CHAPTER 15

FROM SUSTAINABILITY TO RESILIENCE: WHY LOCALITY MATTERS

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ABSTRACT

Purpose – *To look at the role of local decision-making and control in the face of a trend towards unified national and transnational disaster protocols. To look at the implications of a shifting rhetoric – from sustainability to resilience – for this issue.*

Methods/approach – *This chapter draws upon the author's case studies of the 2009 H1N1 pandemic in New York City and Hurricane Sandy (2013) in New York City, as well as studies of Hurricane Katrina (2006) in New Orleans, to discuss governance issues.*

Findings – *Empirical studies confirm the importance of locally based decision-making and control. There are tensions between national disaster protocols and local decision-making; urban governance matters given differences in political culture, leadership, and community participation.*

Social implications – *We need a resilient social infrastructure as well as a resilient physical environment. Strong social institutions are an*

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essential part of this process but communities must be given material, not only symbolic benefits.

Originality/value of chapter — *The conclusion that the threat of natural disasters requires* more *rather than less autonomy in decision-making for the locality.*

Furthermore, that the shift in objectives, from sustainability to resilience (mandating redundancy and sophisticated data retrieval) requires what we might call a more empowered city.

Keywords: Disaster; sustainability; resilience; governance; environmental justice; urban political ecology

Cities are a natural locus for environmental and ecological concerns due to their density and often, their location. Historically, cities have given rise to challenges, but also to *innovation*. For example, cities have long been sites of deadly outbreaks of infectious disease but this led, in turn, to the development of the science and administrative apparatus of public health (Hall & Tewdwr-Jones, 2011).

In the 21st century, cities face particularly severe ecological challenges, among them, problems related to climate change and emerging infectious disease (EID) as well as to the exponential growth of urbanization. China plans to urbanize an additional 250 million rural Chinese by 2030 and urbanization is proceeding rapidly in India and Africa.

We have much scientific information to guide us, and to some extent, we can even predict natural disasters. Klaus Jacob, for example, a physicist at the Columbia University Earth Institute, predicted both the physical and economic dimensions of Hurricane Sandy well before the 2012 storm, and similar predictions preceded Hurricane Katrina's impact on New Orleans (Rudin Center, 2012, p. 5). It is more difficult to predict the occurrence or severity of EID because of the unpredictable mutation patterns of infectious agents (Lipsitch, Riley, Cauchemez, Ghani, & Ferguson, 2009). However, our experience with both natural disasters and epidemics suggests that our *social infrastructure* — our social institutions — is weaker than our science.

This chapter draws upon a published study of the H1N1 pandemic in New York in 2009 (Hoffman, 2013) and an ongoing study of New York's experience with Hurricane Sandy. Looking at "natural" disasters, with the

understanding that all disasters have a social component (Clarke, 2007), I will discuss why and how locality matters. Specific themes include: tensions between national disaster protocols and local decision-making; urban governance, political culture, and innovation; community participation and environmental justice in a neo-liberal era; and the implications of a shifting ecological discourse. I will argue that locality becomes even more important given the recent shift in ecological discourse from sustainability to resilience.

WHY LOCALITY MATTERS

Local Decision-making and Response

Although there has been a trend toward unified national and transnational[1] disaster protocols, empirical study confirms the importance of locally based decision-making and control.

Pandemics

After the terrorist attacks of September 11, 2001, the United States reframed and institutionalized infectious disease as a national security risk and integrated emergency management and pandemic planning under the concepts of "all-hazards" and "dual-use." The rationale was that the infrastructure needed to respond to threats of disease would also improve the response to threats of terrorism. This rescaling and centralization of health governance had organizational as well as ideological components. It introduced a new layer of bureaucracy, created standardized models for detection and response, promoted medicine surveillance technology, used computer modeling and worst-case scenarios, introduced preparedness exercises, and invoked a law-enforcement perspective (Hoffman, 2013).

H1N1, a new variant of influenza A and the first global pandemic since the 1968 Hong Kong flu had its first major U.S. outbreak in New York City in late April 2009. Examining the "fit" between the all-hazards emergency preparedness framework and the initial spring 2009 H1N1 outbreak in New York City, I found that the standardized one-size-fits-all national template, based on modeling "worst-case" scenarios, generated unrealistic assumptions which were at odds with an effective local response.

Despite this, New York City's Department of Public Health and Mental Health was able to take control of decision-making and fashion an appropriate local response based upon its own reading of the evidence, and

developing its own plans for the anticipated return of H1N1 in Fall 2009 (Hoffman, 2013). This was due to its size, expertise, experience, and resource-base. Furthermore, my review of reports and studies of New York City's response to the 2009 H1N1 pandemic aimed at "lessons learned," found that they emphasize the importance of on-the-scene surveillance and evaluation, of flexibility, and of deference to local knowledge (Hoffman, 2013). There are similar findings from England and Australia in the wake of centralized planning.

Hurricanes

In the United States, the national level "all-hazards" emergency preparedness protocols of the Federal Emergency Management Agency (FEMA) cover natural disasters such as earthquakes and hurricanes, as well as pandemics and terrorist attacks. In 2005, when Hurricane Katrina struck New Orleans, Louisiana, neither city, state, nor federal level agencies were able to adequately respond. The policy conclusion was to strengthen preparation and planning at the national level.

Skipping ahead to 2012, what did we find when Hurricane Sandy struck New York City? As with pandemics, New York City's experience with Hurricane Sandy revealed weaknesses in the federal one-size-fits-all approach to disaster preparation and response. For example:

- Federal programs provide displaced residents with cash for rentals or trailers. Although these are only temporary solutions, even as temporary solutions, they were not viable options in a city with dense neighborhoods and an expensive rental market (NYC SIRR, 2013, p. 32).
- The national Flood Insurance Program is geared to single-family homes and not to the multifamily residences typical of most cities. Multifamily residences accounted for 70% of the dwellings damaged by Hurricane Sandy (AIA NY, 2013).
- National protocols and programs fail to adequately take into account the vulnerability of critical buildings such as hospitals, power stations, or data centers. To better cover potential future losses, New York City and New York State have recommended both "soft" and "hard" fixes in their post-Hurricane Sandy reports and proposals, for example, insurance programs for public infrastructure as well as better secured physical plants.

In a post-Hurricane Sandy Report, the New York branch of the American Institute of Architects notes that cities present a broad range of challenges and argues: "There is no universal solution. Design approaches

should be site-specific and respond to local programmatic needs." This means that plans, preparation, evacuation strategies, recovery and re-housing strategies all need to be "site specific" (AIA NY, 2013).

COMPETENT LOCAL GOVERNANCE

Empirical Study also Underlines the Importance of Competent Local Governance. A comparison of municipal response to Hurricanes Katrina and Sandy is a case in point. The devastation (and death toll) wrought by Hurricane Katrina in New Orleans in 2005, was multiplied many times over by the failure of local officials and governmental agencies to adequately respond. Clarke labels this "institutional failure" (2007). Ultimately and dramatically, the federal government had to intervene.

In sharp contrast to New Orleans' corrupt and ineffective governance structure and leadership vacuum, Mayor Bloomberg's managerial regime was praised for having minimized negative outcomes during Hurricane Sandy in New York City in 2012. Although Mayor Bloomberg's focus was notably uneven with prioritized areas functioning effectively and others – such as public housing – much less so, if we compare the total breakdown of leadership and municipal services in New Orleans during Hurricane Katrina to what happened in New York City, it was, in the words of one commentator, "night and day" (Gratz, 2013). New York City maintained centralized command both during and after Hurricane Sandy.

Looking at agency operation and interagency cooperation:

- Pre-storm, Mayor Bloomberg convened daily executive level briefings of municipal agencies at City Hall (NYC SIRR, 2013).
- At the same time, the New York City branch of the FEMA – the Office of Emergency Management (OEM), activated an Emergency Operations Center as a nerve center. It opened a Logistics Center, Health Care Evacuation Center and Emergency Supply Stockpile. This involved concerted interagency cooperation, including daily meetings of key municipal agencies. (NYC SIRR, 2013; Rudin Center, 2012).
- Although FEMA was better organized than in 2005 during Katrina, we should note that the overall effectiveness of FEMA's New York branch (OEM above) depends to a large extent, upon the effectiveness of the New York City agencies that provide basic services such as safety and transportation.

Looking at staffing and resources:

- Prior to the storm New York's police and fire departments increased staffing levels: The police department went to 12-hour tours of duty; the fire Department added 600 fire and emergency medical personnel (NYC SIRR, 2013).
- The City ordered special equipment and personnel such as water rescue teams, and sent them to flood prone locations.
- During the storm, the emergency medical staff (EMS) and fire department coordinated evacuation of patients in hospitals that lost power; they also did grid searches of 31,000 homes and businesses in affected areas (NYC SIRR, 2013).
- In contrast to New Orleans, first responder and emergency service personnel in New York City stayed on the job and focused on rescue operations even as their own properties faced peril (New York State 2100 Commission, 2013a, 2013b). Although agency preparedness and leadership is obviously important, the failure to serve the public is also related to the differing political cultures of the two cities.

Communications

Communications are an increasingly important aspect of disaster preparation, response and recovery. This was true during the H1N1 pandemic as well as during Hurricane Sandy. Mayor Bloomberg – the creator of Bloomberg media and the vaunted New York City 311 information system – was well attuned to the importance of communication. Along with daily press conferences, the city put out information through many channels including the social media (New York State 2100 Commission, 2013a, 2013b; NYC SIRR, 2013). The NYC transit system was particularly praised for its continuously updated travel reports.

Two Crises

New York City faced two major system-wide service crise*s* during Hurricane Sandy and in its aftermath: transportation and power outage. The storm's impact on the New York's transportation system was the worst the city had ever experienced. The subway tunnels were flooded as were all traffic tunnels into and out of Manhattan with the exception of the Lincoln Tunnel. In terms of electric power, Con Edison's substations flooded and malfunctioned leaving most of Manhattan south of 39th Street without electricity and with diminished telecommunications (Rudin Center, 2012).

In the case of transportation, New York City was praised for a "fast recovery." Subways closed on October 28 and resumed limited service on November 1 (Rudin Center, 2012). In part, this was due to preparation and response:

- The public was alerted, three days in advance of the storm, about a possible system shutdown.
- The subway system was shut down in an orderly fashion beginning the day before the storm. This allowed trains, buses, and other equipment to be moved to high ground and helped protect drains and other outlets from water entry (New York State 2100 Commission, 2013a, 2013b; Rudin Center, 2012).
- After the storm, the New York City Department of Transportation and the Metropolitan Transit Authority introduced a range of innovative transportation solutions for commuters to link them to jobs in Manhattan. These included new ferry services between the Rockaways, Staten Island, and Manhattan; new bus rapid service across bridges, and new carpooling rules. Some of these transportation innovations remained in place afterwards.

Along with preparation, analysts credit *redundancy* – the existence of alternative transportation services – for the quick recovery of New York City's transportation system. This meant that while the subways and trains were out, planners could put new routes into play using ferries and buses.

In contrast, the power outages which affected lower Manhattan for almost a week, and differing parts of New York City's five boroughs for longer periods, have remained a serious concern. The city had neither redundancy nor direct control of electric power or telecommunications. Going forward, a planning priority is to modernize the electrical system and transition to a flexible, smart grid (NYC SIRR, 2013, p. 14; New York State 2100 Commission, 2013b, pp. 12–14.

Local Problem Solving and Innovation

In addition to the innovative use of buses and ferries to restore transportation routes, there are other examples of on-the-spot decision-making during and after the storm, in response to both citywide as well as site-specific needs.

- In response to the widespread demand to return to storm-damaged dwellings and the lack of relevant programs, the City worked with FEMA to create NYC Rapid Repairs – an innovative program to

quickly restore electricity, heat, and hot water to return families to their own homes. The first program of its kind in the United States, 11,500 homes were repaired by April 2013. (AIA NY, 2013; Furman Center, 2013; NYC SIRR, 2013, p. 32).

- New York City opened Disaster Assistance Service Centers in flooded areas; also a mobile field office in the hard hit borough of Staten Island because of the need for "situational awareness" (NYC SIRR, 2013).
- The City set up nine Restoration Centers in affected neighborhoods where a mix of city, state and federal agencies offered programmatic assistance to residents to start them on the road to recovery (NYC SIRR, 2013).

One year later most of the issues related to the slow pace of rebuilding or rehousing those displaced are tied to federal recovery programs and bureaucratic delays or to New York City's overall lack of affordable housing. Still New York City seized the initiative during the storm.

The urban policy literature has recently highlighted the role of cities and their mayors as *innovators,* particularly at a time of national political gridlock.[2] As this study suggests, political gridlock is not the only trigger; *natural disasters and the crises that ensue* provide the opportunity and often, the necessity, to innovate. The question then becomes who benefits?

ENVIRONMENTAL JUSTICE, LOCAL MOBILIZATION, AND PARTICIPATION

Sociologists have applied the concept of "environmental justice" to natural disasters such as hurricanes, heat waves, public health emergencies, and high level pollution because low-income, minority, and aging populations are consistently found to be among the most vulnerable. Structural trends such as urbanization and demographic shifts (aging populations, migration), are rapidly increasing the at-risk, vulnerable populations in our cities, further underlining their needs (New York State 2100 Commission, 2013a, 2013b). In both Hurricanes Katrina and Sandy these vulnerable populations suffered the most as did the institutions upon which they depend: *hospitals and public housing*.

Hospitals

Hurricane Katrina's impact on New Orleans hospitals and health care facilities was a tale of inadequate preparation and inadequate response. This

was a true worst-case scenario in which the whole health care system essentially closed down, including pharmacies, and medical transport. Ad hoc decisions were made to evacuate and over 200 deaths occurred in hospitals and nursing homes (some purportedly "mercy killings"); medical records were destroyed and patients dispersed across the country (Franklin, 2006; Kutner, 2007).

During Hurricane Sandy, some seven years later, New York City also faced a health care crisis. Using Hurricane Katrina and New Orleans as a baseline, an article in a leading medical journal comparing the response to Hurricane Sandy notes many positives; there were "more detailed emergency plans and access to better-positioned backup generators." In addition, emergency evacuations were better managed and hospitals had transport equipment. New York City also deployed over 1,000 disaster medical personnel and FEMA placed search and rescue teams at the ready. Most important, 6,300 patients were evacuated without any fatalities (Powell et al., 2012).

At the same time, the authors argue that hospitals still need to "harden" their facilities to withstand flooding. They need "consistent criteria to guide evacuation" and better data and communications systems to provide "situational awareness." For example, before the storm, Mayor Bloomberg issued a mandatory evacuation for residents in Zone A, but not for hospitals which were instructed to discharge those they could and shelter the rest in place (NYC SIRR, 2013). The hospitals had told the mayor that "they were ready for whatever comes." This did not prove to be true; the flood surge and generator failure compromised the ability of hospitals and chronic care facilities to shelter in place. The upshot was that "public health authorities could not take charge to coordinate strategic decisions" and the City stepped into the gap (Powell et al., 2012).

However, it is in the *aftermath* of Hurricanes Katrina and Sandy, that we clearly see a *tale of two cities*. This is illustrated by comparing the trajectories of the two oldest public hospitals in the United States – Charity Hospital in New Orleans and Bellevue Hospital in New York City, both well-regarded teaching hospitals affiliated with major universities.

Charity Hospital had the least damage of the major hospitals – both private and public – in New Orleans. Only the basement flooded and it recovered quickly, ready to receive patients within three weeks. However, Hurricane Katrina became the rationale for radically restructuring and downsizing the public health system. The hospital was closed and despite protest, the city, state, and federal government colluded in building a new

private medical center that required demolishing a large working class neighborhood (Gratz, 2011).

In New York City, Bellevue was flooded and temporarily closed, but reopened within three months to continue to serve the public.

Public Housing

The story of public housing in the wake of Hurricane Katrina was similar to that of public health care. Then New Orleans Mayor, Ray Nagin, along with state and federal government agencies, demolished and privatized much of the city's public housing. The storm, which displaced the city's poor black majority, provided what John Arena cites a former New Orleans planning official as calling a "horrible opportunity" to remove public housing from valuable downtown areas and to accomplish what Arena and others have referred to as a neo-liberal restructuring – remaking the city, demographically, geographically, and politically (Arena, 2012, p. 146).

New York City, in contrast, has traditionally prided itself on operating the largest and most successful public housing authority in the United States. Although faced with dwindling financial resources and a backlog of repairs, the New York City Housing Authority (NYCHA) had resisted the fate of public housing in cities such as Chicago, to be torn down.

New York's public housing did not fare well during Hurricane Sandy. As in New Orleans, the storm called attention to the plight of the low-income residents. During Hurricane Sandy, some 20% of NYCHA properties were in the shoreline Flood Zone – 402 buildings with 35,000 units and 77,000 residents (Sandy Regional Assembly Recovery Agenda, 2013). Although the housing authority moved quickly before the storm to encourage residents to leave, the agency and city government did not follow-up after the storm and "were woefully unprepared to help residents deal with Hurricane Sandy's lingering aftermath" (Lipton & Moss, 2012).

No one enforced mandatory evacuation. This meant that when NYCHA buildings lost power for over 20 days, there were no elevators in high-rise buildings and no heat during a particularly long cold spell. Elderly and sick residents were stranded without food, water, medicine, or means of communication. Moreover, no one thought to check up on the high towers until volunteers found residents in need and brought their plight to public attention. New York City then instituted a "military-scale response" to deal with the needs of the infirm and elderly (Lipton & Moss, 2012). NYCHA and its chairman were strongly condemned for being

"under-prepared." In its defense, NYCHA cited decreased funding and resources; NYCHA had had local representatives in buildings before successive waves of staff cuts. On-site employees, they argued, would have been able to identify the vulnerable residents and notify the housing authority.

In the aftermath of Hurricane Sandy, rather than abandon public housing as in New Orleans, New York City's response has been to repair the damaged buildings and renew efforts to upgrade public housing stock. One immediate proposal – to lease public housing grounds for private development and use the revenue for repairs – was put on hold in the face of widespread concern that it presaged a neo-liberal approach. NYCHA received a $120 million federal grant for emergency generators in the 150 damaged buildings. To prepare for next time, it has created a registry for the elderly, disabled, and those requiring medication (Marritz, 2013). In December 2013, shortly before leaving office, Mayor Bloomberg settled a federal lawsuit by tenants requiring NYCHA to deal more quickly with repairs related to persistent mold problems, both preceding and post-Sandy (Navarro, 2013). Incoming Mayor Bill de Blasio, who ran on a progressive platform that prioritized affordable housing and education, has appointed as NYCHA chair, someone with housing experience and commitment to the public sector. As I write, de Blasio's newly announced a plan to provide 200,000 units of affordable housing over the next 10 years, states:

> The City is committed to securing the long-term sustainability of these NYHCA properties, and will fully engage with NYCHA residents to create a tailored preservation and development plan that will provide a full-scale evaluation of tenant needs and lay out a path forward to accomplish these critically important objectives. (New York City, Housing New York, 2014, p. 50)

How to protect vulnerable communities in the face of natural disasters? Addressing this general question we can make a few suggestions based on disaster experience and social science.

One of the "lessons learned" from hurricanes, heat waves, and other ecological disasters is the importance of mobilizing local populations and locally based NGOs, both to provide adequate response and as a participatory component of future planning and emergency preparation. Social scientists such as Eric Klinenberg have reported that neighborhoods with cohesive social ties do better (2003); they are a first line of response, provide mutual assistance as well as what Jane Jacobs referred to as "eyes on the street" (Jacobs, 1993 [1961]). Klinenberg (2013) uses the term "*social infrastructure*" to discuss the role of local residents and organizations in disasters.

However, we need to be careful about community participation. Although it represents an empirical assessment of "best practices" in disaster relief, at the same time, it can also represent a step-back by the public sector along the lines of neo-liberal policies that ask people to do it themselves, that is, volunteers monitoring a registry of the elderly and infirm rather than paid NYCHA employees.

Participation, whether in planning or response, needs to be combined with a more broadly conceived notion of sustainability – sustainability as an economic and social as well as a physical project. Broadly conceived, it can give real material benefits to vulnerable communities. Along these lines, several of the post-Sandy reports recommend that future investments in infrastructure be grounded in creating economic development opportunities and jobs, particularly in the vulnerable low-income communities (New York State 2100 Commission, 2013a, 2013b, p. 4; among others). Among their recommendations for a progressive New York City agenda, both Freedman-Schnapp and White suggest using "city-funded community partnerships to extend the reach of social services and advance collective problem solving in neighborhoods that lack civic capital" (Freedman-Schnapp, 2013, p. 417; White, 2013).

THE SHIFTING ECOLOGICAL DISCOURSE

Over the last few years, there has been a shift in ecological discourse, from a focus on "sustainability" to "resilience." As a leading ecological concept, sustainability goes back a few decades and has its definition immortalized in the Brundtland Report:

> Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. (WCED, 1987, p. 43)

Sustainability thus assumes the possibility of balancing future and present needs and resources – of maintaining some form of balance or equilibrium.

Resilience, on the other hand, reflects a more critical sense of environmental crisis and a much less optimistic scenario – one of recurrent disruption, disequilibrium, even failure (Keil & Whitehead, 2012). Assuming a permanent "world-at-risk" notion of vulnerability and uncertainty, resilience emphasizes the need to be flexible, the need for a quick recovery. Zolli

and Healy argue that "resilience-thinking" focuses on adaption, not risk mitigation (2012, p. 21). One does not return to any *status-quo-ante*; there is continuing change and transformation.

Some social scientists have criticized resilience for its naturalistic connotations and potential for "neutral" consensus building (Gleason, 2013; Keil & Whitehead, 2012, among others). However, these same criticisms are as relevant to and have also been directed at sustainability as a concept. The question is always the actual costs and benefits and for whom.

Reflecting this turn in ecological thinking, the post-Hurricane Sandy reports of New York City and New York State, both feature "resilience" in their titles.[3] New York State's "Building Resilience in New York" declares: "We can't prevent all future disasters from occurring, but we can prevent failing catastrophically" (NYS 2100 Commission, 2013b, p. 7). New York City's report, "A Stronger, More Resilient New York," which includes recommendations for rebuilding communities as well as infrastructure, features a definition of resilience on the page after the cover sheet:

> Resilient. Adj. (1) Able to bounce back after change or adversity. (2) Capable of preparing for, responding to, and recovering from difficult situations. Syn. Tough. (NYC SIRR, 2013)

What are the implications of a focus on resilience for actual practice? According to Zolli and Healy, authors of a foundational text on the emergent paradigm, key requirements for both social and technological infrastructure include data flow and feedback mechanisms, and adaptive capacity which in turn is related to modularity, redundancy, diversity (2012). This prescription fits the recommendations of both the NYS and the NYC reports which emphasize the need for *better technology to enhance governance*. More explicitly, they call for: (a) sophisticated information technology to provide real-time data and feedback for decision making in every urban system (human and non-human) and (b) *redundancy and modularity* in core operating systems. For example:

- The inability "to collect and synthesize accurate data on essential services in storm battered neighborhoods" hampered response and recovery (NYC SIRR, 2013, p. 18). This was also true for health care systems (see above).
- "Improved information systems – data mapping, visualization, and communications, so that the needed hard data is available to the wide range of institutions and individuals using these tools to inform decision-making" (New York State 2100 Commission, 2013a, 2013b, p. 13).

- The electric grid needs flexible alternatives and spare capacity. Similarly, communications systems must be multiple and "stable" in the midst of crisis.

What does a focus on resilience mean for the locality? First, it places *more* emphasis on the capacity and quality of local planning and governance since the focus is the functioning of urban systems, both soft and hard. This presents a political *conundrum* for the locality in that planning for resilience requires a longer time-frame than the typical short municipal election cycle. We should note that while this was also true for sustainability, it may be even more so for resilience. Furthermore, resilience planning may require a larger share of the city, state, and federal budget.

The prime issue shared with sustainability proposals is that the typical neo-liberal response to disaster funding is to tie disaster aid to redevelopment projects that *benefit elites* more than vulnerable populations. Like sustainability, resilience can be regressive as well as progressive; it can be used to de-politicize policy and cloud the underlying distribution of benefits. If one solution is to build-in sustained mobilization for vulnerable populations, this must be anchored in *material as well as symbolic benefits* – jobs and upgraded housing, as well as equitable environmental protection. Furthermore, to be effective these demands must be backed by political mobilization.

In summary, I have argued that the threat of natural disasters requires *more* rather than less autonomy in decision-making for the locality. Rebuilding for resilience – which includes redundancy in core systems and sophisticated data retrieval – are steps towards what we might call a more empowered city. At the same time, we need to remember that we need a resilient *social infrastructure* as well as a resilient physical environment. Strong social institutions are an essential part of this process but communities must receive material, not only symbolic benefits.

NOTES

1. In the field of public health, for example, we have the World Health Organization (WHO) which sets global standards including criteria for pandemics and monitoring surveillance.

2. Mayor Bloomberg's administration figures prominently in this literature, providing examples of creative social as well as physical policy. Katz and Bradley devote a chapter to New York City's Applied Sciences competition which resulted in the creation of a new science and engineering graduate campus to support an emergent information technology industry (2013).

3. Judith Rodin, who co-chaired the New York State 2100 Commission Report is also the president of the Rockefeller Foundation, which launched the 100 Resilient Cities Centennial Challenge in August (2013a, 2013b).

REFERENCES

American Institute of Architects New York Chapter (AIA NY). (2013). *Post sandy initiative: Building better, smarter – Opportunities for design and development*. New York, NY. Retrieved from http://postsandyinitiative.org/. Accessed on August 26.

Arena, J. (2012). *Driven from New Orleans: How nonprofits betray public housing and promote privatization*. Minneapolis, MN: University of Minnesota Press.

Clarke, L. (2007). Postscript: Considering Katrina. In D. L. Brunsma, D. Overfelt & J. S. Picou (Eds.), *The sociology of Katrina: Perspectives on a modern catastrophe* (pp. 235–241). Lanham, MD: Rowman & Littlefield.

Franklin, E. (2006). A new kind of medical disaster in the United States. In C. Hartman & G. D. Squires (Eds.), *There is no such thing as a natural disaster: Race, class, and Hurricane Katrina* (pp. 185–195). New York, NY: Routledge.

Freedman-Schnapp, M. (2013). A Sustainable city for all. In J. H. Mollenkopf (Ed.), *Toward a 21st century city for all* (pp. 404–447). New York, NY: The Center for Urban Research, CUNY.

Furman Center for Real Estate & Urban Policy, New York University. (2013, March). *Sandy's effects on housing in New York City*. Retrieved from http://furmancenter.org/files/publications/SandysEffectsOnHousingInNYC.pdf. Accessed on August 22.

Gleason, B. (2013). *Resilience and its discontents*. Research Paper No. 1. Melbourne Sustainable Society Institute (MSSI), Melbourne, Australia. Retrieved from http://www.sustainable.unimelb.edu.au/files/mssi/MSSI-ResearchPaper 01_Gleeson_Resilience_2013.pdf

Gratz, R. B. (2011). Why was New Orleans's charity hospital allowed to die? *The Nation*, April 27.

Gratz, R. B. (2013, January 17). *Two storms, two cities: Not many parallels between Sandy, Katrina*. Retrieved from http://citiwire.net/columns/two-storms-two-cities-not-many-parallels-between-sandy-katrina/. Accessed on September 3.

Hall, P., & Tewdwr-Jones, M. (2011). *Urban and regional planning*. (5th ed.). New York, NY: Routledge.

Hoffman, L. M. (2013). The return of the city-state: Urban governance and the New York City H1N1 pandemic. *Sociology of Health & Illness*, *35*(2), 255–269.

Jacobs, J. (1993 [1961]). *The death and life of great American cities*. New York, NY: Random House.

Katz, B., & Bradley, J. (2013). *The metropolitan revolution: How cities and metros are fixing our broken politics and fragile economy*. Washington, DC: Brookings Institution Press.

Keil, R., & Whitehead, M. (2012). Cities and the politics of sustainability. *The Oxford Handbook of Urban Politics Online*. Retrieved from http://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780195367867.001.0001/oxfordhb-978-0195367867-C26. Accessed on September 3, 2013.

Klinenberg, E. (2003). *Heat wave: A social history of disaster in Chicago*. Chicago, IL: University of Chicago Press.

Klinenberg, E. (2013). Adaptation: How can cities be "climate-proofed?" *The New Yorker*, January 7.

Kutner, N. G. (2007). Health needs, health care, and Katrina. In D. L. Brunsma, D. Overfelt, & J. S. Picou (Eds.), *The sociology of Katrina: Perspectives on a modern catastrophe* (pp. 203–215). Lanham, MD: Rowman & Littlefield.

Lipsitch, M., Riley, S., Cauchemez, S., Ghani, A., & Ferguson, N. (2009). Managing and reducing uncertainty in an emerging influenza pandemic. *New England Journal of Medicine*, *361*(9 July), 112–115.

Lipton, E., & Moss, M. (2012). Housing agency's flaws revealed by storm. *The New York Times*, December 9.

Logan, R. (2013). *Hospital readiness for Hurricane Sandy*. Transcript of National Library of Medicine Director's Comments. *MedlinePlus*, January 7. Retrieved from http://www.nlm.nih.gov/medlineplus/podcast/transcript010713.html. Accessed on September 5.

Marritz, I. (2013). Public housing authority turns attention to future threats. *The New York Times*, October 29.

Navarro, M. (2013). Facing suit, New York city agrees to remove mold in public housing more quickly. *The New York Times*, December 13.

New York City, Housing New York: A Five-Borough, Ten Year Plan. (2014). Retrieved from http://www.nyc.gov/html/housing/pages/home/index.shtml. Accessed on May 8.

New York City, Mayor's Special Initiative for Rebuilding and Resiliency (NYC SIRR). (2013, May). *Hurricane Sandy after Action: Report and recommendations to Mayor Michael R. Bloomberg*. Retrieved from http://www.nyc.gov/html/recovery/downloads/pdf/sandy_aar_5.2.13.pdf. Accessed on August 23.

New York City, Office of Mayor. (2013, June 11). *A stronger, more resilient New York*. Retrieved from http://nytelecom.vo.llnwd.net/o15/agencies/sirr/SIRR_singles_Lo_res.pdf. Accessed on August 23.

New York State 2100 Commission. (2013a, July 1). *Building resilience in New York*. Retrieved from http://www.rockefellerfoundation.org/uploads/files/7c012997-176f-4e80-bf9c-b473ae9bbbf3.pdf. Accessed on August 21.

New York State 2100 Commission. (2013b, January 11). *Recommendations to improve the strength and resilience of the empire state's infrastructure*. Albany, NY. Retrieved from http://www.governor.ny.gov/assets/documents/NYS2100.pdf. Accessed on August 24.

Powell, T., Hanfling, D., & Gostin, L. (2012). Emergency preparedness and public health: The lessons of hurricane sandy. *Journal of the American Medical Association*, *308*(24), 2569–2570.

Rockefeller Foundation. (2013). *100 Resilient cities centennial challenge*. Retrieved from http://www.rockefellerfoundation.org/uploads/files/7c012997-176f-4e80-bf9c-b473ae9bbbf3.pdf. Accessed on September 3.

Rudin Center for Transportation Policy, New York University Wagner Graduate School of Public Service. (2012, November). *Transportation during and after Hurricane Sandy*. Retrieved from http://wagner.nyu.edu/files/rudincenter/sandytransportation.pdf. Accessed on August 24, 2013.

Sandy Regional Assembly Recovery Agenda. (2013, April). *Recovery from the ground up: Strategies for community-based resiliency in New York and New Jersey*. Retrieved from http://goodjobsny.org/sites/default/files/docs/sandy_regional_assembly_recovery_agenda_final_032913-2.pdf. Accessed on August 22.

White, A. (2013). Creating collective capacity: NYC's social infrastructure & neighborhood-centered services. In H. J. Mollenkopf (Ed.), Toward a 21st century city for all (pp. 217–245). New York, NY: The Center for Urban Research, CUNY.

World Commission on Environment and Development (WCED). (1987). *Our common future: Report of the world commission on environment and development*. Oxford: Oxford University Press.

Zolli, A., & Healy, A. M. (2012). *Resilience: Why things bounce back*. New York, NY: Simon & Schuster.