Earth and environmental sciences / Environmental social sciences / Climate-change policy
[URI /704/844/2175]

Scientific community and society / Social sciences / Climate change / Climate-change mitigation
[URI /706/689/694/682]

Scientific community and society / Social sciences / Climate change / Climate-change impacts
[URI /706/689/694/2739]

Scientific community and society / Social sciences / Politics
[URI /706/689/454]

Scientific community and society / Social sciences / Sociology
[URI /706/689/523]

Scientific community and society / Social sciences / Economics
[URI /706/689/159]

Scientific community and society / Social sciences / Culture
[URI /706/689/126]

Realizing the Urban Transformative Potential in a Changing Climate

- Patricia Romero-Lankao* moving to a new position at the National Renewable Energy Laboratory, NREL USA by the end of July. I haven't got an official email yet. My personal one is patyrlankao@hotmail.com
- Harriet Bulkeley, Department of Geography, Durham University, UK, h.a.bulkeley@durham.ac.uk
- Mark Pelling, Department of Geography, King's College London, UK, mark.pelling@kcl.ac.uk
- Sarah Burch, Department of Geography and Environmental Management, University of Waterloo, Canada, sarah.burch@uwaterloo.ca
- David J. Gordon, Dept. of Politics, University of California Santa Cruz, USA, dagordon@ucsc.edu
- Joyeeta Gupta, Amsterdam Institute for Social Science Research, University of Amsterdam, Netherlands, J.Gupta@uva.nl
- Craig Johnson, Political Science, University of Guelph, Canada, cjohns06@uoguelph.ca
- Priya Kurian, University of Waikato, New Zealand, priya.kurian@waikato.ac.nz
- Emma Lecavalier, University of Toronto, e.lecavalier@mail.utoronto.ca
- David Simon, Mistra Urban Futures, Chalmers University of Technology, Sweden
  Email: david.simon@chalmers.se
- Laura Tozer, Durham University, UK, laura.m.tozer@durham.ac.uk
- Gina Ziervogel, Dept. of Environmental & Geographical Science, University of Cape Town, South Africa gina@csag.uct.ac.za
- Debashish Munshi University of Waikato, New Zealand, munshi@waikato.ac.nz

Standfirst

SDGs and IPCC Cities offer an unprecedented opportunity for a transformative urban agenda. This also requires bold, integrated action to address constraints imposed by economic, cultural, and political dynamics. We move beyond a narrow, techno-centric view and identify five key knowledge pathways needed to catalyze urban transformation.

While the topic of urban responses to climate change has been on the research agenda for the past two decades,[1] it has only slowly made its way onto the global stage, and is now at a critical juncture

for many reasons. Having proven to be important agents of change globally, cities occupy a central role in societal responses to climate change. The Sustainable Development Goals (SDGs) for climate action (13) and inclusive urban resilience (11), and the Sendai Framework for Disaster Reduction with its call to "Build Back Better", present a radical departure from business as usual. By recognizing the root drivers of climate risk in unequal and unsustainable development, these initiatives and processes offer an opportunity for actions to address deep-rooted development challenges.

The Intergovernmental Panel on Climate Change (IPCC) has also begun to move in a positive direction by endorsing the need for a transformative research agenda on cities and climate change in the form of the IPCC Cities and Climate Change initiative (Cities IPCC). Cities IPCC represents an unprecedented collaboration between the research community and practitioners. It has significant potential to create a transformative agenda. It recognizes the need for research and synthesis across physical, financial and social sectors to catalyze transformation, and the possibility of moving away from the more techno-centric approaches that have historically dominated this agenda.[2]

However, while growing momentum exists to unleash the transformative potential of urban action, the extent to which current practice is able to address root causes and connections among climate change, inequality in emissions, uneven development, and vulnerability, is limited.[3,4]

We argue that pursuing a transformative urban agenda for climate change will require innovative work, and efforts that go beyond a relatively techno-centric view of research and synthesis. Toward that end, we need more work that fosters inclusive forms of knowledge that consider the constraints imposed by economic, cultural, and political power dynamics. Only then can mitigation and adaptation be approached in ways that can achieve the SDGs. As a way forward, we identify five key knowledge building blocks that can help move both scholars and practitioners towards more inclusive and effective urban climate change responses.

Political economy and the power to act

Urban transformations depend on who has power to act.[5] Too often, research and interventions presume that carbon emissions and risk are merely the result of individual actions, and that better information or the right incentives are the means to induce individuals to adopt appropriate behaviors such as recycling and use of public transport.[6] However, a sole focus on the capacities of individuals is misleading.

Research has demonstrated that patterns of emissions and vulnerability are shaped by decisions around the provision, design, location, and operation of transportation, water, drainage, sanitation, housing, in addition to other infrastructure, assets and built environments.[3,6] In cities such as Mumbai, India, for instance, elites pushed a wider-scale rollout of electricity infrastructure than they did for water, drainage and sanitation, with the latter distributed along lines of formal development and legal housing.[3] Individual and or community action alone cannot overcome the deep and lasting influence these decisions have had in heightening the vulnerability of more than half of Mumbai's population.[4]

As a result of emphasizing individual behavior, the mechanisms, processes, and policies perpetuating carbon intensive infrastructure and economies is left unexplored. City dwellers are forced to take incremental, uninformed or misinformed measures to access resources and services, reduce their emissions, and protect themselves against floods, heatwaves and other climate hazards. These actions, in turn, produce unequal exposure to hazards, varying capacities to lead healthy lives, and differences in access to land, jobs, social networks and family ties.

Such insights suggest that, to be successful, interventions must be grounded in analysis of structural drivers, and differential capacities, for change – from global political economies for land markets, urban development models, and infrastructures and services to vested interests, fragmented governance authority and different visions for urban futures. To generate feasible and socially just urban responses, we need research that targets the dynamics of power and political economy at the urban level and examines how they vary within and across urban contexts in the global North and South.

Multilevel governance

Urban transformations are a multi-level, multi-actor phenomenon. Urban governance research has examined the ways that city level responses result from complex interactions between sectors, levels of government and state and non-state actors.[1] For instance, in Lagos, Nigeria, Mexico City, Mexico, New Delhi, India, and Santiago, Chile, climate action is constrained by limited, overlapping or uncoordinated authorities governing land-use, transportation and energy from siloed, fragmented and uncoordinated departments (e.g., disaster risk management and housing) that span local to national jurisdictions. Potential policies are often disjointed, and fraught with conflict between competing framings and priorities (e.g., growth on versus protection of mountains, forests and other risk prone-areas), levels of government, and diverse actors.[1,7]

Across multiscale networks of actors such as government officials, utilities, developers, and grassroots organizations, an uneven distribution of the power to shape and transform cities often dampens the possibilities for transformative climate change responses. It is imperative that we understand how multilevel governance itself may constrain possibilities for transformative action, and how some forms of leadership, institutional arrangements, resources and climate change framings can work to create more integrated and effective urban responses. We also need research that supports transformative urban climate action under different local conditions. For example, research has focused on such experiments as the reuse of brownfield land, cooling services and building designs but more analysis is required to assess their impact and potential diffusion.[8]

Further work is also needed to understand the socio-institutional factors and contexts favoring understandings by some players – including civil society, academia, the private sector, and municipal governments – even when their action is resisted or contested. Answers to these questions can support effective and equitable decision-making, impact measurement, and appropriate framing of climate change challenges and solutions.

Socio-material path-dependency

While cities are dynamic, transformative action is constrained by path-dependencies resulting from design, technological, investment, planning, and construction decisions, and from social inertia generated by norms, customs, routines and habits. Once adopted, infrastructure, low-density urban form, and institutional and social practices become enduring and difficult to change. For example, aggressive freeway construction programs worldwide have driven low-density urban form, dependence on private vehicles, resulting in lower quality of life, higher energy use, and increased emissions. Values and social or economic pressures further reinforce these patterns of development.

Shore armoring and hard flood relief structures may abate risk in one place but create risk in others, degrade ecosystems and biodiversity, and often negatively impact or even force the e relocation of low-income residents.[9] Risk-amplifying path dependencies, such as those created by trans-basin diversions to support urban water supplies, can persist for decades, if not centuries. In

order to overcome self-imposed limitations and to avoid new decisions that embed vulnerability and high carbon lifestyles into urban futures, any agenda aimed at transformative action needs a sound analysis and synthesis of how path dependencies, springing from social, economic and political roots, constrain change.

Multiscale processes, impacts and actions

Because carbon footprints and risk are driven by multiscale processes, impacts and actions, the possibilities for transformation lie both inside and outside the city. For example, food riots across African cities in 2007-08 followed environmental shocks and market speculation. Similarly, the impacts of Hurricane Sandy on New York's food supply in 2012 demonstrated the extent to which food supply chains have become global.[10,11] Disruptions in globalized supply chains have brought about empty food shelves lasting days and exposed vulnerabilities in urban food systems.[11]

Cities spend a significant proportion of the global 'carbon budget'[12] by serving as centers of consumption. This is particularly true for energy- and resource-intensive materials such as steel, cement and plastic as well as for GHG emission-intensive food, such as meat and dairy. The rapidly shifting profiles of consumption in the global economy vary significantly between rich and poor, urban, sub- and peri-urban and rural, and global North and global South, in ways that have profound implications for the distribution of rights and responsibilities related to global climate action. At the same time, unequal access to the global economy can dramatically shape exposures and vulnerabilities of urban residents to climate impacts.

Understanding this landscape will be vital to the formulation of effective and just urban responses to climate change. Any such understanding must attend to how urban security can be realized in one place at the expense of other places and of future generations. It will also demand knowledge of how specific adaptation and mitigation responses intersect, creating trade-offs among emissions, risk reduction, and development priorities.

Cultures and identities

Urban transformation requires engaging diverse cultural norms and identities. Values, beliefs, interests, and worldviews shape personal narratives and political discourse about climate, cities, and society. They underpin the framings, priorities, and blind spots at the heart of action, as well as the counter-narratives, skepticism and denialism at the heart of inaction.[13] Within dominant urban planning discourse, resilience is often seen through a technological lens that identifies physical infrastructure as the primary focus for reducing risk,[4] while the voices of dissenting groups, women, indigenous communities, minorities, and the poor are marginalized in decision-making processes.[14]

In the final cut, some relationships are overlooked although they also are a vital source of urban sustainability and resilience. A pressing need exists to engage with the diversity of everyday lives. Whether differences in values, assumptions and views are visible or hidden, they will, ultimately, come to bear on the effectiveness and fairness of climate change responses. Significant work is under way around the world to record indigenous voices on climate change impacts including resistances to colonial frameworks of action.[15] This provides a unique opportunity to accommodate alternative ways of thinking, and prioritize questions of justice on climate action. The chance must be seized upon.

Realizing the urban transformative potential

Global assessments, like the IPCC, have to balance rigorous evidence with insight into the full range of options for action. As analyses from social science, arts and humanities become more commonplace in IPCC reviews, both understanding and options expand further. This is particularly true in the context of a complex urban reality where more than one explanation can be offered for individual events, challenging the scientific community to deal with conflicting narratives. Moreover, with respect to urban transformation, science itself will not reduce uncertainty (as is the aim of multiple climate models) but, more likely, increase it by surfacing a broader array of understandings in need of elicitation and synthesis.[16]

Blending such a diversity of knowledge within the institutional architecture of the IPCC, the New Urban Agenda, the targets and indicators in the SDGs, and Sendai Framework will require an emphasis on context and analytical positionality. Furthermore, with such diversity of urban form, political context and historical experience, the IPCC will be challenged to make something of multiple threads of knowledge in a way that maximizes utility for readers. To do so, it must more effectively and inclusively incorporate multiple forms of knowledge and methodology, from the arts, humanities, practitioner and local communities, everywhere. It must also understand and confront path-dependencies, political economy, multilevel governance dynamics, interpersonal and political power systems, and the multi-scalar dimensions of climate change root causes, impacts and actions.

An urgent research priority is to ensure that multiple forms of knowledge are included as legitimate and equal from the beginning and throughout the research and synthesis process.[13] This can be achieved by appointing social scientists and specialists in the humanities in research and synthesis efforts, and giving them equal power and resources to co-develop new, or modify existing research and synthesis methodologies. For such an effort to succeed, IPCC must acknowledge and provide equal validity and importance to context-relevant, qualitative knowledge. While we understand the challenge such broad-based integration entails, it will be essential for helping cities realize their urban transformative potential. IPCC must face these challenges and embrace the opportunity this landmark moment provides to open up its agenda to these critical voices and concerns.

References

1. Bulkeley, H. & Betsill, M. M. Revisiting the urban politics of climate change. *Environ. Polit.* **22,** 136–154 (2013).
2. Bai, X. *et al.* Six research priorities for cities and climate change. *Nature* **555,** 23–25 (2018).
3. Romero-Lankao, P., Gnatz, D. M. & Sperling, J. Examining Urban Inequality and Vulnerability to Enhance Resilience: Insights from Mumbai, India. *Climtatic Change* (2016).
4. Ziervogel, G. *et al.* Inserting rights and justice into urban resilience: a focus on everyday risk. *Environ. Urban.* **29,** 123–138 (2017).
5. Pelling, M. *The vulnerability of cities: natural disasters and social resilience*. (Earthscan, 2012).
6. Shove, E. Beyond the ABC: climate change policy and theories of social change. *Environ. Plan. A* **42,** 1273–1285 (2010).
7. Colenbrander, S. *et al.* The Economics of Climate Mitigation: Exploring the Relative Significance of the Incentives for and Barriers to Low-carbon Investment in Urban Areas. *Urbanisation* **2,** 38–58 (2017).
8. Broto, V. C. & Bulkeley, H. A survey of urban climate change experiments in 100 cities. *Glob. Environ. Change* **23,** 92–102 (2013).

9. Simon, D. *Rethinking sustainable cities: Accessible, green and fair*. (Policy Press, 2016).
10. Berazneva, J. & Lee, D. R. Explaining the African food riots of 2007–2008: An empirical analysis. *Food Policy* **39,** 28–39 (2013).
11. Romero-Lankao, P., Bruns, A. & Wiegleb, V. From risk to WEF security in the city: The influence of interdependent infrastructural systems. *Environ. Sci. Policy* (2018).
12. Layer, S. Atlas of the Human Planet 2016. (2016).
13. Hackman, H. & St Clair, A. L. Transformative cornerstones of social science research for global change. *Mundo Amaz. Vol 4 2013 117-152 Mundo Amaz. Vol 4 2013 117-152 Mundo Amaz. Vol 4 2013 117-152 2145-5082 2145-5074* (2012).
14. Arora-Jonsson, S. Virtue and vulnerability: Discourses on women, gender and climate change. *Glob. Environ. Change* **21,** 744–751 (2011).
15. Whyte, K. Indigenous Climate Change Studies: Indigenizing Futures, Decolonizing the Anthropocene. (2017).
16. Brugnach, M. & Ingram, H. Ambiguity: the challenge of knowing and deciding together. *Environ. Sci. Policy* **15,** 60–71 (2012).