

Chapter 10:

Building Resilience for Sustainable Urban Futures



Policy points

1. Building resilience for sustainable urban futures requires integrated linkage of the various pillars of the global sustainable development agenda.
2. Building urban resilience is a multisectoral, multidimensional, multi-stakeholder process that requires a clear change of trajectory from previous paths.
3. Effective urban resilience capacity building requires mainstreaming across local governments.
4. Governments have a roadmap to urban resilience in the global sustainable development agenda.
5. Cities, subnational governments and other urban actors should urgently prioritize bottom-up approaches when designing urban resilience interventions.
6. Building resilience requires innovative, and sustainable financing instruments beyond the traditional fiscal tools at the disposal of cities and national governments.
7. Integrated urban planning is an essential component and prerequisite for resilient urban futures.
8. Extending social protection to informal sector workers is critical for inclusive development and resilient urban futures.
9. Investing in key urban infrastructure must be a prerequisite for building sustainable and resilient urban futures.
10. Policymakers must match urban risk assessments with appropriate solutions.
11. Visioning and implementation of urban resilience plans must prioritize the poorest and most vulnerable communities.
12. Building urban resilience will not succeed without public participation.



The world's cities find themselves at a crossroads of uncertainty as to which scenario of urban futures awaits them. Will they embark on an optimistic path of more just, green and equitable cities? Will business as usual lead them down a pessimistic path of a widening gap between the urban rich who can adapt to twenty-first century challenges and the urban poor who will suffer? Or will they nosedive into a high damage scenario of catastrophic destruction at the hands of cascading public health emergencies, climate crises and armed conflicts? While many factors influence these pathways, resilience is key to determining urban futures.

Since the World Cities Report 2020 was published in the early days of the COVID-19 pandemic, the world has become a more uncertain place punctuated by localized events with global consequence. No human settlement was left untouched by COVID-19, even with widespread, if unevenly distributed, access to safe and effective vaccines. Although many, but certainly not all, cities find themselves in 2022 figuring out how to live with COVID-19, they are now facing other shocks. Persistent and new armed conflict have acute direct impacts in cities across Afghanistan, Ethiopia, Syria, Ukraine and Yemen. Spikes in food and energy prices, as well as runaway inflation, have created new economic stresses for municipal finances and urban household budgets alike. China's zero-COVID policy has disrupted supply chains in the world's second-largest economy. Meanwhile, the long-term stress of climate change continues to threaten the world's cities as extreme weather events and climate disasters like heatwaves, wildfires, hurricanes and typhoons become more frequent and intense.

The suffering caused by the COVID-19 pandemic has set back economic and social development and undermined some sustainability efforts in the short term. Beyond that, it has exacerbated inequalities and poverty as shown in Chapters 1 and 3. The global rise in inequality since 2020 profoundly underlines the unsustainability of many current lifestyles, consumption patterns and livelihoods and thus the urgency of transitions and transformations to build resilience for more equitable and sustainable urban and societal futures.

The pandemic emerged suddenly and transformed the world dramatically through 2020 and 2021. Although recovery gathered momentum during the first half of 2022, its geographically and socially very uneven complexion, determined in large part by the availability and uptake of vaccines, means that the pandemic's shadow will linger far longer. Indeed, the emergence and rapid global spread of the highly transmissible but fortunately less virulent Omicron variant at the end of 2021 exposed the fragility of recovery

and highlighted the highly unequal access to vaccines and people's willingness to accept them. Recent experience demonstrate that other epidemics and pandemics should be anticipated in both emergency and longer-term sustainability and resilience planning.

The effects of COVID-19 have dramatically exposed urban fault lines and highlight that building resilience will require a stronger, more effective multilateral system capable of complementing and reinforcing national and local efforts to put the world firmly on the trajectory of sustainable development. Accordingly, the objectives of this final chapter are to offer clear policy directions for governments and relevant national, regional and local stakeholders in diverse contexts to build resilience, which lies at heart of sustainable urban futures; and to strengthen and integrate the narratives in previous chapters, presenting strong recommendations, especially regarding the complementary roles of national and local governments. The term "urban futures" is used here in recognition of the various potential future scenarios explored in Chapters 1 and 2 but equally importantly, the diverse culturally and locally specific forms that human settlements may take in the future.

In pursuit of these objectives, two key messages are emphasized through this chapter. First, that building resilience for sustainable urban development requires integrated linkage of the various pillars of the global sustainable development agenda. These are the 2030 Agenda for Sustainable Development the New Urban Agenda, Sendai Framework for Disaster Risk Reduction, Addis Ababa Action Agenda and the Paris Agreement on Climate Change. Second, building urban resilience is a multisectoral, multidimensional, multi-stakeholder process that requires a clear change of trajectory from previous paths. This approach entails more than just building back better, if doing so would occur on the same lines that perpetuate inequalities and injustice.

In essence, it is about building back differently. From this mindset, it follows that poverty and inequality are incompatible with sustainability and resilience since they undermine the basis of urban stability and potentially the fabric of society.

The next section examines the concept of resilience in detail, but it is important here to clarify two related terms, vulnerability and adaptation. Both are used in relation to many different hazards, risks, shocks or threats, including climate change, environmental degradation, COVID-19 and other infectious diseases, economic change, political uncertainty and instability, and armed conflict. Vulnerability refers to

an inadequate ability to withstand or resist one or more of these shocks and stresses because of health status, deficient resources, or particular characteristics of an individual, group, location, infrastructure, etc. Adaptation is how individuals or groups respond by changing behaviour, such as making new investments, adjusting building standards, relocating facilities or creating early warning and rapid response systems in order to increase their ability to resist, cope with and otherwise learn to live with the hazard or risk in question.

10.1. Defining, Understanding and Measuring Resilience

Although resilience is key for cities to move toward the optimistic scenario of urban futures laid out in this Report, the term itself deserves consideration. Resilience, like sustainability, has a complex history and is often used imprecisely and with diverse meanings in different communities of practice and contexts, even within the urban arena.¹ This imprecision is unhelpful both analytically and in terms of implementation. Indeed, despite their distinct meanings, sustainability and resilience are often conflated or used interchangeably, including in some documents of the global sustainable development agenda.²

10.1.1. Defining resilience

It is noteworthy that, despite mentioning resilience a total of 17 times, the New Urban Agenda does not define the concept, which implies an assumption that its meaning is clear and universally understood. Yet this is certainly not the case since the proliferation of definitions and widespread lack of clarity regarding measurement of resilience “leads to crippling disconnects.”³ Particularly in urban contexts, which are the main focus here, this can be problematic. One difficulty is that some narrow definitions of sustainability focus principally on increased resource efficiency, perhaps even excluding social justice and equity (including intergenerational equity), even though these have been central to sustainability discourse since at least the Brundtland Commission report in 1987.⁴ Such narrow uses of sustainability lead to the reduction or elimination of one key dimension of resilience, namely redundancy,⁵ which is fundamental to recoverability.

Early formulations of resilience—as reflected in the Global Report on Human Settlements 2011⁶—were framed in terms of the ability to withstand and recover from an external shock and were popularized by the phrase “bouncing back.” Following criticism that bouncing back meant restoring the

previous status quo, regardless of how unequal and unjust it was, the requirement of progressive changes to reduce poverty, inequity and injustice was added more recently.⁷

An added difficulty is that, like sustainability, resilience is often considered to represent stability or equilibrium. However, that implies rigidity and a lack of flexibility to change and adapt as the environment and other circumstances change. Even dynamic equilibrium implies more flexible stability within certain boundaries, which may be appropriate for natural ecosystems or even farming systems, though even there the evidence shows that the severity of shocks and recovery time are not clearly related.⁸ In social sciences and in urban contexts, which are entirely human artifacts, dynamic equilibrium fails adequately to capture the major rethinking and restructuring now required.

It is important, therefore, to define and use these terms clearly and consistently. Accordingly, here urban resilience is framed as coping with and recovering from a shock by “bouncing back differently” to emphasize the need for substantive change in view of the urgency of meeting the various targets of the SDGs by 2030 and attaining net zero emissions by 2050 at the latest. Many relatively simple and low-cost adjustments, such as equipping streetlights with LED bulbs, have already been widely made, so there are often fewer low-hanging fruit left to pick in the transition to urban sustainability and resilience.

As the IPCC⁹ and other authoritative recent reports¹⁰ have warned starkly, progress to date has been inadequate. In order to increase the rate and scale of change needed to achieve these objectives, incremental progress is no longer sufficient and more substantive urban transformations are now required.

The rest of this chapter explores this imperative in greater detail, disaggregating the concept into its economic, social, environmental and institutional elements for greater clarity and precision. This builds on the approach refined by UN-Habitat in recent years: “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, relocation to improved sites, institutional development and building both awareness and local capacity to respond and adapt.”¹¹

Urban resilience cannot be achieved in isolation from resilience of the wider territories and societies of which urban areas form integral elements. As the COVID-19 pandemic has underlined,

this requires both a holistic perspective on resilience and effective multi-scale collaborations and integration. National border closures affected urban populations, while citywide lockdown measures had impacts on national economies. In areas like food systems, reliable regional logistics were essential to maintaining food supplies during the crisis.¹²

In these respects, it is also pertinent to reiterate the key messages from the World Cities Report 2020, which highlighted in detail the various dimensions of the value of sustainable urbanization, the urgency of tackling climate change, and the importance of using the New Urban Agenda and Sustainable Development Goals—especially Goal 11 on sustainable urban areas and communities—as accelerators.¹³ As the recent IPCC and other reports cited above indicate authoritatively, the urgency has only increased over the last two years, with the continuing ravages of COVID-19 in urban areas underscoring the structural vulnerabilities and need to build resilience:

The pandemic has also put cities to the test, revealing that even apparently affluent and highly developed urban centres are only as resilient as their most vulnerable areas and communities. Furthermore, COVID-19 has highlighted the urgent need for inclusive access to services and amenities for all urban dwellers: all too often, the current emergency has only made more visible the profound inequalities in health, housing and income that divided many cities long before the pandemic began.¹⁴

Upscaling ambition to move from incremental urban transitions to substantive urban transformations—and to bridge the gap between bold city visions and coherent programmes of actions to achieve the objectives¹⁵—is therefore essential in order to achieve the optimistic scenario of urban futures. In practical terms, however, it is essential to understand, measure and operationalize urban resilience gaps and strategies in relation to the relevant administrative

boundaries. These are usually the individual local government unit, although in large cities this is likely to be the strategic citywide or metropolitan authority. Increasingly, however, it is recognized that planning should be multi-scalar and include the scale of the city region, embracing the surrounding peri-urban and rural areas comprising the functional region integral to the city for food, resources, waste disposal, travel to work and the like. To be effective at this scale requires multilevel governance, both horizontally among local government units but also vertically, between national, regional and local levels.¹⁶

10.1.2. Measuring resilience

Various initiatives have sought to provide comprehensive approaches to resilience planning through integrated and territorial programming and scorecard methodologies. These include the City Resilience Program, a partnership between the World Bank and Global Facility for Disaster Reduction and Recovery, launched in 2017 to “catalyse a shift toward longer term, more comprehensive multidisciplinary packages of technical and financial services, building the pipeline for viable projects at the city level that, in turn, build resilience.”¹⁷ There is also the proprietary Plan Integration of Resilience Scorecard, which has recently been applied comparatively to two contrasting modest-sized cities in the US.¹⁸

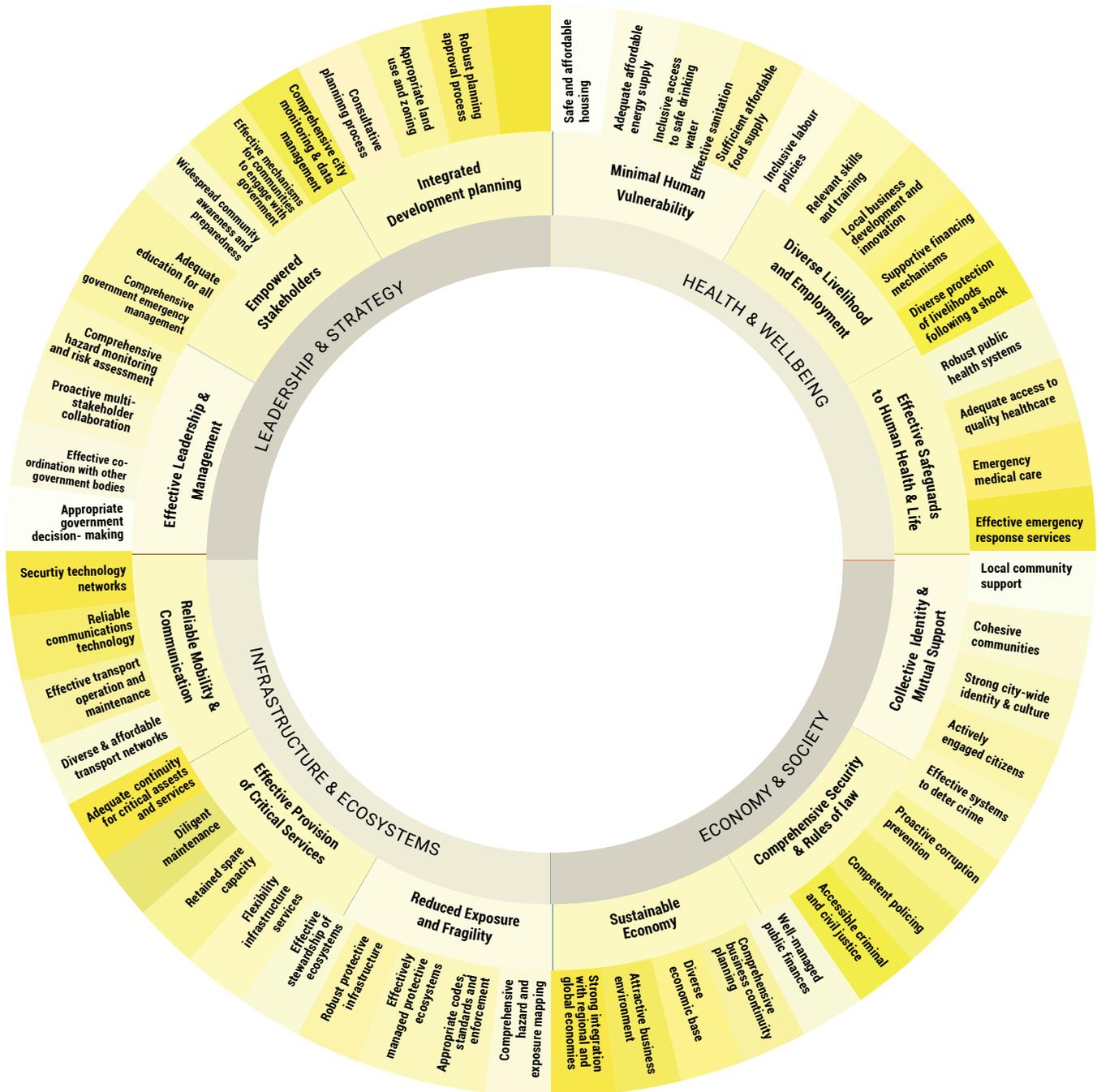
Arguably the most sophisticated, relevant and widely deployed measurement schema to date is the City Resilience Index (CRI) developed by Arup for the Rockefeller Foundation’s 100 Resilient Cities programme (which disbanded in 2019) as a tool for measuring implementation of the City Resilience Framework (Box 10.1).¹⁹ Given the index’s comprehensiveness, all the themes in this Report are represented by a dimension or goal in local combinations, and it is to more detailed consideration of the economic dimension that this chapter now turns.

Box 10.1: The City Resilience Index (CRI)

The CRI was intended for all member cities to adopt and implement as a tool for measuring progress towards overall resilience over time. Represented by a circle, the CRI comprises four dimensions: health and well-being; economy and society; infrastructure and ecosystems; and leadership and strategy. Each of these, in turn, has 12 goals subdivided into a total of 52 indicators designed to capture the many complementary elements of resilience (Figure 10.1). The four dimensions correspond well to the components of resilience examined in the successive sections of this chapter.²⁰ The extent to which the CRI had been implemented by the time of the programme’s end in mid-2019 varies, but some examples are given in later sections of this chapter.²¹ A key part of the process has been aligning local strategies with locally relevant elements of the global sustainable development agenda, especially the SDGs, although only a proportion have so far done this explicitly.²²

The same assessment found that the 100 Resilient Cities tools over-represent disaster-related issues relative to social themes but that the tools were useful in helping to identify local priorities and capacity building needs: “In doing so, they highlight the importance of planning and capacity and the role of resources, data, and technology that comes with building urban resilience—all crucial for achieving any of the global goals.”²³ These issues are addressed in later sections of this chapter.

Figure 10.1: The Rockefeller-Arup City Resilience Index



Source: Rockefeller Foundation and Arup, 2018.

10.2. Economic Resilience

Urban economic resilience refers to the ability of a city's economy to withstand and recover from turbulence and shocks (Chapter 4). However, in view of the foregoing discussion in Section 10.1, it is essential not just to focus on economic activity as such, but to incorporate poverty reduction and more equitable distribution of economic opportunities and rewards as key characteristics. Only by so doing can the socio-spatial disadvantages and constraints facing the poorest and weakest residents be tackled. In other words, economic justice is an essential component of economic resilience. Similarly, the multidimensional nature of poverty and inequality, as examined in Chapter 3, means that these also constitute social and environmental challenges that are dealt with in the respective sections below.

10.2.1. Diversification, repositioning and strengthening of the urban economy

An optimistic version of the post-pandemic²⁴ and climate-resilient era, which this Report seeks to assist local governments in achieving, requires a different structure and balance of urban economic activities, driven increasingly by renewable energy, circular economic activity and green employment. Chapter 4 notes that the need for economic diversification and structural transformation has never been more urgent because of the multiple crises confronting cities. Economic diversification and structural transformation safeguard urban economies against future shocks and provide a more stable and progressive path toward inclusive growth. The pandemic underscored the risks of depending solely on a single driver such as tourism or mining, since any economic downturn could have catastrophic and lasting impacts on the urban economy. As we move into the future, cities should pursue policy measures that enable economic diversification, such as smart urban regulations, strategic investment incentives, green infrastructure development, skills training, innovation districts, and enterprise support and finance, particularly for small and medium-size enterprises—which are the engine of most economies. Collectively, these measures create competitive and vibrant cities that can turn around the economic fortunes of urban areas and more easily adapt to unanticipated changing dynamics.

Economic diversification requires urban leaders who are forward-looking and strategic in formulating policies that strengthen urban economic resilience and prioritize building of productive urban futures that work for all. The COVID-19 pandemic is a wake-up call for both cities and subnational governments on the importance of developing economies

The pandemic underscored the risks of depending solely on a single driver such as tourism or mining

that can withstand and recover from multiple crises while at the same time moving towards equitable and inclusive growth. In cities that are experiencing urban shrinkage, economic diversification should be accompanied by proactive broader economic policies and programmes, with targeted economic restructuring that is aimed at strengthening the competitiveness of new and emerging sectors (most notably knowledge-based industries) in line with the current and future economic realities. As the world moves towards the 2030 deadline to achieve the SDGs, policymakers at all levels cannot afford to remain indifferent to the fragility and vulnerability of urban economies to unanticipated shocks and crises, which can potentially reverse development gains accrued over the years.



Economic diversification requires urban leaders who are forward-looking and strategic in formulating policies that strengthen urban economic resilience

Earlier concerns that economic greening would cause large-scale job losses and impose a heavy economic price have now been allayed by the growing evidence that such losses are more than compensated for by the increasingly diverse productive and commercial opportunities required to enable the green transition.²⁵ Although some declining or “sunset” industries continue to resist change, the majority are switching production increasingly into green, recyclable and renewable commodities and energy systems through a mixture of fiscal measures and straightforward profitable opportunities as the scale and rate of the green shift accelerate (see below and Chapter 5).

Additionally, increasing net employment, which often includes considerable informal income-generating opportunities, is being generated by new construction to comply with green building codes and the retrofitting of existing homes, industrial and commercial premises with insulation, low-energy lighting and renewable energy generating facilities, as well as installation and maintenance of green roofs and walls. The same applies

at the neighbourhood and urban scales with installation and maintenance of green-blue infrastructure to reduce urban heat island effect, increase water runoff retention and grey water recycling, and enhance other nature-based solutions and urban biodiversity. All of these are important areas for appropriate local government leadership and collaboration with other stakeholders to leverage complementary investment and maximize a sense of shared ownership.

Alongside improvements in efficiency of space and resource utilization, increased productivity, wages and employment conditions are important, since “[s]ustainable urbanization and productive cities go hand in hand. In seeking to enhance the economic value of urbanization, efforts should be made to ensure that economically productive cities are also environmentally sustainable, resilient, socially inclusive and safe.”²⁶

Research increasingly emphasizes the importance of understanding enhanced productivity not just in conventional terms but very much as an integral component of holistic urban sustainability. One recent conceptual urban productivity framework comprises the different categories of capital—natural, socio-cultural, human, economic and physical—which should be addressed by means of systemic thinking, equity, justice, co-production, governance and regeneration, all of which are values consistent with the

integrated perspectives of this Report.²⁷ Although not yet tested in detail, this approach appears to hold promise.

10.2.2. The circular economy as a frontier for resilient urban futures

The COVID-19 pandemic is a tipping point that proves the need to adopt the circular economy as an alternative model of resilient and sustainable urban futures, with the potential for unlocking significant social, economic and environmental benefits (Chapter 4). In some contexts, cities were already experimenting with the concept of circular urban economies to promote economic resilience in their urban systems. For instance, London, Paris and Amsterdam were already champions in adopting circular economies to reposition their cities to emerging trends. Such initiatives have the potential to generate new green jobs offering decent work. The effort of individual cities is boosted by the broader European Green Deal, which aims to make Europe the first climate-neutral continent, while ensuring that no one is left behind in the transition. It is important, however, to note that the transition to a circular economy must be carefully planned, considering different factors such as social, economic and political dynamics in each country. There is no one-size-fits-all approach to this transition; each city has a unique urban ecosystem and therefore any repositioning of the local economy should factor in local contextual factors.



Downtown Amsterdam, Netherlands © Shutterstock

10.2.3. Support for the informal sector

A resilient and inclusive urban future hinges on a transformative and just urban economic agenda, which must be driven by policy and programmatic support for the informal sector, particularly in developing regions.

Going forward, city and national governments should make urban policies and plans inclusive by recognizing the contribution of the informal sector to urban economies. The pandemic and other crises have exposed the stark vulnerabilities and structural impediments that continue to undermine the productivity of the informal sector in the absence of tailored support measures. Therefore, a critical element of the transformative urban economic policy is targeted support for informal activities by means of

A critical element of the transformative urban economic policy is targeted support for informal activities by means of appropriate interventions

appropriate interventions to address specific vulnerabilities and insecurities of income and livelihood that undermine the resilience of such activities. This also constitutes an effective way for local governments to reduce poverty and promote economic justice for some of the most vulnerable economically active urban residents, especially women, young people, migrants, refugees, and disabled participants, among other vulnerable groups (Chapters 3 and 4).²⁸ In many cities, informal traders and entrepreneurs are still stigmatized, while their activities are often criminalized and subjected to hostile and repressive urban policies and practices, all of which make it difficult to earn a living in a dignified manner (Chapter 3). Spatial restrictions—often enacted at the behest of formal shopkeepers fearful of being undercut by alleged unfair competition—also preclude them from the areas of highest footfall and should be removed. Any relocations should be carried out only after substantive participatory discussions and negotiations with those affected, as explained below.

Underlying such restrictions are outdated beliefs that informality is somehow inherently bad, inappropriate, parasitic or at odds with modernity. Such views are characterized by the pessimistic scenario of urban futures discussed in Chapter 1. In practice, the informal sector is very diverse, with most actors being poor, often unskilled or only semi-skilled, and trying to earn a livelihood with whatever means they have in a situation of widespread

poverty and unemployment. Some activities are gendered, reflecting cultural norms and values in different situations.

Municipal interventions to improve informal economies include establishing more and inclusive legitimate workspaces, facilitating the integration of informal economic actors in urban and regional supply chains and markets, upgrading facilities and improving sanitary and health conditions by building covered markets and manufacturing workshop hubs with suitable water and related infrastructure, and providing access to shared or hired equipment. Even well-intentioned interventions may have the same unintended negative effect if these facilities are located away from main thoroughfares, bus depots, rail stations and interchanges, which is where potential sales and client accessibility are highest. Sanitation and health facilities and regulations should also be appropriate to the nature of the diverse forms of informal enterprises to encourage and facilitate improvements and upgrades instead of forcing them out of business or displacing them. These measures should also consider the heterogeneous nature of informal businesses so that their specific needs and priorities are adequately addressed.

Any such new facilities and regulations need to be designed and constructed in consultation with the informal or small entrepreneurs on a participatory or co-design basis so that their requirements can be met, and the process can provide a foundation for developing more positive working relations. Indeed, a helpful way to achieve this is to regard informal enterprises as one category of micro-enterprises. Small, affordable user charges for services that informal traders

Municipal interventions to improve informal economies include establishing more and inclusive legitimate workspaces

feel are appropriate and helpful can help to offset municipal costs. These practical guidelines conform to the principles of good practice for inclusive local economic development within integrated urban planning developed by UN-Habitat.²⁹ In addition to these measures, it is prudent for governments to accelerate the implementation of ILO recommendation 204 towards formalization of the informal economy to tackle the mounting decent work deficits and structural constraints that confront informal sector workers.³⁰

This integration should be done in the spirit of social dialogue to create a win-win situation so that the economic fortunes

and productivity of the informal economy can be boosted and their contribution to thriving urban economies enhanced. The transition to formalization should be backed by a combination of different incentives which might include increasing access to social security for business owners and their workers and to business services and public procurement for formalized micro and small enterprises. These policy measures should be locally contextualized and based on the prevailing social, economic and political circumstances in each country. Moreover, such a transformative urban economic policy agenda requires significant political will on the part of elected officials at the national, subnational and local levels.

Building resilience and productive urban futures is not an automatic process; it requires innovative, resilient and sustainable financing instruments

10.2.4. Leveraging new fiscal sustainability frameworks

At the urban level, local governments generally face increasingly severe financial constraints (Chapter 4). Building resilience and productive urban futures is not an automatic process; it requires innovative, resilient and sustainable financing instruments beyond the traditional fiscal tools at the disposal of cities and national governments. The pandemic has reinforced the need for cities to diversify their revenue portfolios outside traditional property taxes and other related municipal rates and charges. Green municipal bonds represent a growing tool for leveraging the scale of capital required for major new green and circular investment schemes to promote sustainability and resilience. Examples range from specific green-blue infrastructure to financing of neighbourhood efficiency and resilience programmes like retrofitting and district heating or combined heat and power. Gothenburg, Sweden's second city and industrial hub, was the first to launch a municipal green bond in 2013 and now has a robust framework for such instruments.³¹ In April 2021, Ghaziabad became the first Indian city to issue a successful municipal green bond to fund a water treatment plant to turn wastewater into drinking quality and to extend the piped water network. Kanpur, Agra and Varanasi, also in India, intend to follow Ghaziabad's example and issue such bonds as well.³² In these contexts, enhancing infrastructural reach and reliability represent important programmes to meeting basic needs securely and achieving the relevant SDGs as contributions to overall urban sustainability and resilience.

The municipal green bond concept has proven increasingly popular in diverse contexts where local governments have the financial autonomy, legal power and creditworthiness

The municipal green bond concept has proven increasingly popular in diverse contexts where local governments have the financial autonomy, legal power and creditworthiness to issue bonds, and the ability to avoid unaffordable debt overhangs. Local governments attracted to such opportunities should examine their legal ability to do so and, if necessary, seek legislative changes to provide them with the necessary powers or at least basis for offering legal surety as a key prerequisite for bond raising. In order to increase funding available to cities more generally and systematically, clear arguments for a green cities development bank have been articulated but, to date, have not been acted upon.³³

Cities and subnational governments should create enabling environments for effective and sustainable public-private partnerships (PPPs) to finance ambitious urban infrastructure projects, particularly in contexts where public resources are limited. PPPs are becoming a popular mechanism to fund large scale infrastructure investments as these are critical for building resilient urban futures. As noted in World Cities Report 2020, and reinforced in the current Report, cities and national governments cannot do this alone; there is the need to unlock private sector financing through the creation of incentive schemes that attract the participation of private sector players in urban programmes. Additionally, as the World Cities Report 2020 points out, the value of sustainable urbanization cannot be achieved without improving municipal financial mechanisms.³⁴ Yet, improved municipal finance alone will not provide an adequate basis for achieving economic resilience. Diverse innovative fiscal incentive schemes are being developed and implemented to promote these changes and to promote climate and disaster risk resilience.

These schemes can operate at different scales. At the household and firm level, local governments should provide municipal grants for retrofitting homes with insulation and installation of renewable energy sources (such as rooftop solar panels).³⁵ Water and sewerage companies, can offer service discounts for properties with rainwater harvesting facilities and permeable surfaces to encourage rainwater infiltration, as available in the UK. Poor households and communities, including those in informal settlements, can access a growing range of individual or neighbourhood/community-level micro-loans or grants to develop enterprises

and undertake neighbourhood risk reduction activities that also enhance public health as proactive interventions.³⁶

10.2.5. Infrastructure investments for sustainable and resilient urban futures

For urban areas to achieve the optimistic scenario, investing in key urban infrastructure must be a prerequisite for building sustainable and resilient urban futures. The current infrastructure investment gaps are a huge impediment for building thriving and productive cities in both developed and developing regions. For example, if cities and subnational governments prioritize investments in public transport systems this could generate more economic benefits, particularly for the poor urban residents whose access to jobs is affected by socio-spatial segregation.

Cities should prioritize extending basic infrastructure and services to underserved communities as this could have citywide transformative impacts. For instance, current projections reveal that that a dollar invested in developing water and sanitation infrastructure generates between US\$4 and \$34 in benefits by improving health outcomes, saving times, and boosting urban productivity.³⁷ If such incremental gains are realized the current negative trends could be reversed and action will be galvanized towards building inclusive, thriving, resilient and productive urban futures in sync with SDGs and the New Urban Agenda. If national and local governments fail to urgently tackle the current underinvestment in infrastructure, this could undermine urban economic resilience and negatively affect the productivity of cities.



Informal settlements, Younde, Cameroon © Kirsten Milhahn/UN-Habitat

10.3. Social Resilience

As explained in Chapter 3, the multidimensional nature of poverty and inequality necessitates comprehensive cross-sectoral approaches. These represent urgent short- to medium-term interventions as essential prerequisites for increasing ambition towards urban transformations to sustainability and resilience.

10.3.1. People-centred approaches to enhance inclusiveness and reduce poverty

The COVID-19 pandemic has underlined the interdependence between individual and public health, with the highly unequal epidemiological patterns of morbidity and mortality reflecting underlying urban socio-spatial inequalities (Chapter 7). In essence, the built environment has a clear impact on health outcomes. Poorer people, who are more likely to have weaker nutritional and health status, tend to live disproportionately in housing and neighbourhoods that have poor or inadequate infrastructure, public open space, and other amenities and services. Such vulnerabilities also have age, gender and other intersectional dimensions. Hence, context-specific interventions are required to safeguard vulnerable and marginalized urban groups (Chapter 4). The importance of extended family structures, wider social cohesion, and the extent of social and cultural capital can also be crucial factors in mitigating such effects.³⁸

National and urban governments have responded in diverse ways; those acting most effectively at first have often been those with recent experience of epidemics like SARS and various strains of bird influenza. Previous experience meant that they had early warning and rapid response capacity as well as important aspects of resilience. In terms of post-COVID-19 recovery, inclusive and integrated policies are required that both tackle the immediate needs and symptoms, and the deeper underlying bases of poverty, inequality and inadequate infrastructure and services in a way that balances socioeconomic rights to achieve social justice.³⁹

As we move into the future, cities, subnational governments and other urban actors should urgently prioritize bottom-up approaches when designing urban resilience interventions and in key urban programming. At-risk communities must be placed at the centre of decisions that impact their lives so that new opportunities for tackling urban poverty and inequalities can be unlocked. The failure to prioritize at-risk urban communities means that the 2030 agenda of leaving no one behind will not materialize.

10.3.2. Context-specific social protection schemes

The most successful strategies to create social resilience are likely to combine three elements: neighbourhood-scale interventions to improve physical infrastructure and basic services; necessary upgrades to sub-standard dwellings; and responsive social protection schemes tailored to household requirements. The current COVID-19 pandemic provides an opportunity for global leaders to rethink transformative urban policies and programmes that can radically tackle poverty and inequalities in all its forms and dimensions. The 2021 UN-Habitat report *Cities and Pandemics: Towards a More Just, Green and Healthy Future* advocates for a “new social contract” in the form of universal basic income, universal health coverage and universal housing and basic services. This new social contract challenges cities and subnational governments to re-imagine what public and social goods they should deliver and under what conditions. At the same time, the pandemic has exposed the gaps in social protection, given the disproportionate impact of COVID-19 containment measures on some of the most vulnerable groups in cities.

Urban-sensitive social protection schemes are potentially, a powerful tool to redistribute wealth, address income inequalities and tackle multiple vulnerabilities that affect the most marginalized groups (Chapter 1). Some social protection schemes, like universal basic income schemes and affordable health insurance, are normally national government responsibilities, although some devolved federal or similar systems provide health insurance at the regional level. Cities and subnational governments should design tailored social protection interventions for informal workers. Extending social protection to informal sector workers is critical for inclusive development and resilient urban futures. Governments at all levels should design policies and programmes to support the formalization of informal businesses and enterprises with access to social protection; extending statutory coverage to previously uncovered workers; adapting benefits, contributions, and administrative procedures to reflect the needs of informal workers; and subsidizing contributions for those with very low incomes. Doing so will ensure livelihood and income security, especially when faced with economic disruptions and other external shocks and stresses.

Cities, subnational governments and other urban actors should urgently prioritize bottom-up approaches when designing urban resilience interventions and in key urban programming



Food vendors at a slum in Bangladesh, Dhaka © Kirsten Milhahn/UN-Habitat

In designing social protection interventions for informal sector workers, cities and subnational governments should consider gender-related risks since women and other vulnerable social groups bear the brunt of economic hardships and vulnerabilities associated with informal work. Moreover, resilient, and equitable urban futures could be realized if governments ensure access to subsidized basic services for the most vulnerable urban households and ensure access to adequate and



Extending social protection to informal sector workers is critical for inclusive development and resilient urban futures

affordable housing for all. Cities and subnational governments should formulate tailored strategies that respond to different form of vulnerabilities. Social protection interventions should be nuanced and wide-ranging to ensure the different risks and vulnerabilities associated with gender, age, ethnicity, migratory status, and other characteristics are effectively identified and tackled in urban welfare programming.

10.3.3. Fostering social change and improving social well-being

Integrated urban planning should be an instrument for promoting social and spatial integration and inclusion, especially by improving access to all areas within the city and its territory. Greater connectivity means that all inhabitants, including the poor, marginalized, displaced and migrants can benefit from the socioeconomic opportunities, services, public spaces and other facilities in a city, and contribute to its social and cultural life. Integrated urban planning also protects and values all elements of cultural heritage, not just in a backward-looking sense but, crucially, in terms of how contemporary cultures, identities and heritages can play valuable roles in promoting locally appropriate urban sustainability and resilience.⁴⁰

Neighbourhood or larger scale municipal interventions to foster behavioural change, reduce vulnerability and promote well-being can include brownfield redevelopments and design of mixed housing areas in new developments to avoid social and economic segregation that reinforce disadvantage and undermine resilience of the most vulnerable social groups. Beyond basic infrastructure

and services, access to appropriate green space is also an important element of well-being.⁴¹

Although not cited explicitly as an objective of integrated urban planning guidelines, social and cultural resilience is indeed an outcome of their appropriate implementation by strengthening geographical proximity between residential, livelihood and social activities. Proximity in line with the principles of the 15- or 20-minute city enhances residents' sense of belonging to a neighbourhood or district, improves quality of life and reduces economically-based residential segregation across metropolitan areas. These benefits also constitute a key element of the social equity and justice dimension of urban sustainability and resilience.⁴²

10.4. Environmental Resilience

Notwithstanding the assertion by some critics that urban sustainability and resilience are often used almost synonymously, as discussed earlier, the following quote from UN-Habitat is explicit that the attributes of environmental sustainability are likely to facilitate integration and resilience: “Environmentally sustainable cities are likely to be more productive, competitive, innovative and prosperous. These cities are able to draw a healthy balance between economic growth and the environment, in the process facilitating integrated development and resilience.”⁴³

One fundamental and inescapable characteristic of cities and urban systems is their complexity, especially in terms of the human environment and the relationships and interactions that underpin them. While cities are human artefacts, their health, sustainability and resilience are critically dependent on these relationships. Indeed, they may be conceived as complex social-ecological-technical systems.⁴⁴ Accordingly, much attention now focuses on fostering nature-based solutions and ecosystem services as essential to reducing urban heat island effect, controlling pests, reducing rainfall run-off and erosion, increasing food production, and making cities more liveable and just for all inhabitants.⁴⁵

As research into the impacts of the COVID-19 pandemic has recently shown, green and public open space is inequitably distributed across the urban fabric, with the poorest, most densely populated areas generally least well served and having access to far less land per person. The logic of urban greening and environmental improvement, particularly to enhance environmental justice and equity, might therefore seem indisputable. However, initiatives to restrict land

uses or to increase green and blue space are often highly controversial and can be hotly contested by different stakeholders, particularly when other land uses might be regarded as having higher values or greater importance, not least for livelihoods and homebuilding by and for the poor. Spatial, social, economic and environmental justice issues must therefore be taken fully into account as part of integrated transformative urban planning.⁴⁶

This section highlights two areas of intervention shown by increasing volumes of recent research to be important in promoting environmental resilience as part of integrated strategies, namely investing in green-blue infrastructure, and in sustainable renewable and cleaner energy.

10.4.1 Investing in green-blue infrastructure

The concept of green infrastructure, used to denote the use, expansion and conservation of parks, riverbanks and other wetlands and green open spaces within urban areas on account of their ecosystem services, has been widened to green-blue (or blue-green) infrastructure (GBI) in recognition of the intimate interrelationships between land-based and aquatic biodiversity. Treating both green and blue natural systems as essential elements of environmentally-friendly infrastructure respects the fact that vegetation and waterways often weave integrated networks through an urban area. This lens facilitates planning and sustainable utilization, as well as the enhancement of biodiversity.

Conversely, a lack of coherent planning and clear, transparent governance (including over land) leads to fragmented outcomes and loss of green spaces—up to 80 per cent in the case of Kumasi, Ghana, from 1991 to 2019.⁴⁷ The rapidity of changes in green space coverage and composition—which are effective proxies for biodiversity and environmental value—has been widely documented in different contexts, including through use of a comprehensive assessment methodology using remote sensing and GIS in Chinese cities.⁴⁸ With appropriate interventions as part of integrated planning, this coverage and quality can increase, as illustrated by detailed studies of drivers and processes—including the political dimensions involved—in Shanghai and the Australian cities of Canberra, Melbourne and Sydney.⁴⁹

With the frame widened to GBI, the positive effect can be further amplified, especially if participatory and co-productive processes are used to convince water users of the benefits in terms of improved water and riparian quality.⁵⁰ Until recently, research and policy on GBI was concentrated in North America, Europe and Australasia, but has become almost

universal since its importance for climate change mitigation, adaptation and resilience has become widely appreciated. Pertinent well-documented case studies include the Ebro Delta and Empordà in Spain, New York's Staten Island Bluebelt, Seattle's Thornton Creek Water Quality Channel, the Serra do Mar project in Baixada Santista Metropolitan Region (Brazil), ecosystem-based adaptation in Cape Town and Singapore, the Gazelle Valley Park Conservation Programme in Jerusalem, and Transforming for Life in Medellín.⁵¹ A recent review has found some commonalities—such as a persistent focus on individual categories of green space—but also national and regional differences in terms of the extent, uses and development approaches towards such infrastructure across Latin America, Africa and Asia.⁵²

Governance arrangements for GBI are evolving with international assistance through bilateral and multilateral initiatives. Global city networks are building awareness and enhancing local capacity to utilize effectively the tools afforded by international treaties and conventions on biodiversity protection and enhancement. In fact, city collaborations and city networks involving the environment have grown rapidly and constitute the largest share of such networks globally.⁵³ In addition to global networks such as C40 Cities and the Global Resilient Cities Network, smaller and regional research and learning networks have proved valuable (Box 10.2).

A set of globally applicable core principles for GBI has been distilled by combining conceptual issues with lessons from the available case study literature. GBI should be multifunctional; needs to be connected (as opposed to comprising isolated pockets); integrate green, blue and grey elements; and have multiple scales; while it is developed through strategic, inter- and transdisciplinary processes that are socially inclusive and reflexive.⁵⁵ These features are explicit so that they can serve to integrate GBI spatially and in governance terms with other sectoral resilience agendas on poverty, inequality and justice.

10.4.2. Sustainable, renewable and cleaner energy

As energy quite literally drives or enables all facets of human settlements, having equitable access to adequate clean and sustainable energy is fundamental to achieving overall urban sustainability and resilience. What makes energy clean and sustainable comprises two closely related dimensions, namely the fuel source of the energy and the nature of the supply infrastructure in relation to actual and suppressed demand. Debates over the unsustainability of finite, non-renewable and polluting fossil fuels use are well known, and the nature of alternatives will be discussed below, but urban planning for an optimistic future scenario must take account of recent developments in renewable energy generation that enable different and more resilient supply infrastructures. Already

Box 10.2: ICLEI's Urban Natural Assets for Africa Programme (UNA)

ICLEI Africa's Urban Natural Assets for Africa Programme ran from 2014–2020 as an excellent example of a regional GBI learning network across Addis Ababa, Cape Town, Dar es Salaam, Lilongwe, Kampala, Kisumu, Entebbe (Uganda), and Nacala and Quelimane (Mozambique). This network shared understanding and experience about rivers, coasts and overall resilience, augmented by access to current international thinking and practice.

The fundamental objective was to promote “human well-being and climate resilience by integrating nature-based solutions into land-use planning and decision-making processes.” It operated through very reflective and adaptive learning and knowledge exchange mechanisms that enabled the tailoring of experience elsewhere and principles of good practice to local contexts through co-production processes. In turn, the participating cities shared their practices and lessons, while ICLEI helped disseminate these practices regionally and globally, hence enabling bidirectional cross-scale knowledge sharing.

Key findings included that identification of appropriate decision-making entry points was inadequate. Instead, cities needed to embark on continual learning, knowledge production and critical reflection as part of a fundamental reorientation of planning processes away from expert knowledge towards co-design and co-creation. Innovative learning and exchange formats, including games and interactive exercises, proved important devices for achieving this goal by helping to level the power dynamics and other differences among participants. For instance, the network brought land-use planners and environmental officers in Lilongwe City Council in Malawi together across departmental silos to share perspectives and explore their conflicting disciplinary and professional rationalities around these issues.⁵⁴

in 2009, the UN-Habitat report *Planning Sustainable Cities* identified the potential in this regard of decentralized systems:

Decentralized energy production systems offer a number of benefits, including energy savings, given the ability to better control power production, lessen vulnerability and achieve greater resilience in the face of natural and human-made disaster (including terrorist attacks). Clever integration of these small systems within a grid can be achieved with new technology control systems that balance the whole system as demand and supply fluctuates. A number of such small-scale energy systems are being developed to make cities more resilient in the future.⁵⁶



Most major cities are taking leading roles in seeking to meet the Paris target through ambitious emissions reduction targets

Over the 14 years since that was written, progress has been remarkable, driven by growing urgency, the increasing obsolescence of older fossil fuel power stations, rapidly growing demand for electricity through population growth, rising incomes, and the vast expansion of electronic equipment and now also electric vehicles. Technical progress and the plummeting cost of photovoltaic (solar) panels, wind turbines of different scales, and early commercial tidal energy installations are all playing important roles in the rapid and impressive increases in renewable energy capacity around the world, even in countries that appear to favour fossil fuel industries or minimize the climate change threat. Given obsolescence and capacity constraints facing conventional national or regional energy grids and the scale of investment required to address these, urban distributed and decentralized energy systems for climate-resilient, post-COVID recovery are vital elements of resilient urban futures.⁵⁷

Globally, the International Energy Agency has now charted a clear pathway towards net zero by 2050, demonstrating the importance of a portfolio of energy sources and supplies, underpinned by a rapid transition out of fossil fuels to the range of renewables and appropriate financing funds to assist developing countries and promote energy justice at different scales.⁵⁸ These issues are also addressed substantially in Chapter 5. By contrast, commitments at COP26, including the agreement to curtail methane emissions and a doubling of financial assistance, provide a first but insufficient step in this direction. Most low- and middle-income countries, along with some high-income countries, strongly favour

substantial increases in the voluntary Nationally Determined Contributions to emissions reductions. However, some large emitters and major fossil fuel producers resisted, and the sum total of Nationally Determined Contributions announced will not reduce temperature increases over pre-industrial levels below 2.4–2.7°C, a considerable and damaging amount way short of the 1.5°C Paris target.

Most major cities are taking leading roles in seeking to meet the Paris target through ambitious emissions reduction targets, increasingly as part of integrated strategies embracing mitigation and adaptation as transformative commitments to sustainability and resilience. City networks, including UCLG, ICLEI, C40 and the Global Resilient Cities Network, are playing leading roles in generating collective will and sharing good practices, as is the biennial One Planet City Challenge run by WWF Sweden on behalf of WWF International.⁵⁹ Cities not already engaged in global networks of local governments for climate action should no longer sit on the sidelines if they wish for their city to achieve the optimistic scenario for urban futures, as these networks support and encourage individual mayors and top officials, who can make a real difference individually in their respective cities' agendas in bridging the gap between vision and action.⁶⁰

In urban contexts, the importance of strategic assessments of energy systems and greenhouse gas inventories as the basis for concerted action is now well established.⁶¹ A series of recent studies of macro-metropolitan São Paulo also identifies the many political constraints and contradictions impeding successful energy transitions, and what further potential exists.⁶² Such issues exist almost universally, not least in terms of vested interests contesting the basis or rate of transition to sustainable and renewable energy, although the changing economics of renewables is starting to prove a game changer.

Moreover, the new opportunities presented by the surge in renewables are particularly important as old power plants are retired and efforts to expand affordable access to electricity among the poor and in underserved localities increase. Combinations of off-grid, local mini-grid and on-grid solutions are now possible, though sometimes limited by regulations. Scalability is also very important, so that individual households, community organizations and firms in many countries can invest affordably to generate some or all of their own electricity. Depending on the precise technology, this can either be stored for use at night or sold to the grid. Donor agencies, NGOs and community-based organizations are also funding innovative schemes to install power in informal and low-income settlements that are not

connected to the wider urban grid. As mentioned above, such investments are important because of their economic and social dimensions, in terms of employment creation and impact on reducing poverty, inequality and ill-health. While some schemes are grant-based, others require affordable repayments over a stipulated period, with repaid funds sometimes being recycled into new loans on the principles of a rotating credit scheme.

This potential to fill gaps in grid coverage and provide affordable renewable energy constitutes a key element of poverty reduction and health improvement as part of an integrated urban sustainability strategy. These types of energy also avoid the safety and health risks, as well as emissions, associated with use of kerosene, paraffin, candles and firewood in extremely low-income households. In situations where electricity grid supply is unstable or unreliable, having off-grid or local mini-grid supplies may be more reliable and sustainable, as well as resilient. Citywide rooftop solar schemes, such as in Palmas, Brazil, are demonstrating the scalability of renewable energy and various co-benefits.⁶³ Access to alternative sources and supplies also provides the redundancy that is an important component of resilience. As older solar panels come to the end of their working lives or need repair, issues around the right to repair—which could provide many new semi-skilled employment opportunities—and the growth of a new form of e-waste also need to be considered.⁶⁴

10.4.3 Raise awareness of different local urban risks and identification of feasible disaster prevention and preparedness

Sustained research on chronic hazards and longer-term climate change risks facing different groups of residents and localities within urban areas have informed urban risk profiles. Many local governments have undertaken comprehensive vulnerability assessments and established disaster risk reduction and climate change mitigation and adaptation strategies, including early warning systems for floods, landslips and droughts. Awareness and preparedness raising exercises appropriate to the particular contexts are important, so that residents know where to obtain reliable and up-to-date information and how to respond to the various categories of emergency.

In Shimla, Himachal Pradesh, India, for instance, the local authority, with assistance from ICLEI and 100 Resilient Cities, has formulated comprehensive landslide and earthquake disaster and resilience strategies, with public engagement. In Buenos Aires; Malmö, Sweden; and Sheffield, UK, attention has

Many local governments have undertaken comprehensive vulnerability assessments and established disaster risk reduction and climate change mitigation and adaptation strategies



The aftermath of cyclone Idai, Beira City, Mozambique © Victor Espadas Gonzalez/Shutterstock

focused principally on flood risk, with imaginative awareness raising strategies and mitigation strategies including a shift from traditional hard engineering solutions towards nature-based solutions and ecosystem services such as restoring and expanding riverine vegetation and floodplains, as well as enhancing run-off retention and water infiltration of the soil.⁶⁵ Particular issues often arise in respect of informal settlements and their inhabitants, where legitimate community-based organizations play important roles in mapping, data collection, negotiations and providing mutual assistance.

10.4.4 Building resilience in slums and informal settlements

A key requirement for effective, integrated citywide planning and resilience building—which is discussed more broadly below—is that it should promote socio-spatial and economic equity. This means explicitly including areas and social groups facing particular vulnerabilities and high risks, most of whom are relatively and often absolutely marginalized and impoverished, living in informal housing and surviving through informal economic activities (Chapter 3). Informality exists universally but in many developing countries it characterizes substantial segments of the built-up area and population.⁶⁶ These planning processes must be seen as legitimate among slum and informal settlement dwellers, many of whom are only too aware of the chronic daily risks and hazards of their lived experience but also lack the resources to resolve them independently. A vital step to promote such policy legitimacy

and remove a major source of vulnerability among the most marginalized groups is for local governments to cease the still widespread use of demolition or eviction (Chapter 3). Rather than literally being planned out of urban areas, such areas should be planned into towns and cities through the inclusive and equity-promoting policies advocated here.

A wealth of experience has been built up through community-based initiatives worldwide, using diverse approaches but generally through shared labour and self-help processes, childcare and education enterprises, rotating credit and collective savings schemes and the like. During high-risk periods, wardens or lookouts can watch for approaching floods, impending landslips, storms, firestorms and other hazards to provide early warning to residents. Many of these modest initiatives—sometimes supported by external NGOs—provide elements of resilience that can be enhanced and integrated with wider multisectoral urban programmes if trust and collaborative relations with officials and the planning system can be developed (Chapter 8). This will take time and goodwill on all sides, which underlines the value of multistakeholder engagement, making use of skilled external facilitators and demonstrating to residents that their knowledge and experiences are valued alongside those of other, more powerful groups and professional planners. Many participatory and co-design, co-creation and co-production techniques have been developed in diverse urban contexts worldwide to help foster such processes.⁶⁷



Participatory slum upgrading session © UN-Habitat

The Know Your City programme of the Federation of Shack and Slumdweller International (SDI), in collaboration with United Cities and Local Governments of Africa, is well-established and engages residents as citizen scientists to map and collect data on their neighbourhoods as the basis for negotiations and collaborations to provide and upgrade services and infrastructure and improve disaster risk reduction capacity and resilience (Chapter 6).⁶⁸ Ideally, individual neighbourhood initiatives should be “joined up” so that drainage and stormwater improvements are accompanied by enhancements to pathways, access routes and other infrastructure, including water supply and sanitation, to make them more resilient to storms, floods, fires and other locally important extreme events.

Such initiatives have provided an important basis for rapid interventions during the COVID-19 pandemic to raise awareness and improve emergency or more durable facilities for handwashing and related personal hygiene and sanitation measures to prevent or slow contagious spread of the coronavirus in high-density areas with inadequate facilities.⁶⁹ These, in turn, point to longer term interventions required as part of upgrading and integrated planning initiatives to promote public health and environmental resilience in such areas (Chapter 6).

Informal and formal low-income dwellings can be made more resilient to heavy rain and flooding through improved roof overhangs, rainwater harvesting and strengthened footings to protect the base of the walls. Resilience to heat and cold can be enhanced through cost-effective ceiling insulation, perhaps accompanied by affordable and appropriate energy generation through solar water heaters, as demonstrated by the Kuyasa scheme in Cape Town, to maximize co-benefits.⁷⁰ Reducing fire risk in homes constructed from flammable materials like wood, cardboard and plastic, particularly because many inhabitants also rely on open fires, candles and paraffin or kerosene for cooking and heating, is also crucial to promoting resilience at this scale.

Such interventions have been documented and supported through other initiatives, as well as the Asian Coalition for Community Action, and collaborative efforts in and with informal settlement dwellers from Buenos Aires to Kisumu to address community priorities to reduce flood risk, vulnerability, water and sanitation and other sources of daily and climate change vulnerability and to build resilience. These initiatives are crucially important in engaging active participation and, in some cases, co-design and co-creation with residents and other beneficiaries. This generates buy-in and community

sense of ownership, while reducing alienation or dependence. The quality and adequacy of the schemes may vary but local ownership might make them more durable and encourage maintenance beyond what conventional local government interventions generally achieve. Ultimately, it is important that these are not seen as purely filling gaps or as substitutes for official action, but that they become integrated with the latter as part of comprehensive urban planning and action to build holistic, multistakeholder and cross-sectoral urban resilience, as elaborated on in the next section.



Informal and formal low-income dwellings can be made more resilient to heavy rain and flooding through improved roof overhangs, rainwater harvesting and strengthened footings

10.5. Institutional Resilience

The UN-Habitat Global Report on Human Settlements 2007, focused on the theme of human safety and security. Even then, the report’s scope included extreme events and disasters in terms that remain both valid and important today. Specifically, the report underlined the key message that governance structures and processes are only as good as their weakest component: “Disasters reveal the resilience and capacity of governments. The performance of infrastructure is a reliable indicator of how well public agencies are doing their jobs. Similarly, the performance of departments within government, as well the performance of leaders, is deeply revealing of the strength and character of public institutions.”⁷¹

Put differently, this means that the sudden and severe shocks that constitute disasters, rather than the performance of ordinary daily functions, show how effective, efficient, flexible and responsive governments and their capacities are. Whereas rigid, bureaucratic and unaccountable systems usually falter when faced with substantial emergencies because they tend to alienate rather than involve or have the confidence of most inhabitants, more flexible, efficient, well-organized and responsive systems often have preparedness and can respond in a timely fashion. At the same time, it is important to bear in mind that resilience cannot be created by economic resources and wealth alone. Above all, there is no substitute for good governance.

As this Report has demonstrated, knowledge and understanding of different natural and anthropogenic hazards, risks, vulnerabilities and how to build capacity to mitigate, adapt and resilience has grown immeasurably over the last 15 years. However, even where sufficient political commitment and resourcing exist, there remain substantial implementation and capacity gaps. A large recent international study of some 200 cities revealed little evidence of just sustainability principles yet having been implemented on the ground.⁷²

The rate and scale of climate change, as well as our understanding of its impacts, have also increased over the intervening years, with the result that the urgency and nature of adaptive transformations now required to achieve just and sustainable urban resilience are commensurately greater. This transformation can only be achieved with greater resolve and commitment by all government institutions, including local government leaders.

10.5.1. Building stronger and nimbler multilevel collaboration

Climate change, pandemics, sustainability and resilience are classic examples of “wicked problems,” a concept in planning and policy that refers to problems difficult or near impossible to solve. Given that scale of challenge, no level or tier of government—no single ministry, department or agency—can address them alone. Indeed, all must collaborate effectively. The necessity of this level of collaboration underpins the entire global sustainable development agenda, particularly the SDGs and the New Urban Agenda, because of the difficulty in tackling multidimensional poverty, inequality and vulnerability.⁷³

Establishment and operation of effective and efficient multilevel governance requires clear divisions of labour, powers, responsibilities and resources among national and subnational government entities.⁷⁴ It also requires multistakeholder collaboration among government institutions, private firms, civil society and other NGOs, higher education institutions and the like. Collaborative governance also builds confidence and trusting relationships. Indeed, early optimism on this score regarding urban governance in the few years after the COP15 summit in Copenhagen was subsequently replaced by greater pragmatism.⁷⁵

Effective multilevel governance may be difficult to achieve, particularly in situations where cross-scale relations are historically fraught or complicated by authoritarianism, lack of transparency and/or political rivalries when different parties or interest groups control the respective levels of

government institution. Moreover, changes in political control, particularly when combined with strong executive power vested in a president, regional minister or executive mayor, can change dynamics rapidly and even reverse previous gains and thus undermine resilience directly or indirectly. This reality highlights the importance of engaging proactively with the politics of climate change and resilience, including both sharpened contestations and innovative collaborations and coalitions to exploit and develop areas of common interest, as well as everyday politics by those outside the corridors of power, especially informal community-based institutions of the poor and marginalized.⁷⁶

Since the funding and revenue cuts, and increased demands on, urban local governments triggered by the 2008-9 global financial crisis, the ability of European cities to innovate and govern economic change and social challenges has depended largely on the existence of supportive multilevel governance.⁷⁷ Another important cautionary example is provided by the fate of climate change measures and progress with emissions reduction and decarbonization under successive Brazilian presidents. Important gains during the first decade of the 2000s have subsequently been undermined and reversed through a combination of political resistance, bypassing regulations, direct legislative change, and the weakening or closure of specialist institutions.

This experience applies equally to collaborative multilevel governance and the role of urban institutions, with climate change and resilience agendas mainstreamed across all mandates rather than being the preserve of specialist departments or institutions. One important strategy for tackling policy volatility across local electoral cycles and reducing the vulnerability of local government programmes to changes in national or regional policy is to seek cross-party agreement on the importance of urban sustainability and resilience so that measures implemented during one cycle are consolidated and built upon in subsequent cycles rather than reversed. This type of institutionalization of resilience policy has been done successfully in countries with proportional representation electoral systems where governance usually takes place through coalitions, particularly in Scandinavia, but such broad agreements can be achieved even under other systems if the respective leaderships accept the importance of doing so.

Effective multilevel governance may be difficult to achieve, particularly in situations where cross-scale relations are historically fraught or complicated by authoritarianism

10.5.2. Well-funded and resourced local governments

Local governments, especially in urban areas, are on the frontline of addressing climate change and COVID-19 and having to reduce vulnerability and enhance resilience. Yet they frequently suffer from longstanding shortages of personnel, resources and implementational capacity relative to their legal mandates and responsibilities, let alone to address the substantial and substantive transformational changes now required. The most common challenges are a lack of local revenue raising ability and heavy dependence on central and/or regional governments for disbursements, and additional tasks and roles being assigned to local government without appropriate funding—sometimes referred to as unfunded mandates.⁷⁸ This may reflect inadequate central government revenues or political centralism that means that allocated resources are not transferred to lower tiers of government.

The phenomenon of unfunded mandates has been widespread during the COVID-19 pandemic, when local governments have been called upon to intervene in diverse ways. The weakened fiscal capacity of cities and subnational governments, which in turn affects their capacity to tackle persistent and emerging urban challenges is indicative of the disastrous scenario of urban futures described in Chapter 1. Even many historically well-funded local governments in OECD countries have suffered successive financial cuts since the financial crisis (Chapter 4); the larger Nordic cities are notable exceptions.

Fundamental to overcoming this situation are two governance requirements. The first is to clarify an appropriate balance of complementary roles with respect to climate change, disaster risk reduction and resilience building across national, regional and local governments. The second is to reach an equitable resolution of the mismatches between the powers, roles and responsibilities of urban local governments on the one hand, and their resourcing on the other. This may be very difficult to achieve in strongly centralized and authoritarian systems. If internal democratic pressure is inadequate, international agencies or city networks might be able to help facilitate dialogue and some form of national debate or consultative mechanism to assist national governments to find the means to address and meet international conventions or agendas to which they have signed up.

The most appropriate solution will also differ according to local circumstances, such as existing institutional capacity of local governments of particular categories and their ability



Many historically well-funded local governments in OECD countries have suffered successive financial cuts since the financial crisis

to raise revenue locally from property, vehicle and/or local income or sales taxes, service provision, and sale of utilities such as water and electricity. The higher the proportion of total revenue that can be raised locally, the greater the level of de facto autonomy a local government will have, the better it will be able to develop and implement coherent strategies, and the more responsive it can be to local priorities and hence accountable to residents. Therefore, these solutions should be promoted; some can be addressed by local governments alone, but most will require multilevel governance negotiations since they affect divisions of labour and resources among them.

10.5.3. The role of new technologies in steering urban resilience

Technologies continue to evolve very rapidly, creating new potentials to accelerate urban change and transformations but also new challenges about their appropriateness to diverse contexts and their wider impact on equity, justice and well-being (Chapter 9). This is the essence of the social dimension in socio-technical approaches and the understanding of cities as socio-technical-environmental systems.⁷⁹

The rapidity of technological evolution can make it difficult to judge appropriateness in the short term, as cost, availability and accessibility can change over time. Two good examples are solar panels and mobile phones. Initially they were expensive as well as required supporting infrastructure, installation and maintenance capacity that rendered them accessible mainly to the elite and middle classes in large cities. However, dissemination and technological refinement have been rapid, even in low-income countries, with the result that both are now widely available and accessible at affordable cost, so that both now make important contributions to resilience at individual, household, neighbourhood and hence urban scales. (Solar panels were discussed earlier.) Mobile phones connect traders to customers, provide access to instant market information from different locations, facilitate maintenance of social contacts among family and friendship networks, enable money transfers cheaply at a distance, enhance personal safety, assist female entrepreneurs to overcome gender barriers and can be a source of early warning of impending extreme events and disasters.

Related developments in digital technologies also facilitate citizen science and community mapping as part of participatory and co-productive neighbourhood upgrading and planning negotiations, which is consistent with the idea of civil technology (Chapter 9).⁸⁰ Networked data sensors and closed-circuit television cameras measuring air quality, traffic and pedestrian flows and many other elements of urban metabolism, as well as antisocial behaviour and crime, are increasingly integral to environmental monitoring and mobility management to cut airborne pollution, congestion and ultimately promote urban sustainability and resilience.

However, as noted in Chapter 9, the equity and justice dimensions to such technological deployments are often overlooked. Who benefits and who suffers when constraints and monitoring are introduced? There are costs and benefits of, for example, traffic detours through neighbouring streets when pedestrianization schemes are introduced or policing abetted by technological surveillance. Similar issues surround the enthusiasm for smart cities, which are often held up as the future of urban sustainability but which, to date, are largely high-tech and high cost in ways that encapsulate

many elements of unsustainability and exclusion, particularly of the urban majority and poorer developing countries. This has prompted efforts to embrace open data and open-source technologies as part of community involvement as mentioned above. Social aspects of smart city living are also now receiving more attention, with Tampere in Finland, for example, adopting a more citizen-focused phase after their initially strong technological emphasis.⁸¹

Carbon capture and storage represents another controversial potential example, where, as a result of greater urgency and technological progress, perceptions are shifting from it being unrealistically expensive and large-scale to having possibilities at different scales. However, this could thus become a mechanism for extending or perpetuating business as usual approaches based heavily on fossil fuel combustion rather than accelerating transitions to renewable energy. In this context, the importance of transforming private-sector business models to align with urban sustainability requires a change in underlying parameters of added value and how private costs and benefits are calculated relative to externalized social costs and benefits.⁸²



Solar Panela at a parking lot © KIM JIHYUN/Shutterstock

10.5.4 Integrated urban planning as the foundation of resilient urban futures

Integrated urban planning is an essential component and prerequisite for resilient urban futures. Sometimes called “joined-up planning,” it requires bringing together the various sections or departments of a local government to discuss and negotiate their respective priorities, proposals, plans and associated budgetary needs into an overall framework that also includes a spatial or territorial dimension so that the entire urban area can be addressed coherently and the whole becomes more than the sum of the respective sectoral and



Integrated urban planning is an essential component and prerequisite for resilient urban futures

locality-specific parts.⁸³ Apart from the missed opportunity of such added value, failure to integrate at the city or city regional scale risks contradictions and gaps between various locality and sectoral plans, and may even increase vulnerability. A city region embraces the functional urban area, which is larger than the urban built-up area. This is more useful in terms of resource flows and sustainability, as well as transport and mobility planning, but adds complexity as such regions include peri-urban and some rural areas.⁸⁴

In simple terms, this helps to avoid a situation where individual departments prioritize development or rehabilitation work in different localities or in the same locality at different times. Such situations lead to inefficiency, greater disruption and cost, and suboptimal outcomes. Instead, effective coordination means that the various elements of infrastructure, buildings or services are designed, delivered or upgraded together. This approach maximizes complementarities and efficiency. The number of cities undertaking such exercises is increasing, partly through the catalytic role of international membership organizations, though Cape Town has been working on disaster risk reduction and climate change mitigation and adaptation at the city scale for over a decade, gaining invaluable experience that bears out the arguments being made here.⁸⁵

Holistic urban resilience requires that proactive responses to climate change, pandemics and disaster risk are mainstreamed into the annual and multiyear workplans and design standards of all departments, and not undertaken as an extra bolt-on to other work or concentrated in one

Holistic urban resilience requires that proactive responses to climate change, pandemics and disaster risk are mainstreamed into the annual and multiyear workplans and design standards

specific department. In turn, this requires effective forward-looking design and planning frameworks that factor in local forecasts of future climatic, environmental and public health conditions so that infrastructure, buildings and services are built or retrofitted to appropriate standards to withstand best estimates of conditions that will prevail over the coming decades. The New Urban Agenda provides appropriate parameters and guidelines for this.⁸⁶

Urgent direct attention is required to change the form and function of existing urban areas to promote comprehensive sustainability and resilience (Chapter 5), just as new urban construction needs to accord with the latest design principles, construction techniques and sustainable materials in any given context to avoid locking in unsustainability for decades to come. This is essential to integrate the economic, environmental, social and institutional dimensions of resilience within the urban fabric.

One key element of this is the imperative to rethink urban land-use and transport systems and requirements in order to reorganize large, mainly single-use and mobility-based urban areas into more nucleated, 15- or 20-minute cities or communities (Chapter 6).⁸⁷ They embody the step changes needed to match the scale of our looming challenges but have yet to be retrofitted or tested in practice outside a few recent model smart city neighbourhoods that are not likely to be widely replicable. Ironically, perhaps, there will be greater potential to upgrade and modernize infrastructure and facilities without large-scale redesign and reconstruction of the built environment in older, central areas of cities and towns in some low- and lower-middle-income countries where multifunctional land uses have survived from the colonial era. In some high-income countries, inner-city neighbourhoods often retain mixed land uses and have integrated infrastructure like district heating and integrated transport systems, enabling them to function both as 15- or 20-minute districts and as integral parts of the larger city.

A crucial example of the kind of reorientations of thinking and urban design required to make such step changes in practice is provided by recent research into the relationships between residential densities and construction materials. The longstanding conventional wisdom has



Neighbourhood profile data validation in Old Saïda, a vulnerable neighbourhood in South Governorate, Lebanon © UN-Habitat

been that maximum urban efficiency in terms of land use, infrastructure and service delivery is provided by increasing residential density through fuller ground coverage and especially more extensive vertical development—high-rise, high-density development. This perception, however, has been based largely on the operational costs and efficiency of buildings after construction. When the full life cycle of buildings is considered, including construction materials, actual construction processes⁸⁸ and subsequent operation, the picture changes considerably. Instead, high-density, low-rise urban designs are optimal in terms of minimizing life cycle emissions and maximizing population capacity.⁸⁹ When social dimensions and overall liveability are taken into account, the arguments against maximizing residential density as an objective in and of itself become even stronger.

Only a full life cycle approach is entirely compatible with achieving urban sustainability and resilience. This should certainly be a medium-term objective, though it will require considerable preparation in all but the best-resourced and capacitated local governments. As with 15- or 20-minute cities or neighbourhoods, detailed practical experiments are still awaited but the concept should serve as an invitation to experiment.

The language and terminology, as well as available technologies and our understandings of climate change interactions with the built environment and the implications, continue to evolve. However, the essential message about comprehensive change being essential was already identified by UN-Habitat in 2009: “While greening buildings, developing renewable fuel sources

and creating more walkable communities are critical elements of the sustainable city, investing in viable, accessible transit systems is the most important component for them to become resilient to waning oil sources and to minimize the contribution of urban areas to climate change.”⁹⁰ While there has been undoubted progress in many towns and cities, including on renewable energy and decarbonization, the urgency is now even greater. Modest, incremental changes are no longer adequate; instead, more ambitious and comprehensive transformative adaptations—sometimes referred to as adaptive transformations—have now become essential.

10.5.5. Building required capacity for sustainable urban futures

Examples of how integrated planning capacity and frameworks can be developed as part of initiatives led by international city networks are provided by Buenos Aires and Cape Town, which took advantage of their membership in the Rockefeller Foundation’s 100 Resilient Cities network to formulate their city resilience strategies (Box 10.3). Rather than being top-down efforts that were externally driven by the global network, these were both essentially internal municipal undertakings, using their considerable internal skills and capacities to bring together the various previous fragmented and sectoral policies and strategies, updating and adapting them for coherence at the same time to fit into the integrated framework, and amenable to monitoring in terms of the City Resilience Index.⁹¹ The examples in Box 10.3 demonstrate how local governments in diverse contexts can formulate comprehensive resilience strategies, whether framed by the CRI or other tools.

Box 10.3: Comprehensive city resilience strategies: Buenos Aires, Cape Town and Gothenburg

Some 70 per cent of Buenos Aires' population live in one of 11 stream basins crossing the city, with about 25 per cent vulnerable to extreme flooding. This feature constitutes the principal environmental and climate change risk in the metropole, resulting from modification of and encroachment into the riverine zones, along with most of the water flows having been piped. The Rockefeller Foundation's 100 Resilient Cities initiative stimulated the city's resilience strategy, which is focused around four key issues of becoming a green city, an integrated city, a city of opportunities and a safe city. These key issues are intersected by three cross-cutting themes (a metropolitan perspective, citizen participation, and a digital city), all supported by five pillars: diversity, gender and co-existence; innovation, talent and opportunities; environment and sustainability; social and urban integration; and security and risk management.⁹²

Cape Town also regularly faces heavy flooding in low-lying, high-density areas, including informal settlements, as well as cyclical droughts and water shortages. Recognizing the challenges of climate change, it had previously formulated policies and plans on a sectoral basis, with separate mitigation and adaptation strategies. These have now been integrated and organized thematically, along with other dimensions of resilience-building that take account of financial constraints and the unique local environment, which underscores the importance of introducing ecosystem-based adaptation.⁹³ An important feature of Cape Town's City Resilience Strategy is its explicit alignment with relevant SDGs to facilitate internal monitoring and external reporting, including by means of the city's new Voluntary Local Review process.⁹⁴

While not a city network member, Gothenburg, Sweden's second-largest city and industrial hub, with a population of over 500,000, has developed and implemented many comprehensive sustainability, climate change and resilience policies and programmes. It too faces flood risks in lower-lying central river and canal environs and associated backfill areas, exacerbated by a combination of urbanized hard, impervious surfaces and a soil type that inhibits water infiltration, thus generating runoff. As a Swedish pioneer of climate change action, it undertook thorough studies of vulnerability and risk, including from extreme weather in the first decade of this century. These plans are currently being updated to reflect changing conditions and urban priorities as well as national environmental standards. This work is also being geared to addressing the key challenges of resource consumption and climate change; residential and social segregation between immigrant minorities and the rest of the population; and steering urban growth with the vision of Gothenburg becoming a climate-smart and resilient city with limited environmental impact.⁹⁵

All these reasonably progressive examples, however, have been compiled and are being implemented by means of principally internal top-down and technocratic processes, with limited public engagement or participation, let alone co-production. Levels of citizen awareness, let alone buy-in or senses of shared ownership, are therefore limited, as is the planned role for citizens in implementation. This illustrates one key area in which the important capacity of residents is not yet being adequately mobilized or harnessed, if at all, so that overall resilience is unlikely to be maximized. It is therefore recommended that appropriate training for local government officials and experienced facilitators be utilized as they are often important in bringing together and building common ground among diverse and sometimes historically antagonistic stakeholders.⁹⁶ The following section provides some pointers to how this might be successfully addressed in terms of realistic transformative ambitions.

10.6 Final Reflections: Building Resilience for Optimistic Urban Futures

The human impacts on the planet and on the future of human development are now inescapable.⁹⁷ The importance of the current context of unprecedented uncertainty and global societal challenges—climate/environmental change, pandemics and epidemics, economic restructuring, human security and the like—cannot be ignored. Yet, exploiting the uncertainty to delay action will only exacerbate the rate, scale, difficulty and cost of subsequent action required to tackle climate change and transform urban areas for sustainability and resilience. Instead, as world leaders reaffirmed at the United Nations Framework Convention on Climate Change summit in Glasgow in November 2021, the time to act, and act decisively, is now.

This urgency applies equally to local governments, and is key to achieving the optimistic urban future first outlined in

Chapter 1. Urban futures can go in any number of directions and the duty of urban actors is to steer our cities toward the most optimistic future, as outlined in the Sustainable Development Goals and the New Urban Agenda. Cities can continue on an unsustainable path of widening income inequality, worsening air quality, continuous urban sprawl, and growing slums and informal settlements that do not provide safe, adequate housing. Or they can change course and chart the path of well-planned, managed, and financed cities that create better becomes for all of their residents, including the most vulnerable.

In pursuit of the optimistic scenario for urban futures, it is helpful to reiterate the key messages of this chapter:

- The global sustainable development agenda, comprising the 2030 Agenda for Sustainable Development, the New Urban Agenda, Sendai Framework for Disaster Risk Reduction, Addis Ababa Action Agenda, and Paris Agreement on Climate Change, provides a coherent framework for integrated, multilevel action that recognizes the importance of subnational entities, particularly local governments, in meeting the challenge. As the lead United Nations agency for human settlements, UN-Habitat's flagship biennial World Cities Report provides dispassionate guidance for decision-makers and planners at all levels based on evidence and lessons from around the world. Following the 2020 Report on the value of sustainable urbanization, the current Report focuses on how to build resilience for sustainable urban futures in the context of the COVID-19 pandemic, accelerating climate and environmental change, inequality and poverty, and armed conflict.

The current Report focuses on how to build resilience for sustainable urban futures in the context of the COVID-19 pandemic, accelerating climate and environmental change, inequality and poverty, and armed conflict

- The COVID-19 pandemic has had profound impacts on urban areas worldwide, with their extent and severity reflecting a complex mixture of socio-cultural and demographic and health characteristics intersecting with inequalities within the built environment. The Omicron variant has demonstrated the ability of new mutations to behave very differently from previous ones, being far more transmissible but, for vaccinated people at least,

less virulent. Whether it, together with increasing if still highly unequal vaccination rates, will provide the basis for mass immunity against future variants remains unknown. A high degree of uncertainty in this respect remains.⁹⁸ However, the implications of what we already know about COVID's urban epidemiology are clear and reinforce the urgency of concerted action to tackle multidimensional poverty and inequality, and to improve the urban fabric in poor neighbourhoods. Only by tackling the underlying conditions that foster the spread and heighten the impact of COVID-19 and other pandemics and epidemics, will comprehensive urban resilience that incorporates social justice be built. This does not require a dedicated programme in addition to all existing investment programmes. However, it does demand accelerating the pace of transformative actions to increase overall sustainability and resilience substantially.

- Initiatives to build comprehensive urban resilience must therefore be forward-looking, proactive, and inclusive of all stakeholders, including the marginalized and poor. They must also be integrated rather than sectoral or piecemeal. In other words, they should be multisectoral, multidimensional and multi-stakeholder—and about building back differently, not just building back better along the same lines that perpetuate existing inequalities and injustice. As with urban sustainability, this approach is about increasing equity while reducing poverty and injustice.

Although incremental and transformational adaptation are often juxtaposed in a false dichotomy, in practice there is no clear dividing line. Moreover, it is important to acknowledge that if the prevailing balance of political power and vested interests resulted in a failure to make step changes in ambition and practice thus far, this almost certainly reflects self-interest as well as possible resource and capacity constraints. Hence, it is unlikely that transformational adaptation will suddenly become feasible and without substantive reform or realignment of those governance institutions and processes. Moreover, such changes are often complex and slow.

Conversely, substantive gains can be made under broadly existing arrangements, promoted by appropriate champions among officials and elected representatives, without demanding unrealistic institutional reinventions as a prerequisite. This can be achieved through a set of interventions targeting continuous transformational change, which can be grouped as follows:

- provide the basic conditions to enable small steps or wins, which are easier to conceptualize and implement with existing momentum;
- amplify small wins through sense-making, coupling and integrating—activities that explain the changes and their significance in relation to transformational change, linking the changes to cognate ones in other departments or levels of institution, and connecting these changes and experiences to existing institutions so that they benefit and participate in the ongoing transformations; and
- unblock stagnations by confronting social and perceptual obsessions with innovative and counter-intuitive interventions that demonstrate the potential of alternatives, provided that officials and elected representatives are willing to engage critically, learn and adapt procedures and behaviours.⁹⁹

Consistent with this approach and specifically in urban contexts, at least five pathways to urban transformation can be discerned as the basis for formulating and implementing effective climate action (Box 10.4). These pathways are also consistent with key messages of this chapter and this Report as a whole—including the nine pathways to sustainable urban futures framed in Chapter 1, in which the New Urban Agenda provides the integrating framework. They focus on the need for integrated territorial planning and accountable governance with a justice or rights focus to tackle climate change, pandemics, economic insecurity and other societal challenges, coupled with a realistic perspective on how local governance institutions operate (Chapter 1). Two of the five pathways in Box 10.4 focus explicitly on resilience but all contribute to building and enhancing it.¹⁰⁰ The urgency of taking action and building overall urban resilience applies to all the scenarios articulated in Chapters 1 and 2. None avoids the difficult challenges articulated in this chapter.

Box 10.4: Five climate action pathways to urban transformation

Pathway 1: Integrate mitigation and adaptation, as actions that reduce greenhouse gas emissions while integrating increasing resilience are a win-win

Pathway 2: Coordinate disaster risk reduction and climate change adaptation as together these are the cornerstones of resilient cities

Pathway 3: Co-generate risk assessments and climate action plans with the full range of stakeholders and scientists for the most effective outcomes

Pathway 4: Focus on disadvantaged populations as the needs of the most disadvantaged and vulnerable citizens should be addressed at the forefront of climate change planning and action

Pathway 5: Advance governance, finance and knowledge networks as city creditworthiness, developing robust city institutions and participating in city networks all facilitate climate action

Source: Rosenzweig et al, 2018, pp. 607–608; Simon and Solecki, 2018.

Two final observations about the pathways in Box 10.4 are required. The first is to flag the importance of matching more accurate, localized and downscaled risk assessments as per Pathway 3 with appropriate remedial steps and solutions if policymakers and individual citizens are to be engaged actively rather than left despondent. The second is to underscore the urgency of Pathway 4 to prioritize and address the poorest and most vulnerable communities and localities because they are facing the brunt of hazards and risk and are disproportionately experiencing cascades or chains of increasingly frequent and often severe impacts that are compounding the undermining of their assets and resilience (Chapter 3).

These observations also apply to the broader set of pathways in Chapter 1, since they emphasise equity, inclusion, appropriateness and the challenges of matching short and medium to long-term interventions to tackle multidimensional poverty and vulnerability and to promote integrated sustainability and resilience. The prospects for success will be considerably enhanced if cross-party agreement on the vital importance of this objective, so that successive electoral cycles focus on consolidating and building on previous gains instead of changing direction or reversing them.

Endnotes

1. Simon et al, 2018.
2. Elmqvist et al, 2019, p. 268.
3. Pimm et al, 2019, p. 895.
4. World Commission on Environment and Development, 1987.
5. Elmqvist et al, 2019, p. 268. Redundancy refers to having some spare capacity or resources to act as a buffer or safety net.
6. UN-Habitat, 2011b, p. 5; see also Simon et al, 2018.
7. Olsson et al, 2015; Ziervogel et al, 2017; Elmqvist et al, 2019.
8. Olsson et al, 2015; Pimm et al, 2019.
9. IPCC, 2021.
10. UK Environment Agency, 2021.
11. UN-Habitat, 2016a, p. 90; this indicates the close relationship between the two concepts in UN-Habitat's approach. See also Castán Broto and Westman, 2021.
12. UN-Habitat, 2021a, p. 16.
13. UN-Habitat 2020a.
14. UN-Habitat, 2021a; McMillan et al, 2021.
15. Huxley et al, 2019.
16. FAO/RUAUF, 2015; Leck and Simon 2019; Croese et al, 2020; Simon, 2021
17. World Bank, 2020.
18. Berke et al, 2021.
19. Rockefeller Foundation and Arup, 2018.
20. Valencia et al, 2021, p.3.
21. The member cities are now organized into a legacy organization, the Global Resilient Cities Network, which seeks to co-ordinate and make progress on the urban resilience agenda.
22. Croese et al, 2020, p.7.
23. Croese et al, 2020, p.11.
24. This includes the scenario of having achieved sufficiently high levels of vaccination and/or immunity to permit living with COVID-19.
25. Simon, 2016a; UN-Habitat, 2020a, pp. 96–106, 277–280.
26. UN-Habitat, 2021a, p. 279.
27. Spiliotopoulou and Roseland, 2021.
28. UN-Habitat, 2020a, pp. 94–95.
29. UN-Habitat, 2015a, pp. 17–19.
30. ILQ, 2015.
31. City of Gothenburg, 2019.
32. GIZ, 2017; The Hindu, 2021.
33. Anderson et al, 2019.
34. UN-Habitat, 2020a, p. 280.
35. In some countries, this falls under the jurisdiction of regional or national governments.
36. UN-Habitat, 2007, p. 203.
37. UNESCO, 2016.
38. UN-Habitat, 2020a.
39. UN-Habitat, 2020a, pp. 299–301; De Groot and Lemanski, 2020; Anderson et al, 2021; Glaeser et al, 2021; Pieterse, 2021; Simon et al, 2021a; Sverdlík and Walnycki, 2021; UN-Habitat, 2021a, pp. 61–62, 163–164; World Economic Forum, 2021.
40. UN-Habitat, 2015a, pp. 14–16.
41. Cinderby et al, 2021.
42. Simon, 2016; Reckien et al, 2016, 2020; Castán Broto and Westman, 2021.
43. UN-Habitat, 2021a, p. xv.
44. Alberti et al, 2018.
45. Simon, 2016b; Tozer et al, 2020; Frantzeskaki and McPhearson, 2021; McPhearson et al, 2018.
46. Simon, 2016b; Ziervogel et al, 2017; Reckien et al, 2018; Saldarriaga et al, 2020; Tozer et al, 2020; Pauleit et al, 2021.
47. Cobbinah and Nyame, 2021.
48. Quian et al, 2015.
49. Wu et al, 2019; Alexandra, 2019; Saldarriaga et al, 2020.
50. It should be noted that some sources include blue—and sometimes also grey—infrastructure under the umbrella of green infrastructure. Pauleit et al, 2021.
51. McPhearson et al, 2018.
52. Pauleit et al, 2021.
53. Acuto, 2016.
54. Simon et al, 2021, pp. 405–409; Smit et al, 2021.
55. Pauleit et al, 2021, pp. 108–110; Simon et al, 2021.
56. UN-Habitat, 2009, p. 118.
57. RCN and ARUP, 2021; see also Roberts, 2018.
58. IEA, 2021; Jacobson, 2021.
59. WWF, 2020.
60. Huxley et al, 2019; Fraser et al, 2022.
61. Marcotullio et al, 2018.
62. Collaço et al, 2019a, 2019b; Lampis et al, 2021.
63. ICLEI, 2021.
64. Samarakoon et al, 2022.
65. Valencia et al, 2021, pp. 17, 20–21.
66. UN-Habitat, 2018a. UN-Habitat, 2020a.
67. Hemström et al, 2021; Sheikh and Bhaduri, 2021.
68. SDI and Know Your City, 2018–2021.
69. Simon et al, 2021.
70. Simon, 2013, p. 209.
71. UN-Habitat, 2007, p. 38.
72. Castán Broto and Westman, 2021.
73. United Nations, 2017. paras. 9, 15, 29, 42, 75, 81, 90–91.
74. Graute, 2016; Leck and Simon 2018; Romero-Lankao et al, 2018a; Bulkeley, 2019; Croese et al, 2020; Simon 2021; UN-Habitat, 2021a., pp. 127–155.
75. Hausknost et al, 2018; Castán Broto and Westman, 2020; Restrepo-Mieth, 2021.
76. Burch et al, 2018; Romero-Lankao et al, 2018b; UN-Habitat, 2018a.; Paller, 2021; Restrepo-Mieth, 2021.
77. Cucca and Ranci, 2021.
78. Parnell, 2020; UN-Habitat, 2021a, pp. 138–153.
79. Alberti et al, 2018; UN-Habitat, 2020a.
80. UN-Habitat, 2020a, pp.183–184.
81. UN-Habitat, 2020a, pp.192–198; Cities Today, 2021.
82. Burch and DiBella, 2021.
83. UN-Habitat, 2018a. UN-Habitat, 2020a. Effat et al, 2021.
84. UN-Habitat, 2015a. Berke et al, 2021; Simon, 2021.
85. Cartwright et al, 2012; Scott et al, 2019.
86. Raven et al, 2018; UN-Habitat, 2018a. Effat et al, 2021.
87. Raven et al, 2018, pp. 141–144, 147–162; C40 and Arup, 2021.
88. These two categories together are often referred to as comprising embodied emissions.
89. Pomponi et al, 2021; Saint and Pomponi, 2021.
90. UN-Habitat, 2009, p.126.
91. Croese et al, 2020; Valencia et al, 2021, pp. 7–11.
92. Gobierno de la Ciudad de Buenos Aires 2018; Valencia et al, 2021, pp. 7–9.
93. Valencia et al, 2021, pp. 9–11.
94. Croese et al, 2020, Table A1, pp. 12–14.
95. Göteborgs Stad, 2020; Valencia et al, 2021, pp. 11–15.
96. Hemström et al, 2021 pp. 31–47.
97. UNDP, 2020.
98. See, for example, the UN Secretary-General's statement on the International Day of Epidemic Preparedness: <https://www.un.org/en/observances/epidemic-preparedness-day/messages>.
99. Leck and Roberts, 2015; Termeer et al, 2017, pp.562-570; Romero-Lankao et al, 2018b; Simon and Solecki, 2018; Perry and Russell, 2020; Patterson et al, 2021.
100. Rosenzweig et al, 2018, pp.xx, 607-8; Valencia et al, 2021, pp.3-4.