Introduction

I think our governments will remain virtuous for many centuries; as long as they are chiefly agricultural; and this will be as long as there shall be vacant lands in any part of America. When they get piled upon one another in large cities, as in Europe, they will become corrupt as in Europe.

— Thomas Jefferson in a letter to James Madison (Jefferson, 1955, 438)

Towns are like electric transformers. They increase tension, accelerate the rhythm of exchange and constantly recharge human life.


These quotes have little in common with each other except that they reflect humankind’s long-standing love-hate affair with cities. Cities are the basis of civilization, yet they have always combined the characteristics of a blessing and a curse. They provide a focus for wealth creation, scientific and artistic creativity, and social interaction. But they also display profound income inequality, pollution, and crime. By virtue of their densities — of population and built environment — cities tend to magnify and accelerate many of the challenges of the nexus. Yet they are also sites of innovative solutions to the challenges we face. Urbanity at its very core represents intensification: of interactions, infrastructure, communication, and, of course of relevance to this volume, resource use. Massive worldwide urbanization commenced roughly with the Industrial Revolution in Europe and has continued, nearly unabated if in a geographically uneven manner, until the present. Human existence on the planet is now better than 50% urban. More people live in cities, variably defined, than do not, and as a result, urban lifestyles, which are in general more resource intensive than traditional rural lifestyles, are having an increasingly outsized imprint on the flows, transformations, and wastage of most natural resources globally. Much like the tension reflected in the two quotes above, there is debate in scholarly literature about precisely what cities mean for resource nexus issues. While urban lifestyles engender certain types of consumption that increase demand for energy, water, land, and minerals over time, once a society has reached a certain level of urbanization and development, living in cities is on balance less resource intensive than living outside the city largely owing to size of housing, distances
traveled, and modes of transportation used. To put it more provocatively, one might ask if the key to sustainably managing resource consumption in the future lies in “piling” an ever larger share of the world’s population in cities, as some have suggested (Owen, 2009).

This chapter provides an overview of the urban resource nexus and draws on a range of literatures from geography, political ecology, and planning. At the outset it is important to note that there is no well-defined area of urban nexus research, with the term connoting in various contexts the urban–rural interface, the water–energy–food nexus as manifested in urban areas, integrated approaches to urban metabolism (Moss, 2016), but also issues of social equity and provision of basic resources (Roy, 2016). This chapter acknowledges this lack of conceptual clarity in current nexus research, while adopting the basic understanding of the nexus referring to the interlinkages of demand, consumption, and waste cycles between different categories of resources, and puts this into dialogue with renewed interest in “urban metabolism” in scholarly literature.

Why cities?

According to the UN Environmental Program, cities occupy 2% of land surface, produce 50% of global waste, account for between 60 and 80% of global greenhouse gas emissions, consume 75% of natural resources, and produce 80% of global GDP (UNEP, 2013). There are 800,000 new urban residents added every week, and if this mass movement of humans continues, by 2050 the rate or global urbanization will be 70%, up from the current 50+, in what is being described as the “second wave” of urbanization. Most of the 3 billion or so people added to the global population will be in Asian and African cities (ibid.). Accompanying this wave will be the creation of massive infrastructural works, housing, industrial, and commercial spaces. Public and private efforts to house new city dwellers have historically not been able to keep up with massive growth, especially in poorer parts of the world, which means that informal settlements (slums) will continue to play an important role in the urban landscape. While the percentage of people living in slums decreased over the last decade, the actual number of slum dwellers increased due to urban population growth.

The oft-quoted UN statistic of the percentage of humans living in cities is illuminating, but it raises the definitional question of what precisely “urban” means. There is no standard definition, but there are general characteristics that governments and scholars look to in order to devise their definitions, such as population size and density, economic functions, and characteristics of the built environment (dense settlement, presence of paved streets, water supply and sewerage systems, etc.). Urban geographers, planners, and sociologists have through time also resorted to a range of metaphorical representations to facilitate understanding urbanity. The MIT planners Julian Beinart and Kevin Lynch (Beinart, 2013) describe three normative modes of urban form: supernatural or cosmic, which considers the non-material drivers of people being drawn to cities (if Biblical heaven is a “city upon a hill,” this metaphor sees cities as beacons representing some sort of spiritual release or realization to non-urban populations); city as machine, wherein urban spaces emerged as multiple systems of moving parts and “grids of expediency” to accommodate the waves of people moving pushed and drawn to cities by material realities of economic development, land enclosures, etc. (think of Fritz Lang’s dystopic depiction of the city in his film Metropolis); and city as organism, which has origins in the Enlightenment unification of nature and reason (Gandy, 2002) but then re-emerged from the scientism of the 19th century. As a metaphorical organism, cities are born, grow, mature, and exist within a surrounding habitat.

The concept of urban metabolism (UM) emerged from this last category, and it has seen renewed interest over the last decade by scholars seeking to destabilize the neat categories of
Urban metabolism, new urban governance

...and rural that tend to conceal the multiple layers of interactions and mutual interconnections between cities and their immediate and more distant surroundings (Figure 28.1). Urban metabolism conceives of cities as akin to organisms that take in food and other resources and release waste into the environment.

Abel Wolman first developed the concept in the 1960s as a means of quantifying inputs and outputs of cities, and he identified the major metabolic challenges as water supply management, sewage disposal, and air pollution (Holmes and Pincetl, 2012; Wolman, 1965). Systems ecologists such as Odum further developed the concept during the 1970s by conducting numerous studies on the solar energy equivalents (“emergy”) that were well received by the deep sustainability and ecology movements but found little traction in urban governance approaches (Kennedy et al., 2011). Meanwhile, more engineering-focused contributions have looked at material flows using conventional units for measurement for various resources.

Urban metabolism helps in analyzing the technical and socio-economic processes of a city (Kennedy et al., 2007). This can be quantified using material flow analysis (MFA), which seeks a system-based understanding of how urban areas transform materials using readily available data (but typically neglects the role of energy) (Holmes and Pincetl, 2012). The material flows in an urban area can be conceptualized as:

- Inputs: domestic extraction of resources, and imports of raw materials and products;
- Outputs: emissions and wastes, and exports of raw materials and products;
- Internal processes: intermediate and final consumption; and
- Addition to stock: share of the consumption that is accumulated in the system.

Life cycle assessment (LCA), a technique widely used in industrial ecology, is another technique for examining the cradle-to-grave use of resources in urban areas (Holmes and Pincetl, 2012).

UM has experienced a resurgence in recent years in the development community, by scholars in urban studies and urban political ecology, and in the context of increasing concern over climate change (Heynen et al., 2006). Some urban nexus studies that might benefit from an UM

---

**Figure 28.1  Extended metabolism model of human settlements**

*Source: adapted from Newman (1999)*
approach include work on “patch fragmentation,” heat island effects, reduced biodiversity, water supply and sewage, etc.

Given the wide-ranging work on UM spanning five decades, it is useful to put the urban nexus into conversation with this longer standing body of work that has similar conceptual and practical aims. The idea of the “urban nexus” approach was conceptualized at the Bonn 2011 conference on Water, Energy, and Food Security. It is aimed at describing the optimization of urban system and processes as a means to the opportunities for resource sustainability and meeting the basic human requirements. It is therefore important to consider a nexus approach for the cities that includes integrated planning of infrastructure and management of resources such as water and energy. The urban nexus is complicated by governance structures of urban areas that often have overlapping, highly fragmented jurisdictional boundaries. A major city such as Mumbai, India, must negotiate across multiple jurisdictional boundaries in order to secure enough freshwater to supply the population, and of course moving precious supplies of water across boundaries creates almost by definition political frictions, as any student of water-scarce regions throughout the world well knows. In effect, the metabolism of the city is in competition for many of the resources required to sustain contemporary urban lifestyles, while the waste and pollution produced by producing electricity, moving people through space, etc, produce effects felt well beyond the city’s confines. The fragmented nature of urban local bodies and their management system are not able to respond to cities’ complex, fast-growing, and interdependent systems. The “silo-thinking” and focusing on development of only one sector does not resolve the issue of urban problems.

One iteration of the urban nexus that has gained traction in certain circles comes from the German development community:

The Urban NEXUS is an approach to the design of sustainable urban development solutions. The approach guides stakeholders to identify and pursue possible synergies between sectors, jurisdictions, and technical domains, so as to increase institutional performance, optimize resource management, and service quality. It counters traditional sectoral thinking, trade-offs, and divided responsibilities that often result in poorly coordinated investments, increased costs, and underutilized infrastructures and facilities. The ultimate goal of the Urban NEXUS approach is to accelerate access to services, and to increase service quality and the quality of life within our planetary boundaries.

(GIZ and ICLEI, 2014, 6)

This approach places a great deal of emphasis on integration across scales, systems, etc. The report includes nearly 40 case studies of public and private projects in cities spanning the globe that exemplify this cross-sectoral frame of mind around questions of resource access, use, and disposal in urban environments.

The urban resource nexus can be useful in this context by considering not just how and in what quantities different resources are used within cities, but rather by destabilizing the supposed binary of urban–rural and thinking through the life cycles of different resources as they move through space, interact with one another, and are fixed in place at various moments in buildings, roads, and a host of other material objects that have come to define what we think of as a city.

The added value of urban metabolism is precisely how it can break down nature–society oppositions; we, humans, and the lives we lead in cities, the technologies we deploy, the structures we erect are all entirely products of the natural world, and in turn human activities impact the natural environment in myriad ways. Cities exist within nature’s economy, and
Table 28.1 Urban problems

Problems arising from badly designed and managed cities:

- Land, air and water pollution
- Destruction of agricultural land, biodiversity and of historical heritage
- Waste of resources (land, water, energy and mineral)
- Great social and economic inequality
- Poor health and physical security, especially for marginalized groups
- Sectors of many cities become ‘single use’ (work/leisure), and the preserve of the rich for living
- Poor transportation, traffic congestion
- Unreliable, nonexistent utility services
- Lack of physical security – crime, breakdown in social order, violent/inhuman police and security services

Threats to cities:

- Inadequate water and energy supplies
- Flood and storm damage in low-lying coastal or riverine locations
- Also, in some places, earthquakes and landslides

Sources of these problems:

- Old cities designed with aesthetic priorities
- Urban sprawl – dormitory suburbs and towns, low density (in some countries)
- Energy inefficient buildings and factories
- Transport systems based on the road/motor vehicles
- Inadequate household, commercial and industrial waste management
- Inefficient and dirty sources of power generation and transport

Source: Andrews-Speed et al. (2015)

Figure 28.2 Cross-scale ecological cycles in cities

Source: Grimm et al. (2008)
they are part of a “hybridized and historically contingent interaction between social and bio-
physical systems” (Gandy, 2004, 364), in what Gandy describes as a dialectical set of feedback
loops. Therefore, it is important not to overly fetishize the distinction between urban and rural
space, since cities are thoroughly integrated into their immediate as well as global hinterlands
by means of infrastructure networks that make available water, energy, food, minerals, building
materials, and of course bits of information in our increasingly digital world (Brenner, 2014;
Gandy, 2002).

Cities are interesting from a resource nexus perspective because of the ways in which they
magnify and concentrate nature’s economy in particular locations, and it goes without saying
that cities provide endlessly fascinating examples of the transformation of resource endowments
to facilitate human endeavors (Figure 28.2). The examples are virtually limitless, but standing on
the Bund in Shanghai with a view of the massive, asparagus-like proliferation of a new skyline in
the span of just a few decades, or looking at the expanse of concrete runways and steel-and-glass
terminal buildings at Dubai’s soon-to-be busiest airport in the world, or wandering through an
informal settlement in some South Asian megacity, with all the challenges in provisioning basic
needs that entails, provide at least a taste of where to look for the resource nexus in the global
urban context.

Case study of sanitation in New Delhi, India

By 2025, the UN projects that South Asia will be home to five of the 10 most-populous cities
in the world (Delhi, Mumbai, Dhaka, Kolkata, and Karachi). By 2030, 590 million people will
live in cities in India (twice the US population today), and that staggering growth will require:

- 700–900 million square meters of commercial and residential space needs to be built yearly
  (a new Chicago every year);
- 2.5 billion square meters of roads will need to be paved;
- 7,400 kilometers of new subways and urban rail (McKinsey and Co., 2010).

If basic questions of providing suitable and ample basic necessities to urban dwellers in this
region were not enough, there are also growing concerns about the ability of megacities to deal
with the impacts of climate change, including amplified monsoons and droughts, sea level rise,
and deadly heat waves such as the ones in 2015 and 2016 that caused thousands of deaths in the
country and saw India’s hottest day in recorded history in May 2016. Strategies to govern the
resource nexus issue in a complex, diverse country such as India also must take into account
cultural norms and practices that are seemingly at odds with the models of urban infrastructural
management found in urban planning textbooks.

Take the case of waste removal, and specifically the still widely practiced caste-based practice
of manual scavenging. Manual scavengers are mostly women, mostly from the dalit caste, and
their profession is to crawl into dry latrines and collect human excreta with their bare hands and
carry it as head-load in a container to dispose of it. Each toilet of a higher caste family earns a
manual scavenger around 20 to 30 rupees per month (US$0.30–0.40). In spite of the practice
being illegal, the Indian Supreme Court estimated in 2014 that there are 9.6 million dry latrines
still being manually cleaned, and this estimate does not take into account the manual cleaning
of open defecation, which is also commonly done by lower caste individuals (HRW, 2014). Of
the nearly 8,000 towns and cities in India, fewer than a thousand have a sewer system, and even
where a sewer system exists it usually only partially covers the city. Moreover, only 160 cities and
towns have a sewage treatment plant, meaning that the remaining communes with sewer systems release untreated waste into the environment, either into waterways or cesspools.

Manual scavenging is a filthy, often dangerous profession. It also comes with a host of accompanying discrimination, including exclusion from places of worship and, perversely, from communal water sources (HRW, 2014). Prime Minister Narendra Modi, prior to taking office in 2014, expressed a commitment to building more modern sanitation systems (“build toilets before you build temples”), but there have been only limited efforts to improve the situation for manual scavengers (ibid.). Manual scavenging is an issue of social justice, but there are also serious environmental implications of the sanitation crisis in South Asian cities.

Efforts by civil society actors have complemented government attempts to eliminate manual scavenging. The work of the Sulabh International Social Service Organization in New Delhi is an NGO that works towards improving the lives of manual scavengers, and it has also designed a toilet to be used in buildings that are not connected to sewage systems. The Sulabh toilet uses an on-site composting system in which collected waste is transformed into an odorless dry sludge and used as manure and biogas. The toilet requires 1–1.5 liters of water to flush, in contrast to the 12–14 liters required by conventional toilets. This alternate source of energy is used for cooking and electricity purposes. This approach provided cost-effective solutions, use of indigenous technologies while expanding sanitation infrastructure and aiming towards achieving the goal of 100% sanitation coverage in the country. Using the ‘Sulabh Model’ design, public toilet facilities have been constructed across the country and linked to around 200 biogas plants of 35 to 60 cubic meters capacity. Human excreta-based biogas technology remained unnoticed for long due to the fact that the available technology was not socially acceptable, as it required manual handling of human excreta, which contains a full spectrum of pathogens. The design developed by Sulabh does not require manual handling of human excreta and there is complete recycling and resource recovery from the wastes.

Creative solutions nexus issues in cities such as this one are ones that can be encouraged by appropriate governance and encouragement of local actors to solve intractable environmental and resource issues.

Case study of cement in China

Cement is the world’s most popular building material, and the industry is the largest user of natural resources in the world, in particular minerals, water, and energy. Cement is composed largely of clinker, which is sintered limestone and clay that must be kilned and is therefore a major producer of GHG. There is a large body of literature mostly focusing on how cement production affects air quality and energy use, such as the carbon footprint of the industry and the dispersal of mercury, acidic gases, and particulate matter. There has been far less attention paid to the entire life cycle of the material, as well as what the concretization of cities globally, but especially in places such as China, means for water (runoff, infiltration, water pollution), land (soil sealing), and other resources.

China produces more than half of the world’s cement, and between 2011 and 2013 the country used more cement than the US used during the entire 20th century (6.4 vs. 4.4 gigatons). Cement production accounts for 7% of total energy consumption in China, 15% of CO₂ emissions, 21% of particulate matter, 4% SO2 and 10% of NOₓ; around 99% of energy for cement production comes from coal. While a recent paper in Nature suggests emissions from cement production in China are lower than earlier thought and demand for the material has recently slowed considerably, the new, lower estimates still make cement a major environmental
factor locally and globally (Liu et al., 2015). Additionally, very little cement is recycled in China, which means that old material is landfilled.

The reason for the concrete boom in China is the urbanization boom of the last three decades. Most of the construction of infrastructure and buildings has been to accommodate the rural-to-urban migration that has occurred, constituting the largest scale mass movement of humans in history. Cement is valued for its versatility and strength, but when applied in such concentrated and mass quantities, there are numerous ripple effects. Paving over soils, “soil sealing,” profoundly inhibits the natural role that soils play in absorbing heat, water, exchanging gases, hosting plant cover, and controlling erosion of fine particles (Scalenghe and Marsan, 2009). The horrendous air-quality issues faced by cities such as Beijing are a very visible manifestation of the types of issues urban China can expect to face, but there are other impacts as well.

One of the largest infrastructure projects in China in recent years has been the South-to-North Water Diversion, a $60 billion megaproject that when fully operational will divert 45 billion cubic meters of water from the relatively water-rich Yangtze River system to the relatively water-poor northern provinces. The per capita water availability in Beijing is now below 240 cubic meters, below the 300 cubic meters per capita standard set by UNESCO for the absolute minimum supply required to support a “modern and productive social life” (cited in Crow-Miller,

Table 28.2 Component affected, effects, timing and consequences of the sealing of soils

<table>
<thead>
<tr>
<th>Effect</th>
<th>Time</th>
<th>Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat</td>
<td>Decreased radiation absorption</td>
<td>■ More reflective surfaces</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■■ Heat island (HUI)</td>
</tr>
<tr>
<td>Water</td>
<td>Less infiltration</td>
<td>■■ Reduced chemical reactivity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■■■ Less filtering action</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■■ Cracking</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Loss of biomass</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■■■ Diminishes the natural recharge of aquifers</td>
</tr>
<tr>
<td>More runoff</td>
<td></td>
<td>■ Increased water through adjacent areas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■■ Increased ponding time</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■■ Probability of anaerobiosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Transfer of contaminants</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■■■ Increased risk of flash floods</td>
</tr>
<tr>
<td>Barrier for perched water table</td>
<td></td>
<td>■ Increased risk of anaerobiosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■■ Release of contaminants</td>
</tr>
<tr>
<td>Gas</td>
<td>Reduced/interrupted exchanges</td>
<td>■ Risk of anaerobiosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Partial trapping</td>
</tr>
<tr>
<td>Biota</td>
<td>Loss of plant cover/biomass</td>
<td>■■ Reduced biodiversity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■■■ Reduced carbon sink</td>
</tr>
<tr>
<td>HUI</td>
<td></td>
<td>■ Thermal specialization</td>
</tr>
<tr>
<td>Landscape</td>
<td>Increased wind erosion</td>
<td>■■ Increased air-borne particulate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■■ Increased erosion of adjacent areas</td>
</tr>
<tr>
<td>Uniformity</td>
<td>Increased water erosion</td>
<td>■ Reduced aesthetic appeal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Reduced visual appearance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■■ Reduced attractiveness</td>
</tr>
</tbody>
</table>

Source: Scalenghe and Marsan (2009)
Urban metabolism, new urban governance

2015). In short, Beijing is the most water-stressed megacity in a world increasingly full of water-stressed megacities. These concrete arteries, the largest interbasin transfer project in history, has been framed as essential to sustain the population of the North China Plain and surrounding cities, but by one estimate the project could have been avoided if a third of buildings in Beijing collected rainwater (Barnett et al., 2015). Thus, while cities such as Beijing lack abundant water resources to sustain the types of growth they are experiencing, the transfusion of distant water in this case results in a clear case of the urban nexus: massive quantities of materials transformed into concrete, steel, and other materials, to construct a series of canals that disrupt natural water cycles in order to sustain a city that if other governance decisions had been made likely could have avoided the need for the project in the first place. In and around the city itself, of course, the paving over of vast tracts of land further disrupts the replenishment of groundwater stocks while runoff carries the pollutants one would expect in any urban area, such as petroleum distillates, fertilizers, heavy metals, and other road-deposited sediment (Zhao et al., 2010).

As urbanization continues to expand its geographic and consumption footprints, understanding the material flows and resource requirements of cement will need to be a high priority. As the case of cement in China illustrates, it is not just the resource requirements required to produce cement that are relevant, but also the longer term shaping of consumption patterns that environments built with cement create. Canals have long-term implications for water flows and energy consumption, just as building roads and buildings involves a host of effects on resource consumption. Infrastructures being built today create significant path dependency for future resource requirements in cites; planners, other policymakers, and private sector actors must take this into account and steer and shape investments with a well-informed sense of these long-term implications (UNEP, 2013). In the case of cement, promising new technologies such as eco-cements that reduce the reliance on energy-intensive clinker and sequester CO₂ emissions from production into the actual product through synthetic carbonate aggregate are certainly part of a more sensible future for cement (Mathews, 2012). But reconsidering the design of cities – and questioning the paving over of vast swathes of land – must also be part of any urban governance strategy.

Governing the urban nexus and conclusion

Governance of the urban resource nexus involves questions of urban design and ecological management. The fragmented nature of urban local bodies and their management system are not able to respond to cities’ complex, fast-growing, and interdependent systems. “Silo-thinking” and focusing on development of only one sector does not resolve the issue of urban problems. There is a long tradition of cities learning from each other, and the urban nexus presents an ideal set of challenges for cities to share experiences around how best to integrate nexus thinking into planning and design processes. The Urban International movement at the start of 20th century witnessed the exchange of town planning practices (Saunier, 2001), as did the Urban Internationale des Villes (UIV), International Garden Cities and Town Planning Association.

Urban nexus has received strong institutional backing from institutions such as ICLEI – Local Governments for Sustainability, the German Federal Ministry for Economic Cooperation and Development (BMZ), the German Society for International Cooperation (GIZ GmbH) (GIZ and ICLEI, 2014), and implicitly from a major recent report the German Advisory Council on Global Change (WBGU, 2016) on the “transformative power of cities.” GIZ and ICLEI (2014, p6) define the urban nexus as:

The Urban NEXUS is an approach to the design of sustainable urban development solutions. The approach guides stakeholders to identify and pursue possible synergies
between sectors, jurisdictions, and technical domains, so as to increase institutional performance, optimize resource management, and service quality. It counters traditional sectoral thinking, trade-offs, and divided responsibilities that often result in poorly coordinated investments, increased costs, and underutilized infrastructures and facilities. The ultimate goal of the Urban NEXUS approach is to accelerate access to services, and to increase service quality and the quality of life within our planetary boundaries.

ICLEI has a toolbox for best practices related to the urban nexus and has initiated pilot projects seeking at to get key stakeholders to talk with one another across boundaries of institutional silos (www.iclei.org/urbannexus.html).

The German Advisory Council on Global Change, meanwhile, sees as its overarching goal for cities:

- moderate densification, resource conservation, and conversion to a circular economy, for cities that are energy-efficient and emissions-neutral in the long term, and marked by socially mixed districts in which the urban societies are substantively involved in urban development. In addition, more polycentric spatial-development concepts and decentralized settlement structures should be promoted in order to avoid spatial socio-economic disparities, and to counteract potential agglomeration disadvantages in growth regions.

(WBGU, 2016, 414)

These ambitious goals for sustainable cities require buy-in from multiple stakeholders in urban, national, and global scales. However, it is in cities themselves, as key sites for economic and environmental transformation and with a commitment to shaping and planning a sustainable urban future where innovations are most critical. WBGU advocates a “social contract for urban transformation” that emphasizes the importance of polycentric responsibility in bringing about transformative action in the fields of decarbonization, mobility, urban form, climate change adaptation, and material flows. They have core recommendations for what self-assured, forward-thinking cities should have as their goals in these various areas in line with development and environmental goals established by, for example, the UN that are more squarely targeted at the national level. Similarly, UNEP and the International Resource Panel have developed a specific set of recommendations and best practices for cities to “decouple” their growth from ever-increasing resource consumption (UNEP, 2013). “Eco-urbanism” that refers to new developments following sustainable design principles is one important facet of this, and already figured in developments in various parts of the world, including the Lingang “Carbon Valley” development on the outskirts of Shanghai.

Cities in many parts of the world are already realizing their potential to effect positive change. In recent years, climate change has been an important motivator for urban platforms for information and best-practice sharing. The cities for climate change movement includes C40, now comprising 80-some megacities, 550 million people. It was started in 2005 as a G8 initiative by Ken Livingston, then mayor of London. Movements such as this reflect “growing influence of a range of non-state actors in shaping urban climate governance and an ever more complex political economy of climate change, woven between notions of carbon control, resource scarcity, resilience and security” (Bulkeley and Betsill, 2013). Municipal voluntarism such as practiced in the realm of climate change politics could serve as a useful model for the urban resource nexus,
and conversely, already established transnational municipal networks could benefit from incorporating nexus-like thinking into their forums, analysis, etc.

One of the major challenges from a social justice perspective is how to avoid a situation in which transnational policy networks arrive at a consensus about “best practices” that are not in the interests of the poorest populations in cities (Clarke, 2012). For example, market-oriented water and sewerage reform and infrastructure investments designed to benefit private, Global North firms may seem in the best interest of expanding access to these key infrastructures, but evidence suggests this is not always the case (Goldman, 2007). Sustainable development goals that consider social equity and environmental health as mutually interrelated are therefore key to addressing the urban nexus moving forward.

References


