4

The New Climate Urbanism: Old Capitalism with Climate Characteristics

Linda Shi

4.1 Introduction

Everywhere we look, pronouncements from politicians, city networks, and research studies tell us that cities are both the greatest sinners against the climate and seeds of global ecological salvation. From 100 Resilient Cities to 10,000 signatories of the Global Covenant of Mayors for Climate and Energy, cities are increasingly portrayed as the primary agents for advancing societal decarbonization and reducing climate vulnerability. Reflecting this discourse as well as developments on the ground, this edited volume articulates a “New Climate Urbanism”—especially in the introduction by Castán Broto, Robin, and While, and the chapter by Long, Rice, and Levenda. While cities are indeed adopting climate actions that are reshaping urban socio-spatial development, I argue in this chapter that emerging urban responses to climate change are not necessarily new or urban. Rather, competitive dynamics of

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adaptation within and between metropolitan regions appear to recapitulate capitalist processes reproducing spatial, social, and ecological inequality. Privileging cities as the primary or sole actors involved in urban climate action can overlook historic multi-scalar and multi-level contestations that drive changes at the city scale. Naomi Klein in *This Changes Everything* (2014: 459) writes:

> as the furthest-reaching crisis created by the extractivist worldview, and one that puts humanity on a firm and unyielding deadline, climate change can be the force—the grand push—that will bring together all of these still living [social, labor, and environmental] movements.

However, this chapter shows that from inter-city competition over climate-resilient development in US cities to urban-rural competition over natural resource governance in Asian cities, climate urbanism to date suggests not so much a transformative “grand push” but a Freudian death-drive capitalism with climate characteristics. If this is not what most people think climate urbanism “should be,” then it falls on all of us to ask what kinds of urbanism might be more fruitful. The chapter concludes with some reflections and the remainder of the book features contributions that identify seeds of this greater ambition.

### 4.2 Metropolitan (Urban-Urban) Dynamics of Exclusionary Resilience

Climate change tightens the screws of competitive urbanism. In an age of globalization, fiscal austerity, and decentralization, cities sustain themselves through entrepreneurial competition regionally, nationally, and internationally. Climate change injects an unprecedented shock to this system by squeezing cities of available water resources and habitable land and increasing costs of development, service provision, and disaster recovery. Market responses to climate risks—such as rising insurance premiums, realignment of mortgage markets and property valuation in coastal areas, and falling bond ratings for at-risk municipal or other government bonds—are already or will inject volatility into the bases of municipal
fiscal function (Taylor 2020). Evolving research not only identifies the overall potential for financial loss, but the implications for fiscal vulnerability at the city scale (Miao et al. 2018; Shi and Varuzzo 2020; UCS 2018). Cities within and between metropolitan regions compete with one another both to survive the impacts of climate change and to use climate resilience as a narrative and marketing device (see Chaps. 3, 8, and 9).

The experiences of metropolitan efforts to coordinate city-level adaptation to date is indicative of a competitive approach to climate urbanism. As growing numbers of cities began to adapt, many practitioners began to recognize the problems of urban climate adaptation planning (Adams et al., 2016; Shi 2019). For many, barriers to digesting climate projections, undertaking vulnerability assessments, and adopting climate adaptation plans are too onerous (Hamin et al. 2014; Moser and Ekstrom 2012; Shi et al. 2015; see also Chap. 10). Others lament that cities cannot control decisions by utilities, highways, airports, state regulations, nor easily advance adaptation projects given multiple, inconsistent permitting standards (Mukheibir et al. 2013; Vedeld et al. 2016). As some cities began to elevate seawalls or roads, practitioners foresaw a mess of uncoordinated infrastructure systems and the potential for spillover effects. In response, a growing number of metropolitan regions in Europe, Canada, and the United States have launched metropolitan-scale collaborations for climate adaptation (e.g. Adams and French 2019; Bauer and Steurer 2014; Vella et al. 2016). These initiatives aim to catalyse adaptation across metropolitan regions to achieve systems-wide resilience. My research of five such collaboratives in the United States finds that they have helped to build awareness, equalize access to high-quality climate data and training, and lobby for resources (Shi 2019). Recent design competitions—New York’s Rebuild by Design (2013); the Changing Course design competition for the Lower Mississippi River Delta (2014); San Francisco Rebuild by Design (2018)—have also enlivened the public’s ecological imagination as many nature-based proposals followed ecological rather than administrative boundaries.

Yet, despite efforts to advance collective, equitable, metropolitan-scale adaptation, local implementation remains highly uneven and unequal. Cities that can attract investment have doubled down on waterfront development, often contradicting their own climate vulnerability
assessments and regional frameworks (Olazabal et al. 2019; Berke et al. 2015; Shi and Varuzzo 2020; Woodruff and Stults 2016). Wealthier, high-risk municipalities have reconciled this contradiction by pushing for climate-resilient designs particularly in high-end developments, such as elevated buildings, wash-through first floors, wind shear resistance, and elevated HVAC systems, as well as building elevated parks like Hunter’s Point and the East River in New York City. The City of Miami Beach and Miami-Dade County are each raising $100 million or more (from water utility charges and bonds respectively) to fund road elevation and drainage upgrades. On the other hand, smaller suburban municipalities and those in “down markets” lack the funding for implementation, easily redevelopable sites from which to squeeze new revenues, and wealthy residents who can afford to pay more for services. An adaptation gap is emerging within and across metropolitan areas as those who can adapt invest in upgrades and armouring infrastructure, and those who cannot afford to adapt fear becoming climate slums (Eubanks 2016).

Competition is also emerging within and between metropolitan regions for status as the preferred “receiving destinations” for people migrating out of flood-prone areas. After Hurricane Katrina, roughly 100,000 people left New Orleans for Baton Rouge, Houston, Dallas, Atlanta, Tampa, and other cities. Studies expect future disaster events to continue to drive internal migration (Hauer 2017). In flood-prone “sending areas,” markets are beginning to see depressed property value appreciation or actual value loss (Bernstein et al. 2019; McAlpine and Porter 2018). By contrast, financial, insurance, and development industries are racing to model which areas are the best sites in which to invest in the future (Keenan 2019). Real estate investors are beginning to incorporate climate impacts into their portfolios, although most still rely on insurance to mitigate risks and there is not yet a measurable change to their investment practices (ULI and Heitman 2018). In Southeast Florida, the ground zero of sea level rise in the United States, unincorporated parts of Miami-Dade County on higher land have seen land values grow faster than low-lying places like Miami Beach (Keenan et al. 2018). Low-income communities of colour on higher ground like Little Haiti in the City of Miami have seen rising demand for property in their neighbourhoods. Taking a page from China’s Belt and Road Initiative, political
scientists Dolšak and Prakash (2019) have proposed a “Green Rustbelt and Road Initiative” to revitalize post-industrial cities of the American Northeast and Midwest with new green industries and climate displaced persons. Whether market shifts and individual choices bring investment to long-neglected geographies with underutilized infrastructure or add housing and transportation pressures to rapidly growing inland metropolises, marginalized communities who have for decades struggled to sustain a right to the city will be among the most impacted.

These emerging dynamics of intra- and inter-metropolitan responses to climate change show that “New Climate Urbanism” can be speculative, competitive, and exclusionary, as described in several contributions across this book. Speculative because individuals and corporations are eyeing future receiving cities, speculatively purchasing land, displacing residents, and anticipating new rounds of a spatial fix (Harvey 2001; Taylor 2020). Competitive because cities ultimately respond to their own residents, budgets, and regulatory requirements, and act in their own self-interest (see Chap. 9). Despite efforts to advance collective action, they necessarily plan and implement adaptation strategies individually and compete for government funding and private development, resulting in short-term decisions that may produce spillover effects to their neighbours. Exclusionary because so much of the emphasis thus far has been on design and infrastructure fixes that are expensive to build and therefore tied to higher-end developments that justify the expense (see Chap. 8). Even where cities espouse nature-based solutions, such efforts can result in gentrification and exclusion (Wachsmuth and Angelo 2018; Anguelovski et al. 2019; Curran and Hamilton 2017; Dooling 2009). Administrative fragmentation, long a factor in racial and class segregation, now produces new dynamics of spatial injustice (Hodson and Marvin 2009).

4.3 Territorial (Urban-Rural) Dynamics of Extractive Resilience

Securitizing cities under climate change also entails landscape-scale efforts to ensure that cities have enough water, electricity, and flood protection. Cities are extractive and dependent on “rural hinterlands” for basic
resources—water, energy, food, and natural resources that supply commodities (Cronon 1992; Duarte-Abadía and Boelens 2019; Hidalgo-Bastidas and Boelens 2019; Kaika and Swyngedouw 2011; Silver 2015). The impacts of climate change on both rural and urban areas inject new volatility into what historian William Cronon calls the “elaborate urban-rural hierarchy” (Cronon 1992: 378). This requires climate urbanism research to look at dynamics of appropriation, enclosure, and extraction within and beyond city boundaries. In a recent study, my students and I explore how climate change and efforts to adapt water management in four Asian metropolitan regions affect surrounding rural communities (Shi et al. under review). We developed in-depth case studies of water supply management in the regions around Mumbai (India) and Khulna (Bangladesh), and floodwater management around Bangkok (Thailand) and Metro Manila (the Philippines). Examining these cases together highlights how climate change impacts existing urban-rural dynamics across the spectrum of water management.

Efforts to ensure the resilience of these four metropolitan centres treat rural areas as sacrifice zones. Mumbai and Khulna are conscripting water from rural areas for urban domestic consumption rather than addressing problematic internal water allocations or inefficiencies. Bangkok has built and continues to enlarge rings of levees that protect the capital from floods while flooding rural areas, even as the city ignores its own land use plans and permits development on floodplains reserved for floodwater retention. In Metro Manila, governments relocate urban informal settlers from along drainage ways to rural provinces to improve drainage in the capital, while ignoring the impacts to the floodplain by middle- and upper-class development and historic inadequate housing construction for the urban poor. The outcomes of urban adaptation actions often compound growing climate vulnerability in rural areas, themselves struggling with changing hydrological patterns, among other social and developmental changes. Rural precarity then drives more urban migration. Cities’ greater political power and bureaucratic capacity, backed by subnational, national, and international development ambitions, tend to overwhelm rural resistance. In turn, unjust privileging of urban resilience contributes to intensifying urban-rural conflicts. In Bangkok, residents of rural provinces broke 14 water gates following months of inundation, and both
water projects in Mumbai and Khulna experienced years of lawsuits. The fragmentation of governance institutions and administrative entities across these large geographic scales challenges efforts to coordinate or rationalize development and water use. These institutional uncertainties further enable dominant political forces to grab resources at the expense of others.

These dynamics suggest, firstly, that cities are not only unintentionally causing spillover effects in pursuit of their own well-being through climate responses, but also privileging their resilience over that of the “other.” These actions go beyond the exclusionary to the actively extractive, as cities seek additional water or floodable land from other geographies. More empowered groups mount a resistance such that the most vulnerable groups—informal settlers without land tenure, indigenous tribes, and subsistence fishing and farming communities—that cannot legally or politically resist urban projects are ultimately the ones most impacted. Their resilience and well-being under climate change are never part of assessments, revealing the double standard for whose resilience really counts. Cities’ growing prominence as climate actors and their search for investments to build climate-proof enclaves within their boundaries reinforces this incongruity (Chap. 3). Depriving rural areas of fundamental land and water resources denies their ability to survive and sustain the social, governance, and ecological relationships that historically stewarded natural landscapes.

Second, these cases demonstrate that urban responses to climate change implicate geographies far beyond their immediate borders. Cities leading climate action are often represented as dots on a map, as if each dot captures the totality of that geography and all dots are equal and harmonious to others on the map. In reality, of course, these dots lie within metropolitan regions including dozens or hundreds of cities that exist as individual jurisdictions precisely because they value their autonomy. Brenner and Schmid argue the definition of “urban” is a chaotic concept and an artefact of statistics. Instead, they call for “a new conceptualization of urbanization processes both within and beyond those settlement spaces that are demarcated as ‘cities’” (2014: 749). Others critique academics for similarly committing “methodological cityism” (Angelo and Wachsmuth 2015) by focusing almost exclusively on the local as the
relevant scale of climate adaptation (Nalau et al. 2015; Preston et al. 2013; Chap. 5). While cities do play a lead role in the United States, in the context of centralized Asian countries, these projects are more often the result of decisions at higher levels of government than of local actors.

The scale suggested by “New Climate Urbanism” belies the multiscalar dimensions of “the urban” (see also Chap. 7). A focus on cities creates dichotomous geographies of urban and non-urban, while neglecting relationships that connect these geographies (Roy 2005). A focus on the urban can overlook the reality of administrative boundaries that divide a seemingly contiguous urban field into hundreds of fiefdoms with uneven capacity and authority. While the examples given above reference integrated landscapes like metropolitan regions or watersheds, the scale of urban climate securitization reflects the global reach of contemporary capitalism and urbanism (Moser and Hart 2015). Gulf countries, for example, have purchased large tracts of land in East Africa to secure food production given their own lack of water and arable land (Todman 2018). Rising nationalism and efforts to restrict immigration into Europe and the United States in turn reflect national responses to secure nations from climate-displaced migrants. At a minimum, scholars and practitioners must be cognizant of these alternative geographies in assessing urban climate action. A critical task for scholars is to put forth workable alternatives to “cities” that facilitate assessment, planning, governance, and decision-making. It is likely that no such scalar metric exists universally, which itself frustrates efforts to scale up equitable adaptation.

4.4 Conclusion: Imagining Alternative Climate Urbanisms

Cities that have the political and economic clout are enacting a capitalist endgame that rehashes and intensifies existing dynamics of urban developmentalism, social and environmental exploitation, and deepening inequality (Anguelovski et al. 2019; Dooling 2009; Long and Rice 2019). In coastal areas, cities are pragmatically, if cynically, maximizing coastal development to reap whatever revenues and profits they can before the
music stops. Other urban centres are wresting resources from rural hinterlands and disposing unwanted urban poor residents to rural peripheries, long-standing practices now buoyed by the added justification of climate change. If this is an era of New Climate Urbanism, these examples suggest that urban responses to climate threats are not necessarily new or even urban. Many of the underlying drivers—fiscalization and monetization of land value; enclosure of the commons and eradication of people from land; boundary-setting to control who can access resources; capital mobility and hyper-competition among municipalities—are depressingly familiar. This is business-as-usual capitalism with climate characteristics. How can scholars, funders, activists, and practitioners challenge these tendencies? Below, I highlight three potential shifts in adaptation practice that can help redirect the growing global industry around adaptation and resilience planning.

Expanding the geographic and temporal scale of resilience planning. There is an urgent need to reframe global resilience discourse to encompass alternative geographic and temporal scales. For one, dominant global networks raise up exemplary cities in ways that elide the complicated territorial infrastructure, ecological, and political systems in which cities sit. From a management perspective, ecosystem scales such as watersheds offer a logical scale at which to manage the hydrological impacts of climate change. The scale of metropolitan (even subnational) regions encompassing urban areas and rural hinterlands also enables more holistic approaches to study the impacts of climate change, the politics of land and resource governance institutions, and identify collective, transformative adaptation strategies. The lack of governance institutions in most countries to manage crises at the regional scale underscores the need to start conversations on territorial governance. The Covid-19 pandemic is reviving interest in relocalization to mitigate vulnerabilities associated with global integration. This potentially awakens opportunities to consider socially and ecologically restorative approaches to regional food, natural resource, and development planning.

For another, the future orientation of climate projections has produced adaptation plans that often forget and erase the historic unsustainable and unjust development processes that have resulted in present-day vulnerabilities. Expanding the historic perspective of resilience initiatives
forces adaptation planning to grapple with drivers of urbanization, past processes of resource extraction, pollution, and depletion, and these impacts on different identity groups. These are uncomfortable issues involving conflicts and trade-offs but which are necessary to confront to advance towards transformative change beyond incremental “win-win” solutions.

Looking to the margins rather than the global hubs of urbanization for inspiration. The inspiration for countering dominant, regressive strains of adaptation is unlikely to come from global cities and their governing elites because of their ability to securitize existing centres of wealth and power. As this chapter demonstrates, it is the most politically, economically, and culturally powerful cities that can exclude and extract in seeking resilience. From Jakarta’s Great Garuda to Lagos’ Eko Atlantis to Rotterdam’s Room for the River to New York City’s BIG U, these cities have incomparable ability to raise funds, attract investment, and launch large-scale infrastructure projects. In these cities, how are sacrificed and overlooked neighbourhoods organizing their own adaptation? How are secondary, tertiary, suburban, peri-urban, or semi-rural municipalities that lack capacity to plan or invest in infrastructure-based adaption responding? How are indigenous communities whose lifeways entail living with ecological flux dealing with these changes, given their reliance on ecosystems for livelihoods? These “views from off the map” (Robinson 2002) are likely to reveal alternative adaptation strategies requiring collective action and non-infrastructural solutions by dint of necessity or alternative values.

There is an opportunity to uplift alternative perspectives of “resilience” from those who have always been outside of or excluded from the benefits of capitalist urbanization. The planning field increasingly accounts for social vulnerability, equity, and justice in adaptation and resilience. While an improvement from mainstream resilience planning, this typically entails prioritizing vulnerable communities for emergency aid and disaster risk reduction. Instead, social scientists can help synthesize case studies of indigenous knowledge, community-based adaptation, and small-medium city adaptation efforts and identify clear implications for policymakers. The Earth Systems Governance Project has worked to build a global community of scholars over the last decade and advance knowledge synthesis and harvesting (Biermann et al. 2019). This and
other efforts must work to ensure this knowledge gains the equivalent salience and recognition as C40 and 100 Resilient Cities.

**Connecting and empowering local and transnational social movements.** Globally, social movements on the left and right are intensifying, from Extinction Rebellion to Black Lives Matter to the rise of populism and nationalism worldwide. These movements are deeply divided by ideology, identity, and geography, yet share undercurrents of opposition to globalization, income and spatial inequality, and environmental decline. One critical need is for movement alignment that can build towards a bigger “we” to counteract dynamics of competitive and extractive urbanism under resource scarcity. An added challenge is bridging activism with communities of practice proposing and debating specific institutional reforms. Property rights and land tenure regimes, fiscal policy, risk mitigation instruments like insurance, and mortgage-lending policies structure the politics around development decisions. Community activism seeks remedies to immediate threats but rarely offers specific implementable reforms to broader institutions shaping urban development. Instead, highly technical professional experts debate policy changes in these domains, bypassing the altogether separate sphere of activism. There is an opportunity to train both communities of practice to speak one another’s language and enable more creative and productive dialogue, learning, and transformation.

Depression, grief, and a sense of helplessness are occupational hazards for natural and social scientists researching climate change. But I reject the notion that critical scholars exist to document the demise of society in an age of climate change. What is the value academia to broader society if not to give hope of better paths forward (see also Chap. 2)? Scholars play a key role in the above proposals. They can support alternative urbanisms by synthesizing knowledge, such as the innumerable case studies we conduct, to show clear alternative pathways. Researchers can become, train, or work with boundary actors to bridge the worlds of activism and institutional governance. As keepers of disciplinary knowledge, we can inform and transform pedagogy and academic or professional institutions that define meaning and norms. Scholars are excellent at identifying and describing the problems with the world; now we must transform our own practice to support a “grand push” towards more liberating climate futures.
References

Adams, S., Crowley, M., Forinash, C., & McKay, H. (2016). *Regional Governance for Climate Action*. Montpelier, VT: Institute for Sustainable Communities.

Adams, S., & French, K. (2019). *Regional Collaboratives for Climate Change – A State of the Art*. Montpelier, VT: Institute for Sustainable Communities.

Angelo, H., & Wachsmuth, D. (2015). Urbanizing urban political ecology: A critique of methodological cityism: Urbanizing urban political ecology. *International Journal of Urban and Regional Research, 39*(1), 16–27. https://doi.org/10.1111/1468-2427.12105.

Anguelovski, I., Connolly, J. J. T., Pearsall, H., Shokry, G., Checker, M., Maantay, J., et al. (2019). Opinion: Why green “climate gentrification” threatens poor and vulnerable populations. *Proceedings of the National Academy of Sciences, 116*(52), 26139–26143. https://doi.org/10.1073/pnas.1920490117.

Bauer, A., & Steurer, R. (2014). Multi-level governance of climate change adaptation through regional partnerships in Canada and England. *Geoforum, 51*, 121–129.

Bernstein, A., Gustafson, M., & Lewis, R. (2019). Disaster on the Horizon: The price effect of sea level rise. *Journal of Financial Economics, 134*(2), 253–272.

Berke, P., Newman, G., Lee, J., Combs, T., Kolosna, C., & Salvesen, D. (2015). Evaluation of networks of plans and vulnerability to hazards and climate change: A resilience scorecard. *Journal of the American Planning Association, 81*(4), 287–302. https://doi.org/10.1080/01944363.2015.1093954.

Biermann, F., Betsill, M. M., Burch, S., Dryzek, J., Gordon, C., Gupta, A., Gupta, J., Inoue, C., Kalfagianni, A., Kanie, N., Olsson, L., Persson, Å., Schroeder, H., & Scobie, M. (2019). The earth system governance project as a network organization: A critical assessment after ten years. *Current Opinion in Environmental Sustainability, 39*, 17–23. https://doi.org/10.1016/j.cosust.2019.04.004.

Brenner, N., & Schmid, C. (2014). The ‘Urban Age’ in Question. *International Journal of Urban and Regional Research, 38*(3), 731–755.

Cronon, W. (1992). *Nature’s Metropolis: Chicago and the Great West*. New York: W. W. Norton and Co..

Curran, W., & Hamilton, T. (Eds.). (2017). *Just green enough: Urban development and environmental gentrification*. London: Routledge.

Dolšak, N., & Prakash, A. (2019). Jobs And Climate Change: America’s (Rust) Belt And Road Initiative. Forbes. Retrieved from https://www.forbes.com/
Dooling, S. (2009). Ecological gentrification: A research agenda exploring justice in the city. *International Journal of Urban and Regional Research, 33*(3), 621–639.

Duarte-Abadía, B., & Boelens, R. (2019). Colonizing rural waters: The politics of hydro-territorial transformation in the Guadalhorce Valley, Málaga, Spain. *Water International, 44*(2), 148–168.

Eubanks, V. (2016). My drowning city is a Harbinger of climate slums to come. The Nation. [https://www.thenation.com/article/low-water-mark/](https://www.thenation.com/article/low-water-mark/).

Hamin, E. M., Gurran, N., & Emlinger, A. M. (2014). Barriers to municipal climate adaptation: Examples from coastal Massachusetts’ smaller cities and towns. *Journal of the American Planning Association, 80*(2), 110–122.

Harvey, D. (2001). Globalization and the spatial fix. *Geographische Revue, 2*, 23–30.

Hauer, M. E. (2017). Migration induced by sea-level rise could reshape the US population landscape. *Nature Climate Change, 7*(5), 321–325.

Hidalgo-Bastidas, J. P., & Boelens, R. (2019). The political construction and fixing of water overabundance: Rural–urban flood-risk politics in coastal Ecuador. *Water International, 44*(2), 169–187.

Hodson, M., & Marvin, S. (2009). “Urban ecological security”: A new urban paradigm? *International Journal of Urban and Regional Research, 33*(1), 193–215.

Kaika, M., & Swyngedouw, E. (2011). The urbanization of nature: Great promises, impasse, and new beginnings. In G. Bridge & S. Watson (Eds.), *The new blackwell companion to the city*. Malden, MA: Wiley-Blackwell.

Keenan, J. M. (2019). A climate intelligence arms race in financial markets. *Science, 365*(6459), 1240–1243.

Keenan, J. M., Hill, T., & Gumber, A. (2018). Climate gentrification: From theory to empiricism in Miami-Dade County, Florida. *Environmental Research Letters, 13*(5).

Klein, N. (2014). This Changes Everything: Capitalism vs. The Climate. Simon and Schuster.

Long, J., & Rice, J. L. (2019). From sustainable urbanism to climate urbanism. *Urban Studies, 56*(5), 992–1008. [https://doi.org/10.1177/0042098018770846](https://doi.org/10.1177/0042098018770846).
McAlpine, S. A., & Porter, J. R. (2018). Estimating recent local impacts of sea-level rise on current real-estate losses: A housing market case study in Miami-Dade, Florida. *Population Research and Policy Review, 37*(6), 871–895.

Miao, Q., Hou, Y., & Abrigo, M. (2018). Measuring the financial shocks of natural disasters: A panel study of U.S. States. *National Tax Journal, 71*(1), 11–44.

Moser, S. C., & Ekstrom, J. A. (2012). Identifying and overcoming barriers to climate change adaptation in San Francisco bay: Results from case studies [White Paper]. California Energy Commission.

Moser, S. C., & Hart, J. A. F. (2015). The long arm of climate change: Societal teleconnections and the future of climate change impacts studies. *Climatic Change, 129*(1–2), 13–26.

Mukheibir, P., Kuruppu, N., Gero, A., & Herriman, J. (2013). Overcoming cross-scale challenges to climate change adaptation for local government: A focus on Australia. *Climatic Change, 121*(2), 271–283.

Nalau, J., Preston, B. L., & Malo, M. C. (2015). Is adaptation a local responsibility. *Environmental Science and Policy, 48*, 89–98.

Olazabal, M., Gopegui, M. R., de, Tompkins, E. L., Venner, K., & Smith, R. (2019). A cross-scale worldwide analysis of coastal adaptation planning. *Environmental Research Letters, 14*(12), 124056. https://doi.org/10.1088/1748-9326/ab5532.

Preston, B. L., Mustelin, J., & Maloney, M. C. (2013). Climate adaptation Heuristics and the science/policy divide. *Mitigation and Adaptation Strategies for Global Change, 20*(3), 467–497.

Robinson, J. (2002). Global and world cities: A view from off the map. *International Journal of Urban and Regional Research, 26*(3), 531–554.

Roy, A. (2005). Urban informality: Toward an epistemology of planning. *Journal of the American Planning Association, 71*(2), 147–158.

Silver, J. (2015). Disrupted infrastructures: An urban political ecology of interrupted electricity in accra. *International Journal Urban Regional, 39*, 984–1003. https://doi.org/10.1111/1468-2427.12317.

Shi, L. (2019). Promise and paradox of metropolitan regional climate adaptation. *Environmental Science and Policy, 92*, 262–274.

Shi, L., Chu, E., & Debats, J. (2015). Explaining progress in climate adaptation planning across 156 U.S. municipalities. *Journal of the American Planning Association, 81*(3), 191–202.

Shi, L., & Varuzzo, A. M. (2020). Rising seas, surging fiscal stress: Patterns and implications of municipal fiscal vulnerability to climate change in Massachusetts. *Cities, 100*, 102658.
Shi, L., Ahmad, F., Shukla, P., & Yupho, S. (under review). Urban security, rural sacrifice: Governing water in an age of climate change. Global Environmental Change.

Taylor, Z. J. (2020). The real estate risk fix: Residential insurance-linked securitization in the Florida metropolis: Environment and Planning A: Economy and Space. Early view: https://doi.org/10.1177/0308518X19896579.

Todman, W. (2018). The gulf scramble for Africa: GCC states’ foreign policy laboratory [CSIS Brief]. Center for Strategic and International Studies. https://www.csis.org/analysis/gulf-scramble-africa-gcc-states-foreign-policy-laboratory.

UCS. (2018). Underwater: Rising seas, chronic floods, and the implications for US coastal real estate (p. 28). Union of Concerned Scientists.

ULI and Heitman. (2018). Future proofing real estate from climate risks. Urban Land Institute and Heitman Real Estate Management Firm. http://www.heitman.com/wp-content/uploads/2018/10/Future-Proofing-Real-Estate.pdf.

Vedeld, T., Coly, A., Ndour, N. M., & Hellevik, S. (2016). Climate adaptation at what scale? Multi-level governance, resilience, and coproduction in Saint Louis, Senegal. Natural Hazards, 82(2), 173–199. https://doi.org/10.1007/s11069-015-1875-7.

Vella, K., Butler, W. H., Sipe, N., Chapin, T., & Murley, J. (2016). Voluntary collaboration for adaptive governance: The Southeast Florida regional climate change compact. Journal of Planning Education and Research, 36(3), 363–376.

Wachsmuth, D., & Angelo, H. (2018). Green and gray: New ideologies of nature in urban sustainability policy. Annals of the American Association of Geographers, 108(4), 1038–1056. https://doi.org/10.1080/24694452.2017.1417819.

Woodruff, S. C., & Stults, M. (2016). Numerous strategies but limited implementation guidance in US local adaptation plans. Nature Climate Change, 6, 796–802.