral anchor" (2007: 457) the corrupted "research" of Naziism and Tuskegee. Instead, he argued, we might consider guidelines and ethical norms arising from traditions of speech and inquiry.

Concluding Comments

In this chapter, we took seriously the mandate to authors to be provocative and iconoclastic. Our goal was to make a spirited argument for the propriety of disaster research by addressing criticisms that have begun to circulate and to do so in a forthright style. Our approach has been, perhaps, unsparing. Thus, we would like to make plain certain points. First, from our perspective, disaster research should be useful, meaningful, and collaborative to the extent possible, across scales and

locales, and with due regard for local and institutional conditions. Second, there are many nuances to be considered in understanding the ethical character of research. There are many forms of disaster research with varying ethical import. For example, much disaster research is not about the community where it occurs, but focuses on disaster response systems and organizations. Therefore, many recent criticisms do not apply or are less relevant. For this reason, blanket statements about ethical obligations should be regarded with skepticism. Third, with changes to the nature and extent of hazards, ongoing research on hazards and disasters is essential. Most scholars of disaster agree that it is important to collect ephemeral or “perishable” data in the early stages of disaster and to see, as early as practicable, the emergency management challenges that arise and how problems are solved. Much of what is known about disaster has been gathered in early reconnaissance trips; a clear and accurate understanding of disaster phenomena and behavioral and organizational features is necessary to the development of valid science and, therefore, to the development of sound policy that can benefit society by reducing hazards and enabling effective disaster response. Nevertheless, some scholars have emerged to criticize disaster research in general, and quick response research in particular. These criticisms are grounded in many faulty assumptions: that disaster research consumes scarce local resources, that people in a disaster area are too vulnerable to participate in research or to give informed consent, and that there must be local agreement on the nature of the research to be conducted. The comments in this chapter are directed primarily at speech-based research: interviews, focus groups, observation of public behavior, review of documents and publicly-available information. Medical research is in a different register. The notorious harms that impelled the Belmont Report have emerged from medical research—which was really malpractice—torture, and psychological experiments. We must be cautious that medically-oriented models of research oversight do not spill over into the area of speech-based research. The community of disaster scholars, rather than casting yet another entangling net around their research efforts, actually has a unique opportunity to retake some rhetorical ground. In our understanding of disasters as political events, with policy implications running all through our work, we have the strongest possible grounds for making a free speech argument and declaring a freedom to conduct research, in keeping with the US Constitution, the Universal Declaration of Human Rights, and other statements.

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A Case for the Grand Challenge of Disaster Science



Tricia Wachtendorf

Abstract This work calls for the development of the field of disaster science. Specifically, it calls on those in the disaster research community to develop a grand vision for the field. This vision could include assembling the various disciplines that study disasters; examining large scale community and society disruption, dissembling, and destruction; and concerning itself with the social, technical, and environmental phenomenon that pertain to the causes and recognition of, as well as the reaction and adjustment to, various stages of that process. Incremental aspects of this effort already represent much of the actual work of interdisciplinary disaster researchers. The author provides an argument for why a rethinking of the field is important.

Keywords Disaster research · Grand challenges

Introduction

Consider for a moment a young girl or boy, barely out of kindergarten and just starting her or his educational journey. Full of dreams and brimming with imagination, the child is drawn to discussions of the solar system, dark matter, and of constellations. Perhaps the girl or boy has already started to read and can name scientists such as Einstein, Newton, and Galileo, whose contributions they can tell you have advanced our understanding of the science of space. The child may already, in the early grades of elementary school, articulate a desire to pursue space science as a career path. They may express an interest in the possibility of space travel, or colonization of Mars, or how to better understand the formation of the universe. In those formative years, math and physics may dominate their attention, but later a greater appreciation of fields such as chemistry, engineering, psychology, and sociology may emerge (as well as botany, if they so happen to view the 2016 film *The Martian*).

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It is possible that the child's sibling, meanwhile, has become fascinated by the allure of marine science, and wants to pursue questions that draw upon the disciplinary insights of many fields to advance a more holistic understanding of oceans and the life that relies on them: the mysteries of the deep. These young children are easily persuaded on the greatness of such big questions as: How does the expanse of the universe or the depth of the ocean operate? How do we protect our oceans or traverse outer-space? How will a greater understanding through scientific inquiry help us better understand the world, or universe, around us? What secrets remain that are yet to be discovered?

Less common in those first, second and third grade classrooms around the United States (and, potentially, in countries across the world) are children bustling with a desire to pursue disaster science. It is not that they are left disinterested by the power of tornados, or the stories of Pompeii, or accounts of the latest hurricane to strike the nation's coastline. It is not that they lack engagement when participating in volcano experiments at school or at shake-table exhibits at science museums. What is less common, however, than those young students captivated by space or marine sciences is a sense that there is a field that captures bigger questions meriting a more ambitious scientific inquiry. We cannot fault this perspective in the very youngest among us, for – as I will argue here – scholars have yet to fully articulate what a field of disaster science is. Our own imagination has been stifled with important, but incremental, disciplinary advances.

Running in Circles

Let me take a critical look at one of my own research pursuits: materiel convergence and humanitarian logistics. We know that unsolicited donations collected by informal donation-drives generate extreme challenges for disaster response logistics (Holguin-Veras et al. 2007, 2014; Wachtendorf et al. 2015). They are often inefficient and expensive compared to organized formal efforts sometimes supported with financial donations (Holguin-Veras et al. 2013; Holguin-Veras et al. 2016). We have fine-tuned these results over the years, placing them in context, but they are not fundamentally different from the findings of Fritz and Mathewson (1957) over a half century ago. We do know more about the strengths of different sectors in the acquisition and distribution process (Holguin-Veras et al. 2012). We know more about how challenges are different depending on whether the event more closely resembles an emergency, disaster, or catastrophe (Wachtendorf et al. 2013). We know more about the motivations of donors and those orchestrating donation drives, and why simply telling these individuals not to engage in the problem-generating aspects of disaster relief will not generate the fundamental change in behavior for which we hope (Penta et al. 2015). Our own recent research on this topic has involved social scientists, engineers, and computer scientists, each area representing multiple disciplines and subfields. That, too, has diversified the perspective. But, despite extensive dissemination of results in scholarly and practice domains, the

problems noted continue – arguably made more complicated by social media as people share misinformation for months after the initial postings asking for assistance were made.

As a society, we have systematic research to back up certain recommendations, yet we continue to fall short in instituting change, either in human behavior or in the systemic response that should take such behavior into account. The public continues to direct personal and materiel resources to ineffective activities at the expense of others. As a society interested in helping, we insist, upon all evidence to the contrary, in continuing down a particular path.

For the past half century, sociologists who study disasters have asserted that widespread panic in these situations is rare (see Fischer 1994 for an overview of the findings). Even in light of systematic research, officials consider that sharing information will cause panic. Although media may offer descriptions of chaos and panic in the immediate post-disaster environment, systematic research points to alternative findings. Individual cases of irrational behavior are possible, although not typical in the broader impacted population. Anti-social behavior closely associated with panic is not usually seen until the very moments before a window of opportunity for escape closes. If people do not trust the information they receive, they may engage in behavior that contradicts formal guidance. It is actually quite difficult to get people to break out of their normal behavior: rather than running around in panic they more often engage in milling behavior and cling to routine behavior as if a disaster were not unfolding around them. At least two fundamental problems are apparent here. First, over 50 years of systematic research has failed to substantially alter public perceptions about disaster or shift official thinking so as to adjust their practice of disaster management. Second, unlike Newton's law of gravity outlining that in a vacuum two objects falling within the same gravitational conditions will fall at the same speed regardless of weight, the behavioral phenomena of panic are so contextual, including so many caveats, that it is easy to dismiss them.

Take another example: Scholars know that segments of the community marginalized in the pre-disaster environment will, in all likelihood, continue to experience marginalization when disaster strikes, and that the situation may, indeed, become exacerbated post-event (see Thomas et al. 2013 for an extensive overview). The classic approach saw disasters as generated from forces solely outside the social system. As the field developed over the course of the twentieth century, the social science literature began a reframing of the agents of disasters (Perry 2006). The vulnerability perspective more clearly articulated the drivers internal to the social system that generate or exacerbate disastrous outcomes. It also recognizes and validates the strengths and capacities of even the most marginalized of the community. But, in the decades since this reframing, marginalization continues. Research points to it in almost every single disaster event. Yet we devote our attention to arguments about terminology and definitions (Are people vulnerable? Are they victims or survivors? Should we highlight special needs? Or does everyone have a special need? Is resilience a thing? Or is the term passé now that it was adopted by government?). Although there is merit to those discussions, and using a common language can improve our ability to enhance knowledge, we do little to advance the science if we

stop there. Consider the language around the critical issue of ensuring that people with disabilities are not differentially at risk to the consequences of disasters (Davis et al. 2013). In the United States, using the term *functional and access needs* is quite inclusive and broad in its application. Using the term *disability* invokes the Americans with Disabilities Act of 1990, which places the discourse as a rights-based issue. *Special needs* is ambiguous and, like *functional and access needs*, it carries no legal weight (Davis et al. p.208). Whether we talk about functional and access needs or disability is a starting point, but that terminology discussion should not be an obstacle to addressing the our failures to rethink our social environment where segments of our society are triaged out of our response and recovery efforts.

Instead of working toward that rethinking in an ambitious way, we write that yet another marginalized segment of the community is less studied than others. And moreover, despite such observations, we have seen little more than incremental improvements in the actual disaster response domain. If you don't believe that assertion, read the next set of articles after the next disaster that continue to point to the negative outcomes of institutionalized populations, such as those in nursing homes or prisons, to the lack of attention to childcare post-disaster, the fact that we should not ignore peoples' desire for the well-being of animals under their care – even in catastrophic times, or to the differential treatment of the homeless after an event. Perhaps practices in some locations have improved, but we have not yet launched our metaphoric un-manned rocket, let alone set a course for the moon. The young third grader will not be captivated by a discussion about the value of the term resilience, and if it is a factor or an outcome. Honestly, most scholars quickly lose interest, as well.

The Need for Disaster Science

We need disciplinary advances, we need interdisciplinary collaboration that harness those advances, and we need translational research that can improve disaster management practice. But it is time for a field of disaster science that assembles the various disciplines that study disasters; that examines large scale community and society disruption, dissembling, and destruction; and is concerned with the social, technical, and environmental phenomenon that pertain to the causes and recognition of, as well as the reaction and adjustment to, various stages of that process. To be clear, advances in the broader field of disaster science benefit from continued advancements brought about by advancements along disciplinary lines. The depth of knowledge that comes with concentrated study of structural engineering, hydrology, sociology or geography – to list a few – has greatly enhanced knowledge about the intersection of the human, built, and natural environment. Research on disasters can be congratulated for its decades of multidisciplinary collaboration, sometimes – though not always – venturing into true interdisciplinary pursuits. Some of this research is enabled by multi-million dollar calls for proposals from federal funding agencies and foundations. Although once parceled out amongst several disciplines

and institutions, little remains for disciplinary innovation. As we rightfully departed from our disciplinary silos, our disciplinary innovation suffered without significant gains in interdisciplinary transformation. Many disaster scholars are drawn to this field because they want to make a difference, because they really desire to improve the well-being of the world's citizens. Their efforts to disseminate results in non-academic forums are testament to those efforts, and are commendable. Yet as we rightfully engaged with each other on practical concerns of emergency management, we inadvertently lost sight of the grand questions of the disaster universe. Our desire to contribute to the practical questions at hand left us with little vision.

Let us return, for a moment to the perspectives on disaster. In the 1980s and 1990s, disaster scholars increasingly argued that – contrary to early definitions that attributed cause of disaster forces external to a social system – disasters are less concentrated in time and space than generated by forces internal to the social system, and that those forces are often persistent over extended time periods. As an illustration, such assertions may claim that the real precipitators of disaster lie in a society's decades-long privileging of economic development over regulation, or concentrated and accumulated wealth over poverty alleviation and equitable wealth distribution, and not primarily the sudden and severe movement of tectonic plates or the development of a significant tropical weather system. Yet many of the solutions we offer to focus on the reaction of the populace and emergency management decision-makers to periodic events. This is equally true of studies that determine the necessary structural improvements required for a building to withstand shake as it is for the studies that point to the disproportionate vulnerability of particular segments of the society when the community functions fail. Let us be clear, both of these studies are valuable and provide critical insight that have implications for reducing human harm and suffering. That said, what of our ability to recognize, to appreciate, and to fully understand the slowly unfolding disaster that we may be in? If we actually do agree that disasters are internal to the social system, the important incremental questions are not enough.

What is missing from our field of disaster science are immense, glorious questions – ambitious objectives, of the kind the space program demanded. Rather than asking how to get a person to the moon and back, our questions in disaster science have the potential to speak to the fundamental questions of human survival. How do we recognize disaster is imminent? What do we do in this midst of disaster – as our world is falling apart – to set the right course? What do we do to set society right when it *has* fallen apart? How do we imagine disaster, even when we cannot seem to see it right in front of us? How do we survive, and equitably thrive? Questions such as these inspire. They have the potential to catapult the interdisciplinary endeavor of disaster science in remarkable ways. The fundamental disciplinary studies are critical components, but without feeding into more ambitious aspirations we risk those incremental advances getting lost in disciplinary discourse, in pursuit of academic journal impact factor ratings, or in lone devotion to the localized processes of emergency management.

There are other ways we have fallen short in grand ambitions. Large-scaled disasters and events catastrophic in nature do not happen often – thankfully – so we

have concentrated our attention on more routine events, such as emergencies or common – albeit tragic – disasters. One of the shortcomings of this approach is that we presume that all that is required to contend with catastrophe is a scaling up of what we know. We acknowledge the assertions of Enrico L. Quarantelli (2006), but our work then again returns to our standard questions and approaches. Scholars, driven by external funding practicalities, have often looked to the suffering most proximate to them. In the United States, this has meant a focus on events of smaller scale, limiting our imagination of how bad things can really be, even when we look to catastrophic events outside our national sphere.

The emergence of the field in the United State was heavily influenced by sociologists from or training in the tradition of the Second School of Chicago. These sociologists were drawn to questions related to collective behavior phenomenon: convergence, crowd behavior, micro-level interaction. These topics included the absence of wide-spread panic and looting, the contextual processes associated with the former, evacuation and warning behavior, the importance of emergent activity in considering routine organization and institutional frameworks. This should have formed the basis, but not the drive. Understanding how protons, electrons, and neutrons work is important, but no one assumes we stop there in our endeavor to understand the universe. Milling, keynoting, and rumor are important, but we need to go further. Our imagination needs to expand.

The development of the field in the United States, a dominant leader in disaster social science scholarship, has blinded the field to contributions from non-US scholars who have arguably done a better job at including creeping disasters such as famine and armed conflict events into their work. Even one of the key pioneers of the field, Russell R. Dynes, identified the need for such a shift in the early 2000s (Dynes 2004). Again, the funding mechanisms in the United States have pushed us in our insular direction. The early work by disaster scholars, conducted during the mid-twentieth century, focused on the use of disasters as social occasions to understand the threat of an attack on the country. Although the researchers had interests beyond the attack scenario, it certainly pushed them to ask questions in alignment with this focus. We became disaster researchers, missing the potential of disaster science. The calling to grapple scientifically with the grand challenges of disaster reaches to a desire to better understand the social condition.

An Idea Whose Time Has Come

How do you get something off the ground into space and get it back again, with a human on board? For that, one needs to know physics, chemical reactions, influence of the process on the body, psychological well-being. Space science involves any of the scientific fields concerned with space travel or phenomena occurring in space, including other planets. And the scientific inspiration began many centuries before twentieth century space travel became a remote possibility. Then let us consider war ravaged Aleppo, Syria in 2017, or a naturally induced agent causing a similar level

of destruction. How does one reorganize, survive, rise again from the ashes? The dominant questions are social scientific, best supported by expertise in the natural, physical, and engineering sciences. Perhaps for that reason, disaster science has not gained the same traction as our comparative interdisciplinary sciences. It could be that progress in space, marine or health sciences were at least partially a consequence of the dominance of natural science fields in these areas.

How do you take a place destroyed and build back in a thriving equitable way? We don't know the answer to that question. But a bigger question could be how do you get people to notice that conditions have changed, that they are no longer acting in what they understand as "normal," and then how do you get them to figure out correctly what that new normal is? The answers lie with the integration of not only the social, engineering, and geological, and atmospheric science, it demands the participation of public health, the humanities, and the arts.

Can we not take a cue from disaster movies? The blockbusters, as rife as they are with errors and misconceptions, capture the idea of transcending the chaos of disaster. Science fiction, be it in literature or on the big screen, was able to thrust our space travel ambitions from the imagination to reality, and it continues to move us to this day.

It is time the disaster science community consider if we have the right institutions to figure out what our "moon shot" really is. It is time to reconsider the way we fund disaster research. The solution, I would argue, is not solved by a Center of Excellence mechanism – concentrating projects within a collaboration of individually underfunded projects vulnerable to the whims of political mandates. It is not solved by only directing money to the problem, although financial support is essential, particularly when funding and publication is so contingent on citing the right person that we are confined in our thinking. No, rather, the community needs to demand a mission that ambitiously defines our next reach. That inspires us to pull our evidence-based findings towards a grand objective. That captivates our imagination and drives us to reconsider the interaction between human, built, and natural words.

Often research is generating data to support what we know or intuit, but the data is necessary to prove it to others. Again, laudable, but we need more. We need freshness, innovation, and inspiration. We need a national – or global – effort to solve the challenge of disaster. We will not prevent the next hurricane or earthquake. Indeed, our human activities will likely generate new hazards, be it through climate change, fracking, or oil exploration. What are we going to do to better adapt to our dynamic and hazardous world? To do so demands a science of managing the paradoxes of change and continuity, of uncertainty and planning, of disruption and stability.

So to a newcomer to the field, I say this. The practical questions disaster scientists should grapple with cannot be restricted to the very important dilemmas of how to encourage those under hurricane evacuation order to evacuate. Disaster scientists should use as their guiding vision the most ambitious, awe-inspiring questions, the most ambitious of goals. We should endeavor to know how we prioritize future risk over imminent risk. We should have a clear sense of, when all seems lost, how we form society again. Do not take incremental steps without having a clear idea of the larger objective. Think big.

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Correction to: **Compromise and Action: Tactics for Doing Ethical Research in Disaster Zones**



Jennifer Henderson and Max Liboiron

Correction to:
Chapter 15 in: J. Kendra et al. (eds.), *Disaster Research and the Second Environmental Crisis*, Environmental Hazards,
https://doi.org/10.1007/978-3-030-04691-0_15

This book was inadvertently published without MOU (Memorandum of Understanding for Mutual Aid Research in Disasters Superstorm Research Lab & Disaster Collaboratory). The current version of the book is published with MOU.

The updated version of this chapter can be found at
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