



Urban Environments and Environmentalisms

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Abstract

Within academia, professional practice, and stakeholder groups concerned with environmental issues, urban environment carries many meanings. This chapter demonstrates the framing of environmental problems, especially as concerns cities, is driven by different normative and theoretical positions. The various social, economic, and political contexts in place play a strong role in shaping the perception of how the problems are conceived, how they gain support, and who will be involved. Often, common dichotomized perspectives underpin the conceptual and analytical framing used to examine urban socioenvironmental problems. To advance both future research and practice, this chapter argues that a more inclusive definition of the urban environment is needed and proposes a broad and inclusive framing that recognizes that these different, seemingly contradicting views actually reflect the various aspects of its multifaceted nature.

What Are Urban Environments and What Is Urban Environmentalism?

The urban environment means different things to different academic disciplines, professional practices, and stakeholders. Conservation biologists and some urban ecologists are predominantly concerned with the urban environment that provides habitat for flora and fauna. For urban environmental managers, air and water pollution, flooding, and other hazards often constitute the

Group photos (top left to bottom right) Xuemei Bai, Eduardo Brondizio and Xuemei Bai, Victoria Reyes-Garcia and Nancy Grimm, Robert Bullard, Gareth Edwards, Anna Lora-Wainwright, Nancy Grimm, Eduardo Brondizio, Begüm Özkaynak, Seth Schindler, Robert Bullard, Xuemei Bai, Eduardo Brondizio and Xuemei Bai, Begüm Özkaynak, Nancy Grimm, Gareth Edwards, Robert Bullard, Anna Lora-Wainwright, Eduardo Brondizio, Nancy Grimm and Seth Schindler, Xuemei Bai

primary concern. For slum dwellers in developing cities, the urban environment often entails the provision of fundamental needs in their immediate living environment: access to shelter, clean water, food sources, and sanitation. For those concerned about resource consumption or climate change mitigation, focus is on the extent of resources consumed or the amount of greenhouse gases emitted by the city.

We adopt a broad and inclusive framing of the urban environment, recognizing that these very different, seemingly contradicting views reflect different aspects of its multifaceted nature. Our conceptualization of the urban environment includes four dimensions:

1. The nonhuman nature of cities, such as parks, green areas, and urban biodiversity
2. The level of provisioning of and access to basic services, such as clean water or sanitation
3. Protection from hazards or adverse ambient conditions, such as flooding and air and water pollution
4. Impacts beyond cities such as extraction of natural resources for construction and emissions of pollutants and greenhouse gas

These dimensions differ within and across cities, often reflecting political, economic, and demographic hierarchies as well as differences in levels of “development” or income distribution (Bai and Imura 2000; O’Connor et al. 2001; UNDP 2013). Because of this, research that focuses on a single aspect is unlikely to generate sufficient guidelines for planners, decision makers, and the citizenry. Even within a city, the composition and relative importance of these issues change over time, reflecting dynamic internal and external social, economic, and environmental factors (Bai 2003). The mode and intensity of interactions with external regions also vary across cities (Guedes et al. 2009; Kennedy et al. 2007; Metson et al. 2015). Many fluxes of resources, pollutants, and other materials across city boundaries are much larger than that within their own boundaries (Kaye et al. 2006; Metson et al. 2012). Thus, the environmental impacts as well as the “responsibility” of cities (e.g., concern for their supply chains) extend far beyond their physical or administrative boundaries. Hence, when assessing the overall impacts of urban environments and policies, we need to think regionally and globally as well as locally.

Urban Environmentalism

Under an inclusive framing of the urban environment, almost all cities face one or more environmental “problems.” Once an issue is identified as an environmental problem, the issue becomes one of “environmentalism,” implying some active engagement with the environment for the purpose of solving said problem. Urban environmentalism can be triggered by certain environmental disasters and associated health impacts, as demonstrated by the Minamata

disease in Japan, smog pollution in China, and municipal waste disposal in areas inhabited by people of color in Houston (Bullard 2000). Urban environmentalism is also found in “urban greening” trends in many cities of the Global North, where communities and local governments work to increase the number of trees or parks (Grimm and Schindler, this volume). To some extent, dimensions of urban environmentalism mirror those of the urban environment: concern for the conservation of nonhuman nature; activism to ensure that the basic needs and rights of people to clean water, clean air, and sanitation are met; interventions designed to solve pollution problems and expose unequal exposure to hazards or pollution; and cross-boundary concerns that reflect impacts on nature or communities in external regions due to a city’s activities.

Different underlying perspectives or frames determine whether environmental issues are identified as problems, and the ways in which they are ultimately addressed. These sometimes can seem to be contradictory. For instance, the nature conservationist’s agenda to save large tracts for parks that can support species diversity may conflict with the environmental justice activist’s concern for access to affordable housing in hazard-free areas. Even if these concerns are not in direct tension, there is often competition for funds to support implementation of different agendas. In terms of cross-boundary concerns, a range of scales should be considered. The export of air pollutants from fast-growing urban areas, for example, impacts regional forest productivity (Innes and Haron 2000) which, in turn, may affect livelihoods. In *Environmentalism of the Poor*, Martinez-Alier (2002) highlights the differences between environmental concern as a postmaterialist luxury in the Global North and as fundamental to livelihoods in the Global South. Indeed, consumption patterns in cities of the Global North have driven resource extraction in the Global South, which has effectively transferred a range of environmental problems from North to South (Burger et al. 2012; Deutsch et al. 2013).

Given the linkage between different perspectives and framings of urban environmental issues and the various approaches to environmentalism, we seek two objectives in this chapter. First, we present and review five dominant framings of the urban environment that exist in the literature and examine commonly used dichotomies that influence these framings: urban–rural, Global North–Global South, the brown–green agendas, environmental commons, and private common property rights. Second, based on the assumption that a transformative change is needed for urban futures that are sustainable, diverse, and just, we explore whether it is possible to address multiple concerns through plural framings and environmentalisms, and to understand the role that urban constituents and global–local interactions might play in bringing about such desirable change.

Our discussion is organized according to four main sections: In the first, we examine five conceptual and analytical framings of the urban environment. Next, we discuss the way issues of sustainability, justice, and diversity in urban environments are addressed in these alternative framings, and expose the

commonalities, intersections, and divergences of different “environmentalisms” as mobilizers. In the third and fourth sections, our focus shifts to tensions, trade-offs, and synergies among different agendas or framings of urban environment. Here we consider the challenges posed by social, economic, and political power structures and legacies that underpin opportunities for transformative change in cities. In conclusion, we highlight the need for collaboration around integrated conceptual framings and analytical tools for reimagining urban futures.

The Urban Environment: Conceptual and Analytical Framings

Before going into the conceptual and analytical framings of the urban environment, it is important to frame the framing; that is, to understand the factors that influence the ways in which issues are framed as environmental problems. Conceptual and analytical framings are socially constructed: exactly who is able to identify and frame a problem or ignore issues considered problematic by others is determined by sociopolitical power structures (Baviskar, this volume). In addition to the rather obvious influence of different theoretical or disciplinary perspectives, influences that stem from underlying value systems, the socioeconomic context, and lived experiences (with the caveat that even in the same urban environment, people can have drastically different lived experiences) play a role in determining what is perceived as the dominant problem and the type of conceptual and analytical framing used to devise a solution. In this discussion, we refer to four common dichotomies that influence conceptual and analytical framings.

First, the *urban–rural framing* is one of the most commonly used dichotomies to analyze the urban environment. From an environmental justice perspective, rural residents criticize city constituencies for overexploiting rural resources while ignoring the needs of rural areas for basic access to services and investments provided by the city (Brondizio 2016). Depending on the region of the world, rural and urban economies often compete, each claiming to be the economic engines of entire regions. The difference between rural and urban areas is, however, not as clear-cut as is often asserted and is better conceived as a spectrum rather than as a dichotomy. It is also important to consider how the concept of “rural” and “urban” has changed over time as well as differs across regions. For instance, rural areas were once defined mainly by agriculture and subsistence. However, an increasing number of so-called “rural” areas (defined in terms of administrative jurisdictions) are now industrialized or dedicated to resource extraction, or are sustained by service industries that are embedded in “urban” networks. Conversely, some urban areas currently encompass practices such as allotment farming, which previously may have been regarded as the mainstay of rural areas. Finally, trends of suburbanization and ex-urbanization prevalent in many areas extend “urban” processes (e.g.,

land conversion, hydrologic modification, and resource pressures) to much larger areas than the original city.

Second, is the *Global North versus Global South*. In its final report, the Independent Commission on International Development Issues (Brandt 1980) highlighted inequality as one of the primary challenges for humanity. It noted that dividing the world into two groups was a simplification, but maintained that “in general terms, and although neither is a permanent grouping, North and South are broadly synonymous with ‘rich’ and ‘poor,’ ‘developed’ and ‘developing’ ” (Brandt 1980:31). Although dichotomizing North and South is a gross simplification, this framing does draw attention to the persistence of fundamentally unequal power relations and living standards, as well as inequalities with regard to knowledge production. Most urban theory has been developed in cities from the Global North (Roy 2009), and thus it is imperative to think critically before models from the North are applied to the South. Counter-trends and diversity within each of these categories must not also be ignored. For instance, many cities and regions in rapidly developing countries like China are difficult to classify according to this binary system, showing well that poverty is not only a feature of the so-called Global South, nor is wealth only a feature of the Global North. As discussed below and elsewhere in this volume (see Baviskar as well as Grimm and Schindler, this volume), the environmental justice literature shows that inequality within cities is as much a feature of the Global South as in many regions of the Global North. Thus, it is analytically more useful to think about a spectrum that stretches between Global North and Global South than a clear-cut dichotomy. Such a spectrum takes into account diversity both between and within cities.

Third, we must consider the *brown versus the green agenda* in cities. In the urban environment, the so-called brown agenda addresses issues such as access to housing, safe water, sanitation, and remediation of air and water pollution, whereas the green agenda focuses on promoting urban green spaces, reducing greenhouse gas emissions, planting trees, and so forth. The conflicts or trade-offs between these two agendas can be very real, especially when competing for political attention or limited budgets, as it is often the *power dynamic* that identifies which agendas/concerns get addressed and supported. It is also important to recognize that synergy is possible between these two agendas: air pollution control and reduced greenhouse gas emission may, for example, coexist in cities, contributing to both the brown and green agendas. Thus, exploring such co-benefits is sometimes more important than prioritization. Different power bases of these agendas, governance, and institutional structures, however, often hamper the real synergies from being realized.

Fourth is the *private rights versus environmental commons*. City landscapes are marked by the intersection of private and public property rights, yet function as a result of the flow of common-pool resources and public goods. Instead of a clear-cut distinction in property systems, urban landscapes represent complex matrices and bundles of rights, such as those which define spaces or who

has the right to access, manage, withdraw, exclude, and/or alienate property and benefit from different types of resources. The spatial allocation of rights and access to common and public goods is mediated by social and political structures and is uneven across class, color, origin, and ethnicity lines. Yet while the distribution of harms may be associated with social inequalities, it also transcends property boundaries with consequences for urban collectives as a whole. For instance, lack of access to sanitation in one part of the city affects waterways that are used by diverse social groups. While still common in urban analysis and planning, simple typologies of property systems and rights are insufficient to interpret the collective action dilemmas posed by urban environmental problems.

Five Conceptual and Analytical Framings of the Urban Environment

Conceptual and analytical frameworks provide a common structure and language to support the analysis of a given phenomenon and/or problem. Conceptual frameworks can be considered as metatheoretical tools: they explicitly identify relationships and directionality between components of a phenomenon without necessarily posing a predefined causality between them (Figure 7.1). Conceptual and analytical frameworks can be organized at

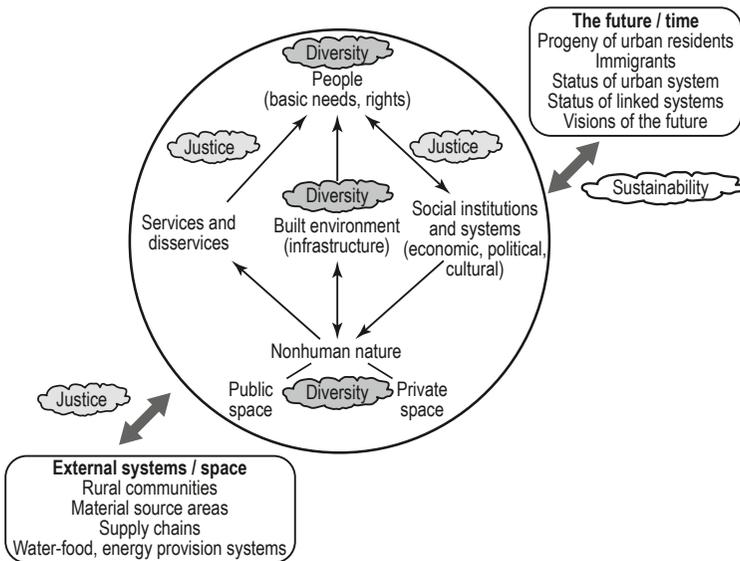


Figure 7.1 Depiction of frameworks and how they intersect with justice, diversity, and sustainability.

different levels of generality, from showing broad components and relationships underlying a phenomenon (e.g., land use and cover change) to describing more specific processes (e.g., land-use intensification). Conceptual and analytical frameworks can be schematic (e.g., systems-based flow charts such as the Millennium Assessment framework) or narrative (e.g., a proposition defining a political ecological approach). Over the past two decades, they have been instrumental as tools for interdisciplinary collaboration around complex and cross-scale problems. Here, we propose and review five groups of conceptual and analytical frameworks used to examine different, but interrelated types of urban processes and problems.

Structure of the Urban System: The SETS Framework

To which urban environment does urban environmentalism apply? One framing of the urban environment derives from the ecosystem concept (Pickett and Cadenasso 2002) but is extensively modified to encompass the urban system's components of people, their varied systems, and the built environment: the SETS (social-ecological-technological systems) framework (Grimm et al. 2016; McPhearson et al. 2016; Grimm and Schindler, this volume). In SETS, cities are systems with social, ecological, and technological components that interact within a boundary as well as across this boundary with external systems (for an earlier manifestation of this framing, see Wang and Ma 1984). In SETS, the boundary must be defined, although it is less important where it is located; ecosystem scientists often locate boundaries for convenience of measurement. For example, in the United States, a "metropolitan statistical area" that includes the inner city, suburbs, and exurban areas may delineate an appropriate boundary for quantifying flows of materials or movements of people because of the availability of data for this unit, but it may not necessarily match the boundaries of biophysical systems upon which it depends, such as a watershed.

The ecological components of cities (i.e., urban nature) provide both benefits and detriments (services and disservices) to people in cities, often reflecting social differences in relative economic and political power. Built infrastructural components of cities are designed and managed to provide specific services. Both urban nature and these built elements are enabled, designed, and managed by people via their political institutions, economic systems, and so forth. Some urban nature and built elements exist in public spaces (e.g., parks, rivers, lakes, water treatment facilities), while others are in private spaces. Thus, the SETS framing of urban environment encompasses green-brown, private-public dichotomies. It also allows the analysis of inequitable distributions of services and disservices as well as differential access to nature and the built environment, which are primary concerns in urban environmental justice. Interactions with external systems are a defining feature of urban SETS. Some of these interactions produce negative impacts on those linked, external systems (e.g.,

resource extraction from or pollution to distant areas). Thus environmental justice for cities, understood through the framing of SETS, might extend to intersystem justice because it incorporates these external interactions.

The SETS framing is flexible and allows us to develop a new conception of the urban environment, since by definition the environment incorporates the service-delivering components of cities, whether natural or built. Potentially, this frame permits us to diagnose environmental inequity, alter thinking about the environment, and explore innovations that represent potential solutions to environmental problems and thus contribute to a transition to sustainability.

Understanding External Dependency and Impact: Urban Metabolism

There is a long history of conceptualizing cities in terms of their “metabolism,” but current scholarship owes a significant debt to Abel Wolman’s (1965) framing. Although Wolman inspired a proliferation of scholarship in a range of fields that conceived of cities as having metabolism analogous to an organism, considerable divergence and scant communication among disciplines was the result (Bai et al. 2016; Castán Broto et al. 2012). Here, we identify two main approaches to the concept of metabolism that emerged independently and without any notable dialogue.

Industrial ecologists have used the term “urban metabolism” (or “social metabolism”) to describe input, distribution, and output in terms of energy and materials that sustain a human settlement. This approach focuses on the circulation and absorption of some resources into the built environment as “stocks” and the transformation of others into waste. Terradas (2001) notes, for instance, that in Europe, a city with one million inhabitants requires a daily input of 11,500 tons of fuel, 320,000 tons of water, 31,000 tons of oxygen, and 2000 tons of food. The same city will also produce 300,000 tons of wastewater, 25,000 tons of CO₂, and 1600 tons of solid waste as output. These figures tend to increase along with increasing levels of per capita consumption. In addition to quantifying the flows, research has focused on understanding the socio-economic determinants of the flows and their distribution (Bai 2016). This framing, therefore, is useful for those seeking to situate cities within larger ecosystems, as well as city-level policy makers trying to reduce resource use within cities, understand structural determinants, and promote a sustainable mode of living.

Urban political ecology conceives of urban metabolism in a similar way but goes beyond an accounting of stocks and flows to ask why a city draws in resources and expels wastes as it does. Grounded in critical theory, it seeks to transgress the rigid dualism that separates society and nature, and show how unequal power relations shape urban resource distribution. Urban political ecology frames cities as metabolisms through which flows of resources circulate to create cities as “socionatural” entities that are characterized by

multiple and often contradictory relationships; these shape their social, economic, political, and infrastructural form (Swyngedouw 1996). Although these metabolisms are contingent on these relationships, they are often configured with the objective of accumulating capital, and this results in poor social and ecological outcomes (Gandy 2004). There is a clear concern with issues of justice, which has also been influenced by the pioneering work of environmental justice scholars (e.g., Bullard 1990; Schlosberg 2007). In contrast to the urban metabolism analysis by industrial ecologists, whose scale of analysis is typically the city, the suburbs, and more recently the household, much of this work is predominantly situated at the microscale and focuses on particular neighborhoods or political conflicts (Demaria and Schindler 2016; McFarlane 2013). Recently, some studies have shown that intercity distribution of the flows and their determining factors (Bai 2016; Lin et al. 2013) can be linked to diversity and justice concerns.

Scholars have sought to bridge these fields and expand the scope of urban metabolism research in an effort to incorporate insights from ecology. Newell and Cousins (2014) refer to the “metabolism of the urban ecosystem,” as a means of identifying the points of intersection between the existing approaches to the concept of metabolism in cities and the relationship with the broader world. Similarly, Bai (2016) argues for the reconciliation of industrial ecology and urban ecology: the former benefits from being closely linked to conceptual advances within urban ecosystem studies, whereas the latter needs explicitly to include anthropogenic materials and energy flows. The large amount of empirical evidence that results can reveal key ecosystem characteristics of cities. Perhaps an underlying motivation for whole-system metabolism studies of industrial ecology and related mass-balance studies in urban ecosystem ecology is to understand how dependent the city is on external ecosystems; a consequent hypothesis holds that reducing this dependence will promote sustainability (e.g., Metson et al. 2015).

Industrial ecology and urban political ecology are in a state of flux with regard to the conceptualization of urban metabolism. Nonetheless, there is increasing willingness among scholars to expand the scope of their analysis in an effort to represent the complexity of cities as human-dominated, complex systems. To be successful, these hybrid approaches should include a focus on ecosystems as well as the contingent nature of urban metabolisms. For instance, solid waste can be interred in a landfill or incinerated, and the ways in which material throughput is managed will have more or less sustainable and socially just outcomes. Rather than a “natural” phenomenon, the configuration of an urban metabolism is unpredictable and commonly contested. Thus, metabolism can signal both an objective relationship between a city and its surroundings and be used as a heuristic device to draw attention to conflicts over access to resources and services. Both perspectives should inform analyses of the urban environment, which should be multiscale and attend to regional, citywide (eco)systems as well as microscale events.

Dynamic, Evolutionary, and Complex Urban Environments

The phenomenon of urbanization represents one of the biggest social transformations in human history (Bai et al. 2014) and is a dominant driver of global environmental change. Grimm et al. (2008) characterize current and future cities as protagonists in the Anthropocene, a human-dominated geological epoch where dynamism, nonlinear change, uncertainty, and complexity prevail (Bai et al. 2016; Brondizio et al. 2016). Thus, as many have argued, the theoretical principles of complexity science are most appropriate for understanding systems in this context.

As human-dominated, complex, dynamic, evolving systems (Alberti et al. 2008; Bai 2003, 2016; Batty 2007, 2016; Grimm et al. 2013), cities exhibit alternative stable states and emergent properties; they are not predictable in a deterministic sense and carry the potential for multiple possible futures (Bai et al. 2016). Each trajectory is somehow shaped by a unique combination of endogenous and exogenous forces, reflecting both pressures from outside the system as well as responses from within the city (Bai 2003). Thus, although the study of patterns and trends of urbanization of the past may generate a general set of expectations, history cannot be used in a predictive sense given the likelihood of nonlinear and abrupt changes. For instance, Bai and Imura (2000) have shown how the diverse environmental profiles and trajectories of Asian cities, as a case in point, are linked to their development stages, and how an evolutionary perspective can help explain the commonalities and differences.

Important aspects of urban dynamism tell the story of urbanization today: as mass movements of the human population, often the result of uneven distribution of opportunities and beneficial or detrimental environmental conditions; as the phenomenon of shrinking cities in the Global North and expanding slums in the Global South, and diverse and novel urban forms, with expanding suburban and exurban development. Deterioration of rural environments, often a driver of migration to cities, is a concern that falls under the diversity dimension of environmentalism. Shrinking cities embody the reverse trend: loss of population from former centers of industry and/or commerce, often owing to economic globalization, can present opportunities for environmental improvement (Haase 2008). The consistency of short- and long-term goals in urban contexts could also be assessed from an urban dynamism point of view (Zetter and Hassan 2002). As LeGates and Stout (2003:228) note:

What looks like a good solution to urban environment to one generation, such as a massive highway construction program to solve transportation problems, building identical suburban tract housing to deal with the housing crisis, or creating a nuclear power grid to meet urban energy needs, may not look so to the next generation.

Viewing cities as complex, adaptive, evolving systems acknowledges a range of possible futures and, in this sense, offers a framework that strongly

incorporates sustainability. From this perspective, it is undoubtedly possible for a city to be more or less sustainable, and managing the resilience of urban systems is one way to guide transitions toward more desirable futures. Resilience is a system property that reflects the capacity to undergo shocks without substantially changing structure, function, feedback relationships, or its fundamental identity (i.e., a resilient city would still be recognized as a city after a major disturbance) (Walker et al. 2004). Awareness of this complex, dynamic nature of cities supports the envisioning of plausible (based on current trajectories) and desirable (managed transitions) futures as well as transformative futures (Iwaniec and Wiek 2014), which may result from game-changing drivers, unanticipated shocks, or even deliberate interventions (Bai et al. 2016). At the same time, however, resilience cannot be simply accepted *prima facie* as a “good thing,” since resilience could act to sustain undesirable socioenvironmental states (Anderson 2015; Turner 2014).

Environmental Justice

The environmental justice framing starts from the perspective that environmental issues are fundamentally questions related to justice, and thus focuses on how environmental harm (externalities or “bad stuff”) and environmental benefits (“good stuff”) are distributed through policies and actions. This framing (a) incorporates the principle of the “right” of all individuals to be equally protected from environmental harm, (b) assesses cumulative impact as opposed to assessing the impact of one chemical at a time, (c) shifts burden of proof to polluters who do harm, (d) redresses disproportionate impact through “targeted” action and resources, and (e) has historically adopted a public health model of prevention over a cure.

In the Global North, particularly the United States, where the environmental justice movement emerged through the work of Robert Bullard and collaborators (e.g., Bullard 2000), the environmental justice framing points to issues common to other parts of the world, but more frequently employs a race and class-based lens to point out the injustices of how environmental harms and benefits are distributed. In the Global South, this form of environmentalism tends to focus on social justice, claims to recognition and participation, and efforts to defend indigenous land rights and preserve their livelihoods against mining, dams, land grabs, oil and gas exploitation. The manner by which the environmental justice framing emphasizes social justice concerns (which may be broader than specific urban environmental challenges) means that it aligns well with the livelihood focus of the “environmentalism of the poor” (Guha 2000; Guha and Martinez-Alier 1997; Martinez-Alier 2002). The plight of slum dwellers for clean water (see Baviskar, this volume) illustrates a form of “environmentalism of the poor” as it applies to urban situations. In the end, neither the northern nor southern perspective subscribes to the “traditional” idea that environmentalism is rooted in a romanticized view of nature as

something to be enjoyed and protected and separated from humans (Grimm and Schindler, this volume).

It is thus important to avoid simplistic oppositions between northern and southern environmentalisms and to be critical of deploying this dichotomy to imply that these present coherent agendas or social movements. As much as “northern environmentalism” cannot be labeled as driven by affluence or self-indulgence, one should not slip into the trap of suggesting that the poor in the Global South are necessarily more likely to act in pro-environmental ways. In fact, local communities in the North or South have mixed views of development, and they may be victims of pollution as much as they are complicit in it or even perpetrate it themselves. Finally, we should be cognizant of the complex dialogue created as environmental concepts move between academia and activist circles as well as across regions, through multiple networks and learning processes (Martinez-Alier et al. 2014, 2016).

Cities as Solutions

The environmental challenges faced by and created by cities are well known. Still, cities can also be framed as agents of positive change. They are locations of extraordinary social, political, and economic power and, as such, can play a pivotal role in transitioning to more sustainable modes of living. As Rees (1995:42) stated:

Paradoxically... while there is no hope for the city per se to achieve sustainability independent of its vast and scattered global hinterland, it is in cities that the greatest opportunities exist to make the changes necessary for general sustainability.

In this sense, cities are well-suited focal points for experimentation and operationalization of sustainability (Selman 1996). The notion of cities as loci for sustainability experiments is increasingly being adopted by urban scholars as well as design and engineering professionals (Bai et al. 2010; Bulkeley et al. 2015). New concepts and approaches, for instance, to climate change are well underway (e.g., smart cities, green cities, ecocities, low or zero-carbon cities). The role that cities play in climate change mitigation and adaptation is widely recognized (Bulkeley et al. 2015; Revi et al. 2014; Rosenzweig et al. 2010). Actions at the urban scale by a range of actors might be central to the ability of the world to circumvent the worst effects of climate change and forge productive solutions to the challenges it poses.

This framing needs to take into account the diversity of urban functions as well as social, economic, and political contexts. For instance, social justice and sustainability are affected by the size, population density, and extant infrastructure of cities as well as the type of political organization and level of inequality of its citizens. Although research shows that larger cities drive more innovation (Bettencourt et al. 2007), there is no single optimal urban morphology or population density with regard to outcomes that are both ecologically sustainable

and socially just. Some cities show a positive relationship between density and inequality, whereas others with dispersed populations exhibit economic inequality and unevenly distributed environmental hazards. Social and ecological outcomes are determined by many structural factors that are mediated or transformed by urban morphology. Thus, it is difficult, if not impossible, to establish universal prescriptions or normative assumptions with regard to city size and density in pursuit of ecologically sustainable and socially just outcomes.

Intersection or Diversity of Environmentalisms as a Mobilizer

In urban contexts, an important way to generate justice and sustainability is through the interaction and productive engagement of a diversity of *environmentalisms*. To illustrate why this is productive, consider the example raised by Amita Baviskar in Chapter 5 (this volume). Baviskar frames her argument around two central narratives, both of which represent a form of environmentalism located in a particular place: Gurgaon, India. Anuj Gupta stands as a paradigmatic case of the “traditional affluent environmentalism” while Sarita Devi represents the paradigmatic case of Joan Martinez-Alier’s “environmentalism of the poor.” Baviskar’s analysis shows that these two environmentalisms revolve around issues of access to adequate, clean environmental resources; distribution of environmental resources, social and economic power, and political agency; and avoidance of harm.

The environmentalisms presented by Baviskar can be articulated with the environmentalism espoused by the environmental justice movement—from its roots as a mobilizing force against the racist and discriminatory positioning of toxic waste facilities in the southern United States (Bullard 2000:29; 2008:89), to more recent mobilizations that seek to frame climate change as inherently an issue of justice (Schlosberg and Collins 2014). Indeed, one of the key aspects of the environmental justice movement has been its commitment to a plural notion of justice (Schlosberg 2007), one that has recently tended to seek larger normative frameworks in which to situate its analysis, most notably Amartya Sen’s “capabilities approach” to justice. The implication of this shift has been an increasing tendency to theorize the “justice” of environmental justice in terms of well-being, an arguable departure from the earlier environmental justice movement, which sought to frame its justice demands in terms of established, liberal notions of justice (Edwards et al. 2015).

In other words, mobilizing the actors’ portrait in Baviskar’s account requires framings that take into account diversity and justice as intrinsically linked to sustainability in cities. The challenge in this approach is for localized interest groups to cohere into a movement that mobilizes the environmentalisms of both Gupta and Devi in unison, rather than playing them off against each other, as has historically been the case (and, indeed, how Baviskar’s analysis

seems to suggest the protagonists view their positions). How, for instance, can Gupta's concern for water access or energy security be connected to the concerns of Devi for green spaces, clean air, and landscape aesthetics in a fast-developing urban area?

The Promise and Peril of Data in the Urban Environment

One of the key barriers in achieving a sustainable and just urban environment is the lack of reliable data, which is absent in some instances, and inaccurate or incomplete in others. Although there is a proliferation of schemes and projects that generate data on cities, these efforts typically prioritize standardization over accuracy.

The standardization of inaccurate, incomplete, and incommensurable city-level data has the potential to disadvantage already marginalized populations and neighborhoods. In his now classic research on environmental racism in the United States, Robert Bullard (1990) showed that African-Americans were disproportionately exposed to environmental hazards. Their disproportionate exposure persisted unabated because, prior to the emergence of the environmental justice movement, data that exposed the unequal distribution of environmental hazards were lacking. The inexorable move toward representing cities as "big data" risks cementing similarly unequal urban systems by rendering informal flows and stocks illegal, not to mention people. One of the pillars of the environmental justice movement that emerged in the United States is that the people most exposed to environmental hazards must be able to speak for themselves. Self-representation becomes more challenging as the standardization of city-level data becomes an increasingly technocratic affair.

Global Capital Circulation and Environmental Agendas

Cities are embedded in a global context, connected in various ways to webs of regional and local resources as well as economic flows, power relations, conventions and regulations, population movement, and various types of displacements of pollution and waste. Cities influence and are influenced by these proximate and distant forces nested within a multitude of feedbacks and interactions that ultimately affect specific places and groups of people (Kok et al. 2006).

The actions of global institutions, such as multinationals, intergovernmental agencies, and regional and international bodies, are key drivers at global and regional levels. Multinational corporations relocated production from industrial centers in the Global North to emerging economies, thus giving rise to the so-called "new international division of labor" (Fröbel et al. 1980) as well as a redistribution of environmental impacts (Steffen et al. 2015). This

precipitated a crisis in many industrial cities, to which municipal authorities have struggled to respond (Bluestone and Harrison 1982; Schindler 2016), as well as in emerging economies, where cities suddenly faced new and complex challenges with regard to the emergent urban environment. The result has been paradoxical: cities are the key scale at which national and global events unfold (see Brenner 2000), yet global policy frameworks (e.g., Habitat III) and intercity competition make it increasingly difficult to define objectives and set priorities at the local level (Cohen 2004). Overall, local strategies have to be formed and reformed, based on the logic of macro-level factors as to what is, or is not, feasible, and actors' responses and political judgments about which values and interests they most wish to promote.

Mollenkopf (2003), while studying the urban political realm, argues that one should not underestimate the importance of urban politics and community action, and the role of agency should never fade out of the analytical picture. There is a broad literature that stresses the fact that grassroots mobilization has been a crucial factor in the shaping of cities (Esteva and Prakash 2004; Mollenkopf 2003). Of course, the plausibility or success of such reactions relies on the stakes at hand as well as on the social actors' ability to counterbalance pressures from the larger context. In general, stakeholders differ in their agency capability, given local conditions. Whereas some stakeholders may have considerable lobbying power, be well versed in interactive action, and significantly oppose the system, others may be more easily affected by external influences.

Overall, it is possible to argue that national and international forces provide the framework conditions (both to benefit from and to react to) and then localities do something about these systemic impediments: they resist, cooperate, form alliances, adapt. What actually happens is a result of the dialectic of structural change and actors' responses. It is thus important to understand the local dynamics as well. Overall, the nature of the linkage between different constituency interests and the roles that actors play at different scales must be understood for multilevel governance.

In linking the role of agents for change (in particular, the potentials and limits of different constituents in cities) to the questions of sustainability, justice, and diversity, three related areas must be considered:

1. Who defines what change is desirable, and who has the power and knowledge to effect change? This question speaks to the themes of justice and diversity. A related question is: How should the sustainability of these changes be measured? Change happens at different scales, and different constituents may aim to effect change at different scales; this has to do, in part, with the limits (both real and perceived) to their power to effect change. Interventions that may be deemed sustainable or just at one scale may change completely when zooming in or out. Providing clean water to one region may seem just and sustainable,

but it is a question that must be evaluated in the context of the larger socioecological system.

2. Regional variation and interdependence must be taken seriously in urban analysis and planning. The political, legal, social, and environmental opportunities available in one place may be starkly different from those in another. Cultural and moral norms affect the potential of cities and their inhabitants as agents of change, both positively and negatively. The stigma of “rocking the boat,” for instance, may work to silence mobilization unless a major critical event pushes people to act. Conversely, a strongly felt sense of equality and rights might push people to ask for better cities to live in, even where laws and regulations themselves have not protected these rights effectively to date.
3. Intraregional and intra-urban variation is equally important in urban analysis and planning. Regional urban systems are often organized by economic, political, and demographic hierarchies, marked by differences in services, resources, and quality of life. Likewise, different social groups are unevenly positioned to benefit from opportunities for gain and may experience different levels of environmental harm (see, e.g., Baviskar, this volume; Bullard 1990).

For constituencies that are typically endowed with little or no power, how might they be able to speak up and gain attention, or make their approach and demands heard and realized? The answers may sound idealistic and unrealistic, but they are worth considering as ultimate aims. The most important aim resonates in the 17 principles of environmental justice, established at the First National People of Color Environmental Leadership Summit (1991): *the people most affected must be able to speak for themselves* [paraphrased]. To do so, they must be endowed with better tools, better networks, and more power to be heard. If formal institutions do little to assist them, alternatives must be considered. For instance, the Environmental Justice Atlas project, directed by Joan Martinez-Alier, documents and maps the global distribution of environmental conflicts. Among other things, it shows how the terms that are used by local communities and campaigners to highlight the conflicts or injustices they face may travel to other localities, be adopted by academics, or vice versa. It also demonstrates how academic concepts may be embraced as tools by campaigners to mobilize knowledge and gain recognition (Martinez-Alier et al. 2014, 2016).

Another way of mobilizing knowledge is to enable people to collect their own data and, where necessary, to challenge scientific parameters. This citizen science represents a growing trend: affected communities gather evidence to challenge data collected by industry or local governments (San Sebastián and Hurtig 2005). Louisiana’s bucket brigades provide an excellent example: they adopted a simple tool to measure air pollution among fenceline communities exposed to contamination and challenged the scant and inaccurate data

collected by industries and the environmental protection agency (see Allen 2003; Lerner and Bullard 2006). The strategy has inspired similar efforts in other parts of the world. For instance in China, a Beijing-based NGO affixed air pollution monitors on kites. Similar crowd-sourcing efforts have resulted in the creation and constant updating of maps of pollution to name and shame offenders. More often than not, their claims to legitimacy are based more on moral grounds than on scientific or legal arguments.

Of course, there are difficulties faced in the model of popular epidemiology, which deserves particular attention. In their study of the childhood leukemia cluster in Woburn, Massachusetts, Phil Brown and Edwin Mikkelsen (1997) defied classic epidemiology methods and proposed mapping illness that appeared in very small clusters—considered statistically irrelevant by classic epidemiology—onto local pollution. This approach seems very similar to Robert Bullard’s mapping of the overlaps between exposure to environmental harm and communities of color (Bullard 1990). The difference is that whereas the latter is difficult to deny, the former is still subject to scientific scrutiny. After all, just because cancer and pollution coexist in a small cluster does not provide incontrovertible proof, by epidemiological standards, that the cause of illness is pollution. The same challenge affects China’s cancer villages. In some cases, even if the entire village population died of cancer, it would still not be statistically significant because data need to be aggregated at a larger scale, and at that scale, these small samples become invisible (Lora-Wainwright and Chen 2013).

Another important obstacle to communities acting as drivers of change is this: not only may their capacity and tools be limited, they may have come to accept their position since they have experienced the same sort of injustice for decades or more. There may be legal or political grounds for complaint, but unless communities feel empowered and entitled to speak up, they most likely will not do so. For several reasons, they may learn to normalize and accept pollution and injustice, and only challenge them on a very low scale, without demanding deeper change (Lora-Wainwright 2013). The only way for such communities to speak up is if they develop a stronger sense of their rights or have better access to tools to measure their exposure to harm; if they came to see their situation not as an accident of fate but as systemic injustice; and if they became connected to activists and campaigners who have faced similar challenges elsewhere.

How can we bring about change across places and communities? Should we adopt a universalist frame, argue that everyone should have the same rights to live in a clean environment, and expect and demand the same outcomes? The answer should be a strong, resounding, idealistic yes, albeit with a realistic sense that we need to adapt to local conditions and that the timelines for change will vary in different places. For instance, global pressure needs to be exerted on governments as they oversee communities exposed to lead contamination; compliance needs to adhere to a global standard of what is an acceptable level

to ensure health. This approach should help campaigners, even though immediate compliance may not always be forthcoming.

To ensure that diverse perspectives are heard, promising tools for urban environmentalists include participatory planning, participatory scenario framing, and other similar approaches. Participatory workshops that bring together different stakeholders to consider options for a neighborhood, a district, a city, or a region offer a means to achieve consensus or, at least, to understand the options, trade-offs, and potential involved. The coproduction of future scenarios by academics, governmental officials, planners, and various groups of people, for example, is a powerful way to convert simple lists of aspirations or (more commonly) problems to be solved into living narratives that illuminate a suite of pathways to desired futures (Iwaniec and Wiek 2014; Özkaynak 2008; Wiek and Iwaniec 2014).

Final Remarks

How are different framings of environmental problems driven by differences in normative and theoretical positions? How might more inclusive framings enable more societally relevant and impactful research and more concerted action/practice?

Our discussion has demonstrated that in cities, the framing of environmental problems is indeed driven by different normative and theoretical positions. In addition, different social, economic, and political contexts play a strong role in shaping the perception of what the problems are and which ones may gain support and for whom. Some common dichotomized perspectives often underlie and influence the conceptual and analytical framing used to examine urban socioenvironmental problems.

However, frequently overlooked are the following: (a) the diversity of urban environmental agendas; (b) the tensions, trade-offs, or synergies among different framings of urban environment and development issues; and (c) the social, economic, and political power structures and legacies which underpin them. At the same time, commonalities or synergies across these agendas are even less commonly acknowledged or applied in practice. We note that there is a lack of fundamentally integrated conceptual framing and analytical tools to understand the complexity of cities and their place within various types of regional and global networks. We do not yet know how to study the complex flows of capital, technology, ideas, and environmental goods and services within and across city and regional boundaries.

More and better data on cities are urgently needed, as is a fundamental reexamination of the nature and method of data collection and analysis. What will be the unit of analysis and data collection in cities? What is left out by conventional urban data collection practices? The data that provide support to legitimize action are often aggregated in a way that masks the vast inequality within

urban areas. Is citizen science the solution for more accurate and representative data collection? Or, should the recognition and legitimacy of such an approach, which can be influenced by political power structures and agendas, come first?

In response to the issue of inclusive framings, we propose that the following three approaches may be more relevant in conceptualizing the urban environment, and thus more capable of advancing both research and practice agendas:

1. Utilize a more *inclusive definition* of the urban environment—one that merges justice with the green and brown agendas. We propose a conceptualization that includes four main components: (a) nature in cities, (b) access to basic services, (c) protection from hazard and adverse ambient environmental quality, and (d) cross-boundary influences.
2. Recognize cities as complex, dynamic, and evolving systems with nonlinear trajectories, where various internal and external forces shape multiple possible futures. Since cities are an integrated part of global capital and environmental systems, they contribute to and are subjected to different types of *impact displacements* across and within regions. Such conditions render consideration of inter- and intraregional processes central to urban analysis and planning.
3. Recognize the important role various urban constituencies play in bringing about desirable change, where the potentials of these constituencies are not fully mobilized, and often limited by various factors such as the lack of legitimacy or political voice to act as agents for change.

Many elements of these approaches, including justice and systems-based problems, have been around and discussed for over twenty years, whereas others are relatively new. For those that have long been discussed, we note that discourse was often limited to particular disciplinary or stakeholder groups, and thus a broader engagement is still very much needed.

In our discussion of five different framings, used to examine and act upon urban social and environmental problems, it is important to note that there are tensions between some of these framings. Although the framings typically address specific elements of urban environment, their purposes are often not dissimilar. The diverse nature of urban problems call for plural concepts and approaches with each contributing different but useful insights. It is also important to recognize that scholars and practitioners using different frames often do not talk to each other. More inclusive, open dialogue across disciplines and across concepts and value systems are needed, but may prove difficult to achieve due to persisting epistemological differences.

Looking ahead, few will disagree that a transformative change is needed for urban futures that are sustainable, diverse, and just. Cities are characterized by uncertainties, often subject to shocks that result in unintended and unevenly distributed consequences. Cities are also spaces where multiple possible and desirable futures can be envisioned, which in turn require closer attention to

participation and evaluation of benefits and trade-offs. As such, envisioning more diverse, sustainable, and just futures for cities calls for better understanding of the dynamic interactions among different structural components affecting urban systems, including those that structure social inequalities. In closing, several questions emerge as important to research and practice: How do we reimagine the urban future? Can city residents, in their diversity, articulate what futures they want, develop collective visions, and mobilize around common desirable goals? New knowledge and tools, as well as a commitment to engage those who are disproportionately affected by the ever-changing environment, are needed to support and enable such an approach.

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