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Viewpoint
New evidence and thinking on urban environmental change challenges

This article surveys current evidence on the extent of climate/environmental change and its urban impli-cations, arguing that novel approaches to addressing the challenge offer hope of greater effectiveness, not least through reducing the apparently intractable conflict between short-term development needs and supposedly longer term climate/environmental change actions.

Keywords: cities, climate/environmental change, development-environment conflict, adaptation, resil-ience, transformation

Publication of the several volumes of the Intergovernmental Panel on Climate Change's (IPCC's) Fifth Assessment Report (AR5) during 2014 will ensure extensive media coverage of the increasing anthropogenic influence on our changing climate system. The evidence becomes clearer and the degree of uncertainty lower with each successive assessment report. The key message of Working Group I's Summary for Policymakers (SPM), published in late 2013, pulls no punches:

> Human influence has been detected in warming of the atmosphere and the ocean, in changes in the global water cycle, in reductions in snow and ice, in global mean sea level rise, and in changes in some climate extremes [...] This evidence for human influence has grown since AR4. It is *extremely likely* that human influence has been the dominant cause of the observed warming since the mid-20th century. (IPCC, 2013, 15)

The report attributes over half the observed increase in surface temperature between 1951 and 2010, with very high certainty, to the combined effects of increasing anthro-pogenic greenhouse gas concentrations and related anthropogenic forcing mecha-nisms. This applies both globally and in every continental region except Antarctica, where such impacts are described as 'likely' (IPCC, 2013, 15). While details of the impact on and increasing vulnerability of human systems and settlements will be revealed in the reports of Working Groups II and III later this year, they are expected to demonstrate stronger effects and greater increases in vulnerability in many areas, requiring more urgent and greater mitigation and adaptation efforts than indicated in AR4 (IPCC, 2007).

The literature on all aspects of climate and broader environmental change and its human impact continues to grow exponentially, and although some techno-optimists believe that novel engineering solutions like carbon capture and storage (CCS) will

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in time greatly increase the effectiveness of emissions mitigation, the need for more systemic thinking and proactive rather than reactive measures is increasingly recognised. The widely accepted dichotomy between mitigation and adaptation actions – which indeed still underpins the intergovernmental negotiations over a successor to the Kyoto Protocol – is artificial, with increasing evidence that carefully targeted interventions can achieve both simultaneously (see below). There is also increasing recognition that the essentially incremental approaches to both mitigation and adaptation being taken worldwide will prove inadequate because of the mistaken underlying assumption that these can safeguard our socio-ecological systems and current consumption-oriented lifestyles. Because of climate/environmental change, as well as more 'traditional' concerns about resource-intensive capitalist development, these approaches will prove unsustainable. 'Resilience' has also become a veritable buzzword, often being adapted inadequately from non-human ecological contexts and/or adopted uncritically. It thus loses its meaning and/or risks embedding inequitable and unsustainable structures, processes and outcomes along with more desirable features. The emphasis therefore needs to shift towards socio-technical and socio-ecological transformations (e.g. Pelling, 2010; Dodman and Mitlin, 2011; Kates et al., 2012; Satterthwaite and Dodman, 2013). Indeed, this is one of the principal themes of the recent *World Social Science Report* (ISSC and UNESCO, 2013).

Since the dominant habitat of *Homo sapiens* is for the first time now classified as urban, the urgency of addressing accelerating climate/environmental change and its urban impacts is inescapable. Within the expanding literature, there has been a growing focus on urban areas outside the OECD (Organization for Economic Co-operation and Development) countries over the last decade or so, including some important city-scale initiatives (Rosenzweig et al., 2011; Cartwright et al., 2012). That said, coverage remains very uneven, both geographically and in terms of a disproportionate but perhaps understandable coverage of mega- and large cities at the expense of small and intermediate centres (e.g. IPCC, 2012; Romero-Lankao et al., 2012). A few conscious recent efforts have been made to address this imbalance by examining smaller capital and intermediate cities and smaller towns. Two key such initiatives are UN-HABITAT's Cities and Climate Change Initiative (CCCI) and the Rockefeller Foundation's Asian Cities and Climate Change Research Network (ACCCRN), both of which were launched in the late 2000s and have recently been evaluated (Gomez, 2013; Silver et al., 2013; Simon and Leck, 2014). Additionally, in 2011, the Inter-American Development Bank launched its Emerging Sustainable Cities Initiative for fast-growing cities with populations between 100,000 and 2 million (IDB, 2012). Urban resilience is also now gradually being understood in more critical terms, both overall and in relation to urban biodiversity and the various categories of climate change action (e.g. Folke et al., 2010; Friend and Moensch, 2013; Elmqvist et al., 2013; Satterthwaite and Dodman, 2013).

A key message emerging from all these initiatives and the evidence they have produced is that it is urgent to address the implications of climate/environment change now. The presumption or convenient excuse that it will be a problem for future generations rather than current populations because the impacts will be felt significantly only during the second half of this century is no longer tenable. In most parts of the world, and in rural, peri-urban and urban areas alike, people are already experiencing environmental change in increasingly problematic ways. Extreme events are becoming more severe and probably now also more frequent in many regions (IPCC, 2012), while slow-onset changes like sea level rise are occurring at an accelerating rate. These two elements of environmental change interact and magnify the overall impact. The IPCC's AR5 will document the worldwide evidence in detail. While it is dramatically destructive extreme events like Hurricanes Katrina, Sandy and Haiyan that grab headlines, slow-onset changes are semi-permanent or permanent and are already affecting large numbers of people. In many urban areas low-lying residential and commercial zones are becoming more vulnerable to the combination of inundation and flooding (Rosenzweig et al., 2011; Satterthwaite and Dodman, 2013).

With the truly transboundary and global nature of both environmental/climate change and of capitalist development as the dominant economic system, as well as the increasing diversity and heterogeneity of countries on all economic and social indicators, many of the conventional post-WWII and Cold War country groupings have lost intellectual purchase. Even the basis for 'development' as a concern essentially focused on poor and transitional economies when many of the same challenges exist within the OECD too, albeit perhaps less severely and extensively, is increasingly contested within post-development debates. This concern is beginning to resonate in the climate change literature (cf. Mitlin, 2012; Pelling et al., 2012; Ireland and McKinnon, 2013). At the same time, global learning networks of cities sharing certain size characteristics or supra-national roles, like the C40 grouping, are bringing together representatives of cities from all regions and historical groupings to share experiences, undertake exchange visits and transfer expertise. UN reports and those of other intergovernmental bodies like the IPCC provide global coverage, and there is now an increasing trend to transcend 'North/South', 'developing/developed', 'First/Third worlds' and similar categories with respect to cities and climate change (e.g. Rosenzweig et al., 2011; Romero-Lankao et al., 2012; Bulkeley, 2013; Castán Broto and Bulkeley, 2013a; Simon and Leck, 2014).

For those concerned with reducing widespread poverty, inequality and social deprivation, especially (but in the spirit of the previous paragraph, not exclusively) in poor countries, one of the principal sets of reasons why addressing climate/environmental change has often not been perceived as urgent until very recently revolves around capacity and funding constraints on the one hand and short- versus longer-term priorities on the other. The latter aspect has already been mentioned above,

reflecting a misperception that climate/environmental change impacts will become pronounced only later this century and hence are not of immediate concern. Even if understood to be needed, it is difficult to comprehend what can be done on a small scale in the face of such large-scale and often ill-defined threats and challenges. While arguably politically convenient, these considerations reflect the short-term horizon to which most democratically elected leaders and their officials operate, namely the next election. Following directly from this is the implication of scarce human and financial capital, which means that – even more than in wealthier countries – political representatives and officials are under constant pressure from diverse interest groups and constituents seeking to have their immediate problems and infrastructural or welfare deficiencies met. Leaders are known to make often unrealistic promises in the run-up to elections in order to bolster support at the polls. The basic point, however, is that in the context of immediate 'development' or social priorities for which there is already inadequate resourcing, any vaguer, apparently insuperable and/or longer-term issues are simply not normally going to be prioritised.

Put differently, there is almost invariably perceived to be a conflict or trade-off between meeting specific short-term development/social needs and promoting longer-term sustainability (which includes tackling climate/environmental change). This is little different in effect from the situation of peasants who chop down the few remaining trees to use for fuel wood as an immediate survival necessity, even though they well know that this will remove shade and accelerate erosion in the longer term. It is generally not done out of ignorance. Yet, just as with the relationship referred to above between taking mitigation and adaptation actions, research is showing that appropriate and carefully targeted suites of actions can and do promote well-being or other development needs while also mitigating and/or promoting adaptation to the effects of climate/environmental change (Schipper and Pelling, 2006; Parnell et al., 2007; Dodman and Mitlin, 2011; Simon, 2011; Gasper et al., 2013; Satterthwaite and Dodman, 2013). Importantly, many such measures are not particularly expensive or complex; some are even very amenable to implementation and/or subsequent maintenance by individual households and community groups in urban neighbourhoods (Castán Broto and Bulkeley, 2013b; Simon, 2013). They can thus be used to promote social cohesion and a sense of community if residents perceive it as being in their interests to undertake the challenge. If the lessons of such interventions can be disseminated and extended, many of the trade-offs or conflictual issues can be reduced or resolved.

One immediate caveat is that small-scale, bottom-up and participatory measures may be multifaceted and sustainable but will have only limited and local benefits. Hence even clusters of similar or complementary projects will not have much impact relative to the requirements for transformation rather than incremental change outlined above. This may be correct but demonstration effects from such interven-

tions are often powerful among neighbours and adjacent communities. In addition, by changing the perceptions, experiences and practices of local community groups and their supporting non-governmental, commercial or local authority partners, their relationships to their socio-ecological systems will change. This in turn should contribute to more favourable conditions for some form of transformation, for which coherent and concerted multi-stakeholder engagement led by the local authority/-ies will inevitably be needed. Proactive local authorities, often driven by strategically placed climate/environmental change 'champions' in the political leadership and/or senior ranks of officials, have been crucial where appropriate programmes and actions have been mainstreamed into normal practices and routines. The kinds of vision in Brazil that transformed Curitiba in relation to public transport and infrastructural integration, and democratised Porto Allegre with participatory local authority budgeting, will hopefully soon provide inspirational examples of socio-technical and socio-ecological urban transformation towards low-carbon, multi-faceted sustainability.

This brief survey of the thinking and emerging evidence at the intersection of climate/environmental change, urbanisation and human/social development as reflected in recent English-language literature has sought to convey some of the progressive directions that are becoming increasingly prominent. Crucially, some conflicts and contradictions among competing goals and priorities, long held to be all but inevitable, need not be so intractable if interventions are locally appropriate and carefully targeted. Urban planners and practitioners, as well as ordinary citizens seeking to improve their lifeworlds, can make positive contributions rather than just being spectators and passive victims respectively of accelerating environmental change. This journal's diverse readership, embracing the spectrum of academic and practitioner communities, makes climate/environmental change an important issue for it to cover. Hopefully, our readership will now be encouraged to submit articles that address some of the issues and innovative interventions identified here, in urban areas and beyond.

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