

CHAPTER

05

“Just” Environmental Sustainabilities

QUICK FACTS

- 1 By 2030, global demand for energy and water is expected to grow by 40 and 50 per cent respectively.
- 2 Solid waste management dominates municipal annual budgets in low- and middle-income countries, with shares of 30 to 50 per cent
- 3 In urban areas, climate change impacts like heat waves, heavy precipitations and droughts can compound one another, making disaster risk management more complex.
- 4 Faced with extreme events, cities increasingly understand that novel ways are called for to build resilience, in the process contributing to a more equitable environment
- 5 Although developed countries provide those less developed with financial support for climate change mitigation, it falls short if the on-going rise in global temperatures is to be contained.

POLICY POINTS

- 1 A human rights-based approach to the urban environment emphasizes our universal dependence on unadulterated, abundant resources.
- 2 Mainstreaming the notion ‘just sustainabilities’ into urban planning and policies will challenge dominant, outdated preconceptions, while taking in specific local ecological constraints.
- 3 New planning approaches are emerging that offer a range of possibilities to finance environmental action and recognize its valuable contribution beyond purely economic valuation.
- 4 Strengthening multi-level governance approaches is essential to achieving low-carbon cities and raising standards of urban resilience in the future.

URBAN AREAS FACE FOUR BROAD ENVIRONMENTAL CHALLENGES:

- > providing public services in an equitable manner;
- > addressing environmental risks, from pollution to climate change impacts;
- > minimizing the negative impacts of land transformations in the use of resources, biodiversity and ecosystems;
- > and responding to the global call for decarbonization and rationalizing the use of resources.



Environmental planning and management are essential to the advent of sustainable cities. This must include planning for resilience in the face of disasters.

Urban areas are emerging as sites of opportunity for **effective environmental action.** ●



A review of sustainable development policies and implementation that followed the conference in Rio 1992, the MDGs, the LA21, Habitat II, including the constitution of global city networks, have recognized delivering sustainability - particularly just sustainabilities - requires good global and effective environmental governance. Ensuring justice and equity in the process of environmental planning and management is crucial towards a just and sustainable city.

Just sustainabilities policies, already advanced by community groups and some local governments, have four pillars that build upon previous experiences of sustainable development in urban planning:



Improving people's quality of life and wellbeing.

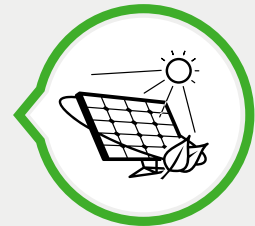


Ensuring justice and equity in terms of recognition, process, procedure and outcome.

Meeting the needs of both present and future generations, that is, considering simultaneously intra- and intergenerational equity.



Recognizing ecosystem limits and the need to live within the possibilities of this planet.



Representatives from different sectors play a key role in delivering urban sustainability. These include:



Academia



Private corporations



Research foundations



Philanthropies



Community organizations and citizen groups

Urban communities have played a leading role in;

- > climate change action,
- > influencing policy and practice for the reduction of GHGs emissions at the global level.

Urban development enables human communities to expand the amount of space available to them even as the surface of planet Earth appears to be more finite than ever.¹ This is the apparent paradox that can turn urbanization and environmental sustainability into a workable challenge. Beyond more verticality and density, this realization speaks to the transformative power of urbanization, a notion that has increasingly been recognized over 40 years of global policy-making through a succession of challenges and breakthroughs.

Urban development enables human communities to expand the amount of space available to them

The 1976 Vancouver Declaration described uncontrolled urbanization as a problem leading to overcrowding, pollution and general deterioration of living conditions in urban areas.² In 1992, along with the final declaration of the UN Conference on Environment and Development held in Rio de Janeiro, representatives from 173 countries adopted Local Agenda 21 (LA21), which was advanced by local authorities, and is now operational in some 1,200 localities in over 70 countries.³ Agenda 21 stressed the need for sustainable settlements as well as for “conservation and management of resources for development” and participatory decision-making. The scheme has made a lasting mark on governance systems.⁴ The 1996 Istanbul Declaration re-emphasized the importance of specific local circumstances in the pursuit of sustainable urban environments.⁵ Habitat III should ensure an equally positive agenda for urban sustainability, with workable proposals for effective change and in full compliance with Sustainable Development Goals (SDGs). While empirical evidence confirms that urbanization acts as a major factor of socio-economic development, it also has all-too visible negative effects on ecosystems, biodiversity and resource use, with pollution⁶ a threat to public health.

Natural disasters are particularly detrimental to the urban poor and their recognized human rights to decent living conditions

Climate change has emerged as a central issue in urban agendas.⁷ Globally, the number of natural disasters is increasing in both intensity and frequency (4,000 between 2003 and 2012, compared with 82 in 1901-1910).⁸ Natural disasters are particularly detrimental to the urban poor and their recognized human rights to decent living conditions, since unplanned urbanization and inadequate infrastructure⁹ leave them more exposed than the rest of the population. The risks from global warming are expected to intensify in the years ahead and fresh pressures are emerging. Indeed, by 2030, global demand for energy and water is expected to grow by 40 and 50 per cent respectively.¹⁰ This will likely accelerate biodiversity loss and spur the spread of infectious diseases. Consequently, adaptation to climate change must continue to mobilize

Urbanization acts as a major factor of socio-economic development, it also has all-too visible negative effects on ecosystems, biodiversity and resource use, with pollution a threat to public health



local action, alongside preservation of biodiversity.

The transformative role urbanization can play in environmental sustainability has been increasingly recognized.¹¹ When well-planned and managed (Chapter 2), urbanization, together with building design and transport modalities, provides a welcome opportunity to devise resilience strategies, in the process reducing resource use, entrenching incremental development gains and managing vulnerability vis-a-vis all plausible hazards.¹² Action in urban centres is critical to global climate change adaptation¹³ and “decarbonization” (i.e. “net zero” planet-warming emissions).¹⁴ The discrete agendas of environmental conservation and sound urbanization can be brought to converge if and when environmental planning addresses the structural (largely spatial) underpinning factors.

Accordingly, “sustainable cities” was one priority area at the 2012 UN Conference on Sustainable Development (“Rio+20”). The theme was discussed against the background of Sustainable Development Goals (SDGs) and as a component of the UN-sponsored Post-2015 Development Agenda.¹⁵ SDG 11 prescribes “inclusive, safe, resilient and sustainable” cities.¹⁶ This comes as a universal recognition that human life in all its dimensions is inseparable from the wide variety of physical (either natural or, increasingly, man-made) circumstances that give humankind vital sustenance. To a broader extent than their predecessors the Global Development Goals (2000-2015), SDGs now provide for



Overview wind power mills in the town of Palencia, Spain

Source: Jose Angel Astor Rocha / Shutterstock.com

all humankind’s living arrangements (and effective basic rights) on planet Earth, and that is why those goals are inseparable from each other, too. Since a higher proportion of humankind is now living in towns and cities, it is incumbent on urban governments, each in its own way, to provide for durable life support systems through adequate planning—and for the benefit of their population as a whole, since slums and other dimensions of urban poverty are a manifestation of unsustainable, environmentally detrimental living arrangements.¹⁷ These were the dynamics behind Habitat II, which gained impetus with implementation of LA21—thus, Habitat III should be an opportunity to give these dynamics further momentum in the face of mounting pressure from climate change.

The multi-dimensional challenges to sustainable planning are daunting, yet many cities have developed promising examples of environmental action, in an effort to restore and preserve ecological balance, changing consumption and production patterns, promoting ecological efficiency and striving for social equity. A comprehensive human rights-based approach to urbanization would contribute to environmental sustainability policies, as resources and risks determine the standards of living and

access to basic resources.¹⁸ Aiming to inspire an effective urban agenda, this chapter introduces the notion of “just sustainabilities” to address urban environmental, alongside economic welfare and social justice issues.¹⁹ Emerging in the early 2000s, just sustainabilities offer a more nuanced definition of sustainable development since the Brundtland Commission: the need to ensure a better quality of life for all, now and into the future, in a just and equitable manner, whilst living within the limits of supporting ecosystems.²⁰ Anchored by just sustainabilities ideals, this chapter reviews current urban environmental challenges, and analyses key trends in urban environmental planning, moving from guiding principles to sector-based initiatives. This is followed by a discussion on key issues governing and financing urban sustainability. Finally, it concludes that achieving healthy cities depends on planning approaches that deliver just sustainabilities²¹ in relation to urban environmental challenges and their manifestations in specific locations.

5.1

Today's Urban Environmental Challenges

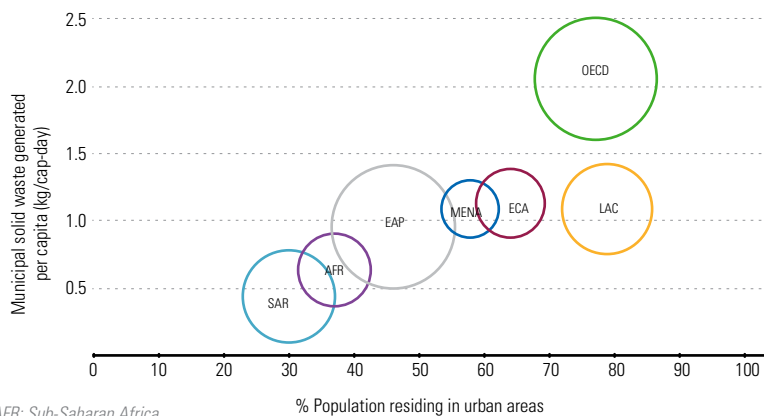
Many developing country cities seek to deploy new infrastructure and systems in a bid to compete in the global economy and attract foreign investors

Cities typically face four main types of environmental challenges, including three types of threat to, and one from, the natural milieu:

- ▶ effective equal access to resources and urban public services contributes to poverty alleviation.
- ▶ managing environmental hazards requires a risk-based approach, fully taking in the uncertainties inherent to environmental information and climate change.
- ▶ the effects of urban expansion on land conditions make it impossible to consider any town or city in isolation, highlighting the need to recognize the variety of specific spatial connections and impacts (such as biodiversity loss and deforestation).
- ▶ a low-carbon world calls for changes to resource consumption and an effective if gradual shift to more sustainable societies.

Figure 5.1: Waste management per capita and urbanization rates in the main regions of the world

Source: Vergara and Tchobanoglous, 2012.



AFR: Sub-Saharan Africa
 EAP: East Asia and Pacific
 ECA: Eastern and Central Europe
 LAC: Latin America and the Caribbean
 MENA: Middle East and North Africa
 OECD: member countries of the Organisation for Economic Cooperation and Development
 SAR: South Asia Region

Equal access to resources and services

Cities must ensure universal access to basic services like water, sanitation, waste management, energy, food, and mobility, which are crucial to socioeconomic welfare, public health and the urban environment. Many developing country cities seek to deploy new infrastructure and systems in a bid to compete in the global economy and attract foreign investors.²² However, such efforts only enhance persistent inequalities, as they do little to alleviate acute deprivation and low living standards, particularly in informal settlements.²³ In Africa as a whole, the average urban sanitation rate stood at 54 per cent in 2010, with diseases like cholera still plaguing urban areas.²⁴ Similarly, in Sub-Saharan Africa electricity was available to only 32 per cent of the urban population in 2011, with power shortages in at least 30 countries.²⁵ In the Latin America-Caribbean (LAC) region, overall proportions are comparatively higher but access to basic services remains inequitable: in 2010, over 20 per cent of the urban population still had no access to improved sanitation, 6 per cent lacked access to safe water and 7 per cent to electricity.²⁶ It is incumbent on urban planners to understand the implications of inequitable access to infrastructure within the context of their city's environment and resources.

Solid waste management dominates municipal annual budgets in low- and middle-income countries, with shares of 30 to 50 per cent according to the World Bank. Waste is correlated to economic development and population²⁷ (Figure 5.1). In developing country cities, informal pickers typically represent five per cent of urban jobs, but are unable to provide proper solid waste management a citywide scale.²⁸

Other cities are reaping the benefits of integrated management and public-private partnerships (PPPs). However, PPPs require thorough assessment and mitigation of the risks to private partners, public officials and financial investors. Norway's Tonsberg Waste to Energy PPP converts sewage sludge, food waste, organic commercial waste and manure into biogas for heating, electricity production and fuel for biogas (an alternative fuel for buses, which in Norway use approximately four million gallons of gasoline/diesel annually).²⁹ Nonetheless, despite increased technical skills provided by the private sector, enhanced financing mechanisms, improved institutional capabilities and regulatory frameworks are needed.

A "just sustainabilities" perspective on infrastructure emphasizes alternatives for underserved areas

and maintaining reliability and accessibility through partnerships with community groups, universities, the private sector and NGOs.³⁰ Participatory governance enables communities to control public service delivery, achieving effective convergence between entitlements and public policy.³¹ In Dar es Salaam, Tanzania, community groups in fringe areas mobilize fund-raising and external technical assistance for water supply and sanitation roads and drainage channels.³² However, community-based approaches may reduce incentives for governments to monitor and eventually run service provision.³³ In LAC, service delivery is led by the public sector, but significant gaps remain in capital expenditure: infrastructure fluctuates between two and three per cent of the region's GDP, when five per cent would close the existing gap³⁴ not including an estimated additional 0.6 per cent of GDP for capital expenditure in climate change adaptation and mitigation.³⁵ With rapid urbanization, new mechanisms are necessary if infrastructure and basic services associated with better living standards are to be provided, and if poverty and inequalities are to be reduced against a background of finite resources.

Are environmental risks and climate change impacts manageable?

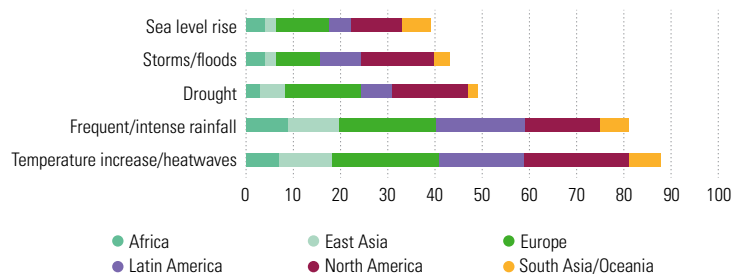
Across the world in 2002, inadequate water, sanitation and hygiene caused four per cent of all deaths and 5.7 per cent of the estimated total of diseases.³⁶ A parallel trend, from London to Shanghai, is air pollution, particularly in rapidly growing and industrializing cities with increasing rates of motorization.³⁷ In urban areas, climate change impacts like heat waves, heavy precipitations and droughts can compound one another, making disaster risk management more complex (Figure 5.2).

However, the physical effects, timeframes and associated migration potential of such climate-related disasters differ significantly across urban areas and continents, with resettlement widely viewed as a last resort.³⁸ Accordingly, Habitat III presents an opportunity to include environment-linked migration in the New Urban Agenda, as addressed by the UNISDR Sendai Framework for resilience building, the UN Principles on Housing and Property Restitution for Refugees and Displaced Persons, and the World Bank Guidelines on Involuntary Resettlement.³⁹

Efforts to build urban resilience can benefit from integrating climate change adaptation with existing efforts in disaster risk reduction, and other similar planning processes.⁴⁰ Resilience refers to a city's capacity to

Figure 5.2: Risks from climate change, as reported by 110 cities to the Carbon Disclosure Project (CDP)

Source: Based on data from <https://www.cdp.net/CDPResults/CDP-Cities-2013-usage-summary.pdf>.



cope with disasters, including ability to address the structural factors underpinning vulnerabilities and to build more sustainable communities.⁴¹ Local authorities and other urban stakeholders have an essential role to play here. In this respect, the UN Office for Disaster Reduction (UNISDR) has set out a number of practical recommendations.⁴² Since then, UN-Habitat, together with the Technical Centre for Disaster Risk Management and Urban Resilience (DiMSUR) has developed and successfully tested a participatory methodology, known as the City Resilience Action Plan (CityRAP) (Box 5.1). Clearly, sustainable development is relevant to all cities and each in its own way (Chapter 2). Resilient infrastructure and services may not come cheap, but unit costs decrease as urban density rises, and the benefits remain significant.⁴³

Both the UN-Habitat and the “just sustainabilities” approaches to urban resilience look beyond the natural environment, and take in other dimensions such as long-term, participatory in-situ slum and infrastructure upgrading,⁴⁴ relocation to improved sites, institutional development and building both awareness and local capacity to respond and adapt.⁴⁵ In this respect, Pakistan's Orangi Pilot Project Research and Training Institute supports local capacity building for the purposes of planning, implementation and low-cost financing of basic sanitation in more than 300 communities in Karachi.⁴⁶ Arab cities like Amman, Cairo, Casablanca and Rabat have launched urban “greening projects” in response to climate change.⁴⁷ Faced with extreme events, more cities understand that novel ways are called for to build resilience, in the process contributing to a more equitable environment.

Participatory governance enables communities to control public service delivery, achieving effective convergence between entitlements and public policy

Accordingly, Habitat III presents an opportunity to include environment-linked migration in the New Urban Agenda

Efforts to build urban resilience can benefit from integrating climate change adaptation with existing efforts in disaster risk reduction, and other similar planning processes

Box 5.1: The UN-Habitat City Resilience Action Plan

UN-Habitat has developed a new tool, which enables fast-growing small- and medium-size towns to overcome their lack of capacities, experience, information and resources and to kick-start resilience action planning over a five-week programme. Instead of imposing a predefined model or involvement of outside technical experts, the City Resilience Action Planning (“City RAP”) tool leverages local knowledge and abilities, including stakeholders and communities. After a week’s training programme, participants engage in local government self-assessment, participatory risk-mapping and cross-sector action planning. Together they set priorities for the short term, which can be met with currently available resources, including the medium (2-3 years) and longer (10 years) terms (to be resourced), which local governments validate, with support from UN-Habitat and other international staff along the process.

Source: UN-Habitat, *City Resilience Action Planning Tool*, 2015.

Resilient infrastructure and services may not come cheap, but unit costs decrease as urban density rises, and the benefits remain significant

Managing urbanization, land transformation and biodiversity

Cities exist in continuous interaction with their surroundings, through many diverse two-way links. However, empirical studies in Mali, Niger and Tanzania demonstrate how urban and rural households now rely on both rural- and urban-based resources and exchanges for access to land, water, markets and diversified livelihoods.⁴⁸

Urban sprawl, as induced by spatial expansion,⁴⁹ is not homogeneous: in industrialized economies it causes loss of arable land and more pollution-inducing mobility.⁵⁰ In developing countries, sprawl results from rigid land markets at the peri-urban interface and is a challenge to basic service provision— especially against a

background of institutional fragmentation.⁵¹ In less developed countries, rising suburbanization results in low densities and exponential expansion of the urban footprint in regions like LAC⁵², compared with increased inequality and social exclusion in industrialized countries.⁵³

Faced with these changes in peri-urban land patterns, it is essential for urban planners to set appropriate guidelines regarding both density (to be increased) and mixed land uses (for a better balance among residential, commercial and leisure uses of land, favouring non-motorized mobility). It is for local authorities to develop and implement such policies and plans. These should also include preservation of agricultural land (and any land that sustains biodiversity, water quality and groundwater recharge), including fragile and coastal areas and others in need of protection. The World Bank’s Land Governance Assessment Framework emphasizes the benefits of integrating land use planning, public land management and revenue collection, while recognizing historical specificities in urban areas.⁵⁴ Finally, as meeting points between individuals and communities, public spaces have a major role to play in sustainable cities.⁵⁵

Urbanization affects biodiversity and ecosystems.⁵⁶ Ecosystem services through rooftop gardens, “vertical forests” and green corridors benefit both residents and urban biota.⁵⁷ However, the need remains for improved – including participatory – governance, as emphasized by Cities and Biodiversity Outlook (CBO)⁵⁸ (Box 5.2).⁵⁹

Responding to decarbonization imperatives

A shift from fossil fuels to renewable energies and improved efficiency is needed to cut planet-warming emissions to a “net zero.”⁶⁰ Estimates of carbon emissions (Figure 5.3) attribute between 67 and 76 per cent of global energy use to urban areas.⁶¹

Rapidly urbanizing areas must respond to increasing infrastructure needs. At the same time, urban



Changing Course in Urban Transport: Strategies to manage traffic in Asia like here in Xian must include a wide range of measures. The “Avoid-Shift-Improve” approach is central to reducing dependence on individual car dependency. It also ensures a high level of mobility while minimizing greenhouse gas emissions.

Source: Armin Wagner / Asian Development Bank, CC BY 2.0, <https://creativecommons.org/licenses/by/2.0/legalcode>



Box 5.2: The *Cities and Biodiversity Outlook*: 10 main messages

1. It is for urban areas to remedy their own negative effects on the natural environment through development and implementation of adequate solutions
2. With proper planning and management, cities can retain substantial components of native biodiversity
3. Quantifying the value of ecosystems and/or attaching qualitative values enables mainstreaming of ecological factors into city management
4. Proper planning and resources can result in mutual benefits for human and environmental healthiness
5. Urban green spaces can contribute to climate-change mitigation.
6. Existing food systems and associated ecosystems can be maintained if their degree of biodiversity is increased, improving global food security in the process
7. Urban and environmental planning provides opportunities and formal legal mechanisms for biodiversity conservation through design guidelines, building codes, zoning schemes, spatial plans and strategic choices, all coupled with effective enforcement
8. Cities have an essential role to play in environmental governance focusing on both the urban landscape and the remote ecosystems that are affected by urbanization
9. Cities test our capacity to live together and to create environments that are socially just, ecologically sustainable, economically productive, politically participatory and culturally vibrant
10. Fostering creativity, innovation and learning is essential if the global challenge of preserving biodiversity in the face of unprecedented urbanization is to be met.

Source: Secretariat for the Convention on Biological Diversity, 2012.

sprawl and motorization come hand in hand with the expansion of slums and gated communities, and the associated social divide⁶² (with the better-off classes producing the bulk of emissions).⁶³

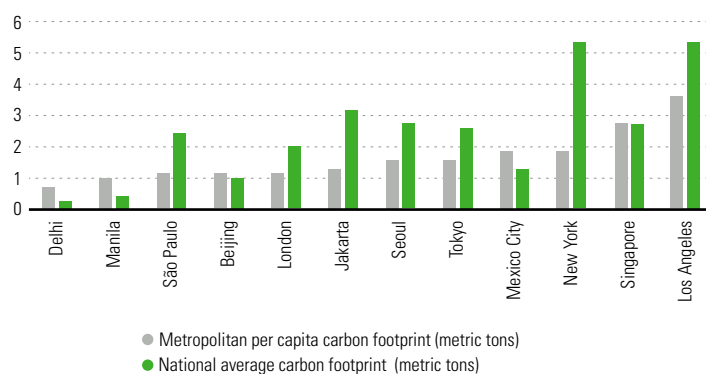
The pursuit of lower- or no-carbon cities has spawned numerous initiatives, such as harmonized instruments for emission inventories (Chapter 2) and alternative financing mechanisms and business models, infrastructure building, changing consumer behaviour and technological diffusion.⁶⁴ Regardless of national approaches and circumstances, some basic options are available. In its 2014 report, the Intergovernmental Panel on Climate Change (IPCC)⁶⁵ highlighted the three pillars of “deep decarbonization,” as follows:

- energy efficiency and conservation (transport, buildings, manufacturing)
- low-carbon electricity (nuclear, solar, hydro, wind geothermal), or coupling fossil fuels with carbon capture and storage (CCS)
- switching to lower carbon fuels (as in (i.)).

Under a “just sustainability” perspective, decarbonization must combine with service provision. The urban poor typically rely on polluting low-efficiency fuels, but also on renewable energy production or micro-grids, which can provide sustainable, “clean” energy.⁶⁶ However, the practical policy implications of decarboni-

Figure 5.3: Comparison between individual city and national carbon footprints per capita

Source: Sovacool and Brown, 2010.



zation in urban areas are still not well understood. For example, restrictions on energy use may compromise access to traditional, non-commercial sources, which calls for attention to the interactions between climate change mitigation and environmental justice.⁶⁷ Overall, awareness of harmful emissions has launched the urban world on a transition towards a sustainable energy future.⁶⁸

A shift from fossil fuels to renewable energies and improved efficiency is needed to cut planet-warming emissions to a “net zero

The urban poor typically rely on polluting low-efficiency fuels, but also on renewable energy production or micro-grids, which can provide sustainable, “clean” energy

5.2

Trends in Urban Environmental Planning and Management

Urban environmental issues appear at various spatial scales and should be tackled at various levels through multi-tier governance

LA21 Chapter 28 emphasized local governments' role as mediators between citizens and other institutions, at both national and international levels

This section examines the key trends shaping urban environmental planning and management. First, it analyses the relationships between national and local actors, and how this can be redefined through multi-level governance. Secondly, it reviews integrated planning developments since Habitat II. Thirdly, it reaffirms the relevance of participatory approaches towards environmental management. Thereafter, it discusses the rise of eco-cities and how they are changing ecology and sustainable development discourses. Finally, it highlights sector-based innovations that may help achieve just sustainabilities.

National, local and multi-level governance

Urban environmental issues appear at various spatial scales and should be tackled at various levels through multi-tier governance: municipal, metropolitan or supramunicipal (Table 5.1), as long as they are addressed at a proper, i.e. *ecological scale, overcoming institutional boundaries*.

LA21 Chapter 28 emphasized local governments' role as mediators between citizens and other institutions, at both national and international levels. Local climate change mitigation has been encouraged by positive experiences supported by urban networks like ICLEI — Local Governments for Sustainability, Cities Alliance, the Inter-American Development Bank's urban initiatives, and the C40 Cities Climate Leadership Group.⁶⁹ Since 2008, UN-Habitat's Cities and Climate Change Initiative has expanded to over 45 cities in 23 countries, with neighbourhood pilot projects, climate strategies and coordination of partners at national and world levels.⁷⁰

South Korea's “green growth” policies⁷¹ encourage cities to promote new technologies, energy efficiency, renewables, “green” buildings and higher density-oriented public transport.⁷² Although local authorities depend on various multi-level governance arrangements to guide policy actions, theirs remains a crucial role when it comes to achieving “just sustainable” societies, and that is why they should be supported by other tiers of government.

Integrated approaches to environmental planning

Integrated environmental management tackles related issues like urban management and governance, integrated spatial planning, economic wellbeing and competitiveness, social inclusion and environmental stewardship — as increasingly recognized after the Rio and Istanbul conferences. However, deregulation of public service provision has tended to marginalize urban planning, turning attention away from the perceived gap between “green” (rural-environmental) and “brown” (urban, particularly the poor) agendas.

Table 5.1: National and local environmental planning and management

Source: Adapted from UN-Habitat, 2014b; Cities Alliance, 2007.

Environmental challenges	National level policies	Local level policies
Resource use	Diversification of energy resources Water pricing reform	Infrastructure planning Local environmental education
Environmental risks	Adaptive social protection programmes Public health programmes	Air quality management
Land and related issues	Diversification of agriculture Land management policies and property rights	Physical planning, zoning Infill and brownfield incentives Restrictions on development of vulnerable land Green space zoning Greenbelt boundaries
Decarbonization imperatives	Energy pricing, taxes and subsidies Sustainability and diversification of economic sectors Low-carbon policies	Incentives to increase density Education campaigns

Table 5.2: Instruments for environmental integration

Source: modified from Cities Alliance, 2007.

Type of intervention	Type of instrument	Examples	Objectives
Policy	Information Instruments	Training, research and awareness campaigns	Produce and share environmental information
	Voluntary Instruments	Codes, labelling, audits	Incentives for eco-friendly behaviour
	Economic instruments	Taxes or subsidies	Account for environmental costs of certain activities
	Regulatory instruments	Controls, bans, quotas, licensing, standards	Applicable to specific outcome
Process instruments	Developing a vision	Events bringing together various stakeholders	Develop a city vision
	Baseline studies	Background studies of a city	Understanding current neighbourhood or city conditions
	Development priorities	Dialogue forums and consensus conferences	Ensure an open definition of multiple priorities and contrasting values that will inform the planning process
Planning instruments	Environmental profile	Systematic analysis of background environmental conditions in a given area	Provide a common understanding of city sectors interaction with the environment and governance
	Environmental footprint and targets	Resource footprinting Material flows analysis	Assess the city's ecological carrying capacity
	Impact assessment tools	Strategic Impact or Sustainability Assessment	Assess the impact of specific policies and programmes
	Monitoring systems and indicators	Systems to take measurements at regular intervals	Specify progress against objectives and revise the planning process
Management instruments	Environmental budgets and audits	EcoBudget, EMAS or ISO 14001	Periodic revision of environmental management procedures

Table 5.2 shows the variety of instruments used to implement LA 21 in Bangkok; Bayamo, Cuba; and Manizales, Colombia. The general lesson is as follows:⁷³

1. Environmental issues can be integrated in urban planning through City Development Strategies
2. Broader-based participation improves focus and relevance, enhancing implementation in urban planning strategies
3. Various instruments are available that combine development, social justice and environmental preservation objectives.

Still, considerable barriers to integrated management remain, including rigid sector-based (“silo”) approaches and fragmented institutions. However, experience shows that when ecological resource use is planned around existing environmental and social constraints, collective wellbeing, and a city’s attractiveness, are enhanced. For instance, in Freiburg, Germany, or Stockholm, Sweden, integrated urban planning is based on significant citizen participation and consensus building.⁷⁴ Given their multi-dimensional nature, “just sustainabilities”

Experience shows that when ecological resource use is planned around existing environmental and social constraints, collective wellbeing, and a city’s attractiveness, are enhanced

require long-term integrated urban planning, and one that speaks to the vision all residents share for their city.

The central role of participatory planning

Sustainable urban development processes must be based on an integral approach, which must comprise all the dimensions the population recognize as essential to their individual and collective wellbeing.⁷⁵ Through participatory planning, citizens can be heard⁷⁶ and become a reliable, inexpensive source of information for spatial planning, decision-making, and identifying both resources and the needs of vulnerable groups. Participation enhances local ownership, improves governance and accountability,⁷⁷ and helps mobilize and allocate budget resources to local priorities. Still, managerial- and technocratic-style planning remains predominant,⁷⁸ regardless of agreed development goals.⁷⁹ Tension can emerge between local managers’ strategic objectives and citizens’ demands for immediate action;⁸⁰ still, participation has a crucial role to play in environmental outcomes, including strategic planning and sector-based initiatives.

From a “just sustainabilities” perspective, which is related to the “right to the city” agenda,⁸¹ par-

Deregulation of public service provision has tended to marginalize urban planning, turning attention away from the perceived gap between “green” (rural-environmental) and “brown” (urban, particularly the poor) agendas



Modern Dutch houses with solar panels on the roof.

Source: Allard One / Shutterstock.com



Box 5.3: An eco-city project in India

Palava is a private, mixed-use urban development 40 km northeast of Mumbai, India. Developed by the local Lodha Group with foreign architects and engineers Palava will house over one million families once completed. Given local water scarcity, Palava resorts to rainwater harvesting and grey water recycling.

Source: Lodha Group, 2014.

From a “just sustainabilities” perspective, which is related to the “right to the city” agenda, participatory planning opens up forums where the citizenry can develop their own visions for the city

The private sector can play a crucial role in urban sustainability through cross-sector partnerships with government and civil society

Innovation cannot be embraced for its own sake and instead must respond to genuine needs - first and foremost the need for more liveable cities for all as embedded in SDGs

participatory planning opens up forums where the citizenry can develop their own visions for the city. This would suggest that broad-based, participatory planning works well as a long-term process, enabling local authorities to build legitimacy for investment in sustainability.

Technologically-driven sustainable urbanism

The private sector can play a crucial role in urban sustainability through cross-sector partnerships with government and civil society. Recently launched, privately-led “eco-” or “smart” cities⁸² typically showcase private sector engineering and design capacity for sustainable urban development⁸³ (Box 5.3: An Eco-city Project in India), largely based on new digital technologies. Built from scratch by the Yellow Sea, Songdo, South Korea is the world’s first “smart city,” where electronic sensors monitor roads and the water, waste and electricity systems in a constant drive for efficiency. However, such a technocratic focus favours top-down action by municipal experts and planning elites, to the detriment of social equity.⁸⁴

Innovation cannot be embraced for its own sake and instead must respond to genuine needs— first and foremost the need for more liveable cities for all as embedded in SDGs. This (together with participatory governance) is the background against which appropriateness of “smart cities” and gated communities, as development models for the future, is to be carefully considered.⁸⁵

Consistent with SDGs, an alternative perspective on eco-friendly urban technologies stresses more bottom-up policies that can bring about the type of development the population actually wants. Sweden’s Hammarby Sjöstad eco-district shows⁸⁶ that ICT alone cannot substitute for integrated management and participatory planning. More valuable interactions are preferable, like citizen science, which enlists residents to gather scientific data, monitoring local biodiversity, identifying pollution “hotspots” and mapping vulnerabilities to disasters.

Such “science” can in turn be mobilized to solve complex problems and hold local governments accountable.⁸⁷ In New Haven (Connecticut, US), residents use SeeClickFix.com, a local advocacy website, to report on public issues affecting their neighbourhood and to monitor developments.⁸⁸

Sector-based initiatives for healthier urban environments

Habitat II came as a rallying call behind integrated urban management and away from conventional sector-based responses, particularly where local authority fragmentation made it difficult to gauge progress against environmental objectives.⁸⁹ However, experimental approaches which privilege multiple actions in separate locales are legitimate,⁹⁰ and policy integration is not necessarily in a position directly to solve some problems (e.g. noise pollution).⁹¹ Whatever the specific modalities, local interventions in specific sectors also have the potential to deliver “just sustainabilities.”

Transport, in a sustainable perspective, takes in whatever mobility mode (including walking) people require for their overall wellbeing.⁹² Instead of motor vehicles,⁹³ the focus is on healthier (less pollution and carbon emissions) and fairer cities, where inclusive public transport remedies structural inequalities.⁹⁴ In Medellín, Colombia, cable cars provide slum-dwellers the safe access to the city centre they badly need for economic reasons, with minimal environmental impact.⁹⁵ “Smarter” mobility also involves (electric) car and bike sharing.⁹⁶

Habitat II came as a rallying call behind integrated urban management and away from conventional sector-based responses, particularly where local authority fragmentation made it difficult to gauge progress against environmental objectives

Housing programmes (Chapter 3) can generate substantial savings in resource use and carbon emissions (Box 5.4). Still, sustainability must be fully mainstreamed in new housing designs; existing buildings must be upgraded and rehabilitated. However, unplanned housing can come with efficient space use and higher densities, while local construction techniques can reduce the embodied energy of buildings, improving performance and enabling materials recycling. Low-cost solar water heaters and lamps benefit the urban poor.⁹⁷ General progress can be measured with tools like Japan's Comprehensive Assessment System for Built Environment Efficiency (CASBEE).⁹⁸

Sustainable centralized **energy** (power, gas) systems involve efficient grid management and alternative sources, but full transition to sustainability requires a model overhaul.⁹⁹ A post-networked society,¹⁰⁰ based on decentralized networks, calls for consumer micro-generation¹⁰¹ (Box 5.5).

Pioneering community-led energy projects make power more accessible to the vast majority of urban populations.¹⁰² Namibia's Electricity Control Board is investigating decentralized supply for small communities, mobilizing their resources to improve costs, access and healthiness.¹⁰³ In Haiti, affordable micro-grid and community-based retail energy ventures complement conventional access.¹⁰⁴

In many cities, participation has improved **water, sanitation and waste management**, empowering residents without fully displacing the public sector's responsibility for service provision.¹⁰⁵ In Pune, India, community involvement in solid waste management and recycling has changed behaviour patterns, improved livelihoods and facilitated composting.¹⁰⁶ However, social stigma and health hazards remain for those involved,¹⁰⁷ which goes to show that community initiatives must be supported by political commitment to social cohesion.¹⁰⁸

In principle, local governments are well placed to **improve resilience against disasters** through structural developments, education, community-based prevention, commercial insurance policies, proper regulatory enforcement, coordinated emergency response, and reconstruction. In Mexico, Romania and New Zealand, teaching of disaster-related subjects in schools is mandatory.¹⁰⁹ The UNISDR Sendai Framework for urban resilience and disaster risk reduction engage urban areas through high-profile events and city-to-city learning opportunities, tools, capacity-building and partnerships.¹¹⁰ In Curitiba, Brazil an integrated, multidisciplinary and partic-

Box 5.4: Financing eco-technologies in Mexico's housing sector

In 2009, Mexico's National Workers' Housing Fund (INFONAVIT) developed a housing finance scheme known as "Green Mortgage" in partnership with a housing subsidy body, to encourage use of energy-efficient systems and technologies for low-income households. "Green" mortgages include up to US\$1,250 in subsidies to make up for the cost of additional eco-technologies, including:

- Electricity: energy-saving lamps, roof and wall thermal insulation, reflective coatings and voltage optimization
- Gas: gas and solar water heaters
- Water: ecological toilets and sprinklers, water saving devices, isolating and flow control valves
- Health: purified water filters and supply, waste separation containers.

So far, over 900,000 Green Mortgage credits have been granted, with USAID, Germany's Environment Ministry and GIZ supporting the scheme with resource sharing and advisory services.

Source: BSHF 2014; Castán Broto and Bulkeley, 2013.

Box 5.5: Decentralized energy provision, Sydney

In a bid to reduce carbon emissions by 70 per cent by 2030 from 2006 levels, Sydney, Australia is introducing a "tri-generation" scheme, whereby small-scale power generation systems use bio-waste and accumulated waste for heating and cooling. The scheme is expected to meet 70 per cent of the city's electricity requirements by 2030.

Source: City of Sydney 2013.

ipatory approach involving community and local leaders, civil society and government agencies protects households in the high-risk Audi União shantytown, combining improved infrastructure, social inclusion and relocation avoidance.¹¹¹ Business involvement in disaster risk reduction is generally confined to corporate social responsibility (emergency relief).¹¹²

Local governments can encourage **nature conservation** through social and economic development, including recognition of traditional livelihoods and cultures. Eco-friendly agriculture and provision of common land should be integrated into the planning of urban and peri-urban areas. "Green" planning approaches emphasize urban-nature relationships and patterns, through green belts and land-use zoning.¹¹³

Unplanned housing can come with efficient space use and higher densities, while local construction techniques can reduce the embodied energy of buildings, improving performance and enabling materials recycling

Restoration and preservation of cultural vestiges and heritage areas can enhance civic pride, create a unique sense of place and identity, and attract both visitors and investors, in the process creating a variety of jobs, as has happened for instance in Hoi An and Hue, Viet Nam; Siem Reap, Cambodia; Luang Prabang, Lao PDR; and Jakarta (Box 5.6). Easy access to multicultural activities contributes to social inclusiveness, especially amongst low-income groups— another way of sharing urban space and evolving a common vision for a city.¹¹⁴

5.3

Governing and Financing the Transition to Sustainable Cities

If adequately empowered, local authorities can achieve sustainability through various modes of governance,¹¹⁵ including improved services and appropriate regulations, with partnerships supporting and enabling private or civil society initiatives.¹¹⁶ Securing resources in support of policies and stakeholder cooperation for effective environmental action can prove to be a challenge, though.

Cross-sector partnerships facilitate urban governance against a background of climate change,¹¹⁷ coordinating various stakeholders at various scales, with enough flexibility to deal with uncertain futures and changing demands.¹¹⁸ The extent to which PPPs can extend services from privileged to underprivileged groups is limited, though.¹¹⁹ Cross-sector partnerships can go further, such as local savings groups and land-sharing schemes.

Leveraging finance for urban environmental action

Local governments have access to diverse financing sources for urban environmental action, including taxes, revenues and intergovernmental transfers. Alternative own sources include recycling waste and collecting biogas in dumping sites.¹²⁰ In eThekweni, South Africa three waste-to-energy plants generate an annual

Box 5.6: Preserving culture and traditions in port town of Hoi An, Viet Nam

The ancient port town of Hoi An in Central Viet Nam was the country's first encounter with western traders in the 15th century. The pattern of its structures and street design reflect a combination of indigenous and colonial architecture and urban design typical of the former Indo-China colonies in the Greater Mekong Sub region. Hoi An preserves its cultural identity through strict policy measures on maintaining the urban fabric of the old quarter, including transport policies which prevent motorized vehicles' access into the old quarter, and policies promoting local industries in and around the old quarter to support the local economy. These have translated into a robust tourism industry, which runs all year round. Still, the town needs to address the perennial flooding which affects its socio-economic activities during the wet season. Hoi An recently sought ADB's assistance to design a project that will address their flood protection concerns.

Source: Asian Development Bank.

US\$3.2 million in revenues through sales of carbon credits and electricity.¹²¹ Micro-finance can help micro-enterprises to become involved in “green” urban strategies. In LAC, the Regional Initiative for Inclusive Recycling involves urban communities in over a dozen countries in an effort to strengthen the financial and commercial linkages of informal waste pickers with formal recyclers.¹²²

Municipalities can provide economic incentives in favour of efficient resource use and minimal waste as an alternative to environmental or “green” levies (like Ecuador's tax on plastic (PET) bottles) which effectively enforce the “polluter pays” principle.¹²³ In Tuzla, Bosnia vehicle tax revenues go to environmental improvement projects.¹²⁴

Where resources are scarce, user fees can make municipal services “greener” and support more resource-efficient alternatives. In Paris and London, businesses fund bike hire schemes as a quid pro quo for advertising space.¹²⁵ Capturing land values can fund public transport, as in Hong Kong.¹²⁶

Multi-level governance reallocates authority to various tiers of government both vertically and horizontally, involving various stakeholders¹²⁷ and also enabling resource transfers. National governments may compensate local authorities for environmental service provi-

sion, through direct lump-sum contributions to specific programmes or matching grants.¹²⁸ In Eastern Europe and Central Asia, intergovernmental transfers are made available when local services cannot be entirely funded by user charges—making local governments dependent on national policy and reducing incentives for own-revenue base expansion.¹²⁹

Further sources of funding include the Clean Development Mechanism (CDM).

The scheme currently provides emission reduction credits for projects in Bogotá, Dhaka and São Paulo which can be exchanged and used by industrialized countries to meet their own targets under the Kyoto Protocol.¹³⁰

However, cities have not yet accessed carbon finance on any large scale, given the low number of current CDM projects in urban areas.¹³¹ The World Bank Institute has proposed institutional reforms for access to carbon finance by individual cities,¹³² which are currently piloted in Amman, Jordan.

The “financing climate change adaptation initiative” established by multi- and bi-lateral agencies provides loans or grants either directly from one government to another or indirectly through non-governmental organizations, the UN system or other multilateral agencies. A good example is the multi-donor Urban Climate Change Resilience Trust Fund (UCCRTF) administered by the Asian Development Bank (ADB).

Although industrialized countries provide those less developed with financial support for climate change mitigation, it falls short of needs if the on-going rise in global temperatures is to be contained. New forms of financing are needed, such as facilitated by information technologies and crowd-funding as a complement or an alternative to local micro-finance for global Internet-based cooperation.¹³³

Decision-making beyond cost-benefit analysis

Environmental decision-making emphasizes the need to shift away from overreliance on cost-benefit analysis (CBA), which privileges the present monetary value of different options.¹³⁴ On its own, CBA is not suitable with regard to the many dimensions of environmental services, or quantifying environmental benefits, or contested perceptions of the actual values of various resources. By contrast, environmental planning is an

open-ended dialogue where participation and innovation are essential, and where life-cycle costing, multi-criteria evaluation and eco-budgeting can help.

Life-Cycle Costing (LCC) is used in project development and appraisal, focusing on potential costs and various associated externalities.¹³⁵ Urban authorities use LCC for infrastructure and large transformation projects. Since the methodology identifies environmental costs and benefits it lends itself well to stakeholder deliberation of various alternatives,¹³⁶ but requires detailed information.

Multi-criteria analysis (MCA) is used for sustainability assessments at neighbourhood scale, comparing various options in relation to well-defined criteria beyond financial benefits and costs. MCA assists local governments in procurement procedures as it can integrate multiple criteria (costs, bidder’s reputation, etc.).¹³⁷ When combined with participatory methods, MCA can justify decisions beyond cost, providing alternative or complementary evaluation ranking and criteria.¹³⁸

Environmental auditing is promoted by ICLEI through the so-called “ecoBudget,” which enables any local authority not just to set environmental budgets for the annual fiscal cycle but also to plan, monitor and report natural resource consumption within its territory—in the process demonstrating the validity of sustainability policies to the taxpayer and the public at large (Box 5.7).

Box 5.7: Implementing an ecoBudget

In 2006 in India, the Guntur Municipality adopted the ecoBudget format, with targets and indicators for water quality and quantity, waste management, green space surface areas and air quality. Water management was the main priority (monitoring water pollutants, structural improvements, upgraded water supply metering) – with tangible results. This highlights two success factors for ecoBudgets – strong political commitment and selection of relevant environmental issues – and two (potential) challenges: inadequate public involvement and cross-sector coordination. Implementation in Tubigon, Philippines showed that the ecoBudget cycle can require support from higher tiers of government.

Source: http://www.gunturcorporation.org/genx/ICLEI_News/July_2006.pdf and http://www.unep.org/Urban_Environment/PDFs/ICLEI_Ecobudget.pdf.

Environmental decision-making emphasizes the need to shift away from overreliance on cost-benefit analysis (CBA), which privileges the present monetary value of different options

5.4

Concluding Remarks and Lessons for Policy

The world has become predominantly urban but this is no reason to overlook our natural environment – quite the contrary. More and more humans choose to move to the city, in the process transforming urban spaces – together with our shared environment. It is for governments worldwide to ensure that when “making space” for urbanization they meet the needs of the challenging dynamics driving both human advancement and the natural environment that gives it basic sustenance. There is no escaping the solidarity of environmental and socio-economic governance of urban and rural areas. Space is the most basic defining condition of “the total human being”¹³⁹ which in turn resonates with recognized human rights (and “just sustainabilities”). This is why integrated management of the urban environment must be both democratic and participatory for all.

This chapter, through a variety of practical local examples, amply demonstrates that this apparently daunting endeavour is within reach of any town or city, if only step by step. In other words, urbanization and environmental preservation represent a workable mutual challenge. Worldwide, any town or city is endowed with one of the basic tenets of sustainable urban prosperity as defined by UN-Habitat, namely, the environment – and one that they must make as “productive” as possible in terms of long-term collective prosperity. Since the environment pervades all dimensions of human life, its proper management provides all sorts of leverage, to set the transformative power of cities going. Building resilience to climate change is not just an urgent imperative for many towns and cities; it is also a good way to familiarize

with local environmental issues, adjusting policies and institutions in the process. Participatory governance is there on the ground to provide much-needed “mediators of change” towards “just sustainabilities”; combined with citizen knowledge, this is as good a means as any to trigger a broad-based, sustainable dynamics – and to maintain the momentum over time.

This chapter recommends the following towards a New Urban Agenda:

- Acknowledging the interdependence of the environmental and urban agendas
- Emphasizing the interconnection of local and global environmental agendas and climate change as an urban issue
- Re-imagining the paradigm of sustainable development to emphasize “just sustainabilities”¹⁴⁰
- Reaffirming the need for reformed urban planning to achieve “just sustainabilities” in cities¹⁴¹
- Addressing the multiscale aspects of environmental challenges, involving multiple stakeholders and interdisciplinary research
- Recognizing the innovation potential of the various stakeholders in urban governance, including business, civil society and the citizenry; and
- Using participatory planning to mainstream the right to the city¹⁴² and to develop effective environmental programmes.

Notes

1. Lussault, 2013.
2. From the report of Habitat: United Nations Conference on Human Settlements, Vancouver, Canada, 31 May to 11 June 1976.
3. Dodds F., Schneeberger K., Ullah F., Stakeholder Forum for the Future and UN-DESA (2012).
4. ICLEI, 2012.
5. UN, 1996.
6. Seto et al., 2012.
7. UN-Habitat, 2011e.
8. UNDP 2014.
9. Revi et al. 2014.
10. OD/ECDDPM/GDI/DIE 2012; see also IEA 2014.
11. United Nations, 2014d.
12. United Nations, 2014c.
13. Revi et al. 2014.
14. UN-Habitat 2011e; Seto, 2014.
15. BMZ, 2014.
16. Open Working Group of the General Assembly on the Sustainable Development Goals, 2014.
17. Griggs et al. 2013.
18. United Nations, 2014d.
19. Agyeman et al. 2003; Agyeman, 2005.
20. Agyeman, J, Bullard, R. D, and Evans, B. eds, 2003
21. Rydin, 2013.
22. UN-Habitat 2015i; Siemens, PwC and Berwin Leighton Paisner, 2014.
23. Alkire and Santos, 2014.
24. UNDESA, 2014.
25. IEA 2014; see also Yepes, Yepes et al. 2008, Foster and Briceño-Garmendia 2010
26. Serebrisky, 2014.
27. World Bank, 2012.
28. IFC, 2014.
29. KPMG, 2012.
30. Mcgranahan and Owen ,2006; Muller, 2007; Mitlin, 2008; Muller, 2008; Spronk,2010.
31. McDonald and Ruiters ,2012.
32. Kyessi, 2005.
33. Jaglin, 2002.
34. Bhattacharya, et al. 2012, see also Economic Commission for Latin America, 2010.
35. Vergara et al. 2013
36. Prüss, et al. 2002; Diseases include: diarrhoea, schistosomiasis, trachoma, ascariasis and hookworms
37. Marcotullio and McGranahan, 2012.
38. López-Carr and MarterKenyon, 2015.
39. López-Carr and MarterKenyon, 2015.
40. UN-Habitat, 2015j; UN-Habitat and DiMSUR, 2015; World Bank, 2011b.
41. Folke, 2006.
42. UNISDR, 2012.
43. UNEP, 2014.
44. Roberts, 2008.
45. Satterthwaite et al., 2007.
46. World Bank, 2012.
47. UN-Habitat, 2012f.
48. Bah, 2003.
49. Urban sprawl refers to the spatial growth of urban areas, typically to the detriment of rural areas.
50. See for example Fazal 2000, Aguilár and Ward 2003, Huang, Wang et al. 2009, Seto, Guneralp et al. 2012.
51. Kombe 2005; Allen, Dávila et al. 2006; McGregor et al., 2006.
52. Angel, Parent et al. 2010.
53. Graham and Marvin 2001; Herzog 2014.
54. Deininger et al. 2011.
55. UNDP, 2013.
56. Pauchard, Aguayo et al., 2006, Seto et al., 2012.
57. Sustainable Development Solutions Network Thematic Group on Sustainable Cities, May 2013.
58. A multi-expert assessment of the relationship between cities and biodiversity led by the Stockholm Resilience Centre, under the auspices of Convention on Biological Diversity.
59. Elmqvist et al., 2013.
60. Rowling, 2015.
61. Seto and Dhakal, 2014.
62. UN-Habitat, 2008.
63. Romero Lankao, 2007.
64. Bulkeley and Castán Broto, 2013, Castán Broto and Bulkeley, 2013, Bulkeley et al., 2014.
65. IPCC, 2014.
66. Haines et al., 2007.
67. Bulkeley et al. 2013; Bulkeley et al., 2014.
68. van Staden and Musco. (eds.), 2010.
69. Bulkeley and Kern, 2006; Betsill and Bulkeley, 2007; Bulkeley, 2010.
70. UN-Habitat Cities and Climate Change Initiative.
71. Turok and Parnell, 2009.
72. UN-Habitat, 2014b.
73. Cities Alliance, 2007.
74. Iveroth, Vernay et al., 2013; Rohracher and Späth, 2014; see also Box 5.4.
75. Westendorff, 2004.
76. Castán Broto et al., 2015.
77. Labonne and Chase, 2009.
78. Watson, 2009
79. Bond, 2006.
80. Castán Broto et al. 2015
81. UN-Habitat, 2008; see also Castán Broto et al., 2015.
82. Joss, 2011; Joss and Molella, 2013; Datta, 2012; Caprotti, 2014.
83. Olds, 2002.
84. UNEP, 2013a.
85. Landman, 2000.
86. Iveroth et al., 2013.
87. Desouza and Bhagwatwar, 2012.
88. Slotnikjan, 2010.
89. See for example: Wesselink et al., 2008.
90. Bulkeley et al., 2014.
91. Weber and Driessen, 2010.
92. Urry, 2007.
93. Barter, 2004.
94. Levy, 2013.
95. Brand and Dávila, 2011.
96. ICLEI, 2011; Intelligent Energy Europe, 2008.
97. Ilha and Ribeiro, 2012
98. Murakami et al., 2011.
99. Grin et al., 2010.
100. Coutard and Rutherford, 2011.
101. Micro-generation consists of small-scale energy production, with renewables or low carbon technologies.
102. Seyfang and Smith, 2007; Hargreaves et al., 2013; Kind, 2013.
103. ESI AFRICA, 2014.
104. Moreno and Bareisaite, 2015.
105. Allen, Hofmann et al., 2008; Mitlin, 2008; Satterthwaite et al., 2015.
106. UNDESA, 2012.
107. Wilson et al., 2006.
108. Zurbrügg et al., 2004.
109. UN-Habitat, 2007.
110. UNSIDR, 2012.
111. BSHF, 2014.
112. UN-Habitat, 2007.
113. Yokohari et al., 2008.
114. United Nations, Bureau International des Expositions, Shanghai, 2010 World Exposition Committee, 2011.
115. Bulkeley and Kern, 2006; Kern and Bulkeley, 2009.
116. Morgan et al., 2014.
117. Castán Broto et al., 2015.
118. Okereke et al., 2009; Schroeder et al., 2013.
119. see for example: O'Malley, 2004; Siemiatycki, 2011; Ferreira da Cruz et al., 2013; Sengupta, 2013; Baletti, 2014.
120. Suocheng et al., 2001.
121. Gumbo, 2014.
122. This platform is the result of a collaboration between foundations, civil society, national and local governments, and multilateral agencies. More details at www.reciclajeinclusivo.org
123. An environmental law principle whereby the polluter pays for the environmental damage of which they are responsible.
124. Castán Broto, 2012.
125. UNEP, 2013a.
126. UNEP, 2013a.
127. Liesbet and Gary, 2003.
128. Kumar and Managi, 2009.
129. OECD, 2006b.
130. UNEP-DTIE.
131. As of December 2009, there were more than 1900 registered CDM projects. According to the World Bank Carbon Finance Unit "There are more than 40 approved methodologies that are relevant to urban areas. The number of registered CDM projects in urban areas is approximately 150 of which 90% are in the solid waste sector" CFU, 2010; p. 11.
132. The World Bank Institute is the capacity development branch of the World Bank.
133. Ashta et al., 2015.
134. see for example: Barde and Pearce, 2013.
135. UNEP/SETAC 2011.
136. Thabrew et al., 2009.
137. Govindan et al., 2013.
138. Munda, 2006; Stirling, 2006.
139. Mauss (1925), 2007.
140. Agyeman et al., 2003.
141. Rydin, 2013.
142. UN-Habitat, 2010a; Castán Broto et al., 2015.