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THE CLIMATE CHANGE-FOOD SECURITY NEXUS: INTERGOVERNMENTAL FRAMEWORKS AND HYPER-EXPERIMENTATION IN CITIES

CARRIE L. MITCHELL,[1] JOANNE FITZGIBBONS,[2] KRISTEN REGIER[3] AND SIYA AGRAWAL[4]

SERIES EDITOR: JONATHAN CRUSH[5]

[1, 2, 3, 4] School of Planning, University of Waterloo, 200 University Avenue West, Waterloo N2L 3G1, Canada, carrie.mitchell@uwaterloo.ca

[5] Professor, Balsillie School of International Affairs, 67 Erb Street West, Waterloo N2L 6C2, Canada, jcrush@balsillieschool.ca

Abstract

In this discussion paper we detail the challenges of tackling the food security-climate change nexus in an era of hyper-experimentation in cities. We detail how the challenge of addressing food security and climate change at the international scale has opened the metaphorical door for urban experimentation, or interventions in the processes of city building at the local level taken by state and non-state actors. Yet, today's urban experiments differ significantly from their historical counterparts. We detail examples from planning history to contextualize the differences between historical and contemporary urban experimentation. Through a review of three global and national urban experiments, we show that the speed, scale, and heterogeneity of experiments differ significantly from traditional planning practice, with equity and governance implications for cities and their citizens. We conclude with recommendations to help mediate some of the biggest challenges with hyper-experimentation in cities.

Keywords

climate change, food security, planning, urban experimentation, equity, governance

This is the 25th discussion paper in a series published by the Hungry Cities Partnership (HCP), an international research project examining food security and inclusive growth in cities in the Global South. The five-year collaborative project aims to understand how cities in the Global South will manage the food security challenges arising from rapid urbanization and the transformation of urban food systems. The Partnership is funded by the Social Sciences and Humanities Research Council of Canada (SSHRC) and the International Development Research Centre (IDRC) through the International Partnerships for Sustainable Societies (IPaSS) Program.

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Introduction

The challenge of feeding a population of nine billion people is a critical global issue. One in seven people do not have access to sufficient caloric requirements to meet their daily needs (Godfray et al 2010). The reasons for food insecurity are multifaceted but have been attributed primarily to three reasons: increasing instability in conflict ridden regions, economic challenges, and climate change. Climate change, in particular, is impacting all four dimensions of food security: the physical availability of food, economic and physical access to food, food utilization, and food stability (Upton et al 2016).

Limited attention has been given to the climate change-food security nexus until recently (Rasul and Sharma 2015). Using a nexus approach to understand global problems, and potential solutions, allows the thinking through of potential synergies and trade-offs between various actions. Yet, primary and secondary research suggests that understanding and responding to these interlinked issues at various institutional scales has been neglected. This paper details this trend, arguing that a lack of international coordination and consensus on issues of food security and climate change has catalyzed the formation of city-based networks and programs, and popularized renewed interest in urban experimentation, or interventions in the processes of city building at the local level taken by state and non-state actors.

In the context of historical and contemporary planning practice, urban experimentation creates new challenges for planning practice by way of the scale and speed of interventions or "hyper-experimentation". The paper focuses on three current urban experiments – the Rockefeller Foundation's 100 Resilient City global program, India's Smart Cities Mission, and Infrastructure Canada's Smart Cities Challenge – and argues there is a heterogeneity of approaches used to tackling food security and climate change underway in cities globally. Other contemporary challenges with hyper-experimentation discussed include: a lack of attention to socio-economic equity and a privileging of the entrepreneurial, competitive city. The issues raised have serious implications for coordinated efforts to solve the key global challenges of food insecurity and climate change. The paper concludes with a discussion on how to move forward in this era of hyper-experimentation.

Global (In)action on Climate Change and Food Security

Food Security: From Global to Local

Food security is most commonly defined as existing when "all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO 1996). While there is enough food produced worldwide to feed the global population, an estimated 815 million people were food insecure in 2015. The FAO (2017) attributes the rise in food insecurity worldwide to violent conflict, exacerbated by climate-related shocks. The International Panel on Climate Change (IPCC)'s Fifth Assessment report echoes this linkage and clearly articulates the climate change-food security nexus: "all aspects of food security are potentially affected by climate change, including food access, utilization, and price stability" (Porter et al 2014: 488).

Effective global action on food security at the international level has been severely hampered by competing institutional objectives and national priorities. Jarosz (2009) argues that tensions between responses that prioritize economic growth, agricultural productivity, and food as a human right have plagued the FAO since its inception in 1945. These internal tensions, fuelled by competing national economic interests, have resulted in the dwindling leadership and influence of the organization. The power and authority of the FAO and other intra-governmental organizations has been further eroded by the plethora of new actors on the food security scene. In the 1960s and 1970s, the FAO's sole authority to tackle global food security

was challenged by the United Nations (UN) World Food Program, which was charged with emergency food aid delivery, and the International Fund for Agriculture Development (IFAD), which was created to fund rural development (Jarosz 2009). The global governance of food security has shifted again in the last few decades, this time towards more participatory and decentralized processes, fuelled by a variety of public and private actors at multiple institutional scales.

The participatory and decentralized evolution of global food security governance, along with concurrent growth in urban populations, has arguably led to increased focus on the "local scale" of food security. Calls for cities to help tackle food security have proliferated. For example, a recent IIED briefing note argues that "local governments' support to community-led initiatives to improve food access and safety can greatly reduce food insecurity and contribute to greater resilience to the impacts of climate change" (Tacoli et al 2013: 1). The rise in grassroots, decentralized, food security governance has been accompanied by an increase in city-driven efforts to address food security. The Milan Urban Food Policy Pact, for example, is an international pact signed by 180 cities. In it, signatory cities acknowledge that they have a "strategic role to play in developing sustainable food systems and promoting healthy diets" (Milan Urban Food Policy n.d.). Regional food security networks are also on the rise. The African Food Security Urban Network (AFSUN), for example, was founded in 2008 to tackle food insecurity in Africa's urbanizing towns and cities (AFSUN 2018).

Yet, despite efforts at reform of the global governance of food security, the new decentralized model remains fragmented, with overlapping mandates and limited policy and planning coordination between countries and cities. Moreover, there is limited action on the challenge of adapting food production systems to deal with the effects of climate change, as this is often beyond the scope of intervention for local governments.

Climate Change: From Global to Local

International action on climate change began in earnest in 1988, when the IPCC was formed to collate and assess evidence on climate change. Two years later, the IPCC produced its First Assessment Report on global climate change, yet a definitive statement that humans are responsible for climate change did not materialize until the Second Assessment Report in 1995. Concurrently, during the 1990s, state governments focused on creating systems to monitor (the 1992 United Nations Framework Convention on Climate Change) and limit (the 1997 Kyoto Protocol) emissions. In the 2000s, the perceived economic consequences of placing limits on emissions led a few prominent signatories to withdraw from Kyoto, namely the United States (in 2001) and Canada (in 2011).

Global action on climate change lagged in the early 2000s. In 2009, the non-binding Copenhagen Accord was the resulting compromise in tense negotiations at the UN Conference of the Parties in Copenhagen. One of the outcomes of the Accord was a three-year deal on "fast-start financing" for developing countries. Over USD30 billion in additional climate finance has been provided to developing countries since Copenhagen, but there remains no clear path to the USD100 billion target. Another concern is that meeting the target has so far involved the reclassification of some existing aid flows. Mostly recently, the 2015 Paris Climate Agreement offered some hope for the future of global climate action. At the UN Conference of the Parties held in Paris, 195 states agreed to tackle climate change and make economic investments towards a low-carbon future. Yet, in 2017 the United States withdrew from the Agreement, leaving the international community's vision for mitigating climate change in a state of flux once again.

While action on climate change is gaining ground globally, the US notwithstanding, there remains a lack of coordination across sectors, particularly among water, energy, and food (Rasul and Sharma 2015). Indeed, most National Adaptation Plans of Action (NAPAs) have been prepared to meet

sector-specific goals, not to address a nexus of interrelated issues. This can result in competing and counterproductive adaptation actions (Rasul and Sharma 2015). The gap created by faltering global action on climate change has been, to some extent, filled by regional non-governmental actors. For example, The C40 Cities Climate Leadership Group connects more than 90 of the world's biggest cities, representing over 650 million people and one-quarter of the global economy (C40 Cities nd). In addition, the Global Covenant of Mayors works to organize and mobilize cities and local governments to be active contributors to a global climate solution. The network includes 9,000 cities and local governments from six continents and 127 countries, representing more than 770 million residents (C40 Cities nd).

In the absence of coordinated and consistent efforts to address climate change at the international and state levels, these initiatives suggest that municipal governments are stepping in to fill the gap. The challenge with this trend, explored below, is that cities have not responded to climate change uniformly. Additionally, like their national and international counterparts, local governments have generally ignored the intersectionality of climate change and food security. However, before delving into this issue, we first turn our attention to understanding historical and contemporary trends in urban experimentation.

Urban Experimentation

History of Urban Experimentation

Urban experimentation can broadly be explained as an intervention in city building, or the urban application of "learning by doing" (Caprotti and Cowley 2017). The initial description of the term can be traced to literature on multi-level perspectives and technological transitions theory (Geels 2005), although there is a long history of experimentation within the field of urban planning. As Evans (2016: 429) notes: "the city has, arguably, always been experimental insofar as urban knowledge has, throughout the history of urbanization, routinely been 'tested' by authorities as part of ongoing efforts to improve the city." Urban experiments were born out of the desire to improve cities and enact lasting, radical change (Caprotti and Cowley 2017, Evans 2016, Karvonen and van Heur 2014). Raven et al (2017: 1) describe urban experimentation as "an actionable form of government."

Urban experimentation takes three broad overlapping forms: policy and governance, socio-technical transitions, and living laboratories (Bulkeley and Broto 2013). These three types of urban experimentation are not mutually exclusive; the forms often overlap and borrow concepts from each other. First, policy and governance experiments can be described as interventions that take place outside conventional channels of state authority and hence reposition the state within urban processes (McLean et al 2016). An example of this is the 100 Resilient Cities initiative, spearheaded by the Rockefeller Foundation, a US-based private philanthropic foundation that has, through this initiative, positioned itself in municipal government affairs. As part of acceptance into the 100 Resilient Cities network, cities have to draft a city resilience strategy with funds from the Foundation. In doing so, the Rockefeller Foundation is running a real-time experiment in its participating cities, attempting to restructure traditional hierarchies within city governments.

Second, socio-technical transitions are characterized by experimentation in defined "niches", where experiments are able to occur in relative safety from outside judgement or influence. These niches act as launching grounds to then expand ideas if proven successful (Bulkeley and Broto 2013). For example, the US city of Austin launched a "smart" energy project, Pecan Street Project, to test new sustainable technologies on the existing energy grid. These technologies were created in an effort to transition the city to a low-carbon community (McLean et al 2016). The experiment was located in the Mueller district, which acted as a relatively defined niche, an area safe to pilot the experiment before trying to scale the initiative to a larger network. In Singapore, the city installed "Supertrees" at their Gardens by

the Bay. These trees, measuring 25 and 50 metres tall, are designed to act as large canopies, providing shade for pedestrians during the day and a light show at night (Gardens by the Bay nd).

Third, urban living labs (ULL) are differentiated by their focus on knowledge production and their ongoing use of partnerships between public and private sectors. One example is the current development of Toronto's Quayside, made possible through a private-public partnership between the City of Toronto, Waterfront Toronto, and Sidewalk Labs. The community is planned to be completely "smart", utilizing urban forms and regulations in an experimental way (Sidewalk Labs nd, Woyke). Another example, from Hangzhou, China, is the "City Brain", in collaboration with the Alibaba Group and Foxconn Technology Group. The City Brain is an artificial technology hub, which will use big data to conduct real-time analysis of infrastructure, transportation, and water supply to improve efficiency (People's Daily Online 2016).

Historical Examples of Urban Experimentation in Planning

Within planning, the roots of urban experimentation can be seen in movements as early as the end of the 19th century, in which experiments were centred on utopian visions of the city and monumental change (Caprotti and Cowley 2017). The first example of urban experimentation can be seen in the "garden city" movement, spearheaded by Ebenezer Howard. This movement was positioned as a response to the environmental and health problems of the industrial city, such as overcrowding, pollution, and the rapid spread of disease. Howard sought to create a community that incorporated the progressive elements of the city with the perceived health benefits of rural living. Howard envisioned a network of "garden" communities with exactly 32,000 people each, where the community would be self-sufficient, connected by canals and rail lines. Each city would be surrounded by a greenbelt and would have easy access to the countryside, enabling its citizens to live healthy and happy lives, in harmony with their environment. At the core of Howard's vision was a community where working-class citizens could have an elevated quality of life. He presented the garden city movement as a solution to capitalist, industrial society (Monclús and Diez Medina 2018).

The implementation of the garden city model was slow. Howard published a book, *To-morrow: A Peaceful Path to Real Reform*, detailing his model in 1898 (Howard 1898). In 1902, he re-published it, titling it *Garden Cities of To-morrow* (Howard 1902). The following year, he created an association to raise funds for the purchase of land and development of the first garden city. Howard was only able to gain funding from wealthy investors, and in 1904 two architects, Raymond Unwin and Barry Parker, won the bid to plan and design the City of Letchworth in the United Kingdom. This experimental city revealed challenges for the implementation of Howard's vision, as Unwin and Parker's construction resulted in housing that was far more expensive than the average working-class citizen could afford, and a design less connected and compact than originally planned (Clevenger and Andrews, 2017). A liberal, reformist movement was thus transformed into a development for the wealthy, and an unintended model for future suburban developments (Monclus et al 2018).

Letchworth remained the only example of experimentation until 1919, when Howard purchased land to create a second garden city (Welwyn, UK). The small, one-city-at-a-time process continued well into the 1930s. These two garden cities remained the only examples of Howard's vision until the end of the 1930s, when the ideals started to infiltrate more broadly into city planning. It was not until after World War 2 that the movement spread within and beyond the United Kingdom. "We want not only England but all parts of the Empire to be covered with Garden Cities" (Home 1990: 32). Pinelands in Cape Town, for example, has been described as the first garden city of South Africa. But idealized garden cities of the United Kingdom, when imported into its colonies, met with resistance. In South Africa, for example, the philosophical ideals of efficient, harmonious living clashed with the realities of segregation (Home 1990). Contrary to

its original aims, the colonial "garden city" often facilitated the creation of racially polarized urban forms, or what has been referred to as "dual cities" (Bigon 2013).

Le Corbusier's *La Ville Radieuse* (1933), otherwise known as "Towers in the Park", is another historical example of urban experimentation. The ideology behind this plan was similar to Howard's garden city in that both were attempts to solve the problems of the industrial city, including pollution, crime, and overcrowding. Le Corbusier (1933) was heavily influenced by Howard and believed that the best way to improve the health and well-being of the population was to allow them access to affordable housing and green space (Vitaliev 2015). For Le Corbusier, this meant replacing unsuitable dwellings with skyscrapers and situating them in a dispersed manner, with open green space shared between the towers. The buildings were designed to hold large numbers of people, while also providing access to green space (Jabareen 2006). Further, the community was planned to be self-contained, with grocery stores, shops, and transportation housed within the development; Corbusier's vision of the ideal living environment (Le Corbusier 1933).

Much like the garden city movement, the speed of implementation spanned several decades. Corbusier originally showcased his vision for Paris in 1933 at the Congress Internationaux d'Architecture Moderne meeting. He then published a refined version in 1935. His modernist intervention was not accepted by the committee as a suitable plan for Paris. The most realized vision of Le Corbusier was the Unité d'Habitation in Marseille, France, completed in 1952, nearly two decades after the debut of his initial vision. In the following decades, his design influenced developments worldwide. A famous example of this experimental architectural style is in Chandigarh, India. Following partition, the state of Punjab was in search of a new capital, and Chandigarh was selected to fulfil this role. In many ways, Le Corbusier's arrival in India "shattered the existing ways of thinking of many architects" (Shaw 2009: 863). However, colonial legacies persisted through, for example, class segregation of government housing.

Contemporary Urban Experimentation

While urban experimentation is a longstanding tradition in the field of planning, contemporary iterations of experimentation present unique opportunities and challenges for cities, as well as the climate change and food security agendas of international, national, and regional agencies. While early experiments, such as Howard's garden cities and Le Corbusier's towers in the park, mainly responded to localized challenges relating to industrial land use, contemporary urban experiments seek to address complex global challenges. Accordingly, the scale of urban experimentation has also changed, with many initiatives bypassing the conventional state and intergovernmental hierarchies to forge their own networks across city governments. This may have the unintended consequence of hindering coordinated action toward common global issues, such as the nexus of climate change and food security. Contemporary urban experimentation has three key characteristics: the scale of interventions, the speed of implementation, and the heterogeneity of interventions.

Scale of Urban Experimentation

One of the major shifts in contemporary urban experimentation is the scale of interventions. In contrast to previous attempts at urban experimentation, contemporary experimentation takes place at much larger scales within and across countries. For example, in 2013, the Rockefeller Foundation pioneered 100 Resilient Cities, and proposed building a network of 100 cities dedicated to building resilience to chronic and acute economic, social, and physical urban challenges. In 2016, the Foundation announced it had reached its "100 City Milestone" with 100 cities, spanning five continents, participating in its USD164 million global initiative to catalyze urban resilience (Rockefeller Foundation 2016).

This rapid scaling of experimentation is also true for urban experiments within countries. India and Canada have used a similar competitive model to

spark urban experimentation in their respective cities. In 2015, India's Ministry of Housing and Urban Affairs challenged its cities to compete for municipal funding through its "Smart Cities Mission". In 2016, 20 cities were chosen for funding in Round 1, and 80 additional cities were selected between 2016 and December 2018, bringing the number to 100 winning proposals. According to the Government of India, the initiative has affected a total urban population of 99,630,069 (National Institute of Urban Affairs 2018). In 2018, Infrastructure Canada launched the "Smart Cities Challenge", which will award a prize of CAD50 million to the winning municipality in 2019. The challenge attracted 130 entries from communities across Canada (Infrastructure Canada 2018).

While these competitions provide no definition of what a "smart city" entails, they do offer cities some general guidelines on smart city features. Infrastructure Canada "encourages communities to adopt a smart cities approach to improve the lives of their residents through innovation, data and connected technology" (Infrastructure Canada 2018). For India's Ministry of Housing, smart cities mean housing for all, walkability, mixed-use land developments, preserving and promoting open space, and promoting a variety of transit options. More lofty goals are also included, such as "citizen-friendly" governance and giving an identity to the city.

Speed of Urban Experimentation

Both the garden city movement and the radiant city movement evolved over decades. Practically speaking, slow implementation means that cities have a chance to "learn-by-doing" and correct missteps along the way before implementing on a larger scale. Today's urban experiments take place over a much shorter period. The Rockefeller Foundation's 100 Resilient Cities program reached its goal of a 100-city network in just three years. As part of acceptance into the 100 Resilient Cities network, each participating city is allocated funds to hire a chief resilience officer responsible for leading the collaborative development of a city resilience strategy over a period of less than one year. Smart city competitions in India and Canada have moved even faster.

On one hand, the faster turn-around time of contemporary urban experiments allows cities to be responsive to changing contexts and problems. On the other, this preoccupation with speed means a lack of critical reflection into the processes of creating resilient, smart, and sustainable cities. Within contemporary urban experimentation, no time is afforded to learn from failure, or to adjust and revise. Instead, time, or lack thereof, is an impetus for action: "People can't afford to wait for digital advances to transform the urban environment. So we're creating a new type of place to accelerate urban innovation and serve as a beacon for cities around the world" (Sidewalk Labs 2018). The Rockefeller Foundation cites fears of precarious urban futures to justify its speed of implementation: "Cities face an uncertain future, and we're helping them prepare" (Rockefeller Foundation 2017).

Heterogeneity of Urban Experiments

Despite a common stated purpose of improving sustainability and the lives of residents, contemporary examples of urban experimentation deploy vastly different interventions. Such heterogeneity can be observed across and within urban experiments; for example, 100 Resilient Cities, Canada's Smart Cities Challenge, and India's Smart Cities Mission all take a different overall view and approach to what constitutes an improved, forward-thinking city. Furthermore, each participating city in these programs applies the challenge or initiative within the context of localized issues, adding to the heterogeneity of urban experimentation.

This has profound implications for important global issues, such as climate change and food security, which may not be locally popular, but which require collective and sustained local action. The evidence overwhelmingly suggests that the nexus of climate change and food security is ignored in these examples. Neither issue has been explicitly prioritized by the respective platforms, although

some competing cities have independently taken the initiative to focus on them based on their own local-level needs. Of the 31 City Resilience Strategies produced to date by cities participating in the Rockefeller Foundation's 100 Resilient Cities Network, only seven cities mention food security in their strategy document. Of these, just two (Bristol, UK, and Dallas, US) discuss food security in relation to climate change. Both only mention "food security" and "climate change" together once. This suggests not only that food security is a low priority on cities' resilient agendas, but that very few cities in the network view food (in)security as a problem associated with climate change. The phrase "climate change" is mentioned in almost every strategy. However, the number of times it is mentioned varies, suggesting that not all cities perceive climate change to be a pressing concern for urban resilience.

In Canada's Smart Cities Challenge, four of the 20 finalists used the opportunity to focus primarily on food security. Of these, Montreal is the only competitor in the CAD50 million grand prize category, and the other three are in the CAD10 million category. Three competitors not selected as finalists focused primarily on issues of food security and access in their proposals, and one focused primarily on enhancing the economic resilience of its agri-food sector without explicitly discussing food security for residents. However, none of the finalists and unsuccessful applicants that focused on food security described the relationship of food security to climate change; indeed, none of the finalists, and only four of the 130 applicants, mentioned climate change in their proposals.

India has interpreted the parameters of "smart city" experimentation quite differently. The country's Smart City Mission focuses mainly on issues of urban services provision and hard infrastructure. Indian cities were evaluated on the basis of existing service levels and capacities, credibility of proposal, self-financing, and overall track record in terms of innovation and implementation. Applicants were asked to report on their cities' recent progress on sustainability and economic development issues such as transportation, housing, water availability, energy availability and outages, solid waste management, and safety and security. Notably, food security or access to food does not appear in the evaluation criteria for the Smart Cities Mission, which appears to have influenced the results. There is no evidence that any of the 100 winning cities were awarded funding dedicated to solving issues of food security.

City governments are thus not responding uniformly to issues like climate change and food security, nor are they even defining and interpreting shared nomenclature (e.g. resilience, smart cities) in the same way. This is one of the major governance challenges associated with the movement toward urban experimentation. Larger-scale, coordinated intergovernmental initiatives such as the 2030 Agenda for Sustainable Development and associated Sustainable Development Goals (SDGs) provide some degree of assurance that participating governments interpret terminology similarly, and work toward similar objectives[1]. Each of the SDGs comes with embedded targets and key performance indicators, whereas the experimentation discussed here encourages participating cities to focus on locally defined issues, and does not require participants to report on standardized key performance indicators.

In terms of advancing sustainability, the heterogeneity of approaches represents a double-edged sword. On one hand, local governments arguably have a better understanding of the unique issues facing their communities than intergovernmental or state bodies. Accordingly, the resultant actions may be more locally relevant and more feasibly implemented because cities can adapt their approaches to the capabilities and challenges they face in their daily governance activities. On the other hand, it ensures that actions taken will not be directly comparable across cities or states due to the diversity of local contexts and challenges faced by participants. This approach has the potential to stall the already-deficient coordination of government action toward sustainability at the global scale and hence potentially promote small-scale, locally-specific changes, rather than global transformative change.

Hyper-Experimentation and Inequality

Urban experimentation and the trend toward both smart cities and resilience in urban planning may also be a cause for concern because they have the potential to detract attention from the pressing and near-universal problem of socio-economic inequality. Evans (2016) and Caprotti and Cowley (2017) point out that the urban experimentation literature has been problematically silent on equity-related questions. Evans (2016: 439) asks "on whose behalf do urban experiments seek to make change?" and "if the city is a laboratory, then are its inhabitants lab rats?" (Evans 2011: 231. Caprotti and Cowley (2017: 5) pose a similar question: "On whom is the experiment carried out?" These commentators argue that the exploration of urban experimentation, as a concept, has neglected to adequately attend to equity and justice.

The same is true of in situ instances of urban experimentation, which largely treat inhabitants as subjects rather than as individuals with a "right to the city" (Lefebvre 2002). In many cases, the subjects and participants in urban experiments are not afforded an opportunity to voice their free and informed consent. Certainly, this is true with 100 Resilient Cities - while 82% of city resilience strategies consulted have specific projects that seek to improve the wellbeing of marginalized residents, only 23% describe having consulted those marginalized people when the strategy was being developed (Fitzgibbons and Mitchell 2018). This finding corroborates the claims of those who cautioned that the language of "resilience", when used as a platform for planning and development work, may neglect issues of justice and social equity (Brown 2012, Friend and Moench 2013, 2015, Gillard 2016, Gillard et al 2016, Joseph 2013, Meerow and Newell 2016, Vale 2014).

Bahadur et al (2013) point out that resilience is increasingly being used as a catch-all term by international and government agencies to describe approaches taken to combat a wide range of social and environmental problems ranging from poverty, to security, to economic development (Bahadur et al 2013, Coaffee and Fussey 2015). While this flexibility makes the concept valuable as an orienting point across disciplines and actors, it also means that the term can be applied to suit nearly any scale and agenda. Many have therefore warned that the application of resilience by powerful actors and institutions could worsen existing systemic vulnerabilities and actually preserve the status quo (Archer and Dodman 2015, Béné et al 2018, Cote and Nightingale 2012, Fainstein 2015, Friend and Moench 2013, Gillard 2016, Gillard et al 2016, Shi et al 2016, Vale 2014, Ziervogel et al 2016, 2017). In essence, the argument is that "resilience" is not inclusive or transformative in practice, but rather serves as a vehicle for business as usual and, indeed, builds the capacity of the business-as-usual system to resist change. To this end, Kaika (2017) argues that the resilience rhetoric represents an attempt to pacify marginalized people into accepting and internalizing preventable hardship.

Kaika (2017) further contends that smart city rhetoric promises technological solutions to socio-environmental problems, and is increasingly entrenched in equity-focused narratives globally, such as the quest to advance human development. She argues that this logic is circular, because many "smart" technologies are built on the backs of the world's most marginalized residents. For example, the metallic ore coltan is an essential component in circuit boards and hence makes its way into the majority of communication technologies. However, "over 19 per cent of the world's supply of coltan comes from the Democratic Republic of the Congo, and is mined by hand under what the UN repeatedly reports to be a highly organized and systematic exploitation of both nature and local people" (Kaika 2017: 90). Evidently, then, the "smart" and "sustainable" technologies being used to advance quality of life in privileged "smart cities" are simultaneously reproducing unsustainable, violent, and oppressive practices in corrupt and abjectly poor communities in the Global South.

Interestingly, none of the 130 applicants to Canada's Smart City Challenge use the words "unequal" or "inequality" in their proposals. Only three

applicants used the word "equality", and three others use the word "equity", suggesting that the quest for smart cities is largely viewed by Infrastructure Canada, and the applicants, as separate from the quest for social equity. Chakrabarty (2018) retells the stories of various smart city initiatives he has interacted with in India, explaining that they have largely taken the form of gated communities and/or necessitated the privatization of large tracts of public land in cities. Accordingly, he argues that India's Smart City Mission is a thinly-veiled perpetuation of neoliberal urbanism, rather than a potentially transformative framework for advancing equitable sustainability. Kaika (2017) similarly accuses the Smart City Mission of being a form of "entrepreneurial urbanization" that neglects issues relating to India's colonial history. Datta (2018) argues that India's smart city movements have delegitimized marginalized members of society by endorsing a form of evidence-based decision-making and tech-focused citizen engagement that is inaccessible to the poor. She argues that "the 'smart citizen' thus becomes a euphemism for an elite citizenship built on class, religious, and caste privilege. The subaltern citizen can now no longer make straightforward moral rights claims through political society. Rather they must now find new ways to breach the boundaries between digital and urban publics that define their exclusion from the future city" (Datta 2018: 414).

Several commentators have argued that the rhetoric of urban experimentation, smart cities, and urban resilience all represent a perpetuation of neoliberal governance styles (Chakrabarty 2018, Datta 2018, Davoudi and Porter 2012, Evans 2016, Gillard 2016, Haughton and Mcmanus 2012, Haughton et al 2013, Joseph 2013, Kaika 2016, Krivý 2018, Oosterlyn and Gonzalez 2013, Wiig 2016, Vale 2014, Ziervogel et al 2017). Resilience researchers have also argued that the narrative is inherently conservative and focuses on self-reliance (Davoudi and Porter 2012, Gillard 2016). Smart cities critics have argued that the movement has largely been used to further economic interests, and prioritized industry partnerships at the expense of meaningfully redistributive or equitable change (Hollands 2008, Wiig 2016). The idea of the "entrepreneurial city" similarly places the onus on individuals to own and address their own marginality, rather than acknowledging structural dimensions of inequality.

At a general level, hyper-experimentation means that city planning is no longer the sole domain of the professional planner, but is now in the hands of a diverse group of actors, tasked with the responsibility of place-making and place-shaping. One of the unacknowledged drawbacks of this approach is that the cities capable of crafting the strongest and most competitive applications are likely not the cities that need the support the most. In the case of 100 Resilient Cities, this manifests in unequal representation of cities across the Global North and South, with 75% of participating cities being in countries with very high human development, and nearly one-quarter being from the United States (Fitzgibbons and Mitchell 2018).

Neoliberalism also manifests in the use of private partnerships. The participating 100 Resilient Cities work with what the Rockefeller Foundation (2015) calls a "platform of partners", including private, public, academic, and non-profit sectors. The Foundation claims that this makes the market more responsive to the needs of cities, hence conflating the quest for community resilience with the quest for a thriving free market economy. This also has the potential to disrupt existing planning and governance processes, as specialized private actors exert themselves financially and conceptually into city planning mechanisms. This could reorient, or delegitimize, existing policy programs and institutions.

Conclusion

This paper has explored the scales of (in)action with respect to the food security-climate change nexus. A review of the history of food security and climate change at various institutional scales showcases the challenges of intergovernmental action on both global issues. As a result of challenges of coordination and collaboration across nation states, and the growing importance of cities in the global political economy, there has been a resurgence of

urban experimentation. However, unlike historical experiments focused on more localized urban issues, contemporary experimentation tinkers with issues of global importance. Unfortunately, the trend towards hyper-experimentation is not a benign process of change; rather, it presents a number of challenges, including heterogeneity of responses to the climate change-food security nexus, an absence of concern with social equity across scales, and trends toward competitive urban governance. Hyper-experimentation not only fails to address the important climate change-food security nexus, but it also has the unfortunate potential to exacerbate existing socio-economic inequality through reliance on a neoliberal model of city planning.

What can be done to minimize the damage caused by undoubtedly well-intentioned organizations and governments in their quest to experiment at a historically-unprecedented speed and scale? First, any organization or government that wishes to experiment in cities (and with citizens' lives and livelihoods) must critically reflect on the ethical implications of their interventions. Failure will be part of the process of change, but how organizations and governments respond to failure is critically important to the future of cities. There must be evaluation of plan quality and monitoring of short- and long-term planning outcomes built into the design (and funding) of programs. There must be checks and balances of planning power, with external evaluation of partnerships and open discussion of the varied (positive and negative) implications of urban experiments for citizens. Time must be allocated to revise plans.

There is an important role for intergovernmental organizations in this new world of hyper-experimentation. While flexibility is necessary to facilitate effective implementation across varied social, political, and economic landscapes, some degree of consistency is important if these city networks are to make any significant contribution to global issues such as climate change and food security. Intergovernmental organizations are facing a crisis of relevance in this new urban world. However, they could play a fundamental role in guiding and mentoring cities, setting international policy targets, and championing scalable solutions that address the complexity of interconnected global issues, such as the climate change-food security nexus.

Endnote

1. There are, however, also critiques of the SDGs. With respect to food security, Battersby, 2017, argues that they neglect food and nutrition insecurity in urbanizing Africa.

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