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CHAPTER 6

Bringing Equity into Climate Change

Adaptation Planning in New York City

ROBIN LEICHENKO, SHEILA R. FOSTER, AND KHAI HOAN NGUYEN

For cities within the United States, efforts to promote climate justice are inextricably tied to the growing awareness of practices and policies such as racialized policing and redlining that contribute to and perpetuate structural racism (Sealey-Huggins 2018; Rice, Levenda, and Long, this volume). George Floyd's cry, "I can't breathe," not only highlighted the shocking reality of police brutality in communities of color but also sparked renewed attention to the ways that systemic racism also makes it difficult for those communities to, collectively, breathe. Communities of color suffer disproportionately from asthma, respiratory illness, heart disease, and COVID-19 infection (Gaynor and Wilson 2020; Abedi et al. 2021). These same communities are often highly exposed to air pollution and are among the most vulnerable to the impacts of climate change such as flooding and heat waves. This heightened recognition of how inequities can be structurally embedded into urban landscapes is especially relevant for urban climate change adaptation efforts, where efforts to create resilience to heat waves, flooding, wildfires, and droughts may necessitate long-term shifts in land-use practices and changes in spatial configurations and functioning of cities.

Growing awareness of the role of systemic racism in shaping communities' vulnerability to climate change is paving the way for new kinds of "praxis" in the way that some cities approach adaptation planning in thick urban environments, that is, urban environments with high levels of diversity and significant social and economic inequalities between communities. This chapter is a reflection on the authors' role on the New York City Panel on Climate Change (NPCC), and specifically our role leading its workgroup on Community-Based Assessment of Adaptation and Equity (CBA-Equity) (Foster et al. 2019). The NPCC is an independent advisory body that is charged in local New York

City law with providing the City of New York with regularly updated climate change scenarios and information on climate change impacts (Solecki 2012).

The authors (Foster and Leichenko) were appointed to the NPCC by New York City's mayor based on their expertise on climate change and environmental justice and their ability to offer scientific advice to the city in order to help it prepare for the impacts of climate change. This was the first time since its inception that the mayor of New York City instructed the NPCC to address climate change impacts and adaptation through the lens of equity and at the neighborhood level, with explicit focus on community-based adaptation. While prior New York City and New York State work had identified a need for consideration of equity and environmental justice in the analysis of climate impacts, vulnerabilities, and adaptation (NYCEJA 2018; NYCEJA 2016; Sandy Regional Assembly 2013; Leichenko et al. 2011), the formation of the CBA Equity Workgroup within the NPCC reflected the city's heightened recognition of and desire for action on these issues (Foster et al. 2019).

This chapter describes our workgroup's efforts to identify ways to incorporate equity into the city's climate change vulnerability analyses and adaptation planning efforts (Foster et al. 2019). Each of the chapter authors are academics—Leichenko is a professor of geography at Rutgers University, Foster is a professor of law and public policy at Georgetown University, and Nguyen is a PhD student in geography at Rutgers. The overall composition of the workgroup consisted of six academic researchers, four graduate students (including Nguyen), and three representatives of local, grassroots environmental justice (EJ) organizations. The racial makeup of the workgroup group was approximately 60 percent white and 40 percent nonwhite.

The workgroup's approach entailed a coproduction model that was designed to meaningfully engage local communities to collaboratively identify key climate vulnerabilities and related stresses and to assess how best to incorporate equity into adaptation planning (Deas et al. 2017; Sarzynski 2015; Leichenko et al. 2014; Lemos and Morehouse 2005; Cole and Foster 2001). The workgroup met at the outset with representatives from the city and from three local community-based organizations (CBOs) representing "frontline" communities—WE ACT for environmental justice in Harlem, THE POINT CDC in Hunts Point, and UPROSE in Sunset Park. The CBOs were included as full participating members and contributors to the research, helping ensure that the focus of the work was guided by community concerns and that the process and product adhere to the inclusive principles of environmental justice (see Foster et al. 2019 for a full description of the work).

While environmental justice activism in New York City can be traced back

decades, it was only recently recognized in the city's climate adaptation efforts. A key initial challenge for the workgroup was navigating competing understandings of the meaning of equity in adaptation planning. From the perspective of the city, the primary initial interests for the work included guidance on the use of social vulnerability mapping as a tool for identifying spatial vulnerability patterns and areas in need of resources and case studies of socially vulnerable communities. By contrast, the CBOs were more interested in having a voice in adaptation decision-making within their neighborhoods and viewed participation in the workgroup as a means of having a voice. The CBOs also wanted the workgroup to pay explicit attention to the inequities manifesting in their communities, particularly economic processes facilitating gentrification and structural racism. As described in the next sections, the workgroup embraced these competing definitions of equity through adoption of a three-part equity framework. The workgroup implemented this framework, first through collaborative exploration of social vulnerability maps, which emphasized distributive equity, and then through coproduction of community case studies that focused on procedural and contextual equity. The workgroup's efforts highlight the vital importance of community partnerships in all phases of urban climate adaptation planning, reinforcing the foundational need for attention to equity and justice as means to secure urban futures (Rice, Levenda, and Long, this volume).

An Equity Framework for Climate Change Adaptation Assessment in New York

By adopting a coproduction model, members of the workgroup were putting to the test what "meaningful engagement" could look like as means to integrate equity and environmental justice into the city's larger climate action agenda. A key initial challenge for the workgroup was the establishment of a sense of trust of the NPCC process with the CBOs. The CBOs have each at times contested that city actions and policies have affected environmental quality in their community (e.g., siting of noxious facilities). Each was initially somewhat skeptical about whether collaboration with the NPCC would be meaningful and productive for their organization, given the history of mixed outcomes in their engagement with the city around environmental justice issues.

In our view, three factors likely contributed to establishment of trust between the CBO representatives and the NPCC. One factor was Foster's record of environmental justice scholarship and her long history of work with these and other EJ CBOs in New York City. Her reputation and established relation-

ship with the leaders of two of the CBOs were especially critical for initiating the NPCC collaboration. Another important factor was transparency about the role and ability of the NPCC to influence city action. In discussing the influence that our work might have on New York City policy, we advised the groups that their participation would be a way for environmental justice organizations to have a voice in guiding the NPCC on how the city can best incorporate equity into adaptation planning. While there was no way to guarantee that the city would use this information as recommended, the fact that the city solicited guidance on equity in adaptation was viewed as important and relevant to the mission of the CBOs. A third factor was the collaborative and coproduction-based approach of the work and our explicit commitment to principles of environmental justice in how our workgroup operated. In particular, the EJ groups would have the leading voice in the identification of key climate risks for their communities as well as adaptation needs. The groups also had an important collaborative role in the framing of the report's findings and its recommendations about how to make the city's adaptation planning process more inclusive and equitable.

To make sense of the differing understandings of equity between the city and environmental groups—namely, distributive versus procedural equity—the workgroup drew on environmental justice praxis and literatures, as well as recent equity-focused contributions within the climate change adaptation and mitigation literatures (e.g., Meerow, Pajouhesh, and Miller 2019; Foster 2017; Schlosberg and Collins 2014; McDermott, Mahanty, and Schreckenberg 2013; Leichenko et al. 2011; Cole and Foster 2001). The workgroup also drew on McDermott, Mahanty, and Schreckenberg's (2013) concept of contextual equity, which focuses on economic and social processes that contribute to marginalization. The workgroup ultimately adopted the three-part equity framework developed by McDermott, Mahanty, and Schreckenberg (2013), with modifications to reflect our focus on urban adaptation (see table 6.1).

Within the framework, distributive equity emphasizes the uneven environmental burdens and benefits across groups and neighborhoods (Foster 1998). This interpretation reflects the suggestions of the environmental justice groups as well as the literature on environmental justice, which has brought attention to racial and ethnic disparities in the distribution of polluting facilities and other environmental hazards and the lack of environmental amenities such as green and open spaces in low-income and minority communities (Corburn, Osleeb, and Porter 2006; Cole and Foster 2001; Fothergill, Maestas, and Darlington 1999; U.S. EPA 1992). This approach also incorporates more recent cli-

TABLE 6.1. Three-dimensional equity framework (based on McDermott, Mahanty, and Schreckenberg 2013)

Distributive equity	Emphasizes disparities across social groups, neighborhoods, and communities in vulnerability, adaptive capacity, and the potential for socially and spatially uneven outcomes of adaptation actions
Contextual equity	Emphasizes social, economic, and political factors and processes, including systemic and structural racism, that contribute to uneven vulnerability and shape adaptive capacity
Procedural equity	Emphasizes the extent and robustness of public and community participation in adaptation planning and decision-making

nition of inequalities in social vulnerability to climate change; inequalities in the capacity to adapt or influence mitigation of climate change; inequalities in benefits associated with adaptation policies; and inequalities and unintended consequences of adaptation and mitigation efforts (McDermott, Mahanty, and Schreckenberg 2013; Leichenko et al. 2011). Both sets of literatures bring attention to the distribution of costs and benefits of policy initiatives on various populations. Rooted in principles of equality and social welfare, these approaches are often needs-based and directly target the least advantaged communities and the most at-risk community members in standard-setting and adaptation planning (McDermott, Mahanty, and Schreckenberg 2013).

Contextual equity is a relatively recent addition to the climate change literature (McDermott, Mahanty, and Schreckenberg 2013). However, its essential elements are well recognized in the climate vulnerability and environmental justice literatures, both of which emphasize social "root causes" of existing disparities and vulnerabilities, including the influence of social context and structural racism (Ribot 2014; Cole and Foster 2001; Sarzynski 2015). Within our framework, contextual equity draws attention to factors that contribute to social vulnerabilities and recognizes that differences in power and access can prevent some communities from receiving resources or from participating in the decision-making process (Fraser 2009). Acknowledging the "uneven playing field" that is created for some communities as a result of preexisting economic, social, and political inequalities (McDermott, Mahanty, and Schreckenberg 2013), contextual equity draws attention to socioeconomic conditions and existing injustices that are critical for designing community-based adaptation strategies (Schlosberg, Collins, and Niemeyer 2017).

Procedural equity is typically defined as the representation and inclusion of affected individuals, communities, and groups in environmental and adaptation priority-setting and decision-making. With respect to climate change, this includes decisions about adaptation strategies and actions, as well as emer-

gency preparedness and emergency response in relation to climate-related risks. Efforts to achieve procedural equity often require explicit mechanisms to ensure participation of affected actors in policy and planning decisions (Chu, Anguelovski, and Carmin 2016; Schlosberg 2013; Leichenko et al. 2011). Traditional efforts to include groups historically deprived of resources in environmental and adaptation decision-making processes include public hearings and meetings, citizen advisory councils, and citizen panels (Sarzynski 2015). However, the climate change community is also paying increased attention to the need for greater inclusion of affected groups in the climate assessment process, including identification of critical risks and vulnerabilities, formulation of adaptation options, and selection and implementation of response strategies (Cornell et al. 2013; Kirchhoff, Lemos, and Dessai 2013; Rosenzweig et al. 2011). This type of collaborative engagement of affected communities in all phases of adaptation planning and implementation has been identified by the environmental justice community as a critical need in the New York region (NYCEJA 2018; NYCEJA 2016; Sandy Regional Assembly 2013).

The workgroup functioned via a collaborative approach where CBO representatives were engaged in all phases of the research. Members of the workgroup initially met in person with leaders of each of the CBOs and asked them to join the workgroup efforts. Each of the CBOs had a history of successful environmental justice activism in New York City, and each was already deeply engaged in climate adaptation, mitigation, and resilience projects. As a first step for the work, CBO representatives collaborated with the workgroup members to identify climate risks, vulnerabilities, and related stressors in order to gain a better and more complete picture of distributive and contextual equity concerns in the three communities. Because each of the CBOs was already engaged in community-based climate resilience efforts, their representatives were readily able to pinpoint key risks and vulnerabilities within each local community. Frank discussions with CBO leaders also provided important insights into their interactions with the city's climate mitigation and adaptation efforts as a lens into the issue of procedural equity. In addition to collaboration with representatives from each of the CBOs, the workgroup also interviewed city officials, reviewed policy and planning documents from both the city and the CBOs, and collected relevant demographic and health data from city agencies and public sources. CBO representatives provided feedback and comments on draft versions of the workgroup report, which were incorporated into the final version (Foster et al. 2019).

We drew on the equity framework for all phases of the work. Distributive equity was central for our examination of spatial patterns of vulnerability to climate change stresses across neighborhoods and our recommendations on methods and indicators for monitoring and tracking neighborhood vulnerability. Contextual equity was featured in our case studies of community vulnerability and adaptation. Procedural equity was incorporated into our assessment of how community groups are included in the development and implementation of adaptation plans. Each of these phases of the study is described briefly in subsequent sections. Full results are presented in Foster et al. (2019).

Distributive Equity: Vulnerability Mapping and Targeting of Resources

Consideration of distributive equity is foundational for social vulnerability mapping and analysis where the goal of the work is documentation of uneven distribution of vulnerabilities to climate shocks and stress across neighborhoods, communities, and regions (Cutter and Finch 2008; Adger 2006; Cutter, Mitchell, and Scott 2000). In addition to measuring vulnerability to climate stressors, social vulnerability analysis also is widely used to measure exposure to toxic and hazardous facility siting and to determine "environmental justice" areas based on indicators that track proximity to a variety of pollution sources (Foster 2017; Sadd et al. 2011). Factors that are often found in both literatures include socioeconomic status (wealth or poverty); education; age; access and functional needs; gender; race and ethnicity (Cutter et al. 2009) (see Foster et al. 2019 for a complete review). Through the creation of empirical metrics and indicators of social vulnerability, researchers capture a wide array of factors that shape the susceptibility of certain populations and communities to harm from environmental hazard events and the ability to recover following these events (Tate 2012; Cutter, Boruff, and Shirley 2003). These analyses are often explicitly designed to help identify "hot spots" for needs-based targeting of resources and policies to communities that are most at risk (de Sherbinin 2014; Dunning and Durden 2011).

In exploring options for documenting and tracking spatial vulnerability in New York City, our workgroup explored a variety of methodological approaches used for social vulnerability analysis and mapping in New York and elsewhere. These include mapping applications conducted by nonprofit organizations, academic institutions, and governmental agencies (HVRI 2018; CDC SVI 2018). Among these studies, we identified two common and widely used approaches for vulnerability mapping. These include the SoVI, developed by Susan Cutter (Cutter, Boruff, and Shirley 2003), and the Social Vulnerabil-

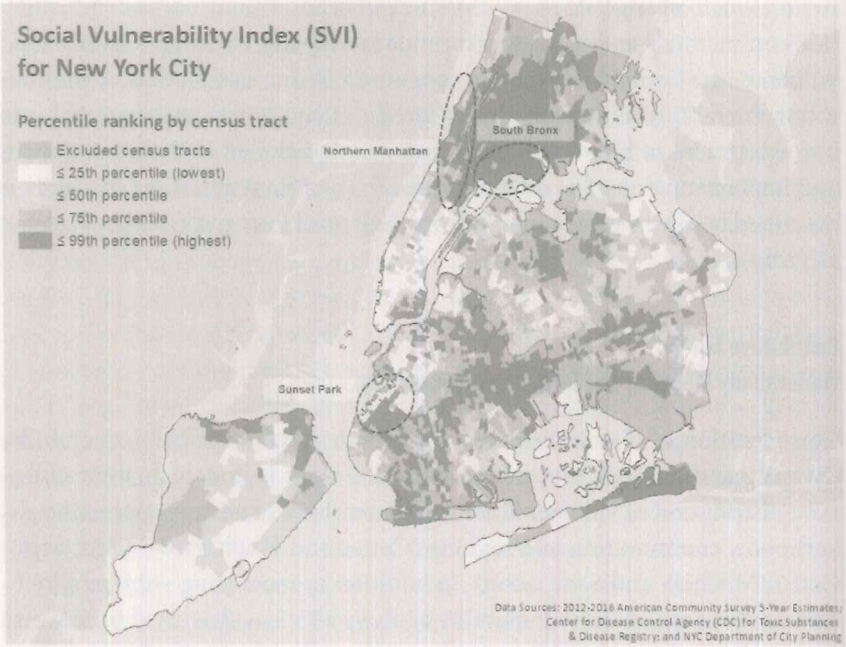

FIGURE 6.1. Social Vulnerability Index (SVI) results for New York City (based on New York State calculation).

ity Index (SVI), developed by the CDC (Flanagan et al. 2011). Both methods have been empirically validated and replicated and are widely used throughout the United States (Reckien 2018; Bakkensen et al. 2017; Myers, Slack, and Singelmann 2008; Cutter and Emrich 2006). For New York City, creation of social vulnerability maps based on either method could aid in the identification of census tracts with high levels of social vulnerability to all types of climate stressors including heat, floods, and other types of stressors.

As illustrated in figure 6.1, which depicts a vulnerability map of New York City created using the SVI method, these maps provide information on spatial patterns across different communities or neighborhoods. The mapping results reveal that social vulnerability is unequally distributed across New York City; high levels of social vulnerability are consistently found in areas with lower incomes and higher shares of African American and Hispanic residents. Our three case study communities, discussed in the next section, are identified as having high levels of social vulnerability.

Despite the widespread usage of social vulnerability analysis, the workgroup also noted several limitations of vulnerability indices for application to policy and planning decisions (Preston, Yuen, and Westaway 2011; Schmidtlein

et al. 2008). For example, social vulnerability scores, which are employed to map and visualize patterns of social vulnerability, only provide a relative indicator of vulnerability in comparison to other areas. In other words, a low vulnerability score simply means that one area has relatively lower social vulnerability than areas with higher scores; a low vulnerability score does not ensure that an area is resilient to climate shocks, nor does it imply that all residents of that area have low vulnerability. This type of aggregated, composite vulnerability index has more limited utility for tracking how vulnerability changes over time in a particular community or geographic area. The numerical score values for individual tracts are not directly comparable over time because the scores for each period are calculated relative to other tracts during that same period. In addition, the scores do not provide clear guidance on which components of social vulnerability have contributed to changes in score values. For these reasons, tracking changes in social vulnerability over time can be better accomplished using single variable indicators.

As an alternative or supplement to construction of vulnerability indices, the workgroup recommended consideration tracking of specific indicators on neighborhood vulnerability over time. Use of specific indicators would permit documentation of changes over time and ensure continual needs-based targeting of adaptation efforts. While many factors contribute to social vulnerability of specific households or groups, the above approaches permit identification of variables that are widely found to be indicative of social vulnerability (NAACP 2015). The proposed variables (see table 6.2), all of which were found to contribute to social vulnerability in the studies reviewed above, are intended to provide a starting point for vulnerability tracking in New York City. Each variable is readily available from census data sources, and each may be supplemented with additional indicators that are viewed as relevant by the city or by particular communities.

These proposed indicator variables, which are updated annually by the American Community Survey (ACS) at the census tract level, would allow for the tracking of factors that are widely thought to contribute to social vulnerability and spatial differences or inequalities in vulnerability. The indicators are intended to capture demographic, economic, housing, and educational disparities across neighborhoods. They also capture access and functional needs populations and older populations who are especially at risk to climate extremes (Kinney et al. 2015). The workgroup suggested that the tracking process could be supplemented as needed using city health data sources (e.g., NYC Environment and Health Data Portal) to ensure accurate documentation of access and functional needs populations. Additional city-specific

TABLE 6.2. Proposed list of vulnerability indicators for New York City (Foster et al. 2019).

Vulnerability factor	Potential social indicators
Access and functional needs populations	Percent of civilian noninstitutionalized population with a disability
Educational attainment	Percent population with bachelor's degree or higher Percent population over 25 years old with no high school degree
English fluency	Percent population 5 years or over who speak English less than "very well"
Female-headed household	Percent of female-headed households
Foreign-born population	Percent of foreign-born population
Income	Median household income Percent of households receiving public assistance income
Older adults over 65	Percent population over 65 years old
Poverty	Percent of population living below poverty level
Race/ethnicity	Percent of nonwhite population
Rent burden	Percent of occupied units paying 35 percent or more of household income on rent

health-related variables might include, for example, population lacking air-conditioning, population lacking health insurance, population living with chronic health conditions, population with asthma, and population dependent on electric medical equipment (Kinney et al. 2015; McArdle 2013).

Our workgroup's social vulnerability mapping analysis revealed important information about distributional inequalities in susceptibility to harm as a result of climate change, and how these inequalities vary across New York City communities. While such information can serve as a useful tool for needs-based targeting of adaptation resources, social vulnerability mapping does not illuminate why certain neighborhoods are more vulnerable than others. To effectively address or reduce social vulnerability to climate change, it is necessary to consider the contextual factors that shape the vulnerability of a particular neighborhood or community. We consider these factors in the next section's examination of contextual equity.

Contextual Equity in Socially Vulnerable Communities

A core tenet of the environmental justice movement is that environmentally overburdened communities should "speak for themselves" with regard to the ways in which they suffer the injustice of disproportionate hazard exposure (Bullard and Alston 1990). As such, the very concept of environmental injustice (or inequality) is rooted in the idea of contextual equity. Scholars have articulated and analyzed the theory of environmental injustice "from the ground up," investigating and listening to (as well as capturing the voices of) communities as a window into economic and social factors and dynamics that render those communities vulnerable to disproportionate hazard exposure (Cole and Foster 2001; Foster 1998). Following this approach to the issue of climate justice and equity, the workgroup conducted case studies of three environmental justice communities in New York City: Northern Manhattan, Manhattan; Sunset Park, Brooklyn; and Hunts Point, the Bronx (see figure 6.1) to better understand the interaction between environmental and climate stressors and social and economic disadvantages. The three case studies provided contextual information about these predominantly racial and ethnic minority, low-income communities and the critical climate and nonclimate stressors that affect them. The case studies highlighted many commonalities across the three communities. Communities in Northern Manhattan, Sunset Park, and Hunts Point are each highly vulnerable to climate change based on the vulnerability mapping analysis (see figure 6.1). The three are all also confronting the challenge of gentrification and/or displacement (Austensen et al. 2015). In particular, CBOs identified numerous concerns related to changing social and economic conditions, including, for example, concern about the rising cost of living, increased rents, and lack of affordable housing options (see table 6.3) (Austensen et al. 2015).

In addition, the processes of deindustrialization and commercialization create great uncertainty regarding job opportunities. At the same time, there is an increased presence of commercial development in all three areas, offering unskilled jobs in the service sector (as compared to skilled manufacturing and industrial jobs). These jobs do not allow existing residents to meet increases in the cost of living, particularly housing. The growth of the commercial sector also contributes to conflicts over land use and economic development planning. Vacant warehouses and buildings are being bought by private developers, which threatens to transform working-class neighborhoods into unaffordable upscale enclaves. Residents and community activists are actively fighting to preserve their manufacturing zoning and job opportunities for residents (Fainstein 2018; Sze and Yeampierre 2018; Checker 2011). New commercial activities typically cater to middle- and upper-middle-class clientele and are generally not accessible to low-income residents (Adams 2016; Gonzalez 2016).

The neighborhoods of Northern Manhattan, Sunset Park, and Hunts Point are also considered hotspots of environmental pollution (see table 6.3). They are disproportionately burdened with numerous noxious and polluting industrial facilities and related activities (e.g., garbage processing centers, power

TABLE 6.3. Summary of social, economic, climate, and other environmental stressors and community needs identified by CBOs in the three case study communities (Foster et al. 2019).

Communities	Northern Manhattan	Sunset Park Brooklyn	Hunts Point The Bronx
SOCIAL AND ECONOMIC STRESSORS			
Aging housing stock	X	X	X
Decrease in manufacturing jobs	—	X	—
Energy cost burdens	X	—	—
Health disparities	X	—	X
High share foreign-born residents	—	X	—
High rate of poverty	X	X	X
Increase in commercial presence	X	X	—
Lack of affordable housing options	X	X	X
Rising cost of living	X	X	—
Unemployment	X	—	—
CLIMATE STRESSORS			
Rising average temperatures	X	X	X
Risk in heat waves and hot days	X	X	X
Changing precipitation; inland flooding	X	X	X
Sea level rise	X	X	X
Coastal flooding	X	X	X
Extreme hurricane winds	X	X	X
Drought	—	—	—
Cold snaps	—	—	—
OTHER ENVIRONMENTAL STRESSORS			
Air pollution	X	X	X
High truck traffic	X	X	X
Storm water runoff	X	X	X
COMMUNITY NEEDS			
Access to health care services	X	—	—
Access to healthy food	—	—	X
Access to the waterfront	X	X	—
Access to affordable housing	X	X	X
Access to public health facilities	—	—	X
Access to greenspace	X	X	X
Improved disaster preparedness and evacuation planning	X	X	X
Protection of local employment	—	X	X

plants, waste transfer stations, bus depots, and heavy truck traffic). In all three neighborhoods, many industrial facilities or former industrial sites are located on the waterfront, which makes them vulnerable to extreme flooding and heavy storm surges (Fainstein 2018; Bautista, Osorio, and Dwyer 2015). These neighborhoods and their residents are concerned about having adequate emergency preparedness capacity and evacuation centers during extreme weather events (NYCEJA, 2018). Low-income residents must bear the health consequences of living in proximity to these toxic sites. There is significant concern regarding toxic chemicals on the waterfront being displaced into

residential areas (Madrigano et al. 2018; Bautista, Osorio, and Dwyer 2015). On the other hand, many young children and adults suffer from asthma and other respiratory illnesses, which can be exacerbated by worsened air quality during extreme heat events (Rosenthal, Kinney, and Metzger 2014). Due to a lack of quality recreational green and open space, the more vulnerable residents such as the elderly and children are at risk for heat-related illnesses (Rosenthal, Kinney, and Metzger 2014).

In order to address the unique ways and contexts in which communities are both ecologically and socially vulnerable, the CBOs on the CBA Workgroup emphasized that their communities lack some of the basic goods and services that are important to fostering resilient communities. They also emphasized how their lack of basic goods is connected to the legacy of systemic racism, exclusion, and disinvestment in their communities. This legacy includes the history of racial zoning, redlining, and urban renewal/slum clearance programs that have contributed to the racial stratification and structural disinvestment that persists in metropolitan areas like New York City. Understanding this legacy is part of the "contextual equity" analysis in our framework. It explains why these communities face a shortage of affordable and quality housing stock, lack of adequate health care and public health facilities, and lack of access to healthy food and green spaces. These disparities undermine residents' ability to face and adapt to the environmental and climate stressors present in their communities. Expanding their access to basic social and environmental goods, and addressing the legacy effects of systemic racism, should be a critical part of adaptation planning in socially vulnerable communities.

The CBOs also emphasized the importance of early and meaningful engagement with public officials in all phases of development planning in their communities, including adaptation planning and implementation. Each of the CBOs has engaged, often extensively, in adaptation planning in their communities and with their residents. To build community preparedness to climate-related emergencies, UPROSE in Sunset Park created the Be a Block Captain program designed to train residents to serve as "block captains" during extreme weather events. Local volunteers are trained to implement climate resilience strategies, including taking inventory of who lives on their block, serving as point persons for neighbors in case of emergency, and coordinating climate adaptation workshops. Similarly, THE POINT in Hunts Point, in partnership with several city agencies, established the Be a Buddy Program, which aims to connect local volunteers with the most at-risk residents and educate the community members about climate preparedness. WEACT, through multiple planning workshops with community members, put together the North-

ern Manhattan Climate Action (NMCA) Plan. The NMCA Plan contains policy recommendations and local actions organized around four themes: energy democracy, emergency preparedness, social hubs, and public participation. WEACT also launched Solar Uptown Now, a campaign that enables residents in Northern Manhattan to purchase solar panels as a group to bring down the cost of power for participants. While these community-led actions represent significant progress in addressing climate change impacts and mitigation in frontline communities, the challenge is how to align these efforts with the city's adaptation planning processes. As we will discuss in the next section, robust community engagement is a critical element of procedural equity in climate change adaptation.

Procedural Equity in Adaptation Planning

We explored procedural equity by gathering CBO perspectives on New York City's practices in recent and ongoing adaptation planning efforts. New York City explicitly recognizes the need for procedural equity in adaptation planning. Some typical ways in which the city engages with communities in adaptation planning are community meetings, inclusion of community representatives and organizations as part of advisory boards, and public forums and workshops (Foster et al. 2019). Yet even for those communities sought out for their input and engagement in city-led adaptation and resilience-building processes, there is a perception that existing city outreach efforts are conducted in good faith but ultimately may miss some of the ways these communities are uniquely vulnerable. In particular, the CBOs perceive that they are asked for their input and engagement often after critical policy and design choices have been made, sometimes leaving little room for the groups to meaningfully shape development to meet the needs of their communities.

The CBOs offered a number of examples of recent resilience-building initiatives and development decisions that prioritize market-oriented development and ignore the equity implications of these efforts. The Hunts Point Lifelines Resiliency Project (City of New York 2013), for example, involved a year-long community engagement process that identified flood risk and resilient energy as priority areas. This process was perceived by THE POINT CBO as very structured and rigid, with limited room for community inputs and creative ideas. While the project is making headway toward a more economically viable coastline, community members expressed concern that the city's concept of resilience was overly focused on coastal protection and renewable energy to the exclusion of social concerns such as gentrification and displacement. Similarly, in Sunset Park the CBO expressed heightened concern that development and resilience projects initiated or approved by the city could potentially lead to or accelerate displacement of local residents. Specifically, the CBO pointed to the mayor's plan for a Made in N.Y. Campus to bring back manufacturing to the waterfront (Santore 2017). Community members expressed concern about limited communication from the city about this initiative and lack of community engagement in a visioning process about development of the waterfront in ways that do not lead to nor accelerate displacement of residents (Santore 2017). The CBO expressed interest in linking the Made in N.Y. Campus to a community-led regenerative energy hub project. However, the CBO also expressed concern that the city's rezoning proposals to accommodate commercial development would limit possibilities for such a project.

Another consistent area of concern for each of these communities, but particularly in Northern Manhattan and Sunset Park, is that city-initiated adaptation and resilience projects may pave the way for new waterfront development projects and high-rise construction marketed toward higher-income white residents (Gould and Lewis 2018). Rising property values and rents associated with "climate gentrification" would mean outmigration of long-term residents and the weakening of social networks and social capital, both of which are necessary for creating resilient communities (Anguelovski et al. 2019). Each CBO expressed a strong desire for city officials and initiatives to actively support residents through cooperative practices that build up social capital and therefore preserve vulnerable neighborhoods through equitable development practices. As Schlosberg, Collins, and Niemeyer (2017) observe, in planning for climate adaptation, "local community groups . . . do not operate in a risk management or simple resilience framework" but rather "focus more on . . . basic needs and capabilities of every day." The CBO's suggested that adaptation and resilience planning might entail stronger focus on community development (e.g., building schools, affordable housing, safer streets, and greening space) to reduce the potential of displacing longtime residents and be more responsive to the social sustainability of these communities.

Our discussions also revealed that resources and capacity—both the city's and that of the CBOs—are significant variables for collaborative and equitable engagement. In particular, more established or relatively well-resourced (e.g., foundation-supported) CBOs are able to not only engage in their own adaptation planning processes but also, when given the chance, substantively and substantially contribute to adaptation plans and implementation. This could include helping the city design adaptation plans and projects that do not duplicate existing community-based efforts but rather leverage them. For in-

stance, WE ACT has engaged in extensive climate action planning with deep community engagement and a collaborative process of identifying vulnerabilities and adaptation needs. Out of that process has emerged a focus on "critical infrastructure" required for emergency preparedness and resilience. Elements of this vision for Northern Manhattan echo the type of secure and equitable future envisioned in the first chapter of this book—including community microgrids, community centers, cooling centers, senior centers, access to grocery stores/food, and access to refrigeration for medication in an emergency. WE ACT is also focused on "energy democracy"—the shift from centralized, corporate fossil fuel–generated energy to energy generated and governed by communities and one that supports local economies, energy security, and the health and well-being of the people within those communities. Given this extensive planning and engagement process in place in Northern Manhattan, there is potential for the city to leverage these efforts to implement adaptation and resilience projects that account for both contextual and procedural equity.

While there is strong support for the city's efforts to ensure procedural equity, there is a strong feeling among the CBOs that there is room for more meaningful and empowering inclusion of vulnerable communities (NYCEJA 2016, 2018). In particular, each CBO expressed interest in a more fully collaborative, coproduction model of equitable adaptation and resilience planning in which city officials work side by side with CBOs (and other actors) at the outset to design and implement climate adaptation and resilience planning. Working side by side with communities at the outset to identify critical and intersecting climate, environmental, and social concerns and to codesign and co-implement adaptation projects was seen as key for reducing the potential of displacing longtime residents and promoting the social sustainability of local communities. Although such approaches are beginning to be implemented in adaptation planning, work on related issues such as community-based land use planning suggests that involvement of local partners at all phases of the design and implementation process is critical for the success and endurability of these efforts (Foster and Iaione 2015).

Conclusion

Equity is a central component of sustainable and just adaptation planning efforts in cities. This chapter described a case study of equity in adaptation planning in New York City. The study adopted an equity framework that incorporated three key dimensions of equity including distributive, contextual, and procedural equity. Distributive equity, which emphasizes disparities across social groups, neighborhoods, and communities in vulnerability, adaptive capacity, and the outcomes of adaptation actions, was incorporated through social vulnerability mapping analysis of spatial patterns of vulnerability in the city. Contextual equity, which considers how social, economic, and political factors and processes contribute to vulnerability and shape adaptive capacity, was addressed through case studies of socially vulnerable communities. Procedural equity, which emphasizes the extent and robustness of public and community participation in adaptation planning and decision-making, was explored through work with three CBOs who identify areas where city adaptation planning efforts can be more collaborative and inclusive.

The case study of New York City suggests several additional areas where our equity framework might be applied in other cities facing adaptation challenges. In particular, the framework may be useful for aiding in decisions about how adaptation projects are selected, including identification of where projects are needed and how they can be collaboratively tailored to meet the needs of local communities. The framework can also help cities reveal equity issues that may potentially arise as adaptation projects are implemented, including fuller examination of the potential unintended consequences of these projects. The framework may also be applicable for use in city- and region-wide adaptation planning efforts. In the face of climate change, many cities are beginning to consider implementation of large-scale flood barriers and other region-wide adaptation projects. All three forms of equity identified in this chapter can potentially be applied to local and regional efforts to plan for just adaptation to climate change.

NOTES

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