Chapter 6:

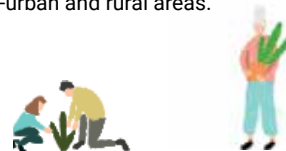## Urban Planning for the Future of Cities

Quick facts

1. While there was a significant drop in climate emissions during COVID-19 lockdowns, the numbers are rapidly increasing towards pre-COVID levels upon easing of public health restrictions.

2. Current urban planning approaches have achieved limited success in reducing urban inequality and achieving social inclusion, a trend that may persist in the future without appropriate intervention.

3. Indoor and outdoor spaces need redesigning or retrofitting to be more flexible and resilient to shocks, disruptions or pandemics looking into the future.

4. Compact cities are resilient to pandemics and a wide range of other shocks and threats.

5. Cities are strongly linked to their hinterlands; therefore, integrating urban-rural linkages in future urban planning approaches is key for the resilience of cities.

Policy points

1. Post-COVID recovery programmes should not only focus on economic recovery but also on social inclusion and climate action.

2. The importance of compact development, managed density and prevention of overcrowding in city resilience should be re-emphasized in view of rising concerns over overcrowding in cities during pandemics.

3. Cities should implement best practices and policy tools such as sustainable neighbourhood planning, the 15-minute city concept and sustainable urban mobility plans (SUMPs) that have been effective in making cities more resilient.

4. Safe, affordable, and reliable public transport systems are sustainable and should be integrated with active mobility.

5. There is an urgent need to focus on strengthening integrated urban and territorial planning approaches that consider interactions between urban, peri-urban and rural areas.

While trends project that rates of urbanization will increase in many parts of the world in the coming decades, unexpected events like the COVID-19 pandemic or the conflict in Ukraine also create unpredictability along that trajectory.[1] As such, preparing for multiple futures that still lead to sustainable and resilient cities able to accommodate rapid urban population growth is a major task that lies ahead of urban planners and decision-makers. How existing and new cities will be developed to accommodate nearly 2.5 billion new inhabitants will have major implications for the future of our planet and for achieving the Sustainable Development Goals. Currently, cities are responsible for more than 70 per cent of global energy consumption and associated greenhouse gas emissions indicating their significance in achieving climate change mitigation targets.[2]

As Chapter 5 highlighted, cities will also be at the forefront of climate change adaptation efforts in the coming decades. Additionally, cities are exposed to a wide range of natural disasters such as floods, extreme heat and sea-level rise. For instance, results of a recent report show that about 20 per cent of urban residents worldwide would be exposed to a 100-year flood, and more than 600 cities are likely to be completely inundated by a 100-year flood.[3] As the urban population in low-lying coastal areas grows, conditions may worsen in the coming decades if cities fail to plan resiliently. Alongside these challenges, cities are also struggling to overcome major inequality issues and provision of equitable access to services and resources to all urban residents.

The COVID-19 global pandemic emerged amidst these challenges and hit many cities hard, underscoring issues related to public health, urban planning and design, and municipal governance. The public health crisis revealed urban vulnerabilities, such as environmental pollution, deep

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social inequalities, inadequate and inequitable access to urban services, lack of integrated urban management, limited availability of public transportation infrastructure, and limited access to open and green spaces.[4] That many cities have struggled to appropriately plan, prepare for and manage the impacts of the pandemic is a clear indication of the inadequacy of current models and paradigms of urban planning and design that guide urban development in many parts of the world. As

pointed out in recent UN-Habitat reports, the outcomes of development processes guided by those models and paradigms do not align with the principles of social, economic, and environmental sustainability.[5] As a result, while cities have traditionally been centres of innovation and could be part of the solution to global challenges such as climate change, existing urban planning and development models seem to be inadequate for building sustainable and resilient cities.

The pandemic has provided an opportunity to reflect on urban planning and design principles and ideas that have been practised over the past several decades. This reflection is essential to understand what transformations are needed to streamline sustainability transitions and improve resilience to future pandemics and other stressors looming over cities such as climate change. The pandemic has questioned the fundamental principles of contemporary urban planning and has highlighted social, economic, environmental, and institutional problems that cities have been facing for decades in a new light. Further, it has shown that societies can act quickly and cities can change drastically if needed.

The period from 2020–2022 is not the first time that pandemics have hit cities. Public health crises have always played a significant role in the advancement of urban planning and policy as evidenced by events such as the 1858 Great Stink of London that resulted in sewer management, or the December 1952 smoke-laden fog that was the basis for the introduction and enactment of the 1956 Clean Air Act.[6] Indeed, it can be argued that previous epidemics and pandemics such as tuberculosis and the Spanish Flu prompted the birth of modern urbanism. Hygienic measures and non-pharmaceutical interventions such as wastewater treatment, waste management, sewage control, indoor air circulation and lighting, and building height-to-width ratio have emerged in response to such public health threats.[7]

While COVID-19 is not yet endemic and many aspects of the disease are still being explored, a lot of research on cities and the pandemic has been published since early 2020.[8] Now is the time to reflect on the impacts of COVID-19 on cities to understand their inherent vulnerabilities and draw lessons for building back in a better and more resilient way that ensures better coping, absorption and recovery capacities when confronted with future shocks. The pandemic has led to many changes to previously normal ways of living. While it is too early to say whether such changes are temporary or permanent, it can be argued that the pandemic will have significant implications for urban life and the way cities will be developed and managed in the future. Indeed, recent

Tyumen region, Russia. Aerial view of the residential area of the suburb of Nizhnevartovsk during the flood of 2015. © Vladimir Melnikov/Shutterstock

trends such as the accelerating uptake of smart solutions and technologies,[9] rapid adoption of teleworking, and flight from high-density inner-city neighbourhoods attests that there is a prospect for some major changes in the post-COVID era.[10]

The critical role of cities in dealing with global challenges and the need to revisit urban planning, design and management were already well-recognized before the pandemic. Since the landmark year of 2007, when the world's urban population exceeded the rural population for the first time, attention to cities has been growing steadily. This trend is manifested by the allocation of a separate chapter to cities and human settlements in the research of the Intergovernmental Panel on Climate Change since the Fifth Assessment Report in 2014 and agreements on several major international policy frameworks such as the New Urban Agenda, 2030 Agenda for Sustainable Development, Sendai Framework for Disaster Risk Reduction, Addis Ababa Action Agenda, and Paris Agreement on Climate Change, which all have specific relevancy to cities and their future. Amidst such initiatives and efforts to guide future urban planning and development, the pandemic has further highlighted the unsustainable current trajectories of urban growth and development and added a sense of urgency on the need to take concerted actions across different scales and streamline the global urban transition towards more sustainable futures.

The UN-Habitat reports *World Cities Report 2020* and *Cities and Pandemics: Towards a More Just, Green and Healthy Future* highlight how well-planned, managed and financed cities can create value. That value, in turn, can be harnessed for sustainable urban futures and provide the basis for local and regional actions that can be taken to facilitate a better and more sustainable recovery from the pandemic.

The critical role of cities in dealing with global challenges and the need to revisit urban planning, design and management were already well-recognized before the pandemic

This chapter builds on these efforts by focusing on some major planning-related issues that emanate from the recent crisis, namely the need for green, inclusive and sustainable recovery; retrofitting urban infrastructure to allow for safe social distancing when necessary; measures to promote the compact city; the need for sustainable neighbourhood planning and design; the significance of safe, affordable and reliable public transportation systems for the future;

and the importance of multi-level and integrated planning approaches that account for dynamic interactions across urban-rural interfaces. While there is a major emphasis on the pandemic, issues discussed in the chapter are not exclusive to it. Rather, other important challenges facing cities are also discussed, such as climate change. Additionally, the chapter avoids providing case-specific recommendations since context is important, and what can work in a specific city may not work elsewhere. Instead, the general ideas and principles discussed here will provide a basis for context-specific local actions that will enable cities to enhance their resilience to future pandemics and make progress towards achieving the SDGs.

6.1. Urban Planning for Sustainable and Inclusive Recovery

Modern urban planning has traditionally been aligned with state authority and highly influenced by market forces. Therefore, it has tended to favour economic growth and the needs of middle- and high-income people while largely failing to be socially inclusive and protect the environment. As a result, many cities are locked into undesirable and unsustainable models. While market forces are still dominant, some paradigm shifts towards more inclusive and sustainable urban development have been made in the past several years. However, urbanization in some developing countries has been so rapid that urban planning and infrastructure have not developed sufficiently to meet the demands of all urban residents in a sustainable and timely manner. Additionally, some countries lack the financial means to support sustainable infrastructure development for all.

The COVID-19 pandemic is a window of opportunity to evolve revisiting current urban planning paradigms and identifying shortcomings and areas that need improvement to inform a more green and inclusive recovery.[11]

6.1.1. Planning a decarbonized recovery
As arguments on the need for deep decarbonization continue to gain ascendancy, temporary dips in pollution during the early phase of the pandemic illustrate the beneficial outcomes of greening transportation systems and cleaning up heavy industries as discussed in detail in Chapter 5.[12] While lockdowns halted urban travel patterns abruptly for knowledge workers, the post-pandemic trend toward a hybrid model where office workers no longer come in five days per week has the potential to reduce peak travel demand and pollution. Furthermore, as will be further discussed later
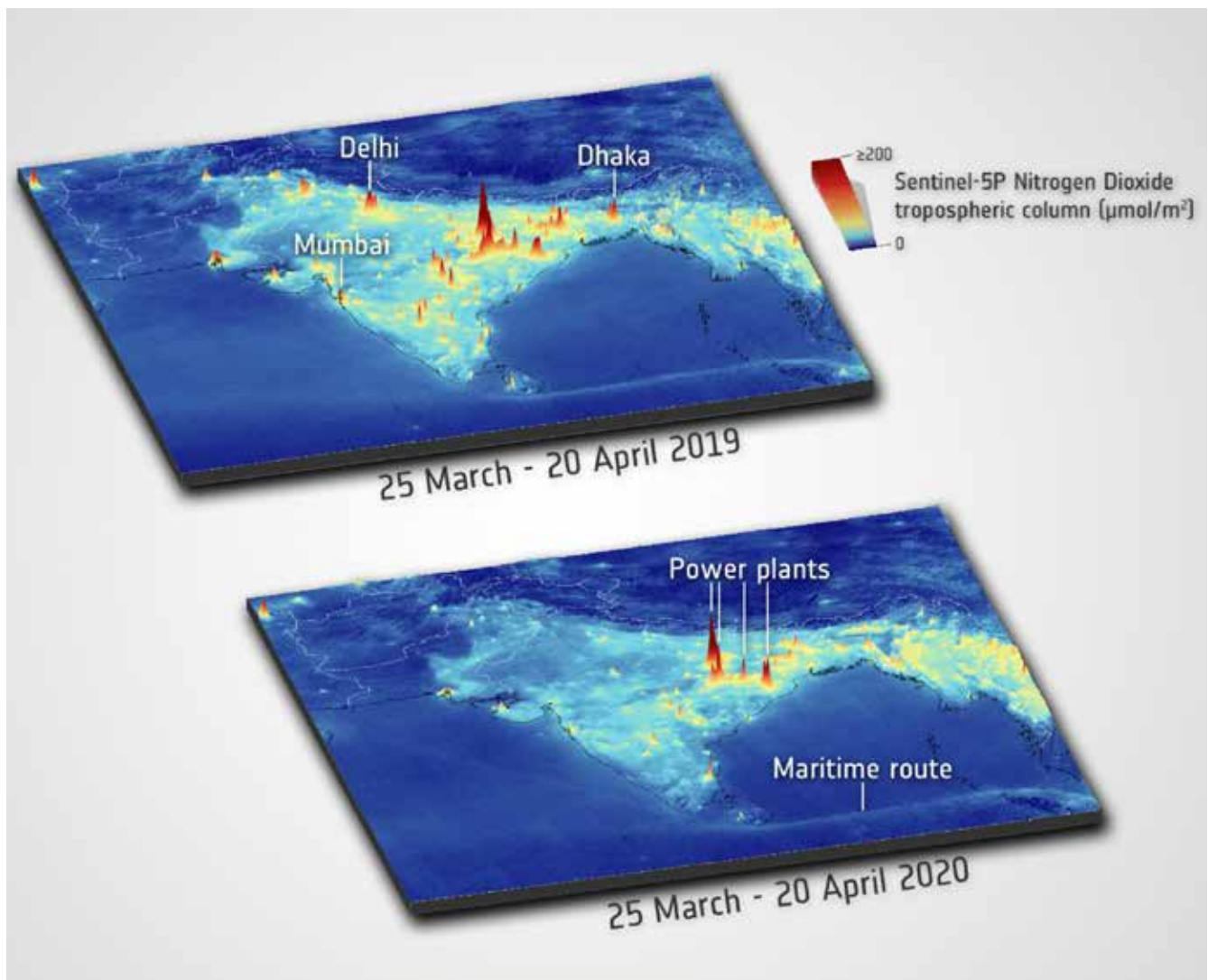
in this chapter, investment in and promotion of public and active transportation systems especially in cities should be prioritized. Such actions will enhance urban resilience to future adverse events and contribute to climate change adaptation and mitigation in cities.[13]

In response to the pandemic, many governments worldwide imposed lockdowns and mobility restrictions, the result of which were major improvements in air and water quality. Many cities around the world, especially those in developing countries such as China and India, reported unprecedented reductions in the level of airborne pollutants such as $PM_{2.5}$, PM_{10}, CO_2, NO_2 and SO_2. Declines were significant in cities that imposed lockdowns given the dominance of road transportation and associated emissions in urban areas (Figure 6.1).[14]

However, recent reports on the growth rate of carbon dioxide emissions post-lockdowns do not indicate an ongoing green recovery. As countries eased mobility and activity restrictions and return to pre-pandemic normal emissions increased rapidly (Figure 6.3, Figure 6.2 and Box 6.1) and even reached a record high level in 2021.[15] Either recovery packages are not prioritizing green growth, or the pandemic has caused delays in the implementation of some climate action plans.

Figure 6.1: Reductions in NO_2 concentrations over India following COVID-19 lockdowns

Source: European Space Agency, 2022.

Figure 6.2: Short-term comparison of PM$_{2.5}$ levels in major cities before, during and after lockdown restrictions imposed by governments at the beginning of the pandemic

Legend:
- Pre-lockdown (February-March 2020)
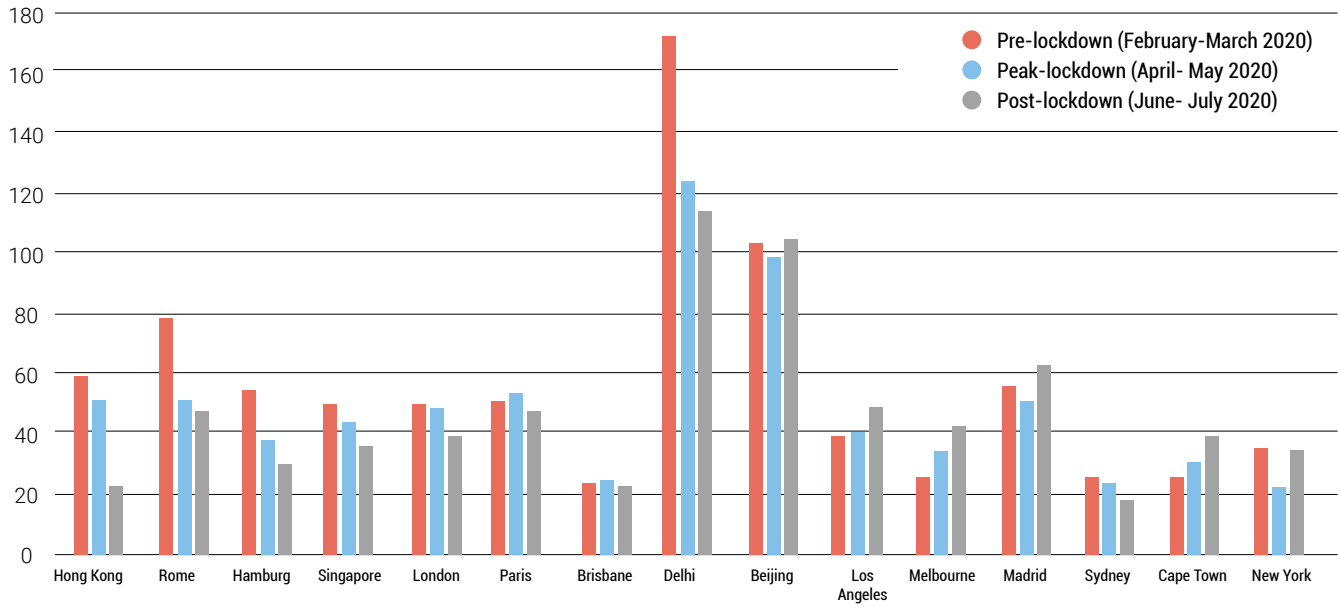- Peak-lockdown (April- May 2020)
- Post-lockdown (June- July 2020)

Figure 6.3: Temporary reduction in global greenhouse gas emissions during the first half of 2020 and rapid recovery in the second half

Source: UNEP, 2020.

Box 6.1: Global emissions almost back to pre-pandemic levels after unprecedented drop in 2020

Global CO_2 emissions from fossil fuels dropped by 5.4 per cent in 2020, compared to the previous year. But they are set to increase by about 4.9 per cent above 2020 levels in 2021, reaching 36.4 billion tonnes. The fast growth in emissions matches the corresponding large increase in energy demand as the global economy opens, with the help of US$17.2 trillion in economic stimulus packages around the world. CO_2 emissions from all fossil fuel types (coal, oil and natural gas) grew in 2021, with emissions from coal and natural gas set to grow more in 2021 than they fell in 2020. Emissions from global coal use were declining before the pandemic hit in early 2020 but they surged back in 2021. Emissions from global gas use have returned to the rising trend seen before the pandemic. CO_2 emissions from global oil use remain well below pre-pandemic levels but are expected to increase in the coming years as road transport and aviation recover from COVID-related restrictions.

Source: Canadell et al., 2021.

Based on such observations, experts working at the nexus of science and public policy urge leaders at all levels to align pandemic recovery plans and programmes with global, national and local climate action plans in order to minimize climate risks and provide co-benefits for health and equity.[16] One important lesson from the pandemic is that cities that have taken early actions to contain the spread of COVID-19 have been more successful in controlling outbreaks.[17] Drawing a parallel between public health measures and urban climate action, it can be argued that timely climate policy at the city level is essential to reduce the future costs associated with climate change adaptation and mitigation in cities and building resilience to pandemics.[18]

Experts working at the nexus of science and public policy urge leaders at all levels to align pandemic recovery plans and programmes with global, national and local climate action plans

Cities and Pandemics: Towards a More Just, Green and Healthy Future provides city stakeholders with guidelines for planned recovery towards sustainable cities. Cities are encouraged to build resilience to future shocks and stresses by investing in and transforming urban weak spots, both systemic (such as car-based movement systems) and area-based (informal settlements, suburban and peri-urban areas). Additionally, well-designed urban density, at a human scale that includes adequate facilities and functions to balance long-term social, economic and environmental sustainability, can enable a level of resilience to the impacts of pandemics without compromising liveability. Planning for transition away from automobile-oriented models with single land uses towards more pedestrian-oriented, mixed-use, diverse and

Planning for transition away from automobile-oriented models with single land uses towards more pedestrian-oriented, mixed-use, diverse and compact city plans will create more flexible and adaptive urban forms to respond to future pandemics

compact city plans will create more flexible and adaptive urban forms to respond to future pandemics.[19]

6.1.2 Planning a socially inclusive recovery

Major achievements were made in reducing the share of people living in extreme poverty following the implementation of the Millennium Development Goals. However, the reduction rate slowed down to only about 1.8 per cent between 2015 and 2019. In 2020, the pandemic exacerbated global extreme poverty for the first time in more than 20 years due to a combination of factors such as loss of employment, economic stagnation, and decreased remittance to low- and middle-income countries. This setback added about 120 million people to those living below the poverty line (Chapter 3). Furthermore, foreign direct investment in developing countries dropped by 8 per cent in 2020 compared with 2019.[20] Considering these impacts, many cities in vulnerable developing countries are likely to decide to prioritize economic growth. Under such circumstances, international cooperation in providing financial support to facilitate inclusive recovery is indispensable.

Previous pandemics have demonstrated that vulnerable groups such as ethnic minorities, the urban poor, women[21] and children are disproportionately affected, making it

difficult to contain the spread of infectious diseases in cities.[22] Despite this historical precedent, modern urban planning has achieved limited success in ensuring equitable distribution of resources, and profound inequalities have existed in cities for several decades. Most notably, close to 30 per cent of the world's urban population lives in slums or slum-like conditions.[23] Compliance with social distancing and hygiene guidelines recommended for containing the spread of the virus in such contexts is difficult, if not impossible.

Overcrowded environments are not conducive to social distancing. For instance, the average per capita floor area for 60 per cent of urban residents in India is about 6 square metres.[24] People living in slums are often cramped with limited or no access to clean water and sanitation. Consequently, slum dwellers face challenges in following hand-washing guidelines and contaminated water resources may also further increase the risk of pathogen spread. In addition to these issues, slum dwellers often have precarious livelihood conditions and cannot afford to stay at home during pandemics. In response to a growing volume of requests from both national and local governments to help them prepare for, prevent, respond to and recover from the COVID-19 pandemic in an equitable manner, UN-Habitat adopted a COVID-19 response plan focusing on city-level and community responses to the crisis (Box 6.2). These responses seek to empower local communities to harness local capacities in addressing their immediate challenges as more long term interventions are planned by decision-making stakeholders.

Pandemics have demonstrated that vulnerable groups are disproportionately affected, making it difficult to contain the spread of infectious diseases in cities

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Box 6.2: UN-Habitat expands COVID-19 prevention in Kenya's Mathare and Kibera informal settlements through youth-led groups

Nearly 5,000 school children in two informal settlements in the Kenyan capital are better protected against COVID-19 as a result of an UN-Habitat initiative to expand mask and recycling bins in those often-overlooked areas.

The three-week initiative in Mathare and Kibera informal settlements is in line with UN-Habitat's commitment not only to upgrade the quality of life in slums worldwide but also to ensure a more equitable distribution of resources to all citizens as a step toward providing more sustainable urban development.

The Youth-led COVID-19 Emergency Response initiative, in partnership with local governments, comes under UN-Habitat COVID-19 Response Plan adopted in April, 2020, which has as one of its main objectives as leveraging on experience, expertise and partnerships to deliver localized solutions. UN-Habitat has an extensive network of youth partners built up over its 20 years of programming with young people globally. Working with these partners on the ground, the organization brought together central and local governments, youth, communities and United Nations agencies to make the COVID-19 response impactful, especially with those in informal settlements and slums.

One key prevention method is masks. The most recent mask initiative facilitated the distribution of 6,577 surgical face masks to 2,226 students in seven schools in Mathare and 8,730 masks to 2,500 students in five schools in Kibera, for a total of 15,307 masks distributed to 4,726 students. To limit the environmental impact of disposable masks and promote economic empowerment among women, the elastic cords from the masks will be reused by women tailoring cooperatives. Along with the masks, recycling bins were also distributed to each of the schools.

The United States Centers for Disease Control and Prevention say students benefit from in-person learning and recommends universal indoor masking for all students.

Source: UN-Habitat, 2022b.

The nature of infectious diseases is such that no one is safe until everyone is safe. Consequently, reducing urban inequalities should be a priority in the post-COVID era. Equitable access to urban infrastructure and services, especially healthcare, has been an important determining factor in the ability of cities to respond to the pandemic effectively.[25] Post-COVID recovery should be equitable and inclusive while prioritizing the needs of vulnerable and marginalized groups, including ethnic minorities, urban poor, immigrants, refugees, women[26], children and those who are precariously employed or housed.

To seize the pandemic as an opportunity to reform our cities and build back better, it is essential to carefully assess the impacts on marginalized groups and ensure that they are engaged in current and future planning processes. Ensuring the engagement of diverse social groups in the planning process is necessary to develop inclusive and equitable plans that respect

The engagement of diverse social groups in the planning process is necessary to develop inclusive and equitable plans

the needs and demands of different groups and facilitate equitable access to urban services and amenities such as open spaces and health infrastructure. This approach, in turn, could contribute to better resilience against future threats.[27] Given the complexity of urban issues, post-pandemic recovery measures aimed at improving the accessibility of certain social groups to urban services should not undermine the accessibility of other groups. For instance, while as will be discussed in the next section, the need for better access to

green, open and public spaces has been observed in many cities, actions centred on increasing the share of such spaces should not negatively impact those who are employed in the informal sector and are reliant on public spaces for their livelihood. It is estimated that over 2 billion people across the globe are employed in the informal sector, and these people are the main users of streets and public spaces in developing countries contributing to the liveability and vibrancy of cities.[28] In Mexico, for instance, street vendors are an integral part of many cities, and more than 50 per cent of the working population is involved in informal economic activities. Response measures should take the rights of such groups into account.[29]

Measures aimed at general economic recovery should not worsen the living conditions of vulnerable groups. For example, recovery from the 2008 global financial crisis resulted in unprecedented growth in international urban tourism and led to the displacement of low-income residents from central neighbourhoods to peripheral urban areas as property owners converted housing into short-term holiday rentals. Housing advocates fear that returning to pre-pandemic patterns will result in gentrification by displacing the original residents that can no longer afford higher rents and further exacerbate the existing socio-economic and spatial inequalities in cities.[30] However, some municipal authorities took advantage of the pandemic pause in short-term rentals to plan for a better-regulated, more equitable future (Box 6.3).

Measures aimed at general economic recovery should not worsen the living conditions of vulnerable groups

Box 6.3: Regulating the short-term rental market

During a gloomy winter in a French capital subdued by the COVID-19 pandemic and missing its usual throngs of visitors, 30 Parisians logged on to a videoconferencing platform over 10 sessions to discuss a once contentious issue: short-term lets. Nearly six months before France would reopen to international tourists, the Citizens Conference on Furnished Tourism Accommodation had gathered to hear a range of perspectives and make a recommendation on one difficult question: to improve access to housing, should regulations on furnished tourism accommodation be stricter? And if so, how?

The Mayor of Paris called the public meeting because her administration had highlighted the growth in short-term lets as a culprit in the city's housing crunch. "Paris has been confronted for several years now with the frenetic development of these tourist rentals," said the deputy mayor for housing. "This development has come at the detriment of housing, that is to say we've seen housing turned into clandestine hotels."

These debates have been playing out in cities across a world that experienced a rapid rise in short-term lets during the 2010s, followed by a severe crash during the COVID-19 pandemic and an uncertain future as travel and tourism make an unsteady return. Tourism dollars are sorely missed where local authorities are grappling with ailing municipal coffers, but the spectre of a worsening housing shortage looms large. "Local governments need to find a middle ground between maintaining their cities' attractiveness to visitors while tackling housing inequalities, protecting long-term residential uses and quality of life," says a University College of London's Professor and lead author of a new study on European short-term lets published by the Property Research Trust.

The report analysed 12 European cities and found that in 2019, professional landlords (defined as renting a property for more than 60 nights a year) commanded the lion's share of Airbnb listings in several popular destinations like Prague, Lisbon, and Rome. In the latter two, over 80 per cent of listings appeared to consist of professional landlords and in all four of these European destinations, some two-thirds of listings could be traced to hosts with multiple properties on the platform.

Catching up has been a challenge for cities caught unawares by sophisticated technology platforms that have rapidly scaled up the number of short-term let listings before regulatory measures like licenses, taxes, and nightly limits have been put in place. Some cities have adopted a zone approach, like Montréal, Canada, which pushes short-term lets off quiet residential streets and onto arterial boulevards. Some cities have taken a tougher approach, with Barcelona, Spain, becoming the first major city in Europe to ban private room short-term rentals altogether.

Source: Scruggs, 2021.

Urban outmigration may intensify patterns of gentrification outside central cities and further exacerbate housing and wealth inequalities across the urban-rural continuum

Avoiding gentrification is essential to ensure that all urban dwellers' right to the city is respected, as elaborated[31] in Chapter 8. This aspiration can be achieved by adopting integrated planning mechanisms that address urban issues through systemic approaches, such as policies requiring the social function of property. Similarly, based on urban exodus trends observed in contexts as diverse as Hyderabad, India[32], and London, in the absence of measures to support existing residents of suburban and rural areas, urban outmigration may intensify patterns of gentrification outside central cities and further exacerbate housing and wealth inequalities across the urban-rural continuum.

6.2. Retrofitting Urban Spaces for Safe Social Distancing

The pandemic and associated guidelines for safe social distancing have transformed the way people perceive the built environment, especially building interiors. COVID-19 has prompted a rethinking of the human relationship to green, open and public spaces. It has increased the demand for multi-purpose and flexible spaces that can adapt to new situation, which is a major shift from traditional urban planning practices like single-use zoning that often overlook flexibility and adaptability. This section is focused on issues related to the retrofitting of indoor and outdoor spaces to allow for social distancing, a trend that has softened in 2022 but that may have lasting effects for commercial design. However, it should be mentioned that planning to retrofit urban infrastructure is also needed to futureproof against other adverse events like climate change impacts, seismic risks and terrorist attacks.[33] Furthermore, as insufficient indoor and outdoor spaces have been identified as risk factors to human distress during the pandemic, retrofitting indoor and outdoor spaces has also been linked to urban dwellers' health and well-being demands[34].

6.2.1. Retrofitting indoor spaces

Architects, interior designers, and facility maintenance managers have rushed to retrofit indoor spaces since 2020 both to improve ventilation as well as to accommodate changing work and lifestyle patterns that have led many urban dwellers to spend more time at home. Indoor residential environments are no longer only spaces for living, but also must accommodate other needs related to work and leisure. This sudden shift revealed the lack of versatility and flexibility of modern building design and indicated that changes in the design layout of buildings may be necessary[35].

Consequently, property analysts believe there will likely be long-term demand for adaptable residential designs that can accommodate the changing needs of citizens during emergencies such as pandemics (e.g. garages that can be turned into office space). This design preference will increase demand for suburban and peripheral housing stock with gardens, garages and off-street parking.[36] Such consumer demand away from dense, multifamily housing will cause affordability issues, and worsen economic inequalities given the difficulties prompted by the pandemic. As a result, wealth inequalities in society may further deepen as some will own multiple homes while others will find it challenging to own or rent a single home.[37]

Accordingly, developing policies and strategies to provide affordable housing should be further prioritized to mitigate housing inequality and its potential associated risks for public health. In this regard, lessons can be learned from successful examples such as the The Million Homes Programme implemented in Sweden in the post-war era.[38] Another risk is that increased interest in suburban and rural areas, with less population density and more flexible housing that can accommodate the need for working from home, may lead to new waves of suburban urban development.[39] As will be discussed later in this chapter, teleworking or remote work may undermine efforts to promote compact cities.
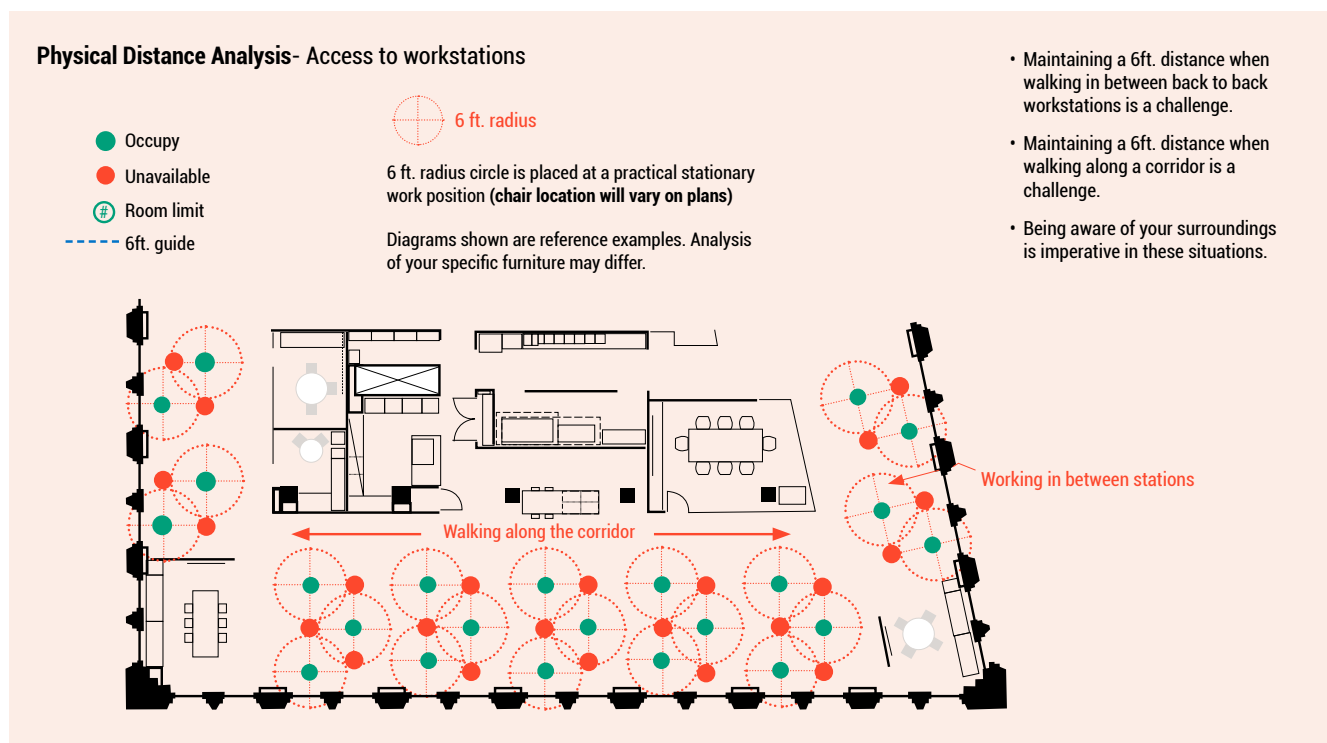
Affordable housing should be further prioritized to mitigate housing inequality and its potential associated risks for public health

During the peak of the COVID-19 pandemic, many temporary measures were taken to reduce contagion risk in indoor environments, such as separating upward and downward staircases, making shop aisles one way, limiting indoor occupancy and reducing elevator passenger loads. As the pandemic recedes, these regulatory responses are likely to recede, if they have not already, as they reduce the efficiency of indoor spaces. Other measures are more capital-intensive and thus will likely remain once installed, such as ventilation system upgrades, body temperature scanners and anti-microbial finishings.[40] However, these measures are costly and may not be affordable to all social groups.

The pandemic is also likely to transform the configuration of offices (Figure 6.4) and commercial spaces such as shopping malls. Regarding office spaces, measures mentioned above to avoid overcrowded indoor environments can be combined with further adoption and promotion of teleworking to allow for better social distancing and more economically feasible ventilation of indoor working environments. Survey results show that support for remote work has increased among both employers and employees after the pandemic. Teleworking also helps reduce transport-related energy consumption and associated GHG emissions and could facilitate social benefits such as job satisfaction and better work-life balance.[41] Additionally, reducing office size could provide opportunities for re-allocating the freed spaces to other purposes such as green and open spaces. However, telework should be combined with in-person work to maintain the innovation advantage inherent in cities and sustain the economies of central business districts, which provide jobs to small business owners and low-wage workers.

People waiting for a city bus as they are maintaining social distancing, Assam, India. © Talukdar David/Shutterstock

Figure 6.4: Guidelines for a safe return to the office during COVID-19

Physical Distance Analysis- Access to workstations

- Occupy
- Unavailable
- (#) Room limit
- - - - - 6ft. guide

6 ft. radius

6 ft. radius circle is placed at a practical stationary work position **(chair location will vary on plans)**

Diagrams shown are reference examples. Analysis of your specific furniture may differ.

- Maintaining a 6ft. distance when walking in between back to back workstations is a challenge.
- Maintaining a 6ft. distance when walking along a corridor is a challenge.
- Being aware of your surroundings is imperative in these situations.

Working in between stations

Walking along the corridor

Source: Harrouk, 2020

Over the past few decades, large indoor shopping malls and hypermarkets have become common in many cities. The temporary disruption of the COVID-19 pandemic has shuttered some malls, although as the pandemic recedes shoppers have returned to these large indoor spaces. Moreover, these facilities are typically owned by well-capitalized property firms that have adequate balance sheets to withstand a downturn. However, the pandemic-era consumer preference for outdoor spaces has helped the fortunes of open-air shopping centres and traditional high streets and commercial corridors.[42] Neighbourhood-oriented mixed-use development can offer opportunities for the revival of such shops. Evidence based on perception surveys in Istanbul shows that due to concerns over the effectiveness of artificial ventilation in shopping malls, some customers are likely to avoid such privately-owned public spaces in the future and shift to traditional shopping streets.[43] This trend presents an opportunity to revive neighbourhood shopping streets as welcoming public spaces that contribute to local economies, facilitate social interactions, cultivate a sense of community, encourage walking and cycling, and reduce travel demand and associated GHG emissions.[44]

Urban planners should support neighbourhood shopping districts with easier permitting, permission to use sidewalks and streets to extend storefronts, street beautification efforts and support for business improvement associations, where enabling legislation allows. Neighbourhood retail faces headwinds from online shopping, which saps urban vitality and contributes to congestion through increased delivery vehicles. New property uses like ghost kitchens, which prepare meals for delivery but do not drive foot traffic, should be regulated closely so that they do not occupy prime commercial real estate.

6.2.2. Retrofitting outdoor spaces (green, open and public)

As evidenced by SDG 11, the need for adequate provision and universal access to safe green, open and public spaces was already recognized before the pandemic. The New Urban Agenda highlights the profound roles that multi-functional green, open and public spaces such as streets, pedestrian spaces, cycling networks, squares, parks and green spaces can play in driving economic development and contributing to human health and well-being. The pandemic brought about more desire for green, open and public spaces, which is likely to change the distribution patterns of such spaces in the coming years. Many argue that the pandemic will have significant implications for the way urban residents will see and use green, open and public spaces in the future.[45] This preference is likely to increase the demand for such spaces, leading to urban form and landscape changes.

New Urban Agenda highlights the profound roles that multi-functional green, open and public spaces can play in driving economic development and contributing to human health and well-being

Effective strategies to ensure continuous use of parks and open spaces by citizens are critical for maintaining their mental and physical health. Outdoor physical activity is essential for healthy child development, avoiding cardiovascular and respiratory diseases, reducing obesity rates and building children's social and emotional skills. During lockdowns many people were alienated from their work and leisure places as well as from other people, which heightened stress and anxiety among urban residents. Results from a survey completed by people from nine countries show that contact with nature and green spaces is essential for overcoming depression and anxiety during lockdown periods.[46]

Despite this benefit, in many cities around the world, use of such spaces was largely restricted during the pandemic. Better design measures, allocating more space to parks and improving accessibility are critical to avoid similar conditions in the future.[47] As will be further discussed later in this chapter, the pandemic has increased interest in active transportation like cycling and walking. This change offers an unprecedented opportunity to restructure cities in such a way that more space is devoted to developing cycling and pedestrian infrastructure. It will allow better opportunities for compliance with social distancing during future respiratory pandemics and provide spaces for further social activities and social interaction that could strengthen resilience. Further, it will have co-benefits for health and climate change mitigation.

Following the increased interest in active transportation, the global movement to reconfigure streets making them more pedestrian- and cyclist-friendly has gained considerable momentum (Box 6.4).[48] More cities should seize this opportunity to start transforming urban environment, including streets. and open and public spaces. Indeed, it should be acknowledged that streets should not just be allocated to cars and need to be reconfigured in a people-centred manner. In so doing, careful attention to the principles of resilient urban

During lockdowns many people were alienated from their work and leisure places as well as from other people, which heightened stress and anxiety among urban residents

Street re-allocation to ensure social distancing in London
Source: (https://www.cnbc.com/2020/05/06/coronavirus-uk-social-distancing-set-to-transform-london-sidewalks.html)

Box 6.4: Scaling up safe street designs in Addis Ababa

Like many low-and middle-income countries, Ethiopia is confronted with a very high road-related fatality rate, with 26.7 road deaths per 100,000 inhabitants recorded each year, according to WHO data. In comparison, high-income countries have an average of 8.3 road traffic deaths per 100,000 people. Death rates from traffic crashes are higher in Africa than anywhere else.

In Addis Ababa, pedestrians and cyclists represent more than half of road users and about 80% of all road victims. Building safe and inclusive walking and cycling infrastructure is crucial to reduce road injuries and mortality.

Since May 2019, UN-Habitat, supported by the United Nations Road Safety Fund and in partnership with the Institute for Transportation and Development Policy (ITDP), the Ethiopian Ministry of Transport, the Ministry of Urban Development and Construction, the Federal Transport Authority and the Addis Ababa Transport Bureau, with support from other national, international and local agencies, have partnered on the Scaling Up Safe Street Designs in Ethiopia project to help the authorities tackle this key road safety challenge.

The project has now reached its completion, delivering results and impact which have exceeded all its initial goals. The project provided technical support to local and national government officials in their ongoing efforts to design, install and upgrade footpaths and bicycle lanes and corridors, supported by the harmonization of street design guidelines. Based on this expertise, the project partners provided technical review assistance to the design of ongoing infrastructure projects, and promoted and co-organized street-level activities to raise awareness around the importance of walking and cycling for all, and road safety issues.

The project resulted in the adoption of a Non-Motorized Transport Strategy for Ethiopia and Addis Ababa, and a five-year implementation plan for 69 cities and towns with harmonized street design guidelines guiding investments in safer facilities for walking and cycling. The Strategy emphasizes the need to consider all residents in the plans and budgets, including women, children, and persons with disabilities.

Source: UNECE, 2021b.

The global movement to reconfigure streets making them more pedestrian- and cyclist-friendly has gained considerable momentum
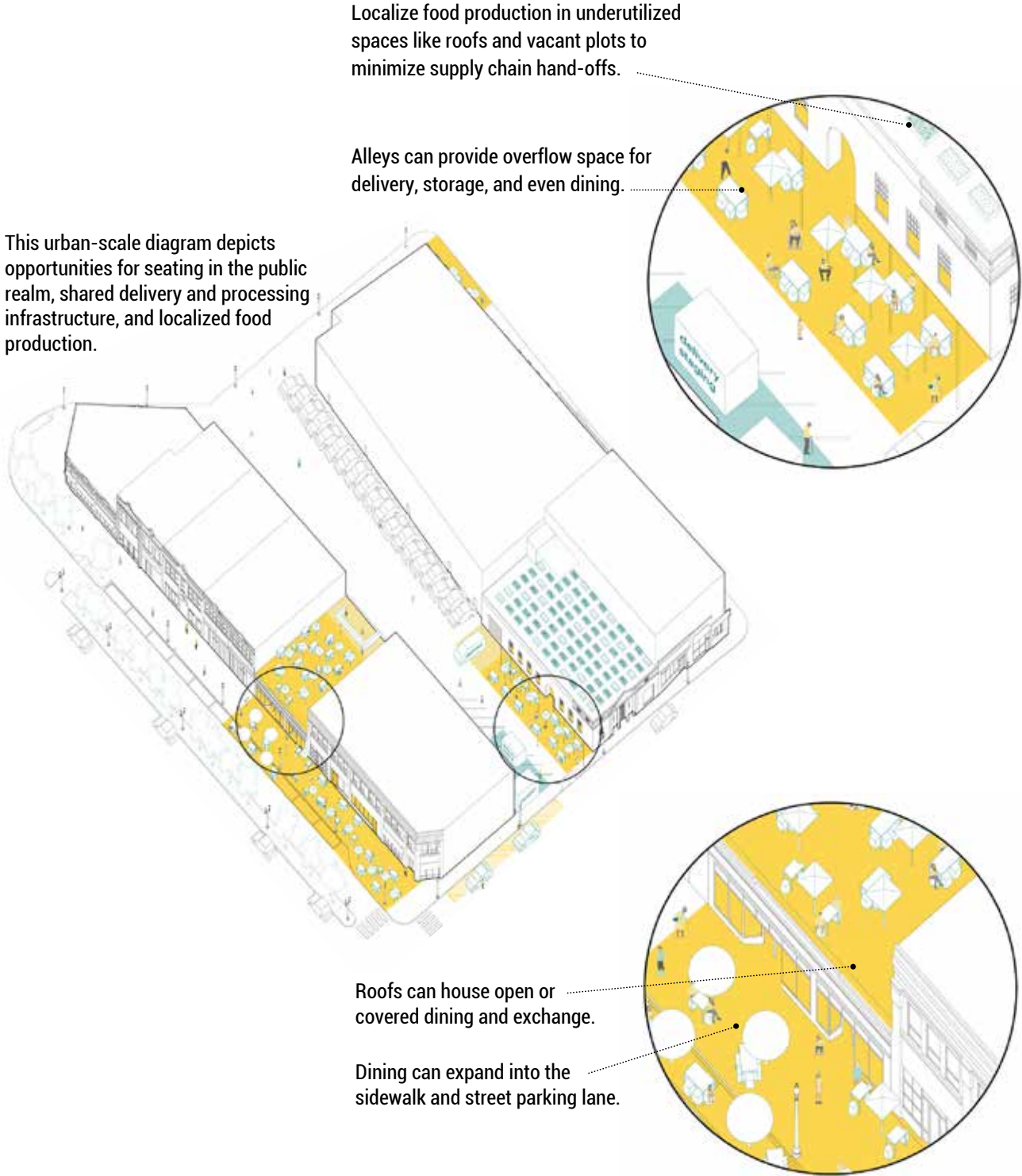
form should be made to ensure designing open and public spaces in a redundant, multi-functional, and flexible manner that allows adaptability to various types of adverse events.

Ample provision of open and public spaces increases urban flexibility and resilience. Such spaces can be converted into sites for artistic activities, outdoor dining, temporary shelter or medical emergency sites during adverse events.[49] For instance, during the recent pandemic large-scale open and public spaces were converted into makeshift hospitals in Wuhan, China. Open and public spaces have also been used for similar purposes in other countries like Japan. Such practices and other measures based on the principles of tactical urbanism can be used to enhance the resilience of urban form.[50]

Integrating green infrastructure into the design of streets and other public spaces is an effective way to enhance their flexibility and multi-functionality. Indeed, creating networks of green areas and open spaces will allow better responses to future pandemics while also providing co-benefits like climate change adaptation and ecological restoration. Networks of blue and green infrastructure can also buffer and regulate interactions between humans and wildlife, reducing the risk of zoonotic diseases.[51] But planning for this type of infrastructure requires a change from business-as-usual practices, which historically defer to hard infrastructure in order to solve urban development challenges. Major barriers are limited funding and expertise, maintenance costs, and inadequate support from local governments.

To ensure that green infrastructure networks can contribute to transformative solutions for better urban futures, these barriers should be overcome by, among other things, better engagement of different stakeholders for co-design and

Figure 6.5: Spatial strategies for restaurants in response to COVID-19

Localize food production in underutilized spaces like roofs and vacant plots to minimize supply chain hand-offs.

Alleys can provide overflow space for delivery, storage, and even dining.

This urban-scale diagram depicts opportunities for seating in the public realm, shared delivery and processing infrastructure, and localized food production.

Roofs can house open or covered dining and exchange.

Dining can expand into the sidewalk and street parking lane.

Source: MASS Design Group, 2020.

Repurposing open space to set up emergency treatment centres in Saitama Japan
Source: https://www.japantimes.co.jp/news/2021/09/05/national/coronavirus-japan-temporary-treatment-sites/)

co-implementation of projects, knowledge production and capacity building, and using assessment and monitoring tools for objective communication of the benefits.[52] Urban residents' recent interest in green spaces provides a key opportunity to garner support for the extension of green infrastructure networks, which could help overcome some barriers.

One important issue that needs to be considered when reconfiguring green, open and public spaces is that they should be designed and distributed properly so that physical accessibility for all social groups, including children and youth, women, older persons, and people with mobility restrictions, can be guaranteed. Planning for marginalized populations avoids taking response measures that will exacerbate the living conditions of vulnerable groups. For instance, allocating more space to walking and cycling could negatively impact the accessibility of other groups such as essential workers who need rapid mobility. Such essential workers are often from low-income and marginalized groups who cannot work from home. Therefore, street reallocation programmes should be implemented so as not to exacerbate inequality.[53]

A recent study conducted in Seattle, US; Washington, D.C., US;, and Vancouver, Canada, demonstrates that such initiatives have been implemented in neighbourhoods home to recent immigrants, low-income families, people with disabilities and racial minorities. Therefore, while temporary reallocation is helpful for meeting resident needs during the pandemic (e.g. social distancing and daily exercise), their permanent implementation should be analysed through an equity lens.[54]

6.3. Promoting Compact Urban Development

The adoption of the New Urban Agenda in 2016 codified a global vision of compact urban development that would check unplanned urban expansion and so-called suburban sprawl. Such development patterns became common with the advent of the automobile and have led to a number of adverse consequences. This land-intensive pattern contributes to environmental degradation, deforestation and habitat loss. By engineering long distances between work, home, commerce, school and leisure, dispersed urban development leads to social isolation, less physical activity and increased

Creating networks of green areas and open spaces will allow better responses to future pandemics while also providing co-benefits like climate change adaptation and ecological restoration

GHG emissions per capita. Serving fewer residents with the same amount of roads, sidewalks and utilities leads to higher public cost burdens to maintain infrastructure. Allowing more affluent residents to wall themselves off in gated communities or distant suburbs defined by exclusionary single-use zoning engenders socio-spatial segregation and worsens social cohesion.[55] Finally, in the wake of the COVID-19 pandemic, urban development that encroaches on wild places increases the risk of exposure to zoonotic diseases.[56]

New Urban Agenda in 2016 codified a global vision of compact urban development that would check unplanned urban expansion and so-called suburban sprawl

There are now concerns that the COVID-19 pandemic could result in a new wave of suburbanization due to perceptions of higher contagion risk in high-density areas, the need for more space to fulfil work and leisure needs during lockdowns, and the accelerated trends of remote working that reduce the need to commute to central business districts. Expensive mega-cities in land-rich countries saw population loss as some residents moved to ensure better access to open and green spaces and avoid overcrowded urban life.[57] While it is still too early to say whether these trends are temporary or people will start to move back to big cities as the pandemic slows down, there is an urgent need for urban planners to examine the performance of compact cities during the pandemic and take necessary actions to ensure that compact cities will not lose their appeal.

6.3.1. Density (population, housing, built environment) and public health

Concerns over the role of density in the spread of contagious diseases date back decades. The link between population density and public health was one of the main themes of the First International Congress for Sanitation and Housing Health Safety held in Paris in 1904. Studies in the past have shown an association between infectious disease mortality (tuberculosis) and housing density as social distancing is challenging in poorly designed, high-density areas that could lead to overcrowding.[58] Research results reported on the association between density and the number of COVID-19 cases and death are inconclusive. Some studies have shown an overlap between population density and COVID morbidity and mortality rates in countries such as China, Iran and Chile.[59] However, in most cases there is no compelling evidence that density is a risk factor.[60] Similarly, there is no strong evidence suggesting that larger cities are more vulnerable. Comparing mortality rates in different cities shows that except for some outliers, there is no special relationship between city size (population) and mortality rates.[61]

Overall, existing evidence on the association between built environment factors and COVID-19 infection/mortality rate shows that density and city size per se are not influential factors and their impacts are mediated by other socio-economic, contextual, and behavioural factors such as income, social structure, degree of connectivity, quality and distribution patterns of urban infrastructure, and the extent of compliance with social distancing and hygiene measures.[62] For instance, while people in a poor neighbourhood of a compact city are likely to be vulnerable due to the lack of access to infrastructure, limited floor area, and the difficulties of compliance with stay home and social distancing measures, those who live in better-off neighbourhoods with better access to infrastructure and can afford staying at home during lockdown periods are less likely to be vulnerable.

In many parts of the world (both developed and developing countries), low-income areas have been hit harder by the pandemic. In New York, for example, mortality rates in low-income neighbourhoods were about two times higher than those in better-off neighbourhoods. This discrepancy could be explained by the fact that low-income households live and work in smaller spaces, making it more difficult to observe social distancing rules. In addition, their precarious livelihood conditions make it difficult for them to stay home for a long period.[63] There is ample evidence suggesting that housing inequality has made it difficult to control the spread of the pandemic in cities such as Mumbai, India. In crowded slums and informal settlements, households have limited access to adequate infrastructure, are deprived of basic services such as clean water and sanitation, and are exposed to high levels of indoor and outdoor air pollution. These conditions make them more vulnerable to infectious diseases and cause challenges for following protective measures such as social distancing and practicing good personal hygiene.

Housing inequality may become further exacerbated during pandemics or other adverse events, resulting in higher rates of unemployment and sluggish housing supply, reducing housing affordability. Accordingly, urban planners should develop policies and strategies to provide affordable housing in order to mitigate housing inequality and its potential associated risks for public health.[64]

Connectivity is another mediating factor that can play an important role. Some have argued that connectivity has

Dealing with adverse events such as the pandemic is particularly challenging in slums. A sense from Santa Marta favela in Botafogo, South Zone of Rio De Janeiro, Brazil © Shutterstock

played a larger role in the initially higher rate of pandemic spread in larger and more dense cities rather than city size or density. Such cities are often characterized by a large network of connections with other cities locally, regionally and internationally, leading to more human interactions and the spread of the virus at higher rates.[65]Accordingly, early actions to restrict mobility or taking measures to ensure safer mobility could be effective in reducing contagion risk in such dense areas.

Generally, suburban areas proved to be less resilient to adverse events due to limited accessibility to emergency and response services.[66] Similarly, the lack of healthcare and medical services in low-density suburban areas could indeed

Housing inequality may become further exacerbated during pandemics or other adverse events, resulting in higher rates of unemployment and sluggish housing supply, reducing housing affordability

make them more vulnerable to pandemics. This hypothesis is supported by evidence showing that the mortality rate from infectious diseases such as flu is higher in suburban and rural areas than in urban areas, which offer better access to medical services and higher rates of compliance with public health measures.[67]

6.3.2. Re-emphasizing the need for compact urban development

Overall, urban planners should make the case that well-designed and well-managed compact cities featuring characteristics such as equitable distribution of infrastructure and services, mixed uses, walkable access to open and green spaces, and support to vulnerable residents during adverse events (e.g. economic support packages, and delivery of food and basic services) are safe and not more vulnerable than low-density suburban or rural areas.[68] Considering that certain levels of compactness are needed to support economies of scale, minimize unregulated intrusion in ecosystems, and facilitate other sustainable urban development measures such as multimodal transportation, it is imperative to regain public confidence in compact urban form.

Well-designed and well-managed compact cities are safe and not more vulnerable than low-density suburban or rural areas

Even as public health fears diminish, the accelerated trends of teleworking, decreased demand for commercial office space and less investment in urban regeneration due to potential decline in inner-city property markets are other likely threats to the future of compact cities.[69] According to global research, 65 per cent of people have been working from home, and around 50 per cent of those plan to continue remote working post-pandemic.[70] To ensure that compact cities do not lose their appeal amidst such transformations, these changing trends and potential decline in land values could be seized as an opportunity to provide affordable housing in inner-city areas.[71] However, measures should be taken to ensure such areas' economic and social vitality. As already practiced in cities like San Francisco (Box 6.5), amending zoning regulations to facilitate the flexible design of outdoor spaces, redesigning streets and open spaces in a more people-centric manner, and promoting micro-mobility options could be effective in helping compact cities emerge more liveable and affordable in the coming years.[72]

6.3.3. Sustainable neighbourhood planning and the 15-minute city

What makes a city compact are its constituent parts: neighbourhoods. Neighbourhood planning and regeneration has been a major concern for urban planners and designers

Velib shared bicycles in Paris, France © Shutterstock

since the early 20th century.[73] Indeed, neighbourhood planning has been the major focus of various urban planning concepts and movements such as garden cities, neighbourhood unit, traditional neighbourhood development, transit-oriented development, smart growth, urban village, New Urbanism, and ecological urbanism. These over 100 years of efforts have been successful in delineating the underlying principles and characteristics of sustainable neighbourhood planning and design. There is now consensus

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Box 6.5: **San Francisco makes four Slow Streets permanent**

San Francisco launched the Slow Streets programme in April 2020 amid the pandemic, ultimately closing 31 streets to through traffic and giving residents safe spaces to walk, bike and socially distance. People living on the streets and emergency vehicles still have access. The San Francisco Municipal Transportation Agency (SFMTA) later voted to keep four Slow Streets beyond the COVID-19 emergency order, starting the process to determine which of the city's streets will permanently remain pedestrian friendly.

Multi-block stretches are the first corridors the board decided will welcome cyclists and pedestrians for the long-term. Design measures have been taken in the four streets to improve safety. Wayfinding signs and crosswalks are planned and new vehicle turn restrictions are slated to reduce through traffic, for example.

SFMTA is evaluating all Slow Streets "for a post-pandemic future" to develop a network of pedestrian- and bicyclist-friendly corridors that lasts beyond the pandemic. The process includes surveying residents who live within a quarter mile of a slow street and collecting pedestrian, bicycle and vehicle counts.

Source: Graff, 2021.

Adequate provision of green, open and public spaces; efficient design of streets and street networks; appropriate levels of density; land use mix; and social mix are elements conducive to developing neighbourhoods

that sustainable neighbourhoods should have a certain level of density, be inclusive and socially mixed, follow principles of mixed-use development, allow walkable access to daily needs, feature a well-designed network of streets and open/green spaces, promote modularity and the circular economy though integration of renewable energy technologies as well as green infrastructure systems that minimize resource consumption and facilitate recycling. Such neighbourhoods are expected to be climate resilient and offer co-benefits in terms of equity and justice.[74]

Context-specific conditions make it difficult to recommend prescriptive standards and design measures. However, there is consensus that attention to measures such as adequate provision of green, open and public spaces; efficient design of streets and street networks; appropriate levels of density; land use mix; and social mix are elements conducive to developing neighbourhoods that can contribute to addressing urbanization challenges such as inequality, congestion, biodiversity loss, urban sprawl and inefficient resource consumption.[75]

More detailed and context-specific measures and standards have been recommended in an increasing number of design frameworks and assessment tools developed to guide sustainable neighbourhood planning and design. For instance, Leadership in Energy and Environmental Design for Neighbourhood Development (LEED-ND) is a US designation that governs standards for various neighbourhood planning and design factors such as smart location and linkage, neighbourhood pattern and design, and green infrastructure and Buildings. While LEED-ND has been mainly developed to promote neighbourhood regeneration and curb urban sprawl in the United States, it has also been used in other countries that lack their own framework.[76] In addition, the Building Research Establishment Environmental Assessment Methodology (BREEAM) and the Communities and Comprehensive Assessment System for Built Environment Efficiency (CASBEE) for urban development are other widely known frameworks that originated from the United Kingdom and Japan, respectively.[77] '

Design standards introduced by these frameworks are context-specific and may not be applicable to all contexts without customization. While much of the future world urban population growth will occur in the cities of developing countries, they often lack their own context-specific neighbourhood design standards, which could result in undesirable neighbourhood development patterns, directed by market forces.

Despite the vast body of knowledge on sustainable neighbourhood planning principles, there is still a mismatch between the theory and practice of sustainable neighbourhood planning.[78] This mismatch has been further highlighted during the recent pandemic when in most cases, neighbourhoods failed to respond to resident needs during the mobility restriction periods. COVID-19 has, therefore, further revealed the need for better accessibility to amenities at the neighbourhood scale. In addition to mobility restrictions, during pandemics and other adverse events, lack of accessibility to essential services and amenities such as neighbourhood health centres, pharmacies and supermarkets could affect the quality of life of residents, particularly those that do not own private vehicles. The importance of neighbourhood medical centres for conducting timely primary response measures (e.g. screening) has been demonstrated in countries such as the Republic of Korea.[79] In the absence of such neighbourhood-based facilities, municipal and regional health centres could be overcrowded, as has been observed in Italy.[80] This will undermine their performance and capacity to test and treat patients. Additionally, overcrowding may lead to the further spread of the virus.[81]

Neighbourhood planning based on the principles of walkability, cyclability, accessibility, mixed use, and compactness and through integration of green infrastructure can provide multiple co-benefits for health, equity, and climate change adaptation and mitigation. The pandemic highlighted the need for walkability and access to green and open spaces. There is evidence suggesting that compact and well-designed neighbourhoods increase physical activity, thereby contributing to health improvements such as reducing obesity.[82] Urban agriculture can also provide better access to healthy food, especially in so-called "food deserts" that lack such access.[83]

Many of the benefits of sustainable neighbourhood planning have been repackaged since 2020 under the banner of the 15-, 20- or 30-minute city. The concept, applicable to both existing and new developments, advocates for neighbourhood
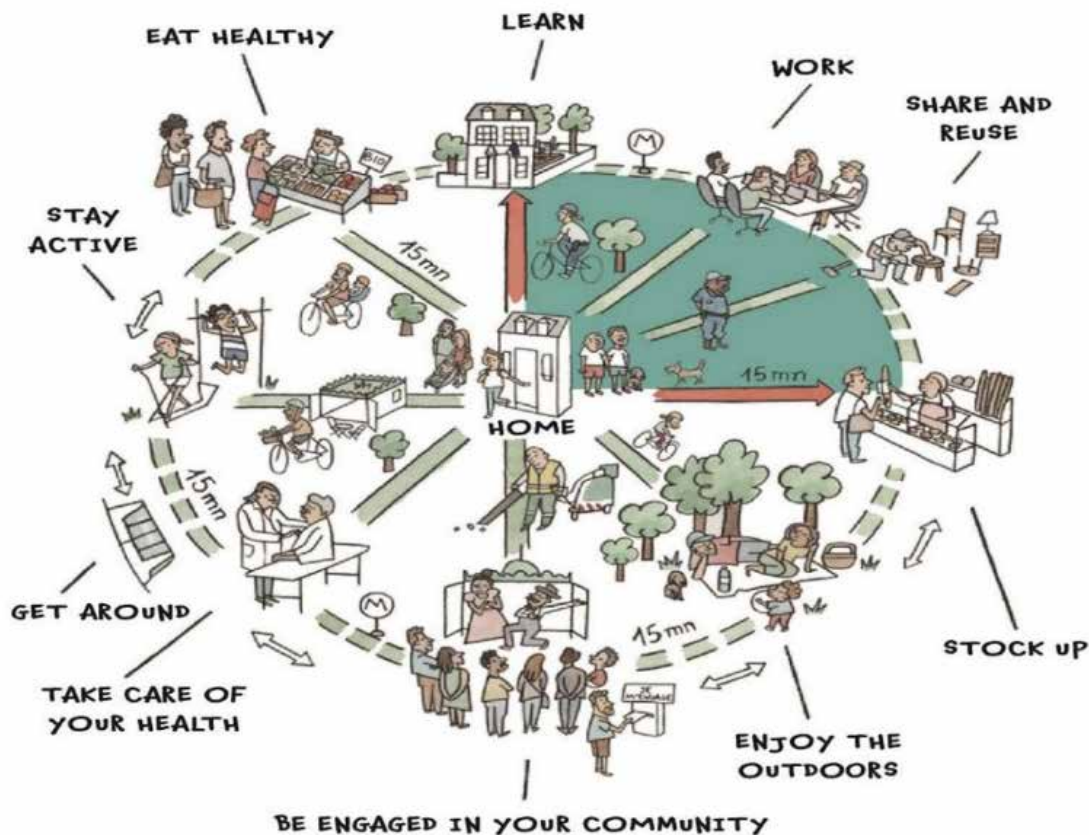
design that allows residents to meet most of their daily needs within a fixed timeframe by foot or bicycle. Paris popularized the 15-minute city (Figure 6.6). Melbourne, Australia, and Portland, US aspire to the 20-minute city (Figure 6.7). Adding public transport to the mix, Sydney promotes the 30-minute city model. While the nomenclature is new, the underlying idea of a 15-, 20- or 30-minute city is not completely new and builds on previous ideas and movements described at the beginning of this section that emphasize walkable, self-contained, and mixed-used neighbourhoods that mix working, living and leisure. The 15-minute neighbourhood design allows for decentralized cities with a more polycentric

Neighbourhood planning based on the principles of walkability, cyclability, accessibility, mixed use, and compactness and through integration of green infrastructure can provide multiple co-benefits for health, equity, and climate change adaptation and mitigation
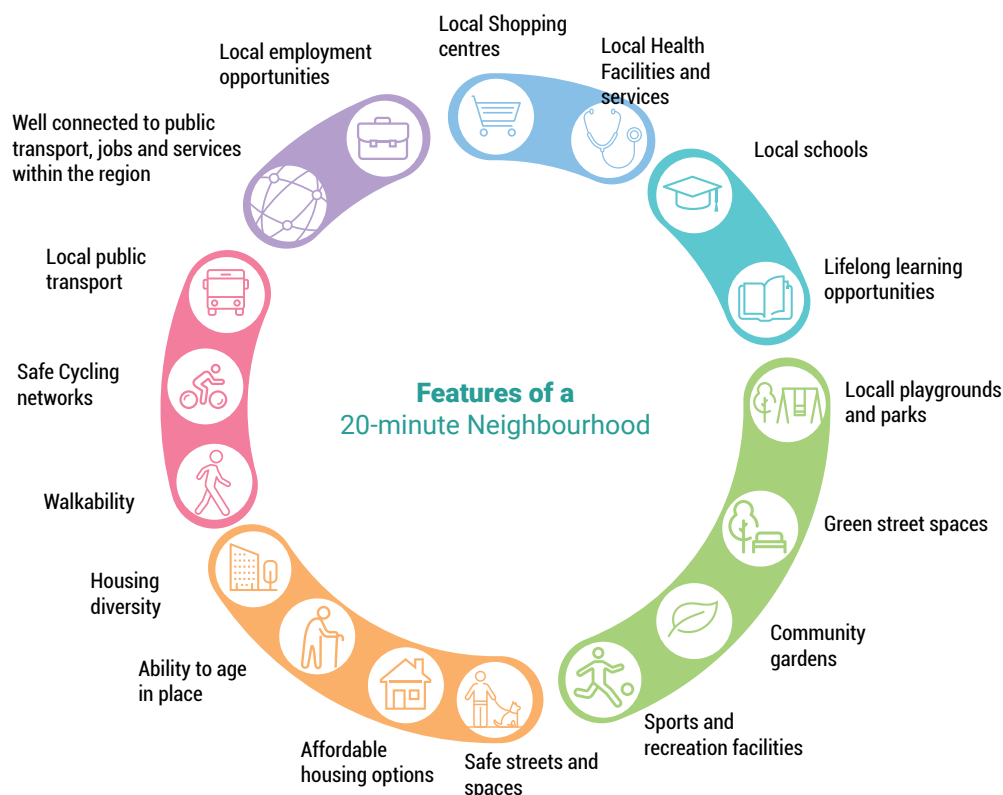
structure. Such patterns enable better resilience to adverse events. For instance, centralized wholesale food markets proved ineffective during the pandemic when accessibility was limited due to mobility restrictions.[84]

While the concept of a 15-minute city is promising, the idea is yet to be fully investigated in real-world contexts. The history of urban planning indicates that similar utopian visions like the garden city model have had limited success in solving societal issues due to their failure to consider the multiple forces that shape cities. Planners should learn from previous movements and take smart measures to ensure that 15-minute neighbourhoods do not exacerbate spatial inequalities in cities by becoming enclaves for wealthy urbanites segregated from the overall urban structure. Another important issue is that planners and policy-makers should not adopt the concept without considering the context-specific conditions of cities. Each city has unique characteristics, which should be duly considered when planning 15-minute cities.

Figure 6.6: The 15-Minute Paris

Source: Nigudkar, 2021.

Figure 6.7: Representation of the 20-minute neighbourhood in the Melbourne Plan

Local employment opportunities

Well connected to public transport, jobs and services within the region

Local public transport

Safe Cycling networks

Walkability

Housing diversity

Ability to age in place

Affordable housing options

Safe streets and spaces

Local Shopping centres

Local Health Facilities and services

Local schools

Lifelong learning opportunities

Locall playgrounds and parks

Green street spaces

Community gardens

Sports and recreation facilities

Features of a
20-minute Neighbourhood

Source: State Government of Victoria, 2022.

6.4. Planning for the Future of Public Transport Systems

Safe and convenient access to public transportation is one of the indicators of sustainable development, as highlighted in SDG 11.2. The importance of safe, affordable, and reliable public transport systems for sustainable development and equitable participation of all social groups in urban activities has also been underlined across the New Urban Agenda. Accordingly, many efforts to promote public transportation have been made in recent years. The pandemic, however, is reshaping urban transport and, due to its impacts, mobility options are likely to be dramatically changed in the future.
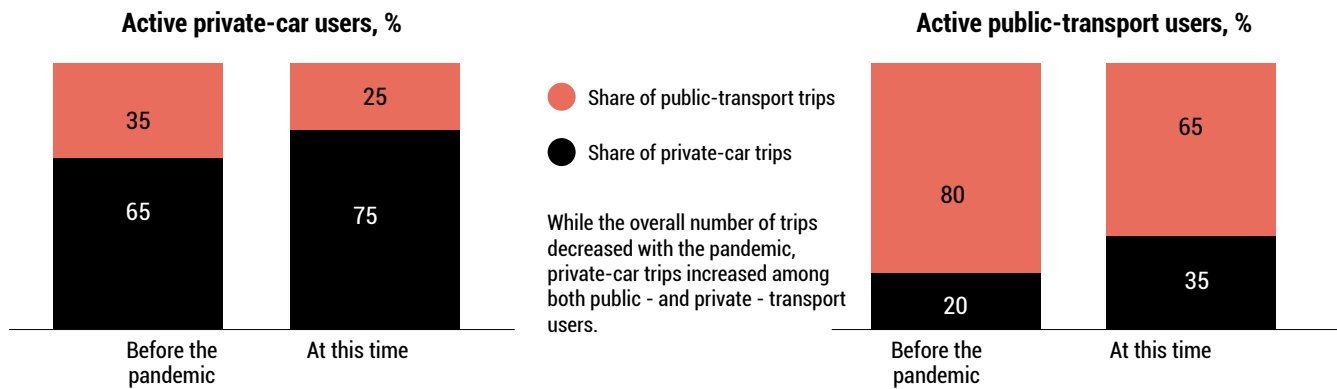
6.4.1 Implications of transportation trends during the pandemic

Public transport has been recognized as an essential service during the COVID-19 pandemic as it ensured the mobility of essential workers. It helped to guarantee access to services for many people around the world. However, due to concerns over the safety of public transport and the ability of knowledge workers to work remotely, transit ridership experienced an all-time low since 2020.[85] Declines were particularly significant during the lockdown and depressed ridership figures have persisted even as restrictions have been lifted (Figure 6.8). According to the International Association of Public Transport (UITP), many governments actively discouraged the public from using public transport. This complete reversal from decades of efforts to promote public transport impacted urban mobility patterns. Evidence now shows that public transport can be "COVID-safe" when measures recommended by health departments are implemented accordingly.[86] But as public transit ridership declined, two major trends emerged. One is increased car dependency and the other, growing interest in active mobility modes such as walking and cycling.

In some countries like India, car dependency increased since the emergence of COVID-19, and people formerly interested in active and public transportation shifted towards private cars.[87] These trends show that in the absence of safe, affordable, and reliable public transportation systems, the future of urban mobility could continue to be dominated by private motorized vehicles. If this scenario emerges, it

Figure 6.8: Impacts of COVID-19 on public transit ridership between 2020 and 2021 in a 25-city research

Active private-car users, %

	Before the pandemic	At this time
Share of public-transport trips	35	25
Share of private-car trips	65	75

● Share of public-transport trips

● Share of private-car trips

While the overall number of trips decreased with the pandemic, private-car trips increased among both public - and private - transport users.

Active public-transport users, %

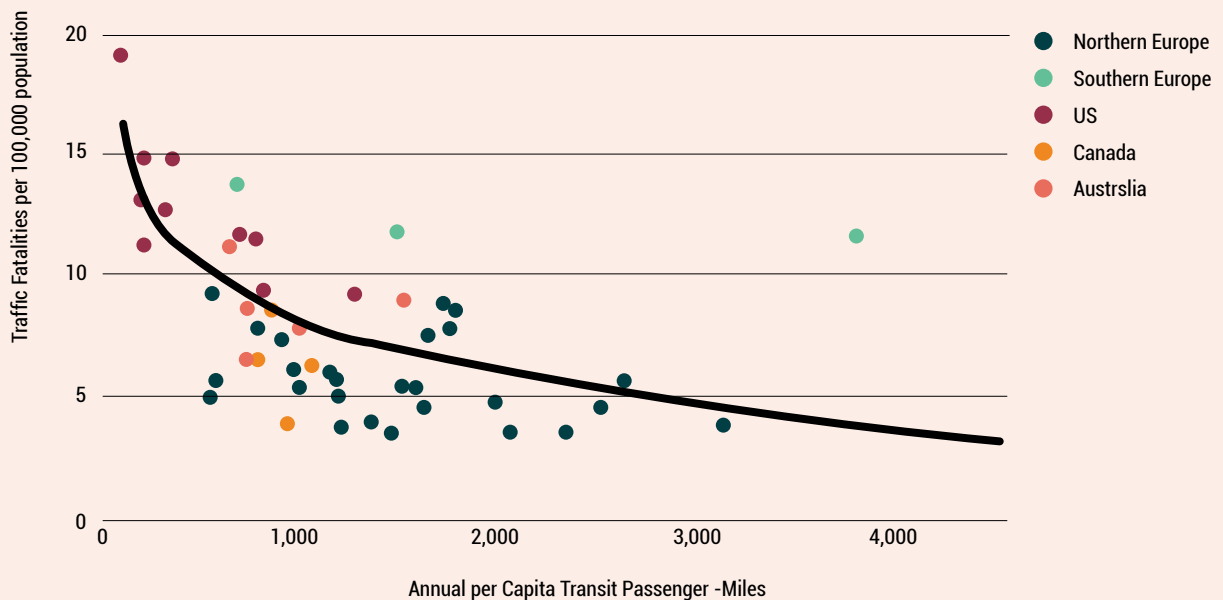|	Before the pandemic	At this time
Share of public-transport trips	80	65
Share of private-car trips	20	35

Source: Checulin et al., 2021.

will have major implications for climate change mitigation and could exacerbate already challenging issues such as air pollution, congestion, and road safety. Productivity loss due to congestion is already estimated to be about 1 per cent of global GDP.[88] Dependence on private vehicles and associated congestion also leads to other issues such as traffic accidents and health impacts associated with air pollution (Figure 6.9).[89] Evidence shows that cities with efficient and modern public transport systems are safer and have less road fatalities as compared to car-oriented cities.[90]

Figure 6.9: The link between traffic fatality rates and public transport ridership

Table 1 -In places where public transport ridership is high, traffic fatalities are low
The link between traffic fatality rates and public transport ridership is especially strng in larger cities

Legend:
● Northern Europe
● Southern Europe
● US
● Canada
● Austrslia

Y-axis: Traffic Fatalities per 100,000 population
X-axis: Annual per Capita Transit Passenger -Miles

Source: Moglia et al., 2021

Given those statistical dynamics, sustaining public transport while ensuring walking and cycling access is vital for avoiding a spike in traffic fatalities, addressing climate emergencies, and improving equity as the urban poor may not be able to afford private vehicles. It is estimated that about 80 per cent of the total vehicle kilometres travelled are made by about 10 per cent of the global population.

About 80 per cent of the total vehicle kilometres travelled are made by about 10 per cent of the global population

Most of the world's population only rarely travel by car.[91] To retain confidence in public transport, a combination of measures is necessary such as enhancement of accessibility and reliability standards, modernization of business models and public-private partnerships for public transport operations, the introduction of tax increases on private vehicles and incentive packages for transit use, improvement of hygiene standards, and use of high-efficiency particulate air filters and better ventilation techniques.[92] While overcrowding was a recurring pre-pandemic concern on public transport, travel demand has been reduced through the adoption of flexible working arrangements that allow both teleworking and working at the office.[93]

While overcrowding was a recurring pre-pandemic concern on public transport, travel demand has been reduced through the adoption of flexible working arrangements that allow both teleworking and working at the office

The second major transportation trend brought on by the COVID-19 pandemic is increased momentum for active transportation. When urban residents were discouraged from riding public transport, many turned to walking and cycling. With less motorized traffic, urban planners responded nimbly by creating additional spaces for these activities as well as other purposes such as eating at outside restaurants in a widespread implementation of a technique known as "tactical urbanism."[94] This quick action was necessary, and cities must act fast in order to build on the momentum and drive lasting transformation in urban mobility in the post-pandemic era.

The tactical urbanism implementation modality during COVID-19, in which bicycle lanes were literally installed overnight, provides great insights on the needed response partnerships between city governments, civil society and private sector.

Lima, Peru, with a high population of informal workers who make their livelihood in public spaces, established 50 km of emergency cycle lanes early in the pandemic to facilitate safe urban mobility. By late 2020, the city pushed to make the infrastructure permanent and in June 2021, the Ministry of Transport and Communication of Peru accelerated the approval of national legislation that promotes and regulates the use of the bicycle as a sustainable mode of transport.[95] In this regard, actions such as redesigning streetscapes and reallocating underutilized spaces to provide protected cycling and pedestrian lanes, promoting bicycle ownership and cycling infrastructure, and expanding smart bike-sharing programmes to facilitate synergistic benefits are recommended.[96]

When bicycles were difficult to find in stores, cities like New York with robust bike-sharing programmes saw substantial increases in use. As public transport ridership recovers, integrating bike sharing with mass transit could provide opportunities to further reduce reliance on private automobiles and taxis for last-mile connections and lead to more low-carbon transportation.[97] Evidence from Boston, US, shows that bike-sharing reduces car ownership per household by over 2 per cent, per capita vehicle miles travelled by more than 3 per cent and GHG emissions per capita by about 3 per cent.

Bike-sharing is found to be one of the most resilient transportation modes. For instance, while subway ridership has not returned to pre-COVID levels in many cities like New York, data shows that bike-sharing ridership returned to normal soon after mobility restrictions were eased.[98] However, to enhance its effectiveness, bike-sharing systems should cover all parts of cities, including low-income areas, and offer affordable pricing.[99]

As the need for private automobiles will not go away immediately, the promotion of shared mobility (car-sharing) is an effective strategy to reduce emissions. Further uptake of shared, electric and autonomous vehicles through so-called "mobility as a service" schemes are also recommended to ensure seamless connectivity, multimodality and innovation in the transport sector. Simultaneously, a shift towards renewable energy is also pivotal to reducing the sector's reliance on fossil fuels.

Integrating bike sharing with mass transit could provide opportunities to further reduce reliance on private automobiles and taxis for last-mile connections and lead to more low-carbon transportation

To enhance its effectiveness, bike-sharing systems should cover all parts of cities, including low-income areas, and offer affordable pricing

Guided by the New Urban Agenda, cities must align their transport, climate, energy and urban development plans to achieve both the Sustainable Development Goals and the Paris Agreement commitments.

Overall, there is a need for a paradigm shift toward human-centric and environmentally friendly mobility options. Currently, the transport sector accounts for about one-quarter of global energy-related CO2 emissions and air pollution kills about 7 million people annually of which a large number can be traced to pollution from vehicular traffic.[100] Road traffic accidents also kill about 1.3 million people every year.[101] The world urban population is projected to reach 6.68 billion by 2050, up from 4.2 billion in 2018. If private vehicles fuelled by non-renewable energy sources remain the dominant mode of transportation by then, the number of cars on streets is likely to reach about 2 billion vehicles,[102] with significant implications for socioeconomic and environmental sustainability and climate change mitigation.

To avoid this scenario and accelerate the transition of sustainable urban transport, future mobility options should move away from the private car and rather focus on a strong multimodal public transport system that comprises good facilities for walking and cycling and share mobility options. The increased environmental awareness and interest in active transportation driven by the pandemic along with advances in technologies that provide alternative mobility options such as smart bike-sharing, or shared and electric mobility, or mobility as a service (MaaS), provide opportunities to lure people away from reliance on private automobiles and towards active transportation, shared mobility and public transit.[103]

6.4.2. Sustainable Urban Mobility Plans (SUMPs)
To achieve these goals, cities can adopt sustainable urban mobility plans (SUMPs) to guide short- and long-term mobility planning and involve stakeholders in the process.[104]

Future mobility options should move away from the private car and rather focus on a strong multimodal public transport system that comprises good facilities for walking and cycling and share mobility options

They are widely used by local authorities to access funding in India, Brazil and France. *Sustainable urban mobility planning, specifically, is a strategic approach to transport planning that focuses on the mobility needs of people and businesses in cities following three principles: integration, participation and evaluation.*[105] Municipal governments use SUMPs to shift investments from infrastructure development prioritizing people's and businesses' mobility needs. SUMPs help prioritize low-cost measures alongside capital-intensive projects in plans suited to the specific urban needs of each city. SUMPs may also be practical tools to align urban goals with those set up at the regional and national levels.

The main objectives of SUMPs are to ensure access to transport services for all, improve safety and security, reduce pollution and energy consumption, improve efficiency and cost-effectiveness of the transport system and contribute to the attractiveness and quality of the urban environment.[106] The emphasis of SUMPs is on interdisciplinary dialogues that enable participation in transport decisions, expanding the range of long-term goals of transport planning, and incorporating key challenges such as wellbeing, nature conservation, and equity (Figure 6.10).
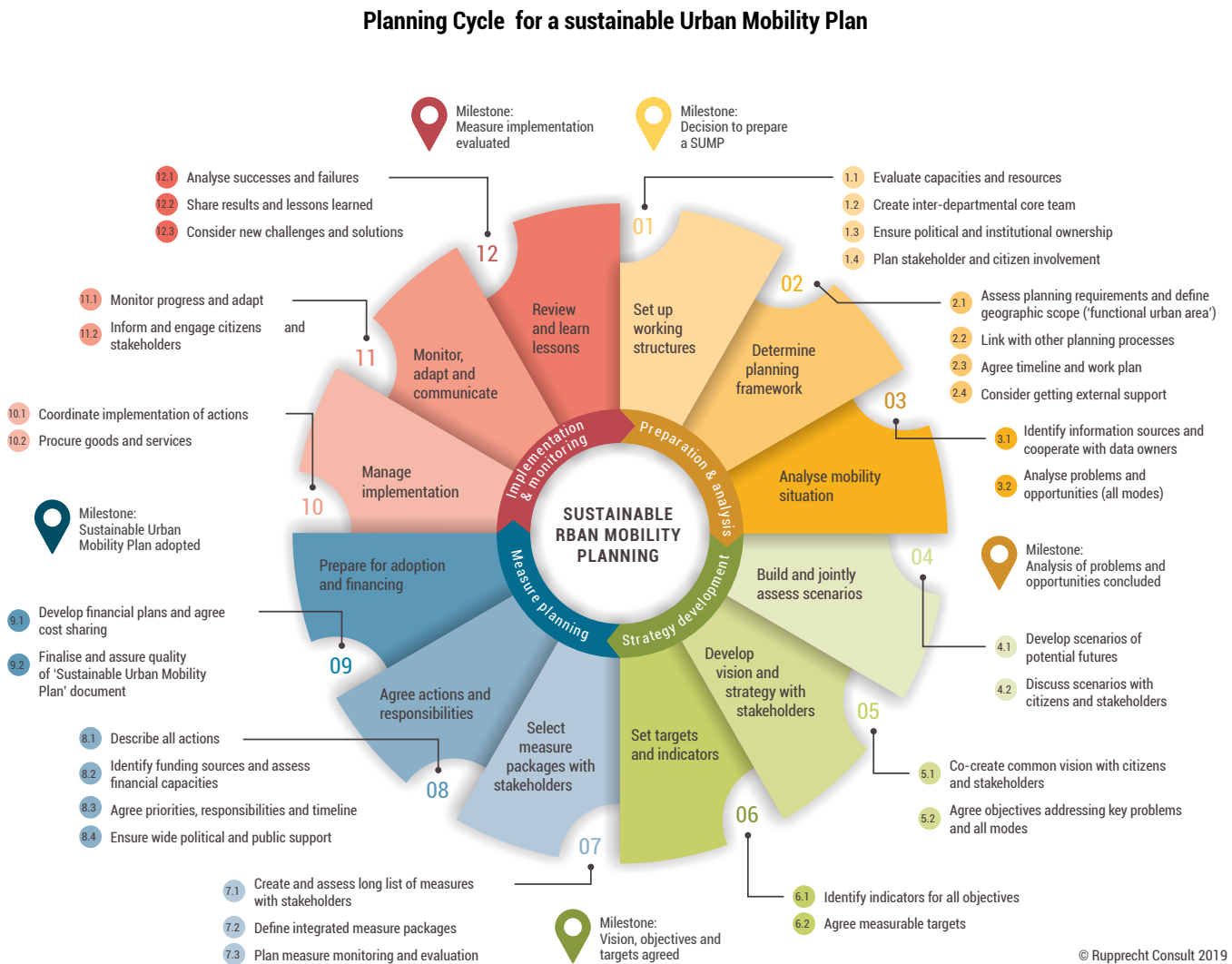
SUMPs benefit from quantitative and qualitative information on responses to modifications in transport supply and demand,[107] user preferences, mobility needs and existing practices. User surveys and focus groups to collect data also serve as engagement exercises, helping a wide range of stakeholders inform SUMPs. Scenario planning processes integrate information and support the development of planning strategies. The main challenges are ensuring disaggregated data collection that includes data on different groups' mobility needs and practices, developing scenario validation methods, and facilitating the participation of a broad set of stakeholders.[108]

6.4.3. Avoid-Shift-Improve
The Avoid-Shift-Improve (ASI) framework summarizes general practical lessons from experiences on sustainable urban mobility. The ASI framework focuses on three interventions:

- AVOID: disincentivize polluting private vehicles and unnecessary trips

- SHIFT: encourage active travel, shared mobility, or public transport

- IMPROVE: facilitate technological and institutional improvements in the current system

Figure 6.10: Sustainable Urban Mobility Planning

Planning Cycle for a sustainable Urban Mobility Plan
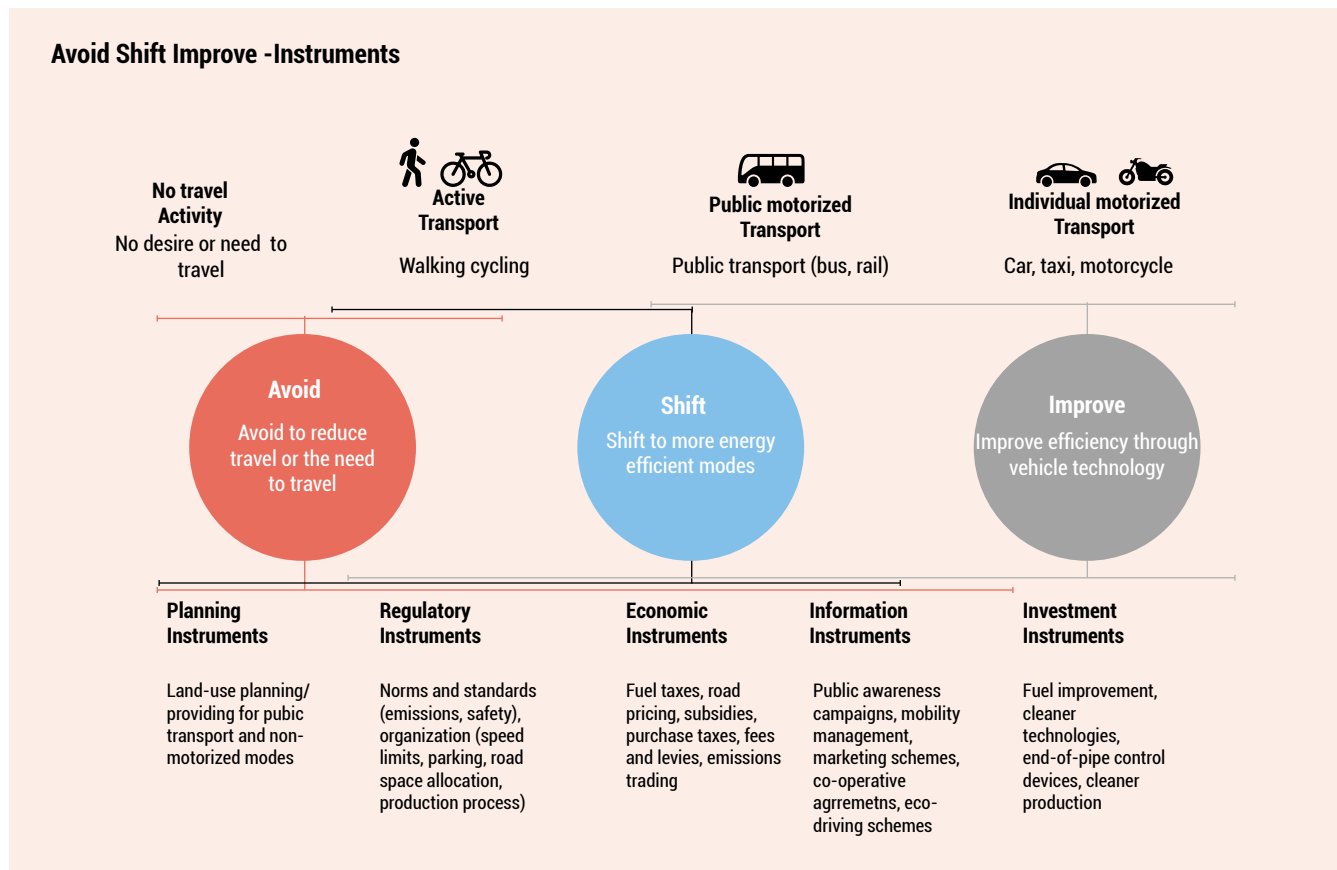

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Source: Rupprecht Consult, 2019.

A detailed analysis of the impacts of each action is also needed. For example, a shift in public transport may have different components, including low-carbon public transport using waterways, electrified road or rail infrastructure, and bikes for local deliveries. The COVID-19 pandemic has called for rethinking the future of public transportation as more people have turned to more remote activity and less travel. Where shifts are not possible in the short term, improving existing options may be the most immediate answer for decarbonization, for example, investing in electric vehicles. However, changing technologies alone will be insufficient to achieve net-zero without significant impacts on people's well-being and mobility needs. As the framework shows,

Avoid and Shift measures may have lower costs and a range of positive co-benefits (Figure 6.11).[109]

Urban planning can mobilize transport planning tools such as congestion charging, road closure, transport provision, creation of cycles lanes and pedestrianization. Land use and urban form are essential elements that enable or hinder the possibilities for sustainable transport and mobility.[110] In its 2013 report Planning and Design for Sustainable Urban Mobility: Global Report on Human Settlements, UN-Habitat advocated for a "conceptual leap" in transport planning: Rather than focusing on extending infrastructure and encouraging people's movements over long distances,

Figure 6.11: Examples of instruments under an Avoid/Shift/Improve framework

Source: Transformative Urban Mobility Initiative (TUMI), 2019.

the report argued for bringing people, places, and activities closer together. These ideas are not new but have regained traction in proposals to facilitate the recovery from the COVID-19 pandemic.[111] The Avoid-Shift-Improve framework exemplifies the need to move beyond specific tools, to integrate action across policy domains and facilitate placemaking interventions that support the integration of different activities in proximity (housing, employment, education, leisure and entertainment) and reduce the need to travel.

6.5. The Importance of Spatial Scales and Analysis for the Future of Urban Planning

Cities do not exist in isolation. In addition to being connected to the global markets, they have strong ties with their hinterland areas. They are always dependent on other cities and rural areas in their hinterland to provide urban services and commodities and multiple types of ecosystem services.

Accordingly, trade, species, humans, and other actors and elements constantly flow in and out of cities in dynamic and non-linear patterns. Further, urban agglomerations, where several cities are closely interrelated and function as integrated economies, are common in many parts of the world.[112] The high density of internal connections between cities in such agglomerations provides multiple benefits for establishing a strong local economy.

However, such high connectivity levels may have implications for resilience as shocks and disruptions in one part of the system could rapidly spread to the other parts. For instance, water contamination at the point source in rural areas can have major implications for urban residents living in downstream locations;[113] or, loss of connectivity between cities and their hinterland areas could lead to supply chain disruption. Accordingly, since the urban-rural interface is highly interconnected, planning processes for urban and rural areas should not occur in isolation from one another. Urban planning should instead consider issues that cross official municipal boundaries.[114]

6.5.1. Urban-rural interlinkages and pandemics

International policy frameworks like the SDGs and NUA emphasize the need for multi-level governance, regional coordination and integrated approaches that acknowledge interactions between urban, peri-urban, and rural areas. Despite these frameworks, urban-rural interlinkages are often overlooked in urban planning and decision-making practices. This oversight has resulted in major problems such as degrading ecosystem services and encroachment on natural habitats.

Urban-rural interlinkages are often overlooked in urban planning and decision-making practices

Unregulated peri-urban development that increases human interaction with other species may increase zoonotic diseases through virologic mutation, as observed in many rapidly urbanizing countries of Asia, such as China and Vietnam.[115] Virologists have argued that the convergence of three processes, namely, urbanization, agricultural intensification and habitat alteration has increased the emergence and spread of infectious diseases. For instance, evidence suggests links between emerging infectious diseases and rapid urbanization in China and other rapidly urbanizing developing countries. In other words, rapid urbanization has triggered and accelerated the spread of infectious diseases. It is estimated that about half of zoonotic diseases that emerged since 1940 could be linked to periods of major forest loss and habitat encroachment.[116]

In rapidly urbanizing contexts that are going through land use transition in peri-urban areas (from agricultural to urban), effective siting decisions need to be made to, in addition to minimizing negative impacts on natural ecosystems, regulate the human-livestock interface and ensure their comingling does not lead to "host-jumping and pathogen spread among humans."[117] In addition to mitigating environmental impacts, regional interventions that manage and regulate urbanization, agricultural intensification and habitat alteration processes through land-use planning and spatial planning can reduce the risk of human exposure to zoonotic agents, thereby facilitating more effective control of virus transmission and contagion risks. Regional planning

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Unregulated peri-urban development that increases human interaction with other species may increase zoonotic diseases through virologic mutation

approaches allow planning to play its role as a preventative tool (in contrast to biomedical approaches that are mainly focused on responses).[118]

Adopting a regional and territorial approach means acknowledging that cities are socio-ecological systems, and their management requires integrated approaches instead of silo-based ones.[119] For this purpose, in some contexts, regional and territorial planning has been utilized.[120] However, the current planning systems based on political or administrative boundaries often do not lend themselves to the proper consideration of dynamic interactions between urban and rural settlements that are nested within an integrated spatial network. It is, therefore, suggested that planning system boundaries should be determined based on community and/or functional criteria. While defining functional boundaries could be challenging in some contexts due to data limitations, readily available data from satellite imagery and population grids can be used to develop standardized methods for defining functional boundaries.[121]

Adopting a regional and territorial approach means acknowledging that cities are socio-ecological systems, and their management requires integrated approaches instead of silo-based ones

Ensuring proper planning in such a functionally-defined system requires adopting a multi-level governance system that can coordinate activities across different types of human settlements.[122] Instead of fragmented systems where each city operates in isolation, in integrated governance systems, networks of cities are formed, and dynamics and impacts beyond individual municipal boundaries are taken into account in planning and decision-making processes. Multi-level governance that facilitates cooperation across scales also contributes to achieving the New Urban Agenda's objectives and enhances socio-economic and environmental values of sustainable urbanization, as is explained in the World Cities Report 2020.[123]

6.5.2. Food systems and resilience

While multi-level governance involves multiple issues, the food supply chain offers a tangible example. The issue of food security and cities' dependence on their hinterland provides a strong justification for promoting multi-level governance systems. While cities can meet part of their food needs through urban agriculture, they will remain dependent on their peri-urban and rural areas and international supply chains to ensure food security. Adverse events such as

its abilities to strike a balance between regional dependency and local self-sufficiency (Box 6.5) and to foster and strengthen collaboration among different local governments and stakeholders.[126] Having collaborative networks is critical for community resilience against different shocks, including pandemics. CRFS also provides multiple benefits for sustainability. It contributes to enhancing availability and accessibility to quality locally grown food, thereby providing health benefits; helps protect the ecosystem by nurturing soil and improving watershed management; strengthens the local economy by increasing money recirculation with the region; and increases social capital by providing more opportunities for interactions and collaboration between different stakeholders.[127]

Overall, for cities to be more resilient against pandemics and other threats, multi-level governance approaches and coordinated policies and actions across different scales and sectors are needed. Such approaches facilitate better management of the transitional spaces between urban and rural areas and can enhance efficiency, minimize conflicts and trade-offs, and maximize co-benefits and synergies between different measures and strategies.

While cities can meet part of their food needs through urban agriculture, they will remain dependent on their peri-urban and rural areas and international supply chains to ensure food security

pandemics can result in food insecurity in cities due to food processing, distribution and delivery disruptions. Multi-level governance at the regional scale is needed to respond to such disruptions and engage multiple actors and stakeholders in planning for better regional resilience. Such multi-level governance will ensure improved management of interlinkages and interdependencies among different settlements in a city-region.[124]

Based on the principles of multi-level regional planning and governance, the Food and Agriculture Organization (FAO) has proposed the City-Region Food Systems (CRFS) approach that provides opportunities to address challenges "inherent to the industrial capital-driven food system" that can result in supply chain disruptions and food insecurity during adverse events (Figure 6.12).[125] Key features of CRFS are

Figure 6.12: The City-Region Food Systems (CRFS) approach

Source: FAO, 2022.

> **Box 6.6:** **Harambee urban farms fill a crucial void for Black, Latinx families during the pandemic**
>
> When COVID-19 began developing in 2020, Victory Garden Initiative, an urban farm in the Harambee neighbourhood, Milwaukee, US, pivoted. The 1.5-acre farm nestled between Concordia Avenue and Townsend Street went from being for members only to allowing access to anyone who wants fresh vegetables that are grown on the site. It has operated as a community-supported agriculture farm since 2017 when the initiative acquired the land. People pay a yearly fee to receive a share or box of the farm's harvest. Urban gardens or farms like Victory Garden Initiative have increasingly stepped up to fill the food access void, providing fresh fruits and vegetables during the pandemic. They've become pivotal in countering food insecurity, especially of Black and Latinx families.
>
> *Source: Lynch, 2021.*

6.6. Concluding Remarks and Lessons for Policy

The COVID-19 pandemic could be a catalyst for major transformations in cities. Indeed, cities have often survived adverse events throughout history and developed innovative solutions to recover stronger. Therefore, while the pandemic has raised serious questions about the sustainability and resilience of cities, it has also provided multiple insights for reflection on the way forward as summarized below:

- The most important lesson is that current urban development patterns are unsustainable in numerous ways. The pandemic revealed that major transformations in the energy and transportation sectors are needed to achieve deep decarbonization, which is essential for dealing with climate change, a pressing challenge looming over cities.

- There is an urgent need for stimulus and recovery plans that ensure both socio-economic recovery and alignment with climate targets. Further investments in green and renewable technologies and solutions across all sectors, especially energy and transport, are needed. Such recovery efforts should be inclusive to minimize societal inequalities that are blamed for disproportional impacts of adverse events such as pandemics and climate-induced disasters on different social groupings in our cities.

- It is essential to retrofit and redesign urban infrastructure, both indoor and outdoor, to enhance its resilience to pandemics and crises. The COVID-19 pandemic has shown the need for multi-purpose and flexible spaces that can adapt to new scenarios, which is a major shift from traditional urban planning practices like single-use zoning that often overlook flexibility and adaptability.

- Compact development remains crucial for supporting economies of scale, minimizing unregulated intrusion in ecosystems, and facilitating other sustainable urban development measures such as creating cities of short distances such as sustainable neighbourhood planning, 15-minute and 20-minute cities. Well-designed and well-managed compact cities with equitable distribution of infrastructure and services, mixed uses, walkable access to open and green spaces, and support to vulnerable residents during adverse events (e.g. economic support packages, and delivery of food and basic services) are safe and resilient to pandemics.

- There is a need to reduce car dependence and continue efforts to promote sustainable public transport and active mobility. There are tools that are readily available such as the Sustainable Urban Mobility Plans (SUMPs) and Avoid-Shift-Improve (A-S-I). Additionally, integrated transportation policies are needed to establish seamless connections between public transportation and walking/cycling networks. In combination with measures aimed at increasing shared mobility and enhancing the safety and affordability of public transportation, such policies could effectively reduce car dependence in cities.

- Urban and territorial planning should be enhanced to include a keener focus on urban-rural and food system interlinkages. Cities do not exist in isolation and planning efforts should reflect this.

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