BRIDGE TO FUTURE LIVABLE CITIES AND CITY CLUSTERS IN THE PEOPLE'S REPUBLIC OF CHINA

POLICY OPPORTUNITIES FOR HIGH-QUALITY
URBAN DEVELOPMENT

Stefan Rau

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Bridge to Future Livable Cities and City Clusters in the People's Republic of China: Policy Opportunities for High-Quality Urban Development

Stefan Rau

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ABBREVIATIONS

ADB	–	Asian Development Bank
BTH	–	Beijing–Tianjin–Hebei (city cluster)
CNY	–	Chinese yuan
COVID-19	–	coronavirus disease
CYR	–	Central Yangtze River (city cluster)
EU	–	European Union
GDP	–	gross domestic product
HACAMP	–	healthy and age-friendly city action and management plan
HIA	–	health impact assessment
ICT	–	information and communication technology
METREX	–	Network of European Metropolitan Regions and Areas
MOHURD	–	Ministry of Housing and Urban–Rural Development
NDRC	–	National Development and Reform Commission
NUP	–	National New-Type Urbanization Plan
PRC	–	People’s Republic of China
PRD	–	Pearl River Delta (city cluster)
R&D	–	research and development
TA	–	technical assistance
TEDA	–	Tianjin Economic–Technological Development Area
TOD	–	transit-oriented development
UNESCO	–	United Nations Educational, Scientific and Cultural Organization
US	–	United States
WHO	–	World Health Organization
YRD	–	Yangtze River Delta (city cluster)

KEY MESSAGES

- Past achievements of the People's Republic of China were historic, massive, and fast, but they came at high environmental and social cost.** For about 40 years or since 1978, the rapid urbanization and socioeconomic development of the People's Republic of China (PRC) have been historic achievements, with more than 850 million people lifted out of poverty, and massive investments in land and infrastructure development. The urbanization ratio increased from 19% in 1978 to 60.6% at the beginning of 2020. As the second-largest economy in the world, the PRC has significantly contributed to global economic growth. But environmental loss; ecosystem fragmentation; and air, water, and soil pollution have been massive. Regional and urban-rural disparities have increased; and in the ongoing coronavirus disease (COVID-19) pandemic, migrant workers have suffered, particularly from unemployment and reduced wages.
- By 2050, the People's Republic of China will be a high-income, four-generation urban society; and by 2100, the country's population will have halved, with many cities substantially smaller.** In 2010, the PRC became an upper-middle-income country, and by 2049 it aims to be a high-income economy, in line with its objectives of well-being and quality development. This underlines the urgent need for high-value economic and high-quality urban development, as “soft” location factors are critical for cities in knowledge economies. White collar workers want a high quality of life, diverse housing options, quality higher education and health services, a vibrant culture and commerce, and attractive green spaces both inside and outside the city to enjoy on weekends.
- There is a need to harmonize current and short-term needs with realistic long-term scenarios, taking advantage of a closing window of opportunity to build a sustainable bridge to future livable cities now.** The short and medium terms—until about 2035—are critical for guiding urbanization in the PRC (and worldwide). As the country transitions from speed to quality, it should exercise *backcasting*, *forecasting*, and *visioning*. Backcasting is for contemplating lessons learned by the PRC from its own culturally diverse history of building and maintaining sustainable and attractive cities, towns, and villages, as a basis for reflecting on the challenges of urban rehabilitation and retrofitting, new districts, and new towns. Forecasting is to fully appreciate the current challenges of carbon-intensive urban patterns and the unsustainable supply-side model resulting in urban sprawl, and in inefficient and fragmented urban regions; and to consider the opportunities of future realistic scenarios. While many cities are already shrinking, and many more will in the future, in the short term, many local governments may still aim for unsustainable greenfield expansion. Finally, visioning is to seize the opportunity to engage in long-term planning for the PRC with broad participation.
- The People's Republic of China's current urban pattern is based on unsustainable principles of land use separation, large blocks, wide roads, and large compounds with fences and gates—which limit livability and are carbon- and resource-intensive.** There is now a broad consensus among planners in the PRC on the need for profound transformation of the urban model, but change is challenging due to system inertia, with rigid institutional arrangements, laws, and codes; and to an industry of research, planning, development, engineering, design, construction, marketing firms, and consumers—with set mechanisms. The current urban areas follow a modernist planning paradigm that favors cars over people; this needs to be transformed to make cities people-centered, pedestrian-friendly, attractive, and safe.
- The unsustainable supply-side model has resulted in massive real estate oversupply and a demand-supply mismatch, requiring sustainable local government finance; a focus on urban infill development; and rehabilitation of existing areas, with very limited and highly selective new greenfield development.** The local government finance system relies heavily on revenue from new land

leases. Attempts have been made to introduce a property tax and other forms of levies, and land-value capture mechanisms of benefits from public investments. However, country-wide reform is urgently needed to stop the cities' need to expand. There is massive oversupply of industrial land, housing, and commercial spaces in many places, especially in the central, western, and northeastern regions and, to a lesser extent, in central locations in agglomeration regions. Meanwhile, one-third of all cities in the country are already shrinking, requiring a drastic refocus from new greenfield development to urban rehabilitation; as well as retrofitting and infill urban development to increase efficiency and quality and to meet the demands of a new green knowledge-based economy.

6. **Departmentalization has to be overcome, and the benefits of future sustainability should be unlocked by transforming institutions and enabling cross-sector and cross-jurisdictional coordination.** Recent policy has already been shifting from growth focus to quality orientation, and a whole range of ambitious policies has been adopted. Innovative pilot programs have been initiated. However, mainstreaming faces systemic challenges in the form of past models and institutional systems in which departments have few incentives for horizontal cooperation, while vertical communications within line bureaus, departments, and ministries are highly effective and efficient. It will be necessary, and highly beneficial, to further strengthen and engage the private sector, so that it will create jobs and engage in urban services. This will require a revision and alignment of policies and administrative regulations; new partnerships among public, institutional, and private players; and innovative governance across local administrative boundaries and levels of government. It will also require adequate incentives to generate private investments in sustainable development.

7. **Existing cities and urban areas should be rehabilitated and retrofitted to become livable and state-of-the-art (i) green-circular-economy, zero-waste cities; (ii) low-carbon, climate-resilient cities; and (iii) healthy and age-friendly cities.** Urban areas are where everybody and everything comes together; where people live; where all sectors contribute and most investments and assets are placed; and where economic value, goods, service, and culture are produced. Urban areas are also the places where most resources are used; land is consumed; and where waste, pollutants, and carbon emissions are generated, contributing to climate change. Urban areas are where people and assets are exposed to the risks caused by a changing climate. The PRC has the capacity to lead the Asia and Pacific region, and the world, in urban innovation. And it should do so by building on, integrating, and advancing some of its key national policies and programs. The PRC could draw from the world's best practices to profoundly transform its economy; build an attractive future offering quality work for its citizens; and to make its cities systemically green, low-carbon, and healthy, as well as fit for an aging society with small families and fewer children. The PRC can also apply smart city systems using advanced information and communication technologies in all sectors, and enable big data and open use of data.

8. **Mega-region governance coordination should be firmly established, and large-scale and long-term sustainable strategies developed, such as a "territorial system of two speeds" especially in the coastal region.** The PRC's coastal region is the most densely populated in the world, where continued sprawling urbanization poses a threat to the environment, food security, ecosystems, cultural heritage, tradition, and resilience to climate-change impacts. This study proposes that there should be a single spatial plan for the coastal region as a whole. The scenario comprises a two-speed spatial and socioeconomic model: (i) "high-speed" territories of high-density, economically productive city clusters; and (ii) "slow-speed" territories for large-scale green territories comprising national parks, nature reserves, agricultural land, and cultural sites, with a focus on rigorous environmental and ecosystems protection with strongly enforced environmental red lines on a large scale; and only with very limited and highly regulated development in pockets where some small least-impact development may be suitable. The high-speed and slow-speed territories follow their own distinct and different spatial and socioeconomic model, and they are equally valuable and mutually reinforcing each another. The high-speed model for urban agglomerations also engages and integrates with the rural and natural hinterland. The slow-speed model for the large green spaces promotes nature, culture and biodiversity

protection, ecosystem services, and sustainable agriculture, which the urban areas depend on and benefit from. The concept of “speed” in this scenario also relates to the pace and intensity of human action and interaction, level of economic activity and development, population and urban density, and human experiences that characterize these respective territories.

9. **Despite the ongoing COVID-19 pandemic, it is important to acknowledge that pandemics are temporary, even if they can be endemic over several years, while urban planning and investments have long-term impacts and benefits.** The recommendations of this study include, among others, the development of healthy and age-friendly cities, with the aim of generating specific health benefits and age-inclusiveness for the emerging four-generation urban society and resilience also in case of a pandemic. Stronger consideration is needed for inclusive development to ensure that vulnerable groups and small enterprises are resilient, that connected public green space systems are included in urban planning and implemented, and that solid and medical waste management is improved and environmentally safe.

SYNOPSIS

Urbanization Achievements, Recent Policies, and Trends

1. Rapid urbanization and socioeconomic development for over 40 years

- Urbanization and industrialization have been at the core of rapid economic development in the People's Republic of China (PRC), where the gross domestic product (GDP) rose an average of about 10% per year from 1978 to 2019. During this period, there was a whole concert of policies that were adjusted from time to time to maintain the momentum.
- The urbanization ratio rose from 19% in 1978 to 60.6% at the beginning of 2020 (increases averaging about 1% per year), with 848.43 million urban residents and 551.62 million rural residents.
- More than 850 million people were lifted out of extreme poverty, and by 2020 the goal to eliminate extreme poverty was achieved, but there are still people experiencing low income and vulnerability, especially in rural areas and pockets of urban areas.
- The country has also achieved massive urban expansion, infrastructure, and improvements in public services (e.g., roads, rail, water supply and sanitation, health, education, and information and communication technology coverage).
- The environmental and social costs were significant; however, with environmental losses and pollution, there were increases in regional and urban-rural disparities.

2. Recent policies: shift from a focus on gross domestic product growth to a focus on quality

- The National New-Type Urbanization Plan (NUP), 2014–2020 became the basis for the urban policies in the national Thirteenth Five-Year Plan, 2016–2020 (13th plan), which initiated a paradigm shift from GDP growth-oriented to quality-oriented development, and more systematically considered environmental sustainability and social inclusion.
- The plan included, among other items, improvements in urban infrastructure, education, and health services; urban-rural integration; strengthening of small and medium-sized cities; coordination of city clusters; and the application of smart cities information and communication technology and mobile phone applications.
- Pilot programs included sponge cities, urban climate change adaptation, low-carbon pilot city development, eco-cities, circular economy industrial parks, industrial transformation, and the economic upgrading of resource-depleted cities.
- The “Made in China 2025 Plan,” released in 2015, promotes the PRC to become a leading knowledge-based economy with innovative clean manufacturing and an advanced service industry.
- The “Healthy China 2030 Plan,” released in 2016, promotes healthy cities and “health in all” policies.
- Regional development programs are ongoing, including those on western development and northeastern revitalization; regional cooperation and integration programs are continuing as well.

3. Trends: slowing growth, rapid aging, and massive population decline in the long term

- Urbanization, which remains a core policy focus, has peaked and differentiated. It is continuing, but at a slower pace, with the annual urban population growth rate slowing from 5.2% in 1980 to 2.3% in 2019. The urban population is expected to reach the

saturation point by around 2050 and then start to decline. By 2030, the urbanization ratio is expected to be 70.6%, and by 2050 it is expected to rise to about 80%, a level similar to high-income countries, according to the United Nations.^a

- About one-third of all cities in the PRC are already experiencing population loss due to out-migration, including many cities in the west and northeast, as well as lesser-connected smaller and medium-sized cities in the coastal and central regions.
- Urban development will exacerbate regional imbalances between the coastal regions and the western and northeastern regions. It will widen disparities within large urban regions—between central cities within city clusters and smaller cities and the periphery.
- Since 2011, GDP has slowed and is expected to range between 5% and 7% in the coming years. This slowdown should result in high-value transition, as new drivers of growth are mobilized (i.e., high domestic consumption, given the country's high savings rate).
- The PRC reached upper-middle-income status in 2012, and aims to be a fully modernized country by 2035, and then a high-income country by 2049. It is seeking to avoid the middle-income trap by promoting comprehensive policies to transform itself from a low-cost to a high-value economy. At the moment, its labor productivity and workforce capacity lag behind their potential.
- The country ranked 14th in 2020 on the Global Innovation Index, up from 29th in 2015.
- The PRC is predicted to undergo a demographic transition: aging and a dramatic decline in numbers, with the population halving from 1.4 billion in 2020 to about 700 million by 2100.
- The population is rapidly aging, with people 65 years and older increasing from 4.7% in 1980 to 11.5% in 2019, and children aged 0–14 dropping from 36% in 1980 to 17.8% in 2019.
- The change of the one-child policy into a two-child policy in 2016 resulted in about every other child being a second child in a family, which is very significant, but still short of expectations. In 2021, the two-child policy was further relaxed to a three-child policy, reflecting the low fertility rate of women shown in the 2020 census data.
- Extreme poverty has been eradicated in the country by 2020, but about 373 million people still experience low-income and live below the upper-middle-income poverty line of \$5.50 a day, according to the World Bank. Per capita income in the PRC is about a quarter of the average for high-income countries.
- The dual *hukou* (household registration) system is being reformed, and migrant workers in many cities are given urban *hukous*, with the associated access to education, health, and social protection systems. Cities (mostly secondary and tertiary) use *hukous* as incentives to attract residents. Meanwhile, the large coastal megacities apply policies aligned with their aim of limiting their populations.
- In recent years, policies and programs on environmental protection have aimed at transforming the PRC into an ecological civilization. Some environmental protection has been achieved, and many good policies have been adopted. The urban–rural environmental red line (delineating environmental protection “no-build” zones) has been included in the 13th plan. The red lines are typically drawn up on behalf of the municipalities at the provincial level. They follow the functional-zones principle of concentrating urban development while protecting the environment. Typically, however, the red lines are quite limited in their reach around natural areas, and do not really aim to restrict urban sprawl. Many programs to reduce air and water pollution, and some programs to remediate soil pollution, have created some positive results. Ministry alignment in 2018 improved the clarity and efficiency of roles and responsibilities regarding environmental management.

Challenges to Sustainable Urban Development

1. Institutions and governance: unsustainable local government finance relying on land leases from urban development, and issue of overlapping and contradictory policies and authorities

- Local governments rely heavily on revenues from new land leases. However, there is an urgent need to replace new land leases with more sustainable sources of local public revenue, but achieving this will be institutionally challenging.
- Line agencies and other administrative authorities differ in their objectives and opinions on various areas of finance and fiscal transfers, as well as on policies concerning land, water, and the environment.
- Cooperation across sectors, government levels, and local government boundaries is challenging. Reducing departmentalization and enabling and promoting collaboration among agencies would bring many benefits.
- Urban planning and building codes and practices, and public and industry arrangements are hard to change.

2. The supply-side, land-based, and gross domestic product-growth model of urban development resulting in massive oversupply, with the linear economic model of “take–make–use–waste” proving unsustainable

- The PRC’s economic and urbanization model has followed the industrialized countries’ linear model of extraction of resources, consumption, and disposal; and this approach has also been applied to land.
- Greenfield urban expansion-based development since 1980 has led to significant oversupply of industrial land, and commercial and residential real estate.
- Significant oversupply, coupled with mismatches of demand and supply, has resulted in industrial land, commercial land, and housing units being in oversupply in remote locations, while affordable housing remains in high demand in the big cities.

3. Urban planning and urban form: urban patterns unlivable, energy-intensive, and exposed to climate change risks

- The PRC has a modern urban model that is based on separation by type of land use, and favors cars over people.
- This model includes large blocks (superblocks) and very wide roads, with additional setbacks from the road right-of-way to the buildings.
- Large developments within the blocks that act as compounds, with fences and gates that disallow free passage, creating traffic jams, generating unnecessary traffic, and promoting lavish lifestyles.
- Many urban areas, including new ones, are in low-lying areas along rivers and coastlines that are at risk of flooding, drought, desertification, cyclones, and sea level rises.

4. Environmental pollution and lack of livability in cities

- Sprawling and polluting land and resource-intensive urban and industrial development generate significant environmental loss, pollution, and ecosystem fragmentation.
- Environmental pollution in the PRC’s cities has been affecting soil, surface water, and groundwater.
- Air quality on many days in larger cities has reached levels beyond the thresholds set by the World Health Organization for small particulate matter (PM_{2.5}), mostly caused by industry, traffic, and the household use of coal.
- While progress on pollution control has been made recently, pollution continues to affect urban livability and health.

5. Fragmentation of administrative boundaries in city cluster territories and lack of coordinated governance, planning, and infrastructure

- A key challenge that city clusters and metropolitan regions face is the fragmentation of administrative boundaries and lack of portability of social protection systems.
- Each local government is independent, with its own urban planning, transport, taxation, and budgetary systems.
- The PRC is constrained by a systemic gap between strong national policies, governance, and infrastructure systems and strong municipal authority, planning, and infrastructure systems.
- There are inadequate subnational cluster-wide institutions and coordinating mechanisms across local boundaries and within clusters, and this reinforces local boundaries.

6. Short-term, continued urbanization, but with long-term aging and population decline leading to increased regional disparities and many shrinking cities

- Overall, urbanization is expected to continue, albeit more slowly as mentioned above, also considering the expected long-term massive population decline.
- Current regional disparities are likely to deepen as people and companies continue to migrate to coastal cities, though migration to regional centers is also expected to increase.
- The receiving cities will continue to face the challenges of congestion, higher costs of living, real estate price increases, overuse of infrastructure, and development pressure on rural land.
- Out-migration will likely continue from remote and rust-belt cities, which will likely suffer from a downward spiral of population loss, economic downturn, and underutilized assets.
- Urban policies and investments—such as those concerning land use, trunk infrastructure, land-parcels and asset investments, and public green parks—should have a planning horizon way beyond 2100.

7. Impacts from coronavirus disease (COVID-19) pandemic and associated policy responses

- The impacts on health safety and security are affected by urban-environment policies, sanitation management, and related infrastructure and services such as water supply, wastewater and solid waste management (including medical waste management), surface-water and soil pollution reduction, and remediation.
- The social impacts may be severe, causing people—especially the low-income, and other vulnerable people who may be challenged in maintaining their lives and livelihoods—to lose formal and informal jobs.
- Households may lose their ability to pay their mortgages, as COVID-19 has severely affected people's life savings. Another social effect has been an increase in domestic violence and divorce rates.

Policy Opportunities and Recommendations

1. The closing window of opportunity to get urbanization “right”

- Urbanization in the PRC is at a decisive crossroads, and this may well be the last stage of significant urbanization through migration.
- There is an urgent need to get urbanization right, to place it on a sustainable path before the window of opportunity closes.
- Urbanization and strategic planning have long-term implications for land use, land parcels, trunk infrastructure, roads, public and private structures and investments, and the protection of green spaces.

2. Learning from international best practice

- International best practice can provide valuable lessons for making cities greener and more livable.
- Quality-of-life factors such as green and clean environment with public open green spaces, attractive housing options, vibrant urban culture, public transport, pedestrian and bicycle paths, and higher education are increasingly important for upwardly mobile white-collar workers and for the “creative class.”
- Lessons may also include low-carbon, climate-resilient planning and smart city applications with big data and open data. These applications may come from companies and startups that are constantly innovating how cities, urban service systems, and citizens interact in real time.

3. People and environment first: turning urban areas into “livable cities” as a priority

- This will require clean and accessible green environments, integrated and spatial land use, transport, open spaces, and other sector planning to provide the infrastructure, services, and other public goods that support economic competitiveness, environmentally sustainable development, social and financial inclusion, and climate resilience.
- Livability also should include balanced urban, rural, and integrated urban–rural development.
- A paradigm shift and the programs under the NUP and 13th plan provided a framework of policies, raised awareness, and achieved a consensus among urban planners on the importance of a comprehensive transformation for changing current urban patterns.
- A law could be crafted that prohibits construction outside consolidated built-up areas and defined master-plan areas, similar to the planning codes of Germany, the Republic of Korea, and Singapore, among others.
- Housing support programs should ease eligibility criteria and ensure that most migrants are included.
- Reform of the *hukou* should aim at unifying urban and rural areas.

4. Green circular economy zero-waste cities

- Short- and medium-term policies should include effective enablers to implement existing laws and programs for developing a green circular economy systemically, initiated by local comprehensive pilots for circular economy zero-waste cities expanding on the program initiated by the Ministry of Ecology and Environment in 2019 and the circular economy law from 2009 and through international cooperation as arranged, i.e., through the formal cooperation agreement with the European Union and its circular economy action plan of March 2020.
- External environmental and social costs should be fully incorporated into the valuation of resources and products, including the valuation of land.
- A “cradle-to-cradle” scheme for the economy at large should be piloted on a local level and in partnership with private sector companies, to make the PRC a global green circular-economy leader.

5. Low-carbon, climate-resilient cities

- Climate change mitigation and adaptation remain as key tasks for the current generation.
- Cities and urban areas are the sources of most greenhouse gas emissions.
- Cities and urban areas are also the most affected by climate change impacts.

- Until 2025, policy makers should prioritize the mainstreaming of low-carbon and climate-resilient urban development and management to establish integrated low-carbon patterns, including spatial increments of places that are compact, walkable, and serviced by public mass transit; and as a way to provide renewable energy by means of smart grids to enable the country's commitment to carbon peaking by 2030 and carbon neutrality by 2060.
- Cities urgently need to be made resilient against climate change risks through systems of green infrastructure integrated with gray infrastructure. Policies and pilot programs should be enabled, mainstreamed, and implemented through technical guidelines and support.

6. Healthy and age-friendly cities

- Rapid urbanization and aging in the PRC and other countries, along with the lessons learned from the COVID-19 pandemic, demonstrate the urgent need to make cities more healthy and age-friendly, as indeed stated in the Healthy China 2030 Plan.
- The challenges of a rapidly aging, urbanizing, four-generation urban society should be turned into opportunities. Health impact assessments and healthy and age-friendly city action and management plans should be mainstreamed and integrated with urban planning and urban design to create positive health outcomes and improve urban livability, services, and public spaces.
- Cities should have pedestrian-friendly patterns and clean and safe environments, which are healthy and age-friendly, embodying universal urban design of public spaces, public transport, and services. Building design and accessibility of public services should be mainstreamed, further developing and implementing scaled and usable urban green.

7. Smart cities

- Policies should further promote and enable smart city information and communication technology systems and applications, engaging both the public and the private sectors, and turning big data into open data. Innovative applications linking people with urban governance, infrastructure, and services in real time could be utilized.

8. Focus on retrofitting existing urban areas to make them livable, sustainable, and attractive for a knowledge-based workforce, as opposed to greenfield expansion

- Since 1978, the focus has been on greenfield urban expansion; from now on, it should be on urban rehabilitation and infill development (development of vacant or underused land in existing urban areas).
- Policies and pilot programs are needed to study and implement options for the paramount task of profound physical and institutional transformation of many of the existing carbon- and energy-intensive urban areas, many of which were built in the 1970s.
- The urban pattern characterized by land use separation, large blocks, wide roads, and fenced-in compounds makes residential and commercial developments highly energy- and carbon-intensive, as it creates long distances between residences, commerce, jobs, services, and recreation. In addition, the environments are not pedestrian- or bicycle-friendly.
- As part of retrofitting, add small roads, paths, and buildings to add density and functions; and make areas more livable and urbane. This will be challenging, and will require detailed, place-specific assessments and solutions.
- Close consultation with, and the participation of, communities, residents, owners, and other stakeholders is essential.
- Incentives for private investments are called for.

9. City cluster governance, metropolitan circles, and urban–rural integration

- Fragmentation, inefficiencies, and lack of integration across local administrative borders within city clusters and metropolitan areas largely remain, despite achievements during the 13th plan period.
- More policies and city cluster-wide institutions with authority and budgets are needed. Also, effective mechanisms for coordination should be implemented, and metropolitan and city-cluster governance should be established.
- Models for cross-boundary coordination can include the PRC's eco-compensation mechanism; the special districts in the United States; the European Union's metro-regional authorities, some of which have elected regional parliaments; and/or bodies with authority over specific administrative areas and budgets.
- It will be necessary to enable both top-down planning and horizontal cooperation on economic and industry-cluster development; the integration of labor markets through enhanced connectivity and social protection-system portability; and the development of unified master plans, intercity rail systems under cluster-wide management, connected open-green-space systems, etc.

10. The need to align policies, authorities across sectors and levels of government, and enable sustainable local government finance and cross-sector coordination

- Administrative reform should be continued to promote clear responsibilities, formal and informal arrangements for cooperation across sectors and levels of government (horizontally and vertically), institutional transformation, and the implementation of good policies.
- The government should improve its fiscal and taxation systems to ensure sustainable local government finance and end the reliance on land leases from new urban development—for instance, through reforms such as a nationwide standardized property tax and fiscal-transfer system based on the number of permanent residents in urban areas.
- There should be an alignment of responsibilities and objectives with regard to master planning, land management, economic planning, zoning (including land use codes), land use change management, land allocations for urban development, environmental protection (including red lines), farmland protection, water source protection, water-resource-quality and flood-risk management, the development of systems and grids for distributing renewable energy, and other functions.

11. The importance for collective visioning of the PRC's long-term future development

- There are no obvious or simple solutions for harmonizing the near-term needs of continued sustainable economic, social, spatial, and urban development, given the long-term trends of population loss and aging.
- Cities, trunk infrastructure, land use, land parcels, and assets are very long-term investments, and getting them wrong will have severe adverse effects on the economy, environment, society, and individuals.
- This study recommends piloting open, inclusive discussions on a common long-term vision that would include wide participation across regions, generations, and the whole spectrum of society.

12. A large-scale territorial “two-speed” system for the entire coastal region

- The PRC’s coastal region is the most densely populated in the world, and the continued sprawling urban development is a major threat to the environment, food security, ecosystems, and climate-change resilience.
- Strategic spatial planning on that large scale should be prioritized.
- This study proposes a “territorial system of two speeds,” based on spatial and socioeconomic models that are equally valuable and mutually reinforcing: (i) high-speed first- and second-tier city clusters with defined development areas; and (ii) slow-speed large-scale national parks, nature reserves, agricultural land, and cultural sites to be slated for protection.

13. COVID-19 pandemic considerations regarding urban policies

- The recommendations and principles above will remain highly relevant even after the pandemic.
- Various government programs should be implemented and strengthened, for instance, increasing the availability and quality of safe and secure water supplies in the rare places where this work has not yet been completed; completion of wastewater and improving solid waste management (including medical waste management); as well as cleaning up the air, water, and soil in both urban and rural areas.
- Strengthen the resilience of local communities and correct unsustainable urban patterns by including transit-oriented development principles, compact-city principles (including a mix of uses and walkable environments), green space protection and public green parks and other green infrastructure to clean the air, ventilate urban areas, and provide local recreation amenities.
- Healthy and age-friendly cities should be established throughout the country, mainstreaming health impact assessments and healthy and age-friendly city action and management plans for existing and new urban areas. These plans should consider the management of, and responses to, communicable and infectious disease outbreaks.

^a United Nations Department of Economic and Social Affairs (UN DESA), Population Division. 2018. *World Urbanization Prospects: The 2018 Revision*. New York. <https://population.un.org/wup/Publications/Files/WUP2018-Report.pdf>.

I. INTRODUCTION

A. Background and Purpose of the Paper

1. This paper is intended to support policy makers, administrators, experts, and advisors at the national, provincial, and local levels of the Government of the People's Republic of China (PRC) on options for urbanization, planning, and governance policy based on described history, trends, comparisons to international cases, and the existing challenges and opportunities. It may also serve as a reference for urban managers, planners, and various sector specialists in the PRC. The background, history, trends, and policy opportunities may also make this study useful for other developing member countries of the Asian Development Bank (ADB). Other countries in the Asia and Pacific region and elsewhere that are undergoing rapid urbanization may find some of the concepts and the analysis and recommendations useful as a reference.
2. This paper was developed based on an assessment of urbanization trends and scenarios, a review of recent urbanization policies and implementation progress, and anticipation of urbanization policy planning. It includes key policy opportunities and recommendations for the short, medium, and long terms.
3. The approach to this paper has been to conduct overall assessment and offer recommendations regarding urbanization in the PRC, considering well-being as the overarching objective of the government (i.e., in the “New Era” or the period until 2035). This includes a focus on cities, city clusters, and urban–rural areas, with a view to making them livable, green, inclusive, competitive, smart, healthy and age-friendly, low-carbon, and climate-resilient. A long-term perspective is provided as a framework and strategic trajectory to guide short- and medium-term actions, while ensuring long-term sustainability, as it takes into account the impacts and irreversibility of urban planning and investments.
4. ADB's history of urban development support to the PRC goes back to the early 1990s, and was aligned with the policies of the government at the time. ADB also contributed significantly to the policies and enabling environments for private sector participation in the country. Since 2004, ADB has supported the government's National Development and Reform Commission (NDRC) in carrying out research on urbanization strategy, including a technical assistance (TA) project that prepared strategic options for urbanization. That TA was conducted in 2011–2012 as an input to the PRC's forthcoming national urbanization plan, and it contained detailed policies and guidelines for urban and economic development and livability until 2020. ADB support also included detailed work on sector-related policies such as water tariff regulations to enable private sector participation, utility infrastructure guidelines, urban environment improvements, urban stormwater management, and urban–rural red line development.¹
5. ADB contributed to the preparation of the Thirteenth Five-Year Plan, 2016–2020 (13th plan) and the National New-Type Urbanization Plan (NUP), 2014–2020² through policy recommendations under various loans and TA projects, including one on strategic options for urbanization, whose

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¹ ADB. 2016b. *Technical Assistance Completion Report: Institutionalization of Urban–Rural Environmental Master Planning to Guide Environmentally Sustainable Urbanization in the People's Republic of China*. Manila. <https://www.adb.org/sites/default/files/project-document/191536/47061-001-tcr.pdf>.

² Government of the PRC, State Council. 2015. *The 13th Five-Year Plan for Economic and Social Development of the People's Republic of China, 2016–2020*. Beijing; and Government of the PRC, State Council. 2014a. *National New-Type Urbanization Plan, 2014–2020*. Beijing.

recommendations were included in the NUP and 13th plan.³ Another TA, on Institutionalization of Urban–Rural Environmental Master Planning, contributed to the Municipal Environmental Red line, which was included in the 13th plan.⁴ ADB completed its Strategy 2030 in 2018 with seven operational priorities, including the achievement of livable cities and guidance on support for upper-middle-income countries;⁵ and many of the strategic objectives align with the PRC’s policy priorities, including those in the urban development sector.

B. Urbanization Context

6. The PRC’s urbanization and industrialization have been at the heart of the greatest and fastest economic and urbanization miracle in the history of humankind. Orchestrating policies for job creation and enabling foreign and domestic investments, together with urban development, have been the key to the country’s urbanization and development success. The opening up and reform policies in the PRC were initiated in 1978, and lifted millions out of poverty. The PRC’s urbanization ratio changed from 19% in 1978 to 60.6% by the beginning of 2020, averaging about 1% every year (Figure 1). The total current urban population stands at about 848.43 million.⁶ Massive investments in urban expansion, infrastructure, and public services have been implemented. However, there have been significant environmental loss and pollution, and an increase in regional and urban–rural disparities. There has also been a dearth of reform policies aimed at achieving fully integrated, inclusive, green, and sustainable urban and economic development.⁷

7. The PRC’s development has impacted the world’s urban population, which has grown from 751 million in 1950 (30% of the total population) to 4.2 billion in 2018 (55% of the total). It is expected to increase to 6.7 billion by 2050 (68% of the total population). Of the world’s urban growth between 2018 and 2050, 90% will likely happen in Asia and Africa, with just three countries—the PRC, India, and Nigeria—expected to account for 35% of that growth.⁸ This makes urbanization in the PRC relevant globally, and this trend in the PRC will continue to drive competition for resources.

³ ADB. 2010. *Technical Assistance Completion Report: Policy Study on Strategic Options for Urbanization*. Manila. <https://www.adb.org/sites/default/files/project-document/80446/44024-012-tcr.pdf>; and ADB. 2013b. *Strategic Options for Urbanization in the People’s Republic of China: Key Findings*. Manila. <https://www.adb.org/sites/default/files/publication/30397/options-urbanization-prc-findings.pdf>.

⁴ ADB, *Institutionalization of Urban–Rural Environmental Master Planning to Guide Environmentally Sustainable Urbanization*.

⁵ ADB. 2018c. *Strategy 2030: Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and the Pacific*. Manila. <https://www.adb.org/sites/default/files/institutional-document/435391/strategy-2030-main-document.pdf>.

⁶ *Xinhuanet*. 2020. China’s Urbanization Rate Hits 60.6 Pct. 19 January. http://www.xinhuanet.com/english/2020-01/19/c_138718450.htm.

⁷ The definition of “urban population” in the PRC has changed over time. Before 1983, it included the total population of the cities and towns. The cities were defined as having at least 100,000 inhabitants and/or special administrative, strategic, or economic importance. Towns were either settlements with at least 3,000 inhabitants, of whom more than 70% were registered as nonagricultural, or they were settlements with 2,500–3,000 inhabitants, of whom more than 85% were registered as nonagricultural. In the 1990s, the urban population was redefined to include all residents of provincial and prefecture-level cities, the residents of *jiedao* (streets) in county-level cities, and the members of all residential committees in towns. In the 2000s, the urban population referred to the population of city districts with an average population density of at least 1,500 persons per square kilometer and/or the population of suburban district units and township-level units meeting certain criteria, such as having a contiguous built-up area, being the seat of the local government, being a *jiedao*, or having a residential committee. In the 2010s, urban residents were said to be those meeting the criteria defined by the National Bureau of Statistics of China in 2008 (i.e., the criteria used in the 2000 census, plus residents living in villages or towns in outer urban and suburban areas that are directly connected to municipal infrastructure, and who receive public services from urban municipalities).

⁸ United Nations, Department of Economic and Social Affairs (UN DESA), Population Division. *World Urbanization Prospects 2018. Country Profiles: China*. <https://population.un.org/wup/Country-Profiles/> (accessed 25 September 2020).

Figure 1: The Urban and Rural Populations of the People's Republic of China, 1950–2050 **Notes:**

1. The values for the years after 2018 are projected.
2. The graph on the left shows the urban and rural populations as percentages of the total population.
3. The figure on the right shows the actual size of the populations.

Source: United Nations, Department of Economic and Social Affairs (UN DESA), Population Division. World Urbanization Prospects 2018. Country Profiles: China. <https://population.un.org/wup/Country-Profiles/> (accessed 25 September 2020).

C. Policy Context: National New-Type Urbanization Plan

8. The NUP and the 13th plan helped the country shift from its previous gross domestic product (GDP)-centered growth model to a quality-centered development approach that emphasizes inclusive and environmentally sustainable development. This slower economic growth environment, the “new normal” since around 2013, has allowed for more reflection, with many sustainable urban and economic development policies and programs set to be implemented. The plans emphasize inclusive and people-centered urbanization and urban–rural integration by enforcing green space protection, utilizing municipal environmental red lines, setting urban growth boundaries to prevent uncoordinated urban expansion, increasing the extent of compact and mixed-use urban neighborhoods, and preserving local culture and historical buildings. The plans include measures to strengthen small and medium-sized cities, to relieve the migration pressure on the large cities. Some of the other measures include expanding public transportation networks and green spaces, accelerating agricultural modernization by focusing on food security, and promoting reforms of the *hukou* (household registration) system and of land management.

9. Programs initiated during the plans’ implementation periods included continued urban infrastructure support; development of the western and central regions of the PRC and revitalization of the northeast; city cluster development; urban–rural integration; and eco-city, sponge city, low-carbon city, and climate-resilient city developments; industrial transformation, relocation, and economic upgrading programs; and the construction of circular-economy industrial parks. Many of these policies have begun their implementation, with good results already being reported. However, implementation challenges remain, caused mainly by overly ambitious targets and policies at the national level, some of which may face difficulties when it comes to implementation by local governments.

10. As the PRC has reached upper-middle-income status and aims to be a fully modernized country by 2035, then an upper-middle income country by 2049, urbanization will remain important, not only as a trend, but also as a core government policy. It will continue to be an overarching and cross-sector objective, one that is critical at this stage of the country's continuing social and economic progress under "new normal" conditions. The PRC's cities have increasingly become leaders in innovation, demonstrated by the country's continuous rise in the Global Innovation Index, where the PRC now ranks 14th, up from 29th in 2015.⁹ This indicator is a reflection of a country that is moving to escape the middle-income trap.

D. Approach to the Paper and Recommendations

11. Urbanization is at a key crossroads, especially in emerging and developing Asia and the Pacific (and in Africa, which, together with Asia and the Pacific, will account for 90% of all urbanization until 2050). Urbanization and strategic urban and regional planning will have long-term implications. Land uses, parcels, trunk infrastructure, roads, urban patterns, and structures will remain for generations; thus, it is critical that patterns and investments are sustainable in the long term. As the PRC is at its last significant stage of urbanization, there is a closing window of opportunity to get it *right* (i.e., with cities that are livable and sustainable, as well as low-carbon and climate-resilient, inclusive, healthy and age-friendly).¹⁰ This study offers a brief assessment of the long-term challenges facing the PRC, and recommends short- and medium-term actions, as well as long-term strategies, to meet them. The time frames are closely related, so planning and implementation must start immediately, regarding the following:

- (i) Short- and medium-term (2025–2035) challenges and recommendations include actions and policies to enable more cross-sector and cross-jurisdiction cooperation, to make city clusters, cities, and their rural hinterlands more livable through an integrative and comprehensive approach.
- (ii) Long-term (2050–2100) challenges and recommendations include considerations of population and demographics, structural institutional weaknesses, unsustainable urban and economic models (both past and present), environmental losses, ecosystems, and associated green spaces and services provided.

12. Policy and program recommendations include a few fundamental systemic changes and in mindset, including the pursuit of a green circular economy and profound changes in the urban pattern currently prevalent in the PRC and the decisive green space protection and the enforcement of environmental protection laws. They also include laws and policy options such as finance reform to promote sustainable local government financing, and an alignment of policies across sectors to enable cross-sector cooperation as a precondition to planning and implementing livable and green cities. And they include institution building and strengthening to facilitate coordinated city cluster governance that would result in (i) numerous benefits; (ii) the nationalization of social insurance, with a possible intermediate step of common social insurance within city clusters to enable integrated labor markets; (iii) the removal of the dual *hukou* system in the long term, again with a possible intermediate step of *hukou* standardization within city clusters; (iv) the mainstreaming of low-carbon, climate-resilient, smart urban development through improved urban form and the use of information and communication technology

⁹ S. Dutta, B. Lanvin, and S. Wunsch-Vincent, eds. 2015. *The Global Innovation Index 2015: Effective Innovation Policies for Development*. Ithaca, New York: Cornell University; Fontainebleau, France: Institut Européen d'Administration des Affaires (INSEAD); and Geneva: World Intellectual Property Organization (WIPO). https://www.wipo.int/edocs/pubdocs/en/wipo_gii_2015.pdf; *The Global Innovation Index 2020: Who Will Finance Innovation? 2020*. Ithaca: Cornell University; Fontainebleau: INSEAD; and Geneva: WIPO. https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2020.pdf.

¹⁰ ADB. 2019a. *Creating Livable Cities: Regional Perspectives*. Manila: African Development Bank, ADB, European Bank for Reconstruction and Development, and Inter-American Development Bank. <https://www.adb.org/sites/default/files/publication/531126/livable-cities-main-report.pdf>.

(ICT); and (v) integrated transport and energy systems throughout the PRC to more efficiently serve existing built-up land and newly planned urban areas. Finally, the recommendations include some incentives to leverage funding and enable private sector participation in sustainable urban development.

13. For the large-scale spatial and socioeconomic development, we recommend to consider a scenario of a “territorial system of two speeds” that would distinguish between (i) the “high-speed” model for urban areas and megacities, metropolitan cities and their associated urban functional areas, i.e., large-scale city clusters (megaregions) and metropolitan circles (metro-regions); and (ii) the “slow-speed” model for areas focusing on green space protection and ecosystem service provision with a distinct model of green development rigorously following the principles of environmental red line development restrictions and ecological civilization. This should apply to both the large scale, i.e., even covering the entire area east of the “Hu line,” between Heihe in the northeast and Tengchong in the south, where 94% of the country’s population resides, and between the planned 19 city cluster areas and within these mega-urban and metropolitan urban regions distinguishing between urban and rural and natural areas.

II. MAIN ISSUES AND CHALLENGES

14. Although the PRC's urbanization since 1978 is an achievement of historic dimensions, and despite the remarkable innovative programs that were recently initiated, with the resulting great strides toward more inclusive and sustainable development, there are some significant challenges that the country and its cities still face. Some of these challenges are long term or involve very large geographic areas. Due to the massive size of the PRC's population and territory, these challenges need urgent consideration, planning, and action. Some of them may have been due to long-time policies and deeply ingrained practices and mechanisms that require profound transformation. Many of them are of a contemporary nature, however; they affect countries and cities around the world, but require solutions designed for the PRC's current context and local conditions, and with the future in mind.

15. The continued rapid urbanization in the PRC remains an important policy, as well as a trend, requiring good governance, institutional strengthening, cross-sector coordination and planning, guidelines, and investments in quality development. Urbanization influences and is influenced by other policy areas, such as economic production, demographic changes, and environmental protection. Some key issues include land and resource scarcity, climate change mitigation needs and commitments, climate risk and adaptation needs, and social inequality (manifested in regional, urban-rural, and local disparities). But a worsening shortage of public funding threatens to constrain the next phase of urbanization. There is a closing window of opportunity to get urbanization *right*—to ensure that the development of land and land uses, public rights-of-way, trunk infrastructure, land parcels, and protected open spaces together comprise a territorial system that is sustainable and resilient. This is essential, and should be one of the key priorities for national development, involving cooperation across sectors and across administrative boundaries. In addition, a more comprehensive and innovative approach is needed to promote new institutions and mechanisms, cross-sector and cross-jurisdiction governance, integrated spatial planning, investment prioritization, financing, and implementation.

16. Cities in the PRC are expected to continue growing in size, with the total urban population rising to about 1.02 billion by 2030, and an urbanization ratio at 70.6% of the population (Figure 2). While the urbanization ratio is expected to be at 80% in 2050, the total urban population is only expected to rise to 1.09 billion. A looming and paramount challenge will be the need to harmonize short-term and medium-term economic, urban, and urban-rural development with investments, taking into account the long-term prospect of a massive population loss: the population is expected to be halved by 2100, according to the United Nations' most likely scenarios.¹¹

A. Challenges to Urban Livability, Environment, and Resilience

17. **The high price of unsustainable urban pattern since 1978.** The urban patterns that have developed since 1978 will be a burden in the future. These patterns include massive urban expansions and new districts around the country characterized by superblocks, very wide roads, land use separation, and large investment units with fences and gates—all of which hinder livability, walkability, urban vibrancy, and community development. This outdated pattern was originally based on a modernist urban model from about 100 years ago, when dirty factories in the early industrial age in western industrialized countries polluted nearby residential neighborhoods and created poor conditions for the workers, leading to the land use-separation concept. When car ownership became common, car-friendly cities were developed,

¹¹ United Nations Department of Economic and Social Affairs (UN DESA), Population Division. 2018. *World Urbanization Prospects: The 2018 Revision*. New York. <https://population.un.org/wup/Publications/Files/WUP2018-Report.pdf>.

Figure 2: Urban Populations by City Size in the People's Republic of China, 1990, 2018, and 2030
(million)

Notes:

1. The values for 2018 and 2030 are projections.
2. The urban population is given by the class of size of urban settlements and a number of cities. The gray areas represent all urban settlements with populations of fewer than 300,000 inhabitants.

Source: United Nations, Department of Economic and Social Affairs (UN DESA), Population Division. World Urbanization Prospects 2018. Country Profiles: China. <https://population.un.org/wup/Country-Profiles/> (accessed 25 September 2020).

but they were not human scale, not walkable, and were land- and resource-intensive. The key challenge for the PRC will be to transform these sprawling, unsustainable urban patterns and spaces into livable urban environments.

18. This pattern was found to be suitable in the late 1970s and early 1980s, when planners from the PRC traveled around the world in search of models for the country's anticipated upsurge in urban growth. What they found then in the developed world were urban expressways, flyovers, and big roads and high-rise buildings with undefined urban spaces. These were based on planning codes from the 1960s, as there were not yet many examples of sustainable and livable urban developments at that time. This is so because the paradigm shift had only just begun in western countries in the 1960s and 1970s, when residents and planners realized that a car-friendly city is not a people-friendly city. In the PRC, cities have been "compartmentalizing" into large areas, with limited public streets and limited access

for the public because of closed-off and fenced-off developments in increments of compounds. Since 1978, those compounds—investment entities built by residential developers—have been referred to as *xiǎo dìqū* (small districts). From 1949 to 1978, such compounds had been built as work-and-living units, or *danwei*. Both *xiǎo dìqū* and *danweis* are spatial principles of organizing cities that might be traced back to the ancient tradition of courtyard houses for large families. This compound principle is also happening elsewhere, particularly in developing countries, but also in some developed countries, with segregation and security provided for wealthy communities, by creating large semiprivate estates with fences and gates.

19. **Environmental pollution and lack of livability.** Urban development since 1978 has focused on economic development accommodating industry, housing, and commerce in newly developed car-oriented urban areas. However, these areas lack livability and the vibrant, diverse culture that is typically generated by high-density, mixed-use urban centers. This applies to many developments everywhere around the country and outside the Tier 1 cities of Beijing, Guangzhou, Shanghai, and a few others.¹² Environmental pollution in the PRC's cities has been significant, with most air quality levels beyond the thresholds set by the World Health Organization (WHO), especially for small particulate matter (PM_{2.5}), which is mostly caused by polluting industries, mining, traffic, and the household use of coal. Surface and groundwater pollution, as well as soil contamination and noise pollution, are also serious risks to public and environmental health.

20. **Resource-intensive urban patterns and lifestyles.** Cities and urban patterns in the PRC are land-, resource- and carbon-intensive, as well as energy-consuming, due to the physical layouts of these cities and urban areas (many of them built since the 1980s) and to the lifestyles and consumption patterns of the residents and businesses there. The PRC's approach to urban development—based on land use separation, large blocks, wide roads, and fenced-in compounds—makes cities highly energy- and carbon-intensive because it creates long distances between residences and stores, jobs, services, and education and recreation facilities. Moreover, these environments are not pedestrian- or bicycle-friendly. Mitigating more severe changes in the global climate remains a key challenge of our time. The PRC has already become a leader in this regard, committing itself to reducing its carbon footprint under the Paris climate change agreement in 2015, and peaking carbon emissions by 2030 and become carbon-neutral by 2060. The PRC's national program, including early peaking and pilot low-carbon cities, is important, but urban patterns, sprawl and consumption patterns are major hurdles that must still be confronted.

21. **Climate change risks for the PRC's cities and urban areas.** Climate change has led to an increase in extreme weather in recent years, resulting in disasters that have claimed numerous lives, damaged assets, and adversely impacted livelihoods globally, especially in Asia, including the PRC. Disasters have been exacerbated by unsuitable land use planning and urban development in flood-prone areas, and by a reliance on unintegrated, isolated flood-protection structures (as opposed to watershed-wide flood risk management). The future impacts of climate change are expected to be even more frequent and severe.¹³ For the PRC, a significant temperature increase by up to 4.5°C in the north and west, and by up to 3.0°C in the southeast, is projected to occur by 2100, compared with the 1960–1990 averages. An increase in precipitation of up to 20% is expected in the PRC's northeast.¹⁴

¹² Under the PRC's city-tier system, Tier 1 cities are the “Big Four”: Beijing, Shanghai, Guangzhou, and Shenzhen. Tier 2 includes the provincial capitals and a few other highly developed cities, such as Xiamen; Tier 3 are the secondary and tertiary cities within each province; and tiers 4–6 cover the rest.

¹³ Intergovernmental Panel on Climate Change. 2014. Urban Areas. In *Climate Change 2014: Impacts, Adaptation, and Vulnerability; Part A: Global and Sectoral Aspects; Working Group II Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, United Kingdom and New York: Cambridge University Press.

¹⁴ ADB. 2015a. *Addressing Climate Change Risks, Disasters, and Adaptation in the People's Republic of China*. Manila. <https://www.adb.org/sites/default/files/publication/177728/climate-change-risks-prc.pdf>.

Unsustainable urban pattern with lack of livability. These photos show very wide roads, large blocks, and buildings with gates and deep setbacks create an urban environment that is not bicycle- or pedestrian-friendly (photos by the author).

22. Climate change-related impacts include heat stress, droughts, more evaporation, food and water insecurity, water pollution, sea level rise and storm surges, inland flooding, extreme weather events, heavy rainfall and strong winds, ocean acidification, and accelerated environmental degradation. In particular, floods, droughts and desertification, cyclones, and rises in sea levels have become more severe and frequent in the PRC and around the world; and loss of life and damage to infrastructure and assets have become more significant. Urban areas in the PRC are particularly exposed to the adverse impacts of climate change, since many cities are in low-lying river and coastal areas, and have high concentrations of residents, infrastructure, and fixed assets. Continuing rapid urbanization, combined with the expected increase in the frequency and severity of climate change-related disasters, will increase risk exposure.¹⁵ In addition, the absence of smart early-warning systems linking urban administrators, infrastructure operators, and citizens will increase vulnerability to disaster.

23. **Regional and urban-rural divide.** While urbanization has helped to lift more than 850 million Chinese people out of poverty since the 1980s, the process has also increased regional imbalances between the rich coastal regions and the less-developed western-central and northeastern regions.¹⁶ Urban-rural disparities have increased, as seen in the widened income gap, which in 2014 was at a factor of 2.75. In rural areas, there is only restricted access to education, training, jobs, health care, and social security services for the residents there and for rural-urban migrants with rural *hukou*.¹⁷ In 2008, an urban and urban-rural planning law included rural-area planning and urban-rural integration as key policy areas. Some provinces have already successfully completed the urban-rural integration and rural-vitalization programs, especially in eastern provinces such as Jiangsu. And some municipalities, such as Chengdu,

¹⁵ ADB. 2017. *Technical Assistance to the People's Republic of China for Mainstreaming Urban Climate Change Adaptation in the People's Republic of China*. Manila. <https://www.adb.org/sites/default/files/project-documents/49318/49318-001-tar-en.pdf>.

¹⁶ World Bank Group and Government of the PRC, Development Research Center of the State Council. 2019. *Innovative China: New Drivers of Growth*. Washington, DC: World Bank and the Development Research Center of the State Council. <http://documents1.worldbank.org/curated/en/833871568732137448/pdf/Innovative-China-New-Drivers-of-Growth.pdf>.

¹⁷ The household registration system in the PRC, called *hukou*, dates back to ancient times, while the current dual system of rural and urban *hukous* was established by law in 1958. The law assigns access to social protection mechanisms to holders of urban *hukous*; while land rights and land use rights as part of the village collectives are lodged with holders of rural *hukous*. The system has been recently undergoing reform aimed at both reducing urban-rural disparities and improving the urbanization process in peri-urban areas, as well as generating benefits for rural populations from urbanization. *Hukou* reform is a continuing effort of the government.

have made great strides in that direction. However, the development progress in general—and effective linkages among small cities, towns, and villages, in particular—have been implemented relatively slowly, so enhanced policy making, planning, and action are urgently needed.

B. Sustainability Challenge of the Urban and Economic Development Model

24. **Unsustainable linear growth-oriented economic model.** Development in the PRC since the 1980s has been focused on a linear economic model of GDP growth, and industrialization and urbanization were key instruments. As a result, there have been significant increases in the extraction of natural resources, their processing into consumable products, their use, and their disposal. This principle has even been applied to the use of land, leading to the abandonment of mines and industrial properties when they are no longer profitable. This practice has been following the international model of accounting for GDP.

25. **Demand–supply mismatch and overdevelopment.** Land-based development, in which land leases are a key source of local government revenue, continues to create a massive oversupply of industrial parks and residential properties in some areas, while there are shortages in other areas. Supported by regional development and urbanization policies, some remote and rural areas have been overdeveloped, while in the major urban centers (which attract many migrants and companies) the high demand for land and space remains unmet due to inadequate supplies in the sought-after locations. This supply-side model and the competition to acquire new industries have created a significant oversupply of industrial facilities in rural areas, which have also seen the construction of numerous apartment buildings as private investments, used for personal estate planning and financial security. This may be due to an emerging urban middle class with large savings and limited options for sustainable investments, who sees real estate as a safe and stable long-term investment option.

26. Land-based new greenfield development is associated with land leasing, which is not only a key revenue source for local governments, but also one of the criteria for the promotion of government officials (the criteria also include local GDP growth and infrastructure construction completion, among others). This challenge is complex and very significant for the real estate market, which is being carefully monitored by the government, and undergoes frequent regulatory adjustment measures to ensure stability. This is to avoid any depreciation and real estate price crises, as real estate is very important for private and public investors.

Mismatched supply and demand. In rural areas, the construction of industrial park infrastructure and residential units is sometimes in excess of local demand, while in many urban areas, the demand for commercial and residential space goes unmet, especially for affordable and social housing (photos by the author).

27. **Unsustainable growth model based on land and the gross domestic product.**

The overdevelopment mentioned is a significant challenge, impacting local government finance and debt, environmental loss and pollution, and ecosystem fragmentation. It indicates the urgent need for a significant transformation of current practices and governance, as well as the need for fiscal reform, including reform of the fiscal-transfer and tax systems. These reforms would seek to ensure the existence of sustainable revenue streams independent from those based on leases of new urban and industrial land. The reforms are thus critical as a way to end the need for unsustainable continuous greenfield development.

C. Governance Challenges of Departmentalization and Administrative Boundaries

28. **Departmentalization.** Departmentalization into “silos” is a quite articulated practice in the PRC, which makes working together across sectors and levels of government very challenging. Line ministries have strong authority and responsibilities that translate down to the local government levels. Working vertically within a line agency system is extremely efficient and smooth because coordination between the Ministry of Finance and the provincial, municipal, and county finance bureaus is very efficient and effective. However, working across line ministries, provincial government departments, and/or local government administrative bureaus requires formal arrangements. There is significant room for improving efficiency and communications for formal and informal cooperation mechanisms. However, there are some encouraging examples of smooth cooperation, such as interministerial roundtables arranged by some ministries and local governments to facilitate approvals.

29. **Policies and areas of authority that overlap or contradict one another.** There are some policy areas in which the boundaries of authority overlap across ministries and departments, and there are cases in which ministries and departments have contradictory objectives. Some examples include land, water, and environmental policies. Cooperation across sectors and levels of government is already very challenging in the PRC, and with such overlaps, fragmentation, and contradictory objectives, the implementation of sustainable policies at the local level becomes even more challenging. Yet to achieve livable cities, such cross-sector and multilevel cooperation is essential. A recent realignment of ministries has clarified some of the divisions of responsibility and improved land, environmental, and climate-change policy implementation.

30. **Fragmentation and lack of coordination in city clusters and metropolitan regions.**

Administrative boundaries in city cluster territories and metropolitan circles or regions are often fragmented; and there is a lack of coordination in governance, planning, and infrastructure systems. City clusters are economic engines and population magnets in our rapidly urbanizing world, capable of driving economic development. But they also produce the most carbon emissions, pollution, environmental degradation, and loss of natural green spaces and farmland. The most common challenge that city clusters face is fragmentation, which affects various dimensions, both physical and administrative in nature. The question of how to coordinate across multiple administrative entities—each with its independent authority over urban planning, transport, taxation, and budgets—demands a solution. In the PRC, there is a systemic gap between strong national policies, governance, and infrastructure systems and strong municipal authority, planning, and infrastructure systems. There is a lack of subnational cluster-wide institutions and coordinating mechanisms across the local boundaries that exist within clusters. Such governance would have unleashed many synergies and benefits. Administrative borders and silos have been addressed under the 13th plan, and the national support for city cluster coordination has led to awareness raising and initial activities, including plan preparation. However, there are still no effective institutions and mechanisms that can overcome the boundaries within city clusters. Administrative reform has started to reduce the silos and align the policies of local authorities, but there is more work to be done.

D. Long-Term Population Decline and Slowing Urbanization

31. **Population and demographics.** The most significant challenge of all is how to, now and over the next few years, effectively and efficiently design a solid and sustainable bridge into the future, and start building its foundations now. The PRC is expected to lose about half its population by 2100—from about 1.41 billion today to between 700 million and 800 million people by 2100—an 80-year scenario deemed the most likely by the United Nations. The rapid aging of the population presents its own unique set of challenges for urban development. The government will have to harmonize the long-term trend of declining urbanization with the needs of continued urbanization in the short and medium terms: until 2035, and up to 2050, when the PRC is expected to become a high-income country. The long-term perspective, reaching up to 2100, is essential because urban planning and investments last for a long time, and a massive oversupply of infrastructure would result in the heavy burden of maintenance of unused or underutilized infrastructure, which would have a significant impact on the real estate market. This is a dramatic and unprecedented prospect for the PRC, the world's most populated country at present, and the world's largest economy in terms of purchasing power parity.

32. **Decelerating urbanization and regional disparities.** Overall, urbanization in the PRC is slowing down, and will saturate around 2050, when the country reaches a level of urbanization similar to that of high-income countries. Current regional disparities are likely to widen, as people and companies vote with their feet by moving into coastal cities and also increasingly to regional centers. On the receiving end, there will be continued challenges of congestion, higher costs of living, real estate price escalations, and the overuse of infrastructure and open spaces. In the coastal region, there will be a differentiation between the megacities and the second- and third-tier cities, with the latter receiving more migrants because of their lower cost of living combined with good job opportunities (as companies also relocate there to escape the high prices of commercial real estate in the megacities).

33. **Shrinking cities in some regions.** At the same time, cities in remote and rust-belt regions will likely continue to experience out-migration and may suffer from a downward spiral of population loss, economic downturns, and the underutilization of existing infrastructure and assets that will be expensive to maintain. Such regions urgently need comprehensive programs of economic and urban revitalization to mitigate these effects.¹⁸ A reconsideration of policies that currently might result in overdevelopment and overinvestment should apply not only to local structures but also to national-level infrastructure, such as the underutilized and expensive-to-maintain high-speed rail and highways. It is important to note that shrinking also occurs in smaller and medium-sized cities within the coastal megaregions, in locations that are less connected or otherwise disadvantaged. Internationally, other countries have experienced shrinking in some of their subregions, including the Republic of Korea, Japan, and the United States (US). In Germany, active policies and investment programs have been implemented in shrinking cities to reduce public infrastructure and assets to lighten the financial burden on local governments, and to “correct and adjust” real estate markets through a suitable balance of supply and demand of housing and commercial properties.

34. **Impacts of the COVID-19 pandemic and associated policy responses.** The impacts of COVID-19 directly concern health safety and security, and so may incentivize improvements in urban environment and sanitation management; investment in related infrastructure and services (e.g., water-supply, wastewater, solid-waste, and medical-waste management); and surface-water and soil-pollution reduction and remediation. But the social impacts of the pandemic and policy responses may have been quite severe, however maybe less so in the PRC compared with other countries, and recent reports show that economic recovery is already well on the way. However, COVID-19 caused

¹⁸ S. Rau. 2019a. Northeast China Can Turn Challenges into Prosperity with Right Approach. *People's Daily*. 19 September. <https://app.pdnews.cn/NewsDetailPage/NormalNews?newsId=news631327459a254f688f866982b50819b5&dataMode=1&showType=1&from=singlemessage&isappinstalled=0>.

some people to lose formal and informal employment, especially low-income, and other vulnerable individuals and households. Some homeowners may also no longer be able to pay their mortgages, a trend that could lead to a depreciation in housing prices. The pandemic has also severely diminished some people's life savings and, as with other social effects, led to increased domestic violence and divorce rates. All these trends have exacerbated the problems of a predominantly urban economy already severely affected by the disease itself and by the lockdowns that are now implemented when local incidences increase, in which market supply and demand have been significantly reduced, and domestic and international supply chains interrupted, creating a ripple effect on economic output. Moreover, work-from-home arrangements have reduced the need for office space, possibly leading to a depreciation in the commercial real estate market.

III. KEY FINDINGS AND BEST PRACTICE CASES AND LESSONS

35. The approaches to spatial planning and environmental management have been improved by the 13th session of the National People's Congress, which passed the State Council's reform program in 2018 to realign responsibilities, as follows:

- (i) Ministry of Natural Resources—general functional zone planning, with the corresponding local bureaus responsible for land use planning;
- (ii) National Development and Reform Commission (NDRC)—overall organization and guidance;
- (iii) Ministry of Housing and Urban–Rural Development (MOHURD)—urban and rural development planning;
- (iv) Ministry of Water Resources—water resource investigations and registration;
- (v) Ministry of Agriculture and Rural Affairs—farmland and grasslands;
- (vi) State Forestry Agency—management of forests (including afforestation) and wetlands; and
- (vii) National Mapping and Geographic Information Bureau—integration and unification of data with the government's mapping platform.

A. Livable, Green, Inclusive, and Healthy Cities

36. **Livability of cities lagging behind international standards.** In international rankings for the livability of cities, the PRC's cities typically rank below 100, with Shanghai the highest-ranked among them. This may be due to some unique features of cities in the PRC and to the country's approach to economic development since around 1980, which has placed infrastructure, economic, and GDP growth first. The model's emphasis on wide streets, large blocks, setbacks from roads, single-use urban areas, and fences and gates around large compounds is a great challenge to livability, walkability, urban vibrancy, and community development. And it is carbon- and energy-intensive, as mentioned earlier. Urban livability should be the top priority in the PRC, as cities are made for people; and green development should be pursued, as it makes cities more livable for people and improves biodiversity. While there are a few definitions of "livable cities," at the heart of the envisioned transformation of a city there should be integrated planning with five crosscutting themes: (i) economic competitiveness; (ii) environmental sustainability and resilience; (iii) equity and inclusiveness; (iv) enablers (e.g., multisector planning, incentives, green financing); and (v) engagement of stakeholders and communities, which is also included in the government's agenda. To make cities in the PRC more livable, it is also important to (i) improve access, quality, and reliability of urban services; (ii) strengthen urban planning and financial sustainability; (iii) improve urban environments, climate resilience, and disaster management; and (iv) develop relevant institutions, policies, and enabling environments.

37. **Transforming the urban development model and revising planning and building codes.** The PRC's current planning, road-system, and building laws and codes are based on an urban model that was developed in the late 1970s and early 1980s. Planners at the time found models and practices that were based on international modernist paradigms originating in the early 1900s, developed further in the 1920s, and implemented in the post-World War II era. Land use separation, superblocks, and car-oriented developments were prevalent, and became the model for the PRC. Changing the system of laws and codes and industry practices and mechanisms would require the collaboration of many line ministries, and would entail challenging the entire system of spatial urban development—including all the market players that have become used to the system. A fundamental transformation of the laws and codes is urgently needed; in fact, it should happen within the next 5 years. The new codes should

Importance of people-friendly spaces. While there are livability issues in cities of the People's Republic of China, there are also many examples of people-friendly spaces, like for example in Hangzhou (photos by the author).

consider both retrofitting existing urban areas and planning new ones—to enable small blocks, livable streets, mixed uses, buildings facing streets, east–west-oriented residential units, and accessible and usable green spaces that contribute to a city's green infrastructure (as opposed to buffer greenery, etc.).

38. The 13th plan and the NUP promoted livability as an objective in various dimensions, including significant investments in infrastructure and services, expanded urban green spaces, increased water supply coverage (from 82% in 2012 to 90% in 2020), increased wastewater treatment capacity (from 87% to 95% between 2012 and 2020), and increased solid-waste treatment (from 85% to 95% over the same period). Environmental protection included reducing per-capita urban land to less than 100 square meters, increasing the share of energy-efficient buildings among new buildings to 50%, and increasing the share of cities above the prefecture level that meet national air quality standards (from 41% in 2012 to 60% in 2020). Social welfare systems increased their coverage significantly. For instance, compulsory education for migrant workers was set to expand to more than 99% and social housing was expanded (from 13% in 2012 to more than 23% in 2020). Since 1978, many strides have been taken toward more livable cities through urban service delivery and infrastructure construction. Between 2000 and 2012, for instance, urban water supply increased from 63.9% to 97.2% coverage, the urban wastewater treatment rate increased from 34.3% to 87.3%, and urban per-capita road area increased from 6.1 square meters to 14.4 square meters. Still, the demand for urban infrastructure and services will remain high, especially in the less-developed northeast, central, and western regions. Generally, the NUP promoted strengthening small and medium-sized cities to reduce the pressure on the large cities from rural–urban migration and the associated costs.¹⁹

39. Further expansion of urban infrastructure and services into towns and villages and better integration to generate mutual benefits in these areas are much needed. The China Development Research Foundation estimated that the PRC needed to invest Chinese yuan

¹⁹ The PRC's State Council reclassified city sizes in 2014 as follows: "Cities with a permanent population of less than 500,000 in the urban area are small cities, of which cities with a population of more than 200,000 and less than 500,000 are type I small cities, and cities with a population of less than 200,000 are type II small cities; cities with a permanent population of more than 500,000 and less than 1 million are medium-sized cities; cities with a permanent population of more than 1 million and less than 5 million are large cities, of which cities with a population of more than 3 million and less than 5 million are type I large cities; cities with a population of more than 1 million and less than 3 million are type II large cities; cities with more than 5 million and less than 10 million are megacities; cities with an urban permanent population of more than 10 million are megacities." See: Government of the PRC. 2014b. Notice of the State Council on Adjusting the Standards for City Size Classification. *State Development*. (2014) No. 51. Beijing. http://www.gov.cn/zhengce/content/2014-11/20/content_9225.htm (in Chinese).

(CNY) 24 trillion (\$3.8 trillion) in urban infrastructure by 2020 to meet its needs. The PRC has made significant progress in areas of *hukou* reform and affordable housing, with the government funding 20 million affordable housing units during 2011–2014, and 12 million more are under construction. In 2014 alone, the government contributed \$32 billion to affordable housing and completed 5.1 million affordable housing units. However, the lack of affordable housing and the housing supply–demand mismatch between the market segments remain significant. Also, access to social and affordable housing, especially for migrant workers, remains a challenge.²⁰

40. There are many international cases of livable cities and livable-city programs for planned new districts within larger urban areas. International programs include the Sustainable Development Goal 11, which calls for making cities and human settlements inclusive, safe, resilient, and sustainable. The new urban agenda of the United Nations Human Settlements Programme (UN-Habitat) represents a shared vision of urbanization as a powerful tool for sustainable development for both developing and developed countries. International livable city rankings are based on a catalog of factors, including recreation, housing, economy, consumer goods, public services and transport, political and social environment, natural environment, sociocultural environment, and education. Health care and other medical services are also factors used for example by Mercer, Economics Intelligence Unit for their ranking. Highly ranked cities include Vienna, Vancouver, Zurich, Sydney, Melbourne, and Munich. An example of a newly developed livable urban area in the European Union (EU) is Freiburg, Germany, which includes a new district that is car-free and powered by solar energy, with a mix of uses and as brownfield redevelopment. Another is Hammarby Sjöstad, in Stockholm, a green urban district by the water that is well served by multiple modes of public transit, including streetcars and ferry boats.

41. **Green economy and green finance.** The PRC is engaged in developing a circular economy involving industrial parks, urban mining activities, and solid-waste management based on the three “R’s” (reduce, reuse, recycle).²¹ The government passed the Circular Economy Promotion Law in 2008 to facilitate the development of a circular economy,²² raise resource-utilization efficiency, protect and improve the environment, and realize sustainable development. Circular-economy industrial parks have been developed since the law was enacted. For example, in Henan Province, 175 circular-economy industrial parks were planned in 2008. Some industrial parks adopted the internationally applied name and concept of “eco-industrial park.” Three national demonstration eco-industrial parks were developed, including the Tianjin Economic–Technological Development Area (TEDA), which evolved into a complex industrial symbiosis network within a mixed industrial park. Water, land, and other resources were extremely scarce in TEDA. Since the early 1990s, TEDA has been forced to conserve and make efficient use of what natural resources it has. This led to various industrial symbiosis initiatives involving energy, as well as materials and water recovery and reuse within infrastructure systems. However, a systemic approach for the PRC would require significant transformation and coordination in many areas. Green finance will fuel the green economy, and has been introduced by the PRC banking regulator.

²⁰ Government of the PRC, MOHURD. 2010. *Guiding Opinions on Accelerating the Development of Public Rental Housing*. Beijing. http://www.mohurd.gov.cn/wjfb/201006/t20100612_201308.html (in Chinese); Government of the PRC, MOHURD. 2007. *Guiding Opinions on Improving the Living Conditions for Rural Migrant Workers*. Beijing. http://www.mohurd.gov.cn/wjfb/200801/t20080110_157799.html (in Chinese); Government of the PRC, State Council. 2006. *Several Opinions of the State Council on Solving the Problem of Migrant Workers*. Beijing. http://www.gov.cn/jhuanti/2015-06/13/content_2878968.htm (in Chinese); Y. Huang and R. Tao. 2015. Housing Migrants in Chinese Cities: Current Status and Policy Design. *Environment and Planning C: Government and Policy*. 33 (3). pp. 640–660.

²¹ S. Rau. 2019b. Options for Urban Mining and Integration with a Potential Green Circular Economy in the People’s Republic of China. *ADB Briefs*. No. 124. Manila: ADB. <https://www.adb.org/publications/urban-mining-green-circular-economy-prc>.

²² A circular economy is one that keeps products and materials in use as long as possible and refurbishes them at the end of each service life for reuse. The goal is to regenerate natural systems and diminish waste and pollution. This is in contrast to the traditional linear economy (based on make, use, dispose).

Stockholm's Hammarby Sjöstad. This former industrial zone, now redeveloped as an attractive residential district, is built around canals and has green spaces with foot and bicycle paths (upper right and left). It is well served by public transport, including light rail (lower left) and ferries (lower right). These amenities enhance the area's livability (photos by Arild Vågen). See: L. Wang and S. Rau, eds. 2018. *New Towns and New Districts—Case Studies from the People's Republic of China*. Manila: Asian Development Bank/Shanghai: Tongji University.

42. International models of green economies, which involve a profound transformation that goes beyond urban development, have been developed by the United Nations Environment Programme. There are a number of approaches to the implementation of aspects of a green economy, including life cycles, industrial circular economies, cycles for reducing and recycling waste, and urban mining. First, the EU, the US, and other countries have policies regarding “extended producer responsibility,” to enforce the polluter-pays principle. Extended producer responsibility means that the responsibility for a product’s end-of-life environmental impact belongs to the producers and primary sellers and/or distributors of the product. The EU also enables funding modalities to producers for the safe disposal and reuse of end-of-life electronic waste. Second, Austria and Germany have packaging-free supermarkets where people bring their own reusable containers. Third, in Denmark, the Kalundborg Eco-Industrial Park has been pioneering the circular economy for over 50 years, and is now an industry cluster with a closed circular industrial ecosystem. By-products of one enterprise and/or process are used by another enterprise and/or process within the industrial park. This generates economic benefits, and hence is sustainable, as companies benefit from lower costs and profits from waste products. Kalundborg’s symbiosis concept is a result of collaboration among four main companies with formal agreements, the first being signed in 1972. Fourth, Singapore is a leader in solid-waste management in terms of recycling and waste incineration. The waste generated per person per day in

Singapore is only 3.8 pounds, and 60% of it is recycled, compared with about 33% in the US and just below 50% in Europe. In Singapore, only 2% of the waste is sent to landfills, compared with 53% in the US and 31% in Europe.

B. Low-Carbon, Climate-Resilient Cities

43. **Low-carbon cities, transport, energy, and lifestyles.** The PRC committed itself to significant nationally determined contributions under the 2015 Paris climate change agreement. A United Nations report from 2019 shows that the target of limiting global temperature increases to 2.0°C or even 1.5°C will be extremely challenging, and that the performance of the PRC, and of many other countries, urgently needs to be improved significantly.²³ In its 13th plan, the PRC committed itself to low-carbon and climate-resilient development. Detailed plans and specific sector policies with clear goals and activities were issued, including for (i) energy development, (ii) the development of the construction industry, and (iii) the control of greenhouse gas emissions, among others. The plan's main measures for green, low-carbon development included (i) an adjustment of the industrial structure; (ii) optimization of the energy structure, conservation, and efficiency; (iii) the development of low-carbon transportation and construction; and (iv) the promotion of low-carbon lifestyles. Optimizing the energy structure and developing renewable energy were considered two of the most important ways to reduce carbon dioxide emissions. The PRC introduced various policies during the first 2 years of the 13th plan to reduce fossil energy consumption and to encourage the use of renewable energy. Measures to increase energy efficiency in buildings, as well as construction through smart grids, were also proposed, and would contribute greatly to reducing carbon emissions. The progress made reflected the government's good intentions. However, significant moves are still needed toward the decarbonization of the country's economy. And solutions for cities, which are the main emitters of greenhouse gases, will play a key role. The PRC government reduced its coal consumption; invested CNY30 billion between 2016 and 2019 to cut down 20% of coal production; and shut down 4,300 coal mines. Since 2020, renewable energy has accounted for 27% of total electricity production, with 38% more renewable electricity production than in 2015. Large-scale low-carbon infrastructure during the 13th plan was supported with a total investment of CNY175 billion in smart grid and

A two-wheeled solution. The Government of the People's Republic of China has revived the country's tradition of cycling by providing public bicycle rentals and made it safer by introducing many new bike lanes (photos by the author).

²³ United Nations Development Programme (UNDP) and the United Nations Framework Convention on Climate Change (UNFCCC). 2019. *The Heat is On: Taking Stock of Global Climate Ambition*. New York and Bonn. https://www.undp.org/content/dam/undp/library/planet/climate-change/NDC_Outlook_Report_2019.pdf.

renewable energy development. Further low-carbon activities, especially in urban areas, industry, energy, transport, buildings, and others are needed to achieve the recently announced objective to peak carbon emissions by 2030 and be carbon-neutral by 2060.

44. **Climate-resilient cities and communities.** Comprehensive adaptation to climate change is urgently needed in urban areas; and it should include climate-proofing existing cities and infrastructure, planning new urban areas to be climate change-resilient, and establishing early warning systems for disaster preparedness and response. Successful adaptation through a combination and integration of structural and nonstructural adaptation measures—as demonstrated in selected water, food, energy, and transport projects—will lead to more resilient cities and communities and contribute to the achievement of the Sustainable Development Goals. Cities and their energy, transport, industry, and building systems, as well as the residents' lifestyle choices, have the greatest potential for reducing greenhouse gas emissions.

45. The PRC released a National Climate Change Adaptation Strategy in 2013, which indicated the types of adaptation measures that should be adopted, including enhancing risk management and improving disaster response systems affecting human health, infrastructure, and other private and public investments.²⁴ To implement the strategy, the NDRC, MOHURD, and other relevant line ministries released the Urban Climate Change Adaptation Action Plan in 2016.²⁵ However, the current technical standards for land use; urban master planning; and infrastructure and building construction, operation, and maintenance do not adequately incorporate climate change projections or the potential risks that they pose. Critical urban and urban-rural infrastructure and public and private fixed assets are not designed to withstand climate change-related shocks and stresses, and are not designed as systems to mitigate the impacts of disasters. The action plan needs to be complemented by technical guidelines; a framework defining institutional coordination and responsibilities; and implementation arrangements to enable city clusters, cities, and their rural hinterlands to plan and implement structural and nonstructural adaptation measures effectively, to mainstream urban climate-change adaptation in the PRC.²⁶

46. International lessons can be drawn from the experiences of many cities around the world with low-carbon development aimed at decarbonization following the 2015 Paris climate change agreement. For example, the city of Malmö, Sweden, developed an integrated master plan to ensure climate neutrality by 2020 by running all municipal operations on 100% renewable energy by 2030. Tokyo implements low-carbon climate-resilient planning through efficient transit and effective land use strategies to promote efficient urban centers, the redevelopment of brownfields and capture opportunities for infill development, improvement of suburbs and prevention of urban sprawl, and the protection of natural resources and farmland. In London, Milan, Oslo, Singapore, and Stockholm, carbon emission reduction has been achieved by applying emissions or congestion charges for vehicles entering these cities, to reduce private car use. These schemes improve air quality and increase the speed of public transport, the number of low-emission vehicles, and city revenues.

²⁴ Government of the PRC, State Council. 2013. *National Climate Change Adaptation Strategy*. Beijing.

²⁵ Government of the PRC, NDRC, and MOHURD. 2016. *PRC's Urban Climate Change Adaptation Action Plan* (in Chinese). Beijing.

²⁶ ADB, *Mainstreaming Urban Climate Change Adaptation*. This TA supports development of technical guidelines and pilot cities in their preparation of an action plan.

C. Healthy and Age-Friendly Cities Development

47. **An aging population and urbanization.** In the PRC, urbanization has coincided with a rapid demographic transition. Urban residents increased from 17.9% of the total population in 1978 to 59.2% in 2018, and they are expected to reach about 70% by 2030.²⁷ Meanwhile, the proportion of people aged 60 and older is expected to reach 18%–20% by 2030.²⁸ The elderly population will amount to 437 million in 2051, when one out of three people will be aged 60 and older, and the number of people aged 80 and above will rise to 90 million.²⁹ The elderly population in cities is increasing even faster, with about 52% of people over 60 years of age living in urban areas in 2015, compared with 34% in 2000.³⁰ This trend will increase the burden on elderly care systems in the PRC's cities.

48. **Health risks and urbanization.** The trend toward urbanization has brought significant health benefits to the urban population, such as better access to health services and increased average life expectancy (by about 6–7 years, compared with rural residents in 2010). However, health inequality also increased in urban areas. Impacts on people's health caused by urban environmental pollution from industry, energy production, transport, and households, causing economic losses estimated to be over \$70 billion during the first 6 months of 2015 alone.³¹ In addition, urban residents are subject to a higher prevalence of noncommunicable diseases than their rural counterparts—including cardiovascular disease, diabetes, cancer, and respiratory illnesses. Noncommunicable diseases have replaced infectious diseases as the leading cause of death among urban residents, accounting for more than 80% of the 10.3 million premature deaths annually and 77% of disability-adjusted life years lost in 2010, close to the share in Organisation for Economic Co-operation and Development countries of 83%. For populations aged 30–70 years, the probability of dying from cardiovascular disease, cancer, diabetes, or chronic respiratory disease is 19.5% in the PRC, compared with 9.3% in Japan and 14.3% in the US.³²

49. **Healthy China 2030 Plan.** To ensure that health issues would be prioritized in urban and economic development, the PRC launched the Healthy China 2030 Plan on 25 October 2016.³³ This plan calls for a “Health in All Policies” approach to disease prevention and health promotion in the PRC, emphasizing the importance of healthy urban planning, health impact assessment (HIA) as a mechanism for operationalizing the approach, and of cross-sectoral collaboration. The PRC is placing health at the center of urban, economic, and sustainable development; building an elderly care system, as well as mechanisms for assessing urban health risks; and preparing healthy city master plans, as outlined in the plan.³⁴

²⁷ UN DESA, Population Division, *World Urbanization Prospects: The 2018 Revision*.

²⁸ Q. Chen, E. Dietzenbacher, and B. Los. 2017. The Effects of Ageing and Urbanisation on China's Future Rural and Urban Populations. *Asian Population Studies*. 13 (2). pp. 172–197; Y. Zeng and T. Hesketh. 2016. The Effects of China's Universal Two-Child Policy. *The Lancet*. 388 (10054). pp. 1930–1938.

²⁹ *People's Daily*. 2006. China's Elderly Population Reaches 143 Million. 13 May. http://english.people.com.cn/200605/13/eng20060513_265381.html; Y. Wang, E. Gonzales, and N. Morrow-Howell. 2017. Applying WHO's Age-Friendly Communities Framework to a National Survey in China. *Journal of Gerontological Social Work*. 60 (3). pp. 215–231.

³⁰ J. Yang, J. G. Siri, Justin V Remais, et al. 2018. The Tsinghua–Lancet Commission on Healthy Cities in China: Unlocking the Power of Cities for a Healthy China. *The Lancet*. 391 (10135). pp. 2140–2184. [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(18\)30486-0/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)30486-0/fulltext).

³¹ Global Burden of Disease 2015 Mortality and Causes of Death Collaborators. 2016. Global, Regional, and National Life Expectancy, All-Cause Mortality, and Cause-Specific Mortality for 249 Causes of Death, 1980–2015: A Systematic Analysis for the Global Burden of Disease Study 2015. *The Lancet* 388 (10053): 1459–1544. [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(16\)31012-1/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(16)31012-1/fulltext).

³² World Bank and WHO. 2019. *Healthy China: Deepening Health Reform in China: Building High-Quality and Value-Based Service Delivery*. Washington, DC: World Bank. doi:10.1596/978-1-4648-1263-7.

³³ Government of the PRC, State Council, and the Central Committee of the Chinese Communist Party. 2016. *The Plan for “Healthy China 2030.”* Beijing.

³⁴ Government of the PRC, State Council, *National Climate Change Adaptation*.

50. **Healthy Cities pilots.** Cities in the PRC are also testing new strategies for urban health management, such as the Healthy Cities pilot project. The management of chronic diseases and mental disorders in the cities has improved dramatically, and major progress has been made regarding access to preventive and primary health services. All these efforts have helped reduce exposure to health risks and improved overall health in urban areas. Despite these successes, however, major gaps remain, including though not limited to an overreliance on a top-down approach to environmental management, a narrow focus on health care in urban health management, and a scarcity of intersectoral actions.³⁵

51. **Healthy Cities on an international scale.** As we become an urban species, and a grayer one, as well, it is imperative that cities and urban areas promote healthy lives and well-being for people of all ages, preferably in a holistic way. Policy makers around the world agree that placing people first, with a view to making cities more livable, should be the most important consideration in new urban developments and in adaptations of existing urban environments. Healthy Cities has become a key part of urban planning agendas in many countries. Since the middle of the 1980s, WHO has cooperated with various governments in their efforts to develop healthy cities. As for the PRC, its Healthy China 2030 Plan includes healthy cities as a major component.

52. **The historic relationship between health and urban development.** Many early city planners aligned urban design with health considerations, for instance by placing animal markets and hospitals outside cities, and during the Middle Ages by screening visitors at city gates for signs of plague.³⁶ Medical researchers and urban planners in London noted the rise of certain diseases when fountains were infected. In the 19th century, during the peak of industrialization and urban expansion in many European cities, local urban planners focused on improving sanitation and hygiene, and heavily invested in sewer systems and wastewater treatment.³⁷ Today, health conditions in urban centers are the current focus of much attention globally. WHO estimates that 24% of the global health burden stems from urban environments.³⁸ Recent literature identifies neighborhood design, housing, healthier food environments, natural and sustainable environments, and transport as key determinants of healthy urban settings.³⁹

53. **Healthy and age-friendly cities integrated with sustainable development.** The creation of healthy and age-friendly cities has become an integral part of urban development that is environmentally sustainable, socially inclusive, and economically competitive. This is critical everywhere. In developed countries, where basic needs are met and life expectancies have been extended, the challenge is often how to promote healthy lifestyles and healthy communities, while in developing countries, cities have to ensure that fundamental risks to health are addressed through improved access to safe drinking water, good sanitation, nutritious food, adequate clothing and shelter, and basic health care, as well as environments providing clean air and surface water, unpolluted soil, acceptable noise levels, and other environmental assets.

³⁵ J. Yang et al., The Tsinghua-Lancet Commission.

³⁶ L. J. Duhal and A. K. Sanchez. 1999. *Healthy Cities and the City Planning Process: A Background Document on Links between Health and Urban Planning*. Copenhagen: WHO Regional Office for Europe. <https://apps.who.int/iris/bitstream/handle/10665/108252/E67843.pdf?sequence=1&isAllowed=y>.

³⁷ P. Hall. 1996. *Cities of Tomorrow: An Intellectual History of Urban Planning and Design in the Twentieth Century*. Oxford, United Kingdom: Blackwell.

³⁸ S. Su et al. 2016. Public Health in Linkage to Land Use: Theoretical Framework, Empirical Evidence, and Critical Implications for Reconnecting Health Promotion to Land Use Policy. *Land Use Policy*. 57. pp. 605–618.

³⁹ E. Bird et al. 2017. *Healthy People Healthy Places Evidence Tool: Evidence and Practical Linkage for Design, Planning and Health*. Technical Report. Bristol: University of the West of England; M. Davern et al. 2016. *Quality Green Space Supporting Health, Wellbeing and Biodiversity: A Literature Review*. Report prepared for the Heart Foundation; SA Health; Department of Environment, Water and Natural Resources; Office for Recreation and Sport; and the Local Government Association (SA). Parkville, Victoria, Australia: University of Melbourne; WHO. 2007. *Global Age-Friendly Cities: A Guide*. Geneva. http://apps.who.int/iris/bitstream/handle/10665/43755/9789241547307_eng.pdf?sequence=1.

54. **Healthy and age-friendly cities priorities based on hierarchy of needs.** The overarching priorities of a healthy city are, first, the prevention of disease and, second, accessible health services that provide adequate diagnoses and treatment for all. Healthy Cities should thus follow a priority action plan based on Abraham Maslow's pyramid of needs, though adapted for urban health requirements. As a first step, applicable to developing countries, a healthy city should see that basic health needs are met, to ensure the physiological safety of people, with risks of exposure to communicable diseases eliminated or reduced to minimal levels. As a subsequent step, healthy lifestyles and healthy communities should be promoted; and the risks of noncommunicable diseases like cardiovascular diseases and cancer should be reduced, resulting in longer life expectancies. Finally, Healthy Cities should enable the self-actualization of citizens, families, and communities, considering all aspects of physical and mental health, as well as the need for vibrant and diverse human interaction, culture, and education.⁴⁰

D. Smart Cities Development

55. Smart cities development, in which information and communication technology (ICT) is used extensively for the management of urban systems, is important for future improved efficiencies. Cities and infrastructure must become “smarter” to function more efficiently and become more resilient. Smart systems utilize smart technologies based on ICT, infrastructure systems, utilities, and intelligent approaches to providing infrastructure and other social services. The integration of multiple smart ICT systems and associated manager, operator, and user applications with city assets offers a great potential for citizens to improve their quality of life and to be safer, healthier, and better informed.⁴¹ By applying innovative real-time digital systems, sensors, and data management, municipal governments can (i) deliver infrastructure with better service efficiency and access; (ii) improve transparency and interaction among city officials, businesses, and citizens; (iii) enable faster, more responsive, and more inclusive services and city planning; and (iv) facilitate the reduction of urban barriers based on income, gender, or physical location.⁴²

56. The PRC has already made great strides toward smart city development, which is included in the NUP and the 13th plan as a key objective of urban development. There are many examples of smart-city ICT applications in various sectors for monitoring and operating urban infrastructure and utilities, most notably in urban transport infrastructure and public transport. For example, in addition to the megacities, such as Beijing, Guangzhou, and Shanghai, smart-city ICT is being mainstreamed into Tier 2, Tier 3, and even into medium-sized cities. Smart technologies and innovations are widely used in urban transport, such as mobile phone applications for transit information; WeChat and/or Alipay and other real-time online payment systems on the smart phone for expressway tolls and bus ticketing; intelligent transport systems; facilities for road traffic management; and comprehensive software systems for managing traffic, and for public transit monitoring and management. In most PRC cities, bicycle use has been increasing, thanks to the invention of dockless bike sharing and an enabling market with rules enforced by a regulator.

57. Smart city applications are also used to improve the flow of cargo and logistics in ports and local urban cargo transport, as in Ningbo and Shanghai. Smart city water and wastewater systems are used in all the big cities, and in medium-sized cities such as Yanji, in Jilin Province. One example of a smart energy application is a demonstration project in Qingdao, Shandong Province: a low-carbon, energy-efficient

⁴⁰ N. Habib, S. Rau, S. Roth, F. Silva, J. Shandro. 2020. *Healthy and Age-Friendly Cities in the People's Republic of China: Proposal for Health Impact Assessment and Healthy and Age-Friendly City Action and Management Planning*. Manila: ADB. <https://www.adb.org/sites/default/files/publication/701026/healthy-age-friendly-cities-prc.pdf>.

⁴¹ ADB. 2016c. *Technical Assistance for Promoting Smart Systems in ADB's Future Cities Program*. Manila. <https://www.adb.org/sites/default/files/project-documents/49049/49049-001-tar-en.pdf>.

⁴² ADB defines 15 fields of action for smart cities, and recommends five enablers. See: S. Y. Yoon et al. 2020. *Smart City Pathways for Developing Asia: An Analytical Framework and Guidance*. ADB Sustainable Development Working Paper Series. No. 71. Manila: ADB. <https://www.adb.org/sites/default/files/publication/673441/sdwp-071-smart-city-pathways-developing-asia.pdf>.

district heating, cooling, and power-production and distribution system that does not rely on coal as its energy source. Instead, it uses natural gas, solar thermal energy, shallow-ground geothermal energy, and waste heat recovered from industrial plants. The project also demonstrates how a low-temperature district energy-distribution network can work, using a smart-energy management system. The system is expected to lower energy intensity by 40% and carbon intensity by 64% from the averages achieved by comparable systems now in use in the northern PRC.⁴³

58. **Yokohama and Japan's other smart cities.** The city of Yokohama has been at the forefront of developing its smart city management application and of disseminating its smart-city knowledge to other cities around the world. The Government of Japan also launched a program to build on the country's strength in innovative hardware development for promoting smart and integrated software applications for the benefit of urban management and efficiencies and user convenience. Japan spent the equivalent of about \$1.2 billion between 2010 and 2014 on the project. Many smart city projects in Japan focus on renewing social infrastructure using ICT applications. Smart grids are a priority for smart-city infrastructure systems. After the Great East Japan Earthquake, on 11 March 2011, the smart city concept experienced a paradigm shift: due to the electricity shortages following the associated Fukushima nuclear accident, smart cities became a necessity. To start with, a feed-in tariff system was introduced in July 2012 to fund the expansion of renewable energy generation. In addition to smart energy utilization, the element of disaster risk management is now considered an intrinsic part of the Japanese smart city concept. Social infrastructure for coping with aging is also seen as important. Eyeing the future, Japan intends to create its own type of smart city to export abroad. In the meantime, the government has selected eight coastal areas damaged by the Great East Japan Earthquake to be reconstructed using smart city technologies. To promote smart city application development, its integration, and wide use, the government is providing subsidies and tax incentives to support smart-city schemes.⁴⁴

59. **Songdo, a new smart city.** Another international example of a comprehensive smart city is the new city of Songdo, in the Seoul metro region. Built in 2003 on reclaimed land near the Incheon International Airport, Songdo is linked to the airport and the core city of Seoul via high-speed train. "Smart" in Songdo means environmentally sustainable, resource efficient, and safe for its residents—all this achieved through high technology that is programmed and linked by ICT. Songdo features state-of-the-art ICT throughout its urban systems, and features a single control center where all information comes together, decisions can be made, operations can be directed, and emergency response units dispatched. The smart city program mainly involves smart applications for transport, crime prevention, disaster prevention, and environment-and-citizen interaction; but services relating to homes, commerce, education, health, finance, and private vehicles are also being actively developed. The buildings were designed according to Leadership in Energy and Environmental Design (LEED) standards, and photovoltaic modules are installed on the rooftops of most of the residential and office high-rises. Rainwater is harvested and stored, while wastewater is treated and reused. Solid waste is collected in public bins near residential buildings that are connected to pipes leading to a treatment and transfer station through a vacuum pressure system. There is an extensive and safe bicycle path network and public bike-sharing scheme. Playgrounds for children are placed near residential buildings, and 40% of the area is devoted to green space. Sensors measure many dimensions of the environment (air, water, noise) and infrastructure capacity and use in real time. A total of 980 cameras monitor traffic flow and traffic safety, as well as safety in public spaces. Songdo is a living laboratory, and it is home to the headquarters of the Green Climate Fund.⁴⁵

⁴³ ADB. 2015c. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People's Republic of China for the Qingdao Smart Low-Carbon District Energy Project*. Manila. <https://www.adb.org/sites/default/files/project-document/176595/48003-002-rrp.pdf>.

⁴⁴ C. Pham. 2014. *Smart Cities in Japan. An Assessment on the Potential for EU-Japan Cooperation and Business Development*. Tokyo. <https://www.eu-japan.eu/sites/default/files/publications/docs/smartcityjapan.pdf>.

⁴⁵ S. K. Lee et al. 2016. *International Case Studies of Smart Cities: Songdo, Republic of Korea*. Washington, DC: Inter-American Development Bank. <https://publications.iadb.org/publications/english/document/International-Case-Studies-of-Smart-Cities-Songdo-Republic-of-Korea.pdf>.

60. **Smart water management in Seoul.** Another international example of a smart-city ICT application is the Seoul Metropolitan Water Supply Operation Center, the world's largest integrated multiregional (bulk) water supply facility. The center provides safe drinking water to over 10 million citizens, and it is the hub for water resource management, flood risk and early warning functions, and hydropower generation for the entire country. The center also operates dams, weirs, hydropower plants, gauging stations, and warning stations. The high-end information technology facilities are managed by K-water, which is also responsible for nationwide water-resource management. The center oversees the water-supply production and distribution system for the entire Seoul metropolitan area, and has a daily capacity of 790 million cubic meters.⁴⁶

61. K-water's Integrated Water Operation Center manages the country's water resources 24 hours a day, 365 days a year. K-water's smart water-management model streamlines water operations and processes. Using smart technologies, the K-water Integrated Water Operation Center is capable of online bulk water monitoring, rainfall and flood prediction and analysis, and water quality monitoring, among other functions. The ICT-based system consists of the (i) Real-time Hydrological Data Acquisition and Processing System, which gathers water-level, water quality, and other data via satellite imaging and other communication technologies; (ii) Precipitation Forecasting System, which predicts and measures rainfall; (iii) Flood Analysis System, which provides real-time flood analysis for flood control; (iv) Reservoir Water Supply System, which optimizes water supply by estimating demand; (v) Generation Integrated Operation System, which monitors dam and weir operations remotely; (vi) Satellite-based Flood Forecasting and Warning Equipment, which provides flood forecasts and early warnings based on satellite data; and (vii) Water Disaster Monitoring System, which monitors hydrological data through a geographic information system, closed-circuit television cameras, and other tools.

E. Urban Rehabilitation

62. **Recent urban policy developments.** In December 2015, during the Central City Working Conference, President Xi Jinping emphasized that it was important to focus on the development of sustainable and livable cities. He pointed out that the PRC's cities needed to increase development intensity; limit industrial capacity; rehabilitate the existing urban and industrial land and building stock; improve the quality of life, based on national and local conditions; respect and protect nature and ecosystems; and improve the urban ecological environment. Similarly, addressing the need to further strengthen the management of urban planning and construction, the Central Committee of the State Council pointed out in 2016 that incremental urban development should be governed by strict control mechanisms, and that activating and rehabilitating existing land and building stock would be a priority for urbanization management, as well as optimizing and gradually adjusting urban land use to ensure that the natural environment is protected; balancing the requirements for construction sites with the protection of farmland; and promoting intensive urban development, including through infill development in existing urban areas. The National Land Planning Outline, 2016–2030 included the objectives of utilizing existing building stock and other construction already served by infrastructure, and reducing the proportion of industrial land. Urban rehabilitation planning that seeks to improve and upgrade existing urban areas is thus well-established as a priority, but there are several types of rehabilitation planning, including (i) old urban core renewal and transformation; (ii) comprehensive environmental regulatory planning; (iii) traffic improvement and infrastructure upgrading; (iv) heritage protection and landscape protection planning; (v) industrial upgrading and local industry chain planning; and (vi) land rehabilitation, preparation, and relocation planning.

⁴⁶ J. Nam. 2017. Case Study: Sustainable Water Management for Smart Cities. *Development Asia*. 25 September. <https://development.asia/case-study/sustainable-water-management-smart-cities>.

63. The lead cities of Beijing, Shanghai, and Guangzhou have already engaged in successful urban rehabilitation, creating pilot demonstration areas with human-scale streets, lanes, buildings, and urban spaces; a diversity of uses; urban vibrancy; and a diversity of venues where people can walk and mingle. These areas have attracted a highly educated and creative domestic and international workforce. The creation of some of them involved the restoration or rehabilitation of historic sites, and of former residential, commercial, or industrial complexes. They have been expanded to create pockets of connective urban fabric—for instance, in the case of Xintiandi, Tianzifang, and other areas in Shanghai; Shichahai in Beijing; and urban villages in Guangzhou—all of which are served by public transit (subways and/or bus rapid transit). Lessons have been learned from these and other developments that should be mainstreamed. However, the real challenge will be turning the residential compounds built since 1980 into livable, sustainable, and urbane places.

Revived and renewed in Shanghai. The historic city center of Jiading, a suburb northwest of Shanghai (above left), was successfully rehabilitated, while Tianzifang, an old residential area in central Shanghai (above right), was transformed from an old residential district into a popular enclave of boutiques and restaurants (photos by the author).

64. International lessons can be learned from the urban rehabilitation and retrofitting experiences of many places including Boston, Paris, Seattle, Seoul, and Stuttgart, where major highways built in the 1960s were placed underground, at a high capital and political cost, or were replaced with water channels bordered by green spaces, and where urban spaces were restored for people to use at grade. Lessons can also be learned from the rehabilitation of Parisian neighborhoods originally built in the 19th century, and from Barcelona's famous Eixample area, a very large urban expansion designed and built in the second half of the 19th century. Eixample is currently being rehabilitated to reflect contemporary needs and lifestyles, with the adaptation of old buildings to new uses and the creation of more green spaces and spaces for children and the elderly. In Germany, the planning law requires a preliminary assessment involving local residents and building owners before a major development project is undertaken. In the former East Germany, some districts with superblocks that had been built in the 1970s were transformed into attractive, human-scale enclaves of small streets and lanes. Precast-concrete 11-story buildings were replaced with three-story structures that were rearranged into smaller blocks. An example from Berlin urban rehabilitation is in Figure 3 and Figure 4.

Figure 3: Rehabilitation Plan for Berlin's Central District

Note: The map shows Berlin's central district's rehabilitation program as of April 2011 and since 1995. The areas marked in red show active rehabilitation areas. Those in yellow were completed before 1995, those in orange were completed before 2003–2004, those in blue were completed before 2007, in light green before 2008, and in purple before 2009.

Source: Central Berlin District Office. Redevelopment Areas. <https://www.berlin.de/ba-mitte/politik-und-verwaltung/aemter/stadtentwicklungsamt/stadtplanung/staedtebaufoerderung/sanierungsgebiete/> (in German).

Figure 4: A Section of Berlin's Urban Rehabilitation Project

Note: The map shows Berlin's rehabilitation of the area surrounding the avenue Turmstrasse. The shades of red indicate the level of rehabilitation and/or reconstruction required for residential buildings, the shades of blue indicate the level of rehabilitation and/or reconstruction needed for light-industry buildings and sites, and the shades of purple show the level of rehabilitation needed for public buildings. The project also included the upgrading of green spaces.

Source: Central Berlin District Office. Redevelopment Areas. <https://www.berlin.de/ba-mitte/politik-und-verwaltung/aemter/stadtentwicklungsamt/stadtplanung/staedtebaufoerderung/sanierungsgebiete/> (in German).

F. Urban–Rural Integration and the Upgrading of Towns and Villages

65. Many residents of rural areas still suffer from low incomes, and from a lack of adequate infrastructure and of urban–rural linkages. A significant challenge that is unique to the PRC is its history of rural policies and systematic settlements, with large numbers of small natural villages supported by subsistence farming spread throughout vast rural territories.⁴⁷ Populations and settlements that are so widely dispersed are difficult to efficiently serve and connect. In addition, there is the demographic shift that has left elderly people in the villages taking care of their grandchildren, while their working-age sons and daughters move to the cities for better job opportunities. This practice often splits up families in the PRC.

66. Another related challenge is the dual household registration system *hukou*, which benefits the residents of rural areas with the right to use collective village land, as a form of social security. This is based on a land quota system that grants limited urban land use rights to each province to maintain basic farmland, and thus ensure food security. Currently, rural land use rights, which are administered by the village collective, cannot be exchanged for land in urban areas. The *hukou* system should be reformed, with a step-by-step transition to a more equal allocation of land resources, and with the introduction of a more unified land-valuation system that would allow rural residents to benefit from land value appreciation, i.e., from urban development.

67. Key developmental challenges in the PRC include balancing and integrating urban and rural development; mitigating socioeconomic disparities; reducing gaps in income, services, and infrastructure; and narrowing the inequality of access to social welfare services due to the dual *hukou* system. Policies and programs addressing these challenges were included in the PRC's National New-Type Urbanization Plan (NUP); Thirteenth Five-Year Plan, 2016–2020 (13th plan); and in the government's rural vitalization strategy (2018). Important complementary aspects of urban–rural development to consider are (i) economic development; (ii) socially inclusive development; (iii) environmentally sustainable development; (iv) connectivity, services, links, and infrastructure; and (v) institutions and governance. Provincial NUPs have been produced, and they typically aim to (i) increase the urban proportion of the registered household population; (ii) remove the dual *hukou* system; (iii) develop and improve small and medium-sized cities; and (iv) upgrade the quality of life in rural areas. The PRC government's rural vitalization program is addressing most of these challenges, and broad and thorough implementation is recommended, and also supported by ADB.

68. Jiangsu Province is one of the outstanding cases of best practices for urban–rural integration and rural upgrading in the PRC, among other policy areas. The province completed its environmental improvement program in about 149,000 villages by 2014, which account for more than three-quarters of the natural villages in the province. The process of improving the rural environment has become a matter of highlighting and protecting the rural characteristics of the province. The natural ecological environment of the villages has been well protected and utilized, and the traditional morphological pattern and landscape characteristics have been protected and preserved for future generations. Actions included environmental cleanups, including the removal of accumulated garbage and regular solid-waste collections; the cleaning and dredging of rivers, ditches, and ponds; the rehabilitation of surface water environments; and the management of flood risks. The program transformed Jiangsu's rural environment from dirty and disorderly to clean, hygienic, and orderly. The program also included the preservation and renovation of famous historical, cultural, and traditional villages. The pleasant features of traditional villages, including the famous water towns, were preserved and restored, as well as

⁴⁷ “Natural” villages are those that can trace their history to before 1949, and even further back, to the Qing or Ming dynasties. This term is used in contrast to “administrative” villages, which were structural integration of neighboring villages during the early Mao years, before collectivization. Note that an administrative village might contain two or more natural villages.

buildings and public spaces, which retained their human scale. Culture, traditions, and local crafts were revived; and an organic and integrated spatial relationship with the natural and agricultural surroundings was restored. Many of these villages became famous tourist attractions, and thus enjoy public interest as well as greater revenues.⁴⁸

69. Jiangsu Province also expanded the infrastructure and public services in the villages, and the degree of improvement in the infrastructure and facilities has increased rapidly. The water supplies provided to the villages increased to 39% coverage after 2000; waste collection coverage improved to 84%; sewerage and drainage coverage increased to 87%; and public health service coverage reached 58%. In addition, access to entertainment and sports facilities and events reached 83%. As most of the rural houses had already been renovated or were relatively new (i.e., built after 1990, which comprised 57% of the housing stock), the improvement works respected the farmers and prevented any unnecessary large-scale removal or construction of houses. As much as possible, the residents' living conditions were improved, but with the original form of the village preserved. Small investments thus garnered great social and environmental benefits. Special funds allocated from the provincial and municipal budgets in 2011 and 2012 for the rural-environment renovation comprised only 3.8% of the budget for municipal public-utility construction in 2011. However, significant gaps remain in the coverage and service levels of urban and rural infrastructure and public service facilities; and the situation is worse in rural areas, due to the deep and long-term urban–rural divide.

Jiangsu Urban–Rural Integration and Rural Village Upgrading Program. The attractive scenes shown here are of villages in Jiangsu Province that were rehabilitated and improved under the provincial government's urban–rural integration and rural village upgrading program (photos by the Jiangsu Provincial Department of Housing and Urban–Rural Development).

⁴⁸ Jiangsu Provincial Department of Housing and Urban–Rural Development. 2014. *Policies and Programs of Urban–Rural Integration in PRC: Case of Village Environment Improvement, Jiangsu Province*. Presentation prepared for the ADB–Tongji Urban Knowledge Sharing Workshop Shanghai: Balancing and Integrating Urban–Rural Development in the PRC. Shanghai. 13 November.

70. International best-practice lessons may be drawn from programs in various regions and countries, among them the EU Partnership for Sustainable Urban–Rural Development, a preparatory program agreed to by the European Parliament in 2010, and managed by the European Commission. This program aimed to (i) analyze territorial partnership practices for towns, cities, and rural areas; (ii) achieve better cooperation among different actors in developing and implementing urban–rural initiatives; (iii) promote territorial multilevel governance; (iv) assess possible economic and social gains from enhanced urban–rural cooperation; (v) identify the potential role of urban–rural partnership in improving regional competitiveness and regional governance; and (vi) see how the EU funding through the European Regional Development Fund and the European Agricultural Fund for Rural Development can best be used to support urban–rural cooperation.⁴⁹

71. Lessons from the EU program showed that (i) urban–rural partnerships require a high level of engagement by local political, business, and community leaders and communities; (ii) linkages are the basis for urban–rural partnerships (e.g., road and regional public transport associations); (iii) shared identity, goals, and solutions for challenges are essential; (iv) time is required to build trust between the parties; (v) many small steps, in the form of specific projects, are needed that can lead to immediate local improvements; (vi) a robust legal and financial cooperation framework is needed, with support from the EU and the national governments; and (vii) the collaborators must be diverse and highly motivated, as the participants include local urban and rural governments, institutions, the private sector, and community representatives and residents. Stakeholders worked together with people from government, business, academia, and civil society. The projects were funded by, and carried out in, various EU countries, including Austria, Finland, Germany, Hungary, Italy, Portugal, and Sweden, with a later program also in Poland.⁵⁰

72. Germany has carried out many programs under the auspices of its states since the 1970s and after the reunification in the 1990s in eastern states, through a multilayered system of programs and associated funding, including support from the EU, and national, provincial, and local sources. The southeastern state of Bavaria, for example, had a program between 1981 and 2001 to upgrade villages by building infrastructure and public spaces, improving public services; revitalizing schools and cultural institutions in consultation with the communities; and, along with reforms of the agriculture sector, by making farming businesses more efficient through landownership reform and the provision of agricultural infrastructure, such as small farm roads and drainage, as well as shared facilities for local value addition. Administrative regulations and guidelines were included. Also, urban designs for the participating villages were carried out and were integrated with transport planning that involved some bypass roads, as well as ecological protection and improvements. Over 1,400 villages were upgraded, at a total cost of about €750 million (about \$880 million equivalent), leveraging a total investment of about €2.1 billion (about \$2.5 billion equivalent). Economic development grew by 15% per year on average for the participating villages, with livelihoods and real estate values significantly improving as a result of the program. Bavarian villages are especially attractive, and the province's rural areas enjoy a positive reputation, so they benefit from agritourism, partly due to the village revitalization program.⁵¹

⁴⁹ J. Artmann et al. 2012. *Partnership for Sustainable Rural–Urban Development: Existing Evidences*. Berlin and Brussels: Deutscher Verband für Wohnungswesen, Städtebau und Raumordnung e.V. (Berlin); European Commission, Directorate-General for Regional and Urban Policy (Brussels); and the Federal Institute for Research on Building, Urban Affairs and Spatial Development (Berlin). <https://op.europa.eu/en/publication-detail/-/publication/21ba8cd7-7436-4347-bf62-2f179a0e8747>; European Commission. Urban–Rural Linkages. https://ec.europa.eu/regional_policy/en/policy/what/territorial-cohesion/urban-rural-linkages/.

⁵⁰ Artmann et al., *Partnership for Sustainable Rural–Urban Development*.

⁵¹ Government of the Free State of Bavaria, Bayerisches Staatsministerium für Landwirtschaft und Forsten (Bavarian State Ministry for Agriculture and Forests). 2001. *Dorferneuerung in Bayern 1981–2001*. Munich.

G. Metropolitan and City Cluster Governance

73. **Metropolitan areas or metropolitan “circles,”** as referred to by planners in the PRC, encompass one megacity (more than 10 million residents) or metropolitan city (more than 1 million residents) surrounded by medium-sized and smaller cities, towns, and villages.⁵² They can be considered single labor markets whose aim is to link most places within a 1-hour traveling radius from the urban core by public transport, enabling economic and supply-chain integration and daily commutes to jobs. Planners in the PRC are working to create mechanisms for closer cooperation within these metropolitan circles, as they are easier to manage and organize, with fewer administrative entities, compared with the much larger city clusters.

74. **City clusters in the People’s Republic of China.** City clusters comprise one or more megacities, or a megacity and metropolitan cities, or a range of small and medium-sized cities, and their rural hinterlands. City clusters are very large, and in terms of their territories and populations, they are often the same size as European countries.⁵³ Currently, only a few of the conceptualized city clusters in the PRC are highly integrated, effectively and efficiently linked throughout their territories, and coordinated by regular mechanisms and institutions. For all 19 clusters planned during the 13th plan period, plans were prepared and mechanisms discussed and, in some cases, initiated. However, further policies and measures are needed to make them more effectively coordinated across their administrative territories, so that they can function as integrated clusters. Places within clusters would be within a 1 hour–2.5 hour traveling radius. In the international context, city clusters are referred to as “mega-urban regions.” Whatever the term used, the PRC has had little to no prior experience but had the ambition regarding the coordination of planning and governance at least as early as 2006 in its national urban system plan.

75. **Importance of city clusters and improved coordination.** City clusters are economic engines and population magnets that generate the most economic value in our rapidly urbanizing world.⁵⁴ The GDP of 17 key functional city clusters as a share of the PRC’s total GDP was 90.5% in 2016, and the population share was 82.8%, compared with a land-area share of 29.6%. These 17 functional city clusters accounted for 89.8% of the built-up land in the PRC.⁵⁵ Almost all of the 19 city clusters included in the 13th plan experienced relatively high GDP growth between 2012 and 2016, significantly above the national average. Ten of these city clusters had GDP growth of above 40% over the 4-year period, five had growth of over 20%, and three had 10% growth, while only one suffered economic decline. However, city clusters also generate the highest carbon emissions, pollution, and environmental degradation. They also suffer the greatest loss of natural green land, and would benefit from more ecosystems services, and they lose farmland due to inefficient land use and uncoordinated sprawling development.

76. **Fragmentation as the key obstacle.** City clusters in the PRC also face fragmentation. Multiple administrative entities coexist within clusters, each with independent authority over tax and budget systems, land use planning, transport infrastructure and traffic management, industrial park development, open space planning and environmental protection, and even over labor markets (through *hukou* and

⁵² The United Nations defines the world’s urban hierarchy as composed of megacities, with more than 10 million inhabitants; large cities, with 5 million–10 million; and medium-sized cities, with 1 million–5 million. The other categories are defined as cities with 0.5 million–1 million; cities with 300,000–500,000; and urban settlements, with fewer than 300,000 inhabitants. See: UN DESA, Population Division, *World Urbanization Prospects: The 2018 Revision*.

⁵³ City clusters in the PRC are composed of more than one metropolis, with strong existing or potential connectivity; and they also include suburban areas, peri-urban areas, medium-sized and smaller cities, towns, villages, and the surrounding hinterlands.

⁵⁴ United Nations Human Settlements Programme (UN-Habitat). 2016. *World Cities Report 2016: Urbanization and Development; Emerging Futures*. Nairobi. <https://unhabitat.org/sites/default/files/download-manager-files/WCR-2016-WEB.pdf>.

⁵⁵ NDRC and Baidu. 2018. *Study on City Clusters*. City of Publication. <http://huiyan.baidu.com/cms/report/zhongguochengshiqunyanjiu> (in Chinese).

related systems). While cooperation and institutionalized coordination started among jurisdictions in city clusters as early as in the 1990s in some of the eastern city clusters of Beijing–Tianjin–Hebei (BTH), Yangtze River Delta (YRD), and Pearl River Delta (PRD, Box 1), more coordination across local administrative boundaries within city clusters needs to happen. And since most city clusters straddle the boundaries of provinces, city cluster governance coordination across provincial boundaries also needs to be arranged. Economic growth of the PRC's key city clusters has already been significant (Table).

Box 1: Pearl River Delta City Cluster: Growth and Expansion through Reform and Integration

The Pearl River Delta (PRD), in the southeastern part of Guangdong Province, People's Republic of China (PRC), is one of the largest and most dynamic city clusters in the world. This polycentric urban cluster is composed of Hong Kong, China; Macau, China; and 12 natural cities.^a The PRD has experienced one of the most rapid urban expansions in human history: its built-up area increased from 11,000 square kilometers in 1992 to 20,000 in 2016, and its population grew from 26 million in 2000 to 60 million in 2016, transforming a largely agricultural region into a large metropolis.

The delta is one of the world's most productive economic subregions, growing 12% annually in the 2010s, and having a gross domestic product estimated at more than \$1.2 trillion in 2017. Although the subregion accounts for less than 1% of the PRC's land area and just 5% of its population, the PRD attracts more than 20% of the country's foreign direct investment, and generates more than 12% of its gross domestic product and 25% of its exports.^b

The PRD subregion is a story of growth led by manufacturing, though its growth also involved a planned approach to regional integration that included a series of reforms. In 1979, the Government of the People's Republic of China allowed three cities in Guangdong Province (Shantou, Shenzhen, and Zhuhai) to set up special economic zones to attract foreign investment. The cities were each granted greater political and economic autonomy, and they played a major role in triggering rapid investment and cluster expansion in the PRD.

In 1988, Guangdong Province was designated a “comprehensive economic reform area,” with powers to set its own economic direction. This helped create the Shenzhen Stock Exchange and an attractive land lease system. In 2008, the PRC announced plans to weave the nine PRD cities into one single megacity. Large-scale infrastructure projects have since been underway to merge transport, energy, water, and telecommunication networks across these nine cities. An intricate rail network featuring three circular and eight outbound routes will be built by 2020, forming a “one-hour intercity circle.” In 2017, the government established the Guangdong–Hong Kong, China–Macau, China Greater Bay Area Development Agreement, aimed at integrating Hong Kong, China and Macau, China with the existing nine cities in the PRD cluster. A 55-kilometer bridge-and-tunnel system was built in 2018 to link Zhuhai to Macau, China and to Hong Kong, China. In February 2019, the PRC issued a more detailed development plan for the China Greater Bay Area through 2035.

^a Natural cities are defined with reference to the physical parameters of contiguous built-up urban areas, using nighttime-light satellite imagery combined and overlaid with population and street grid data at a certain density. This definition is an alternative to definitions by administrative area, as used in many countries. The term “natural cities” is used by this study to unify the meaning of “cities” and “urban areas” across different countries in the Asia and Pacific region, which may have varying definitions of “city” and “urban.”

Box 1 continued.

^b S. Groff and S. Rau. 2019. China's City Clusters: Pioneering Future Mega-Urban Governance. *American Affairs*. III (2). pp. 134–150. <https://americanaffairsjournal.org/2019/05/chinas-city-clusters-pioneering-future-mega-urban-governance/>; J. Shikha, S. Raghuram, and S. Awasthi. 2019. Exploring Strategies for Planned Urban Cluster Development in South Asia. *ADB South Asia Working Paper Series*. No. 64. Manila: Asian Development Bank. <https://think-asia.org/bitstream/handle/11540/9967/swp-064-urban-cluster-development-south-asia.pdf?sequence=1>.

Source: Asian Development Bank. 2019b. Fostering Growth and Inclusion in Asia's Cities. In *Asian Development Outlook 2019 Update*. Manila. <https://www.adb.org/sites/default/files/publication/524596/ado2019-update.pdf>.

The Evolution of the Pearl River Delta City Cluster

Note: The calculations of the extent of urban areas are based on nighttime light satellite imagery.

Source: Asian Development Bank.

Table: City Cluster Economic Outputs, 2012 and 2016

City Cluster	GDP, 2012 (CNY100 million)	GDP, 2016 (CNY100 million)	GDP Change, 2012–2016 (CNY100 million)	GDP Change, 2012–2016 (%)
Beijing–Tianjin–Hebei	39,476.41	56,063.49	16,587.08	42.02
Yangtze River Delta	107,341.88	148,656.17	41,314.29	38.49
Pearl River Delta	47,294.12	66,926.22	19,632.10	41.51
Central Yangtze River	50,277.12	72,619.25	22,342.13	44.44
Harbin–Changchun	22,751.83	25,510.88	2,759.05	12.13
Chengdu–Chongqing	32,072.39	45,642.18	13,569.79	42.31
South–Central Liaoning	23,025.47	19,037.20	(3,988.27)	(17.32)
Shandong Peninsula	50,883.81	67,215.31	16,331.50	32.10
West Strait	33,661.93	48,019.52	14,357.60	42.65
Hohhot–Baotou–Erdos–Yulin	12,211.79	14,192.20	1,980.41	16.22
Central Shanxi	3,297.33	4,046.70	749.37	22.73
Central Plain	48,679.54	65,016.54	16,337.01	33.56
Beibu Gulf	12,047.64	17,481.71	5,434.07	45.10
Ningxia Yellow River	1,577.34	2,912.84	1,335.49	84.67
Guanzhong Plain	11,746.87	16,459.55	4,712.68	40.12
Lanzhou–Xining	3,057.32	4,785.89	1,728.56	56.54
Central Guizhou	4,141.35	7,512.41	3,371.06	81.40
Central Yunan	6,758.93	9,342.66	2,583.72	38.23
Tianshan North Slope	4,039.45	4,653.45	614.00	15.20

( ) = negative, CNY = Chinese yuan, GDP = gross domestic product.

Note: The 19 city clusters listed in this table are those covered by the Thirteenth Five-Year Plan, 2016–2020.

Sources: Asian Development Bank; Government of the People's Republic of China, National Bureau of Statistics of China. 2017. China Statistical Yearbook 2017. Beijing: National Statistics Press.

77. **Opportunities for improved city cluster coordination.** Effective city cluster governance would unleash a wide range of benefits. Improved connectivity would enable the development of an integrated labor market, as well as reasonable daily commute times for workers across these very large regions. An articulation of industry clusters would enhance competitive advantage through better-coordinated marketing for tourism and other industries, thereby improving the wider region's economic performance. Each cluster could also have an intercity rail system linking its larger and smaller cities and districts, which could be divided into walkable, mixed-use neighborhoods centered around public-transit or regional commuter-rail stations. In addition, coordinated regional open-space systems could be planned with parks, farmland, forests, river estuaries, and wetlands, thereby providing multiple ecosystem services. And these services would include recreation, as well as environmental and flood-risk management. All these changes would make city clusters more sustainable, livable, inclusive, and competitive.⁵⁶

⁵⁶ S. Groff and S. Rau. 2019. China's City Clusters: Pioneering Future Mega-Urban Governance. *American Affairs*. III (2). pp. 134–150. <https://americanaffairsjournal.org/2019/05/chinas-city-clusters-pioneering-future-mega-urban-governance/>.

78. **Objectives for city cluster development in the 13th plan.** The 13th plan aims to improve the distribution, layouts, patterns, and efficiency of 19 city clusters through their development along east–west and north–south corridors.⁵⁷ The plan calls for the establishment of sound mechanisms for coordinating the development of these city clusters, as well as a more effective division of industrial labor, infrastructure enhancement, ecological conservation, and environmental improvement between and within the clusters, which are located in various regions. This is to realize integration and efficient development that would generate benefits at both the national and city-cluster levels. Priorities include institutional innovations; urban–rural integration; and improved transport systems within city clusters, especially intercity rail systems and suburban rail, led by clusters with Tier 1 cities. The 13th plan aims to coordinate and develop urban transport hubs, civil aviation and port clusters, and commercial and industrial clusters within the city clusters. The more mature city clusters along the PRC’s east coast aim at optimization, while the lesser-developed city clusters in the central, western, and northeastern PRC are targeted for coordination improvements. General urbanization policies, such as those laid out in the NUP, also apply to cities within clusters; among these policies are the strengthening of small and medium-sized cities, urban–rural integration, and rural upgrading.

79. **Recent findings from city cluster coordination efforts in the People’s Republic of China.** The plans for coordinated development for all 19 city clusters included in the PRC’s 13th plan have been completed, covering the short- and medium-term horizons. They offer recommendations for spatial structures; describe the hierarchies, roles, and economic profiles of places within the clusters; and define what constitutes metropolitan circles and development belts along the transport corridors. Some plans also include growth boundaries, ecological zones, and green belts. The PRC’s achievements in city cluster coordination have resulted from both *top-down* policies and infrastructure systems (e.g., national high-speed rail networks within clusters) and *bottom-up* governance and investments (including municipal-level *hukou* reform and infrastructure such as subway networks). *Top-down* national policies include industrial policies like Made in China 2025, regional policies like the Yangtze River Economic Belt, and foreign policy programs like the Belt and Road Initiative, as well as a range of spatial development policies like the PRC’s *large-scale functional zoning*, which was done on a national scale. National infrastructure investments have significantly improved city cluster connectivity and services. High-speed rail, highways, waterways, airport and port planning, electricity production and transmission, south-to-north water transfer, and other projects have bolstered the city clusters. The high-speed rail network already connects many of the first-, second-, and third-tier cities within the city clusters, and enables daily commutes for workers and students between the major centers. It also enables equally important business travel, such as when managers travel to meet suppliers. *Bottom-up* achievements come primarily from municipal-level policies and infrastructure—including subways and road networks, water supply projects, pilots for *hukou* reform and social protection systems, urban–rural integration, and rural upgrading pilots that have created benefits beyond municipal borders. Nevertheless, it should be pointed out that, while the PRC has accomplished much in pioneering mega-urban regional governance, more needs to be done if the country is to reap the benefits described above.⁵⁸

80. **Governance and institutional development.** While some achievements have been realized, much remains to be done in the key overarching area of governance to enable the coordination of various priority activities. The YRD Council was established in 1992, and has held annual or biannual meetings ever since. The YRD Regional Cooperation Office was created in June 2018. The BTH has been cooperating since 2005, and has regular high-level meetings plus working groups on policies regarding air pollution reduction and environmental management, industrial relocation, connectivity, and transport. The PRD has governance mechanisms enabled by the Guangdong provincial government, as well as horizontal partnerships, such as one involving intensive cooperation between Foshan and Guangzhou that includes a subway line linking the two cities. Chang–Zhu–Tan is the cluster of the greater Changsha

⁵⁷ Government of the PRC, State Council, *The 13th Five-Year Plan for Economic and Social Development*.

⁵⁸ Groff and Rau, *China’s City Clusters*.

metropolitan region, in Hunan Province, which includes Xiangtan and Zhuzhou, two cities that have engaged in a formalized partnership since 2005, addressing many activities based on regular high-level meetings. However, governance coordination has much room for improvement.

81. **International examples of city cluster governance.** The PRC is pioneering mega-urban governance. While international examples of city clusters of a similar scale to the ones in the PRC do exist, effective coordination on that scale is rare; and where it does exist, it is typically limited to transportation. For example, in the US, the Northeast Megalopolis, which extends from Boston to Washington, DC, had plans for a high-speed rail network in the 1990s, but only one section of the line—from Washington, DC to New York City—was completed. The Pacific Belt of Japan (i.e., the Tokyo–Nagoya–Osaka corridor) is linked by the Tokaido Shinkansen high-speed train. The Blue Banana, which stretches from Manchester, in the United Kingdom, to Milan, in Italy, coordinated on rail connectivity that facilitates the transport of goods across four countries.

82. Population density maps combined with statistical data on local economics for the US show that the country's entire economy is dominated by a few city clusters, including the Northeast Megalopolis, which has a population of about 52 million people. There have been plans for improved infrastructure within these clusters and across the US, including high-speed rail networks, and California has taken steps to construct the first major line. However, coordination within and across states has not yet been institutionalized. In the Pacific Belt, also known as the Tokaido Megalopolis, the Tokaido Shinkansen line connects the region's more than 80 million residents. Europe's Blue Banana encompasses a population of more than 100 million. There have been some subregional connectivity efforts, including a rail link between the port cities of Rotterdam in the Netherlands, and Genoa in Italy. And the EU has had some policies to connect its regions on a smaller scale.⁵⁹

83. **Metropolitan governance.** While larger-scale coordination remains rare and limited, there are many international examples of effective metropolitan governance from which the PRC could draw lessons.⁶⁰ For example, more than 50 metropolitan regions in Europe are organized into the Network of European Metropolitan Regions and Areas (METREX) to represent their needs in the EU. Some municipal functions in the EU and the US are subject to cross-jurisdictional governance, with each jurisdiction having its own authority, responsibilities, and budget. In Germany, the Stuttgart and Hanover regions have each elected parliaments and regional directors, which have the authority and budgets to plan and operate their regional commuter rail systems, among other activities (Box 2). They also carry out land use planning; promote transit-oriented development (TOD), regional open spaces, and bicycle path networks; and they coordinate economic-development promotion and the planning of industry locations, as well as tourism planning and marketing. In Japan, the Greater Tokyo region is governed directly by an office within a national-level ministry.⁶¹

84. In the US and Canada, municipal governance (smaller in scale than the PRC's city clusters, but still extended across many local administrative boundaries) was first promoted in the early 20th century, when the US Census introduced metropolitan statistical areas. Forming the metropolitan statistical areas helped the US to account for urban and suburban growth beyond the administrative boundaries of large cities. The metropolitan statistical areas encompass various forms of cooperation, including that between the municipal governments and businesses and neighboring governments. In 1898, Greater New York was created when the city consolidated five counties within its borders, making it the world's

⁵⁹ Groff and Rau, *China's City Clusters*.

⁶⁰ For an extensive global review of metropolitan governance, see: M. Andersson et al. 2016. *Metropolitan Regions as Governance Systems: Unpacking Metropolitan Governance for Sustainable Development*. Bonn and Eschborn: Deutsche Gesellschaft für Internationale Zusammenarbeit; and Nairobi: United Nations Human Settlements Programme (UN-Habitat). https://www.metrosite.org/sites/default/files/resources/Unpacking%20Metropolitan%20Governance_case%20studies.pdf.

⁶¹ Government of Japan, Ministry of Land, Infrastructure and Transport. 2006. *White Paper on National Capital Region Development (2006)*. Tokyo.

The Stuttgart Regional Association comprises six municipalities, 179 communities, and 2.7 million people. It was founded by provincial legislation in 1994, and has an elected regional parliament that governs various aspects of planning, among them the balanced and coordinated development of a road network; public transport, including regional rail; traffic management; and open space protection. It also has authority and budget control over regional planning, and operates the regional rail and bus lines. Below are maps showing the association's plan for park-and-ride facilities along the rail lines and its plan for open spaces.

[illegible]

<https://www.region-stuttgart.org/index.php?elD=dumpFile&t=f&f=682&token=5d584afc521d2491a202126da5d2d600e8192c77>.

largest city at the time. In 1929, the Regional Plan of New York and Its Environs was established to guide investment; and in 2017, the fourth such plan was published, with far-reaching investments in regional rail transport, open spaces, a regional trail system, and climate change resilience. In the US, various forms of cooperation exist, such as business-led voluntary cooperation between neighboring governments, as well as taxation partnerships. Many “special districts” have been established as a form of cross-jurisdiction governance for one or a set of specific functions, such as airports, ports, rail, commuter rail, subways, toll roads, bridges, parks, water supply, irrigation, and many others.

85. **Economic cluster development coordination.** The relationships among cities within clusters have mostly been characterized by competition to attract companies, jobs, and qualified workers (“talent”). However, more benefits could be gained from improved cooperation.⁶² Achievements could include (i) the uplifting of the economic profiles of the three global cities of Beijing, Guangzhou, and Shanghai, thus increasing their roles as places for government; (ii) acquisition of high-value knowledge; and (iii) more developed service economies based on finance, insurance, real estate, etc., depending on the very different competitive advantages of the three cities. Such a strategy would benefit from the ongoing deindustrialization of these cities, a trend that is already largely completed in Beijing. The PRC’s leading cities should be centers of innovation, science, technology, and research and development (R&D). Policies and activities have included the successful deindustrialization of core cities and relocation of manufacturing industries within supply chain areas of the BTH, YRD, and PRD city clusters.

86. Shanghai remains highly industry-dependent, and is strongly connected through supply-chain links throughout the YRD city cluster. In that cluster, Ningbo engages in manufacturing (often with firms), while Hangzhou has taken on corporate management and R&D tasks. Beijing has deindustrialized to a greater degree, and the increased connectivity within the BTH cluster has led Tianjin to become a stronger manufacturing center (e.g., in areas of aircraft manufacturing), and less of a high-level services city. For its part, Beijing has developed rapidly into an innovation and high-level services city, generating significant cluster-wide gains. In the PRD cluster, Shenzhen is a leader in technological innovation, and is likely to be the country’s largest municipality by GDP in the 2020s, based on current growth rates.

87. While much remains to be done, industry clusters and economic specialization were strengthened by the division of labor and partnerships in R&D and manufacturing that have occurred in the BTH, YRD, PRD, Chengdu–Chongqing, Central Yangtze River (CYR), and Harbin–Changchun city clusters. Examples are the automotive clusters within the YRD, CYR, Cheng-Yu, and Harbin–Dalian (Ha-Da) city clusters—including R&D and manufacturing partnerships within and between the city clusters based on differentiated local and firm roles. In 2016, the CYR cluster started to coordinate the development of its finance sector by setting up an investment fund and a venture capital fund. Significant improvements have been made, although many potential benefits remain untapped; and as international cases show, improved cluster-scale cooperation on economic development, industry cluster building, place branding, and tourism marketing generates much greater economic benefits for the clusters and for each city within the clusters.

88. **Labor market integration and coordination of public facilities and services.** The PRC has made some noteworthy progress with regard to connectivity, by enabling convenient commutes for all employees, workers, managers, and technical staff, and by improving travel times between the large cities within clusters. The introduction of a nationwide residence card system, policies promoting the portability of social insurance and security schemes within greater Beijing and greater Shanghai, and *hukou* reform pilots at the local level have all been important in facilitating labor market integration in city clusters. However, further

⁶² Also see: K. Choe and B. Roberts. 2011. *Competitive Cities in the 21st Century: Cluster-Based Local Economic Development*. Manila: ADB. <https://www.adb.org/sites/default/files/publication/29242/cluster-based-local-economic-development.pdf>; ADB. 2007. *Clustered Cities Development: Innovative Interventions in South Asia*. Manila. <https://www.adb.org/sites/default/files/project-document/65619/40124-reg-spr-07.pdf>.

integration of cluster-wide labor markets will be necessary for the inclusive and economically beneficial development of the clusters. International cases demonstrate that labor mobility and a coordination of higher education, technical training, health services, and transferability of social insurance (particularly pensions) would greatly benefit the clusters, cities, and individuals.

89. **Land use planning and efficiency.** While some achievements have been recorded in the nationwide planning of large-scale infrastructure, there has been only limited progress with regard to special economic zones, functional zoning planning, coordination of land use planning, and the coordinated planning of high-impact facilities across boundaries. Land use planning and urban expansion planning are closely related to the generation of revenues from land leases. These are very important sources of revenue for cities, and thus may trigger a reluctance of individual jurisdictions to give up land-based development in the interest of the cluster as a whole. The result can be overdevelopment and urban sprawl within city cluster regions. Increased land use and infrastructure-investment coordination would result in sizable efficiency gains. Some international cases show that urban growth boundaries, coordinated industrial park and commercial development, residential land allocation, and shared facility planning improve land use efficiency.

90. **Connectivity, transport networks, and public transport.** The high-speed rail, highway, airport, port, logistics, and waterway infrastructure planned by higher-level governments, as well as infrastructure built by local authorities, have greatly improved connectivity within the city clusters. However, the systemic gap between national and municipal systems has resulted in a serious transport service gap. Public transport and road infrastructure are in many cases not designed to serve an entire city cluster, so they are sometimes disconnected at administrative boundaries, even with roads and public transport lines coming to a terminus at some of those points.

91. International examples demonstrate that commuter rail lines linking core cities to large and medium-sized cities, and to small cities and towns, are critical for enabling workers, students, shoppers, and patients to obtain regional employment, education, commerce, and health services. Such linkages can also create an integrated regional labor pool, which would greatly benefit companies, as well as the overall economies of city clusters. A regional labor pool would also promote inclusive development of city cluster regions by offering individuals more choices and greater opportunities to enhance and benefit from their skills.⁶³

92. Household trips to schools, hospitals, and shopping areas are increasing faster than commutes to work, so smaller travel distances or times for all those trips are needed. At the same time, the longer distances traveled by managers, technicians, and suppliers for weekend technical training sessions and government consultations require larger travel circles than those used for mass commuting. In Europe and Japan, urban-rural linkages, infrastructure, and service upgrades in small cities, towns, and villages have been crucial for equitable development throughout city cluster territories, enabling full urban-rural integration. Former farming villages have turned into suburbs, with people commuting to core cities while residing in historic farmhouses or modern rural homes in fully served villages in the middle of rural landscapes.

93. **Open green space planning and environmental protection.** There have been some achievements in the area of green space planning and environmental protection in the PRC, both driven by higher-level policies and also by municipal-level planning. Among these achievements were the identification and implementation of national environmental red lines; and the identification and protection of the United Nations Educational, Scientific and Cultural Organization (UNESCO) world heritage sites, national and provincial natural and heritage parks, water source protection areas, and

⁶³ A. Bertaud. 2015. *Cities as Labor Markets: Relevance to China City Cluster Development*. Presentation for a meeting of the New York University Urbanization Project. Beijing. 2 July.

farmlands. Further, the definition of basic farmland to be protected ensuring food security is an effective measure applied in the PRC. However, continued rapid urban expansion poses a threat to natural and agricultural green lands, especially within city cluster areas. International cases have shown that the coordinated planning and protection of open green spaces, urban growth boundaries (which may take different shapes and forms, following natural and cultural features such as mountains, forests, and rivers), and of the networks of regional parks and green corridors can succeed in effectively protecting green space systems and maintaining important ecosystem services that benefit the residents within and beyond the city cluster areas.

94. To summarize, city cluster planning should consider the interests of the clusters as a whole, including both the urban and rural areas. Many current plans focus on the interests of individual municipalities and counties, as in the case of the CYR city cluster, where only the key large municipalities are involved in cluster planning and implementation. There should be a meaningful identification and assessment of priority investments that would produce significant cross-jurisdictional benefits and promote cluster integration, to foster a broad acceptance and ownership of projects, and to ensure the efficient use of capital. Institutions that facilitate cooperation across jurisdictional boundaries should be built, incorporating the interests of all levels of government within the city clusters. The identification of possible financing projects should be carried out in consultation with national and provincial stakeholders.

95. On a strategic level, there should be a thorough review of the geographic scale, boundaries, extent, and level of current and expected integration, connectivity, and potential linkages in the short, medium, and long terms of the currently planned city clusters. Careful consideration should be given to the development of adequate institutional arrangements, and to infrastructure investments based on economic feasibility and demand. The large CYR and Harbin–Changchun–Shenyang–Dalian clusters, for example, may be too large for very close spatial integration and coordination, for a focus on connectivity infrastructure and services, and for any large-scale environmental-protection and climate-resilience planning. Differentiated policies may be needed to reflect different stages of development, levels of integration, and spatial scale and distances, with some mega-urban regions having the potential to become one territorial and economic urban system, such as the YRD cluster.

H. Demand-Based Development That Avoids Overdevelopment

96. Scholars in the PRC have pointed out the challenge of potential overinvestment in remote regions under the government's Western Development Strategy and other policies, which might not be economically feasible. However, comprehensive stocktaking and analysis, including a modeling of scenarios regarding the use or management of infrastructure and assets, remains to be done.

97. International experience provides lessons regarding rigorous requirements for economic feasibility and financial viability, with a balance struck between actual demands and modest expectations for economic development resulting from stimulus policies. Such policies may draw on various theories on stimulating economic growth, including that of John Maynard Keynes on public investments, Joseph Schumpeter on innovation, Paul Krugman on the new economic geography, and/or Michael Porter on regional competitiveness. For example, the downscaling of rail infrastructure, involving a stoppage of service to areas that had become uneconomical, occurred in the US and in some European countries, including Germany. Cases like these have led to controversies, even ending with reinvestment and the reopening of lines. In the 1920s, the introduction of cars led to the abandonment of streetcars in many cities in the US. Ghost towns came into being where an exodus of people occurred—for example, when the gold rush ended in the US; or after deindustrialization and massive job losses, as have occurred in modern-day Detroit, with car factories and related supply industries closing down.

IV. POLICY RECOMMENDATIONS FOR THE SHORT AND MEDIUM TERMS

98. In the PRC, urbanization is at a key crossroads, as this may well be the last stage of significant urbanization through migration. There is a great sense of urgency to get urbanization *right* before this window of opportunity closes. Therefore, it is essential that urban patterns, ecosystem protection, and investments are structured in a sustainable way over the long term. Strategic urban and regional planning will have long-term implications. Land uses, parcels, trunk infrastructure, roads, urban patterns, and public and private infrastructure and buildings will remain for generations to come. Some of the long-term challenges, like the shrinking population and demographic transition, environmental degradation, land and resource scarcity, and climate change, require a long-term and large-scale strategic vision, as well as short- and medium-term actions that specifically address the long-term challenges while harmonizing them with the near-term needs. Both long- and near-term challenges are closely related, and plans need to be prepared and approved and implemented immediately to address them both. Urban development impacts territories much larger than local government jurisdictions; and built-up urban areas require planning to guide the linkages and integration of urban systems within agglomeration regions and with the surrounding rural areas. Moreover, urban and regional planning must also consider the context of ecosystems and agricultural land. Urbanization fundamentally involves most (or all) other sectors, and sustainable urban and regional development requires comprehensive assessments and approaches in close cooperation (and integration and balancing) with other sectors. Therefore, this paper recommends that urban plans be integrated with plans and policies prepared for those other sectors.

99. Addressing these challenges and transitioning from an upper-middle-income country into a high-income country comes with a fundamental economic and societal transformation—specifically, a shift to high-value creation through a creative knowledge economy and an increase in productivity. City clusters and cities will be at the core of this transformation. High-income countries are urbanized and value creation happens in cities and urban areas. In the PRC, the needs of urban areas will be different from what they have been since the 1980s, when the focus was on manufacturing. In particular, industrial and service sectors will require a highly trained and educated workforce, and more R&D, among other factors. There are new rules for this new economy, as well as new factors affecting the competitiveness of cities, clusters, and regions. Compared with the traditional factors of labor, land, capital, and proximity, knowledge and creative economies demand urbane environments, with attractive, clean, and green urban spaces; high-quality urban infrastructure and services, including schools and universities; a vibrant urban culture; and a variety of housing options. These features of livability need to be the PRC's focus during the next stage of urban development.

100. To achieve *well-being* in the PRC, urbanization is an important area of policy and action, given that more than 60% of the population resides in cities. Important issues will include urban livability; economic competitiveness; and access to a diversity of jobs, education, health services, and social and affordable housing. Cities must be clean, green, and resilient. They should be well connected with other cities in their agglomeration regions, and linked to towns and villages in urban and rural environments. Cities must be inclusive and accessible; public services and social protection should secure people's lives; and benefits should be portable across local boundaries. Effective partnerships among regions, city clusters, local urban and rural jurisdictions, and government institutions will be critical.

A. Livable, Green, and Inclusive Cities

101. **People and environment first!** Prioritizing the well-being of residents and the environment will mean making clusters, cities, towns, and villages more livable, green, inclusive, smart, healthy, and age-friendly. Short-term policies should include strong regulations and measures that help make cities more livable and green.⁶⁴ Cities need to be the solutions to environmental and socioeconomic challenges, rather than sources of problems and complications, so the residents and the environment both have to be put front and center as people depend on and request clean and healthy environments. Comprehensive green development seeks to expand a city's open green-space systems; in a broader sense, it also considers the need for a green and circular economy, energy efficiency, and a sustainable energy supply. Green finance will provide the resources, and the communities will perform the visioning, planning, implementation, and the operation and maintenance of their green and livable urban areas. Existing policies, planning codes, administrative regulations, and practices and systems will have to be reviewed and aligned with these overarching objectives, and will thus have to be fundamentally transformed.

102. Planners in the PRC agree that a fundamental shift is needed. The National New-Type Urbanization Plan (NUP) and Thirteenth Five-Year Plan, 2016–2020 (13th plan) clearly include sustainable urban development as an objective, and provide specific guidance and targets. A series of national programs contributed to the progress of sustainable urban planning in the PRC, among them the eco-cities pilot, low-carbon cities pilot, sponge-cities pilot, and urban climate-change-adaptation pilot programs.⁶⁵ However, policies and mechanisms to facilitate coordination require revisions of the regulatory system as a whole, and a concerted effort across the relevant sectors to achieve livable, sustainable, green, and inclusive cities.

103. **Integrated solutions for livable cities.** Short-term policies need to facilitate the next stage of urbanization, but in a way that will put people and community well-being at the center of urban planning, development, management, and decision-making. The envisioned transformation of cities in the PRC should involve strongly integrated spatial, land use, transport, open-space, and other types of sector planning, with a view to providing the infrastructure, services, and other public goods that support economic competitiveness, environmentally sustainable development, social and financial inclusion, and climate resilience. Policies should also value and leverage the cities' unique traditions and cultural, natural, and human resource assets. Housing policies should be reviewed and revised to ensure that economic growth benefits everybody; indeed, inclusive urban development should include an adequate supply and access to social and affordable housing. Reform of housing support programs should focus on clarifying and easing eligibility criteria and ensuring that most migrants are included. Policy reform should also consider the needs of interprovincial migrant workers, who tend to change jobs frequently, and are more vulnerable.

104. **Circular economy zero-waste cities.** Short-term policies should include laws, measures, institutional reforms, standards, market-based instruments like incentives and disincentives for various economic sectors and levels of government to promote and enable a transformation toward a circular economy. The basic principle is to circularize our current linear model of “take-make-use-waste.”

⁶⁴ ADB's *Strategy 2030 Operational Plan for Priority 4* defines the livable city as follows: “‘Livability’ is a term often used to describe the quality of life and community well-being, supported by strong governance systems and practices. Although definitions vary, at the heart of the envisioned transformation of a city to become more livable is an integrated planning approach to the provision of infrastructure and services and other public goods based on economic competitiveness, environmentally sustainable growth, social and financial inclusion, and resilience. ADB. 2019c. *Strategy 2030 Operational Plan for Priority 4: Making Cities More Livable, 2019–2024*. Manila. p. 1. <https://www.adb.org/sites/default/files/institutional-document/495966/strategy-2030-op4-livable-cities.pdf>.”

⁶⁵ “Sponge city” is a concept of comprehensive urban water-resource management in which greenways, parks, and wetlands maximize ecosystem services, including storm-water management, using ecosystem-based adaptation.

This requires a comprehensive response to scarce land, water, and resources. This transformation is urgently needed to reconceptualize how it will build and use cities, value things, design, make and use things, and how we reuse, repair, upcycle, recycle, and recover things and manage our resources. The PRC has the potential to become a leader in the development of a green circular economy and green finance, which monetarily values products and services by fully internalizing external environmental, social, land, and other external costs. This should be applied to the entire economy through the development of full material cycles, following the “cradle-to-cradle” lifecycle concept. It should be enabled and managed by smart city applications; networks linking smart objects through the Internet of Things; mainstreaming of new ownership; and sharing economy models to make resources, products, and services more efficient.

B. Low-Carbon, Climate-Resilient, and Smart-City Development

105. Short-term policies should include rapid-mainstreaming requirements for the planning and implementation of low-carbon, climate-resilient urban regions and patterns. Policies and planning codes need revision to ensure that urban planning and management are integrated across government departments focused on various sectors, and that local administrative jurisdictions can produce sustainable low-carbon, climate-resilient urban environments that promote low-carbon lifestyles and enhance urban livability. Effective climate-mitigation actions often help improve climate resilience, and vice versa (e.g., actions to improve climate resilience often contribute to reductions in greenhouse gas emissions). Such synergies and co-benefits should be systematically promoted and enabled by the new policies.

106. **Low-carbon city development.** In the short term, the low-carbon pilot city program needs to be upscaled and mainstreamed. Programs promoting the early peaking of urban greenhouse gas emissions are urgently needed to help the PRC fulfill its commitments to the 2015 Paris climate change agreement to reach carbon peaking by 2030. Requirements should include the integration of land use, urban- and social-infrastructure, transport, energy, and open-space-system planning. This is to create high-density, mixed-use, TOD, along with complementary open-space development, to enhance the benefits and sustainability of infrastructure; urban livability; and the efficient use of land, energy, water, and other resources. Policies need to enable the development of places that are compact, walkable, mixed-use, and serviced by public mass transit, and where people can live near where they work and/or near public transit that will reduce the need for transport. Regulations should include indicators for overall energy use per capita, by urban area, and by activity. There should also be detailed guidelines for applying TOD principles, especially when it comes to creating attractive and safe pedestrian and bicycle urban environments and networks.

107. **Sustainable low-carbon urban transport.** Short-term policies, investment programs, and incentives for the private sector should enable changes in land use, transport systems, and lifestyles that will endure from the short to the long term. And they should follow TOD principles, under which regional commuter rail, subways, bus rapid transit, and bus priority transport will be integrated with intercity and intra-urban public transport, along with intelligent transport system technology. Short-term policies may prioritize new-energy vehicles and an expansion of charging facilities and infrastructure. Cities should be encouraged to explore new operation modalities, including customized transportation, shared transportation, and cooperation between the government and the private sector. Shared transportation markets like carpooling or bicycle sharing should be further developed. The PRC’s legal and policy framework should be revised to allow the prioritization of public space for shared vehicles. In this capital-driven market, a standardization and guidelines will be needed as a framework for management and operation, and as a way to strengthen entrepreneurial and user risk management.

108. **Low-carbon and green urban energy systems.** Policies are urgently needed to promote an urban shift to green energy. These should include (i) incentives and targets promoting high levels of energy efficiency for urban areas, utilities, industry, and buildings (i.e., by enforcing low-energy building standards); (ii) the production of renewable energy; (iii) the implementation of green energy systems such as smart grids; and (iv) the channeling of local energy supplies into the grids. Policy support for renewable energy, as well as mechanisms for enabling decentralized production and distribution, should be pursued in the short term through the promotion of wind and solar energy, among other sources. However, the power generation base is far from the eastern power load centers, and it is currently not equipped for the production of renewable energy. Smart-grid implementation will need strong support in the short and medium terms, including big-data-processing technology and knowledge solutions. Financial support for a shift to green energy, as well as the long-term planning and implementation of that shift, will rely on the integration of the existing infrastructure and planning systems.

109. **Smart grid development.** The construction of a strong, reliable, cost-effective, clean, and environmentally friendly modern power grid should be based on strong grid infrastructure, supported by information and communication platforms and intelligent control and management. Government and industry should ensure that consumers understand the benefits of renewable energy and smart grids. They also need to discern what will motivate consumers to change the way they use energy, and which bodies are best placed to engage with the consumers. Meanwhile, every opportunity should be taken to present the benefits of smart grids through the rollout of smart meters. A policy and regulatory framework should be developed for the short term that clarifies the benefits of smart grids, and ensures that the entities providing the upfront investments benefit from incentives and assurances. For example, a utility can be expected to invest in smart grid technologies only if there is confidence in the returns on investment, including high-share investments in renewable energy. Regulators must therefore establish financial incentive structures that will appropriately reward smart-grid investments. An effective price-control system and a monitoring-and-communication system should be in place to enable implementation by both the public and private sectors.

110. **Climate-resilient city development.** New short-term policies should improve the existing policies and integrate and align with the revision of the PRC's planning codes and practices. They should also be fully integrated into a new structure of ministry responsibilities, building on the National Climate Change Adaptation Strategy, 2013 and on the National Urban Climate Change Adaptation Action Plan, 2016.⁶⁶ While realignment happened with the reorganization of some ministries in 2018, more work remains to be done. The new policies should require the mainstreaming of urban climate-change adaptation for all cities, and they should be based on place-specific climate risk and vulnerability assessments, as well as assessments of adaptation options and comprehensive and integrated urban climate-change-adaptation action plans. Institutional arrangements and governance should be improved to (i) account for climate change; (ii) aim to make existing urban areas climate proof and resilient; and (iii) include plans for new, climate-resilient urban areas (where such planning is really needed), integrating land use, transport, and open green spaces into an ecosystem-based adaptation approach. There must be a review and improvement of policies and practices regarding municipal early-warning systems and mechanisms. This review should include nature-based solutions in the form of linked systems of green infrastructure and open spaces providing a variety of ecosystem services that are systemically integrated with gray infrastructure, such as drainage pipe networks. The sponge city program should be improved to ensure the preparation of assessments and plans, promote comprehensive environmental protection and the use of green infrastructure; and mainstream environmental protection and open space planning, so they may benefit from multiple ecosystem services in terms of climate change mitigation and adaptation.

⁶⁶ Government of the PRC, State Council, National Climate Change Adaptation; Government of the PRC, NDRC and MOHURD, *PRC's Urban Climate Change*.

111. Detailed technical guidelines for urban climate change adaptation should provide options to improve and mainstream urban climate change adaptation that consider the various geographic climate risks on urban areas, infrastructure, and assets for various types of cities; and risks to public safety and human health. The guidelines should include recommendations for local institutional arrangements and responsibilities, and for cooperation across departments in local and provincial governments on planning, investment prioritization, plan implementation, and nonstructural measures such as early-warning and disaster-response systems. The guidelines need to identify action categories and methods for assessing the climate change-related risks and vulnerabilities for cities and rural areas; peoples' lives, health, and livelihoods; and public and private assets. And the guidelines should specify the options for structural and nonstructural interventions to promote the climate-change adaptation of both existing and newly planned urban areas. Structural measures to be covered by the guidelines include green infrastructure, which would benefit from various ecosystem services; integrated planning for private assets and climate-resilient infrastructure; the climate-proofing of existing infrastructure systems; and the retrofitting of existing assets and infrastructure, with the aim of improving public health and making climate resilience socially and gender inclusive. Nonstructural measures include fostering a general awareness of climate change-related exposure to risks, as well as an awareness of early-warning and disaster-response mechanisms.

112. **Smart city development.** Short-term policies should (i) include measures to enhance and integrate smart-city ICT systems; (ii) promote the next level of collection and use of big data; and (iii) make the data available to government agencies and companies, so they can create applications that benefit urban areas and residents. Cities that are using smart ICT systems, with big and open data, are more successful at linking residents with their governments and public services. Smart systems and mobile applications can make infrastructure use more convenient and efficient, and they provide local governments, utilities, and other service providers with real-time information from users, thus enabling efficient management of capacity and intelligent investment planning. The short-term policies should also promote smart planning systems that enhance the urban planning process through the collection, storage, analysis, and utilization of data that are integrated into a unified geographic information system. And that platform should be made available to all local government departments. In addition, new technologies should be integrated into the system, including innovations in the sustainable and inclusive use of artificial intelligence, Internet of Things, 5G technology, Industry 4.0, smart transport, energy, and systems building.⁶⁷

113. Guidelines should be developed and disseminated to enable cities to optimize the benefits of the data and platform for the following:

- (i) **Data interpretation using satellite imagery.** This could assist in the analysis of land-use patterns, urban sprawl, climate change resilience, water flow patterns, flood risk management, desertification processes, wildfire risks, and other phenomena.
- (ii) **Wireless communication, connected sensors, and the Internet of Things as tools of location information.** These technologies could be useful for transport and logistics, linking information on origins and destinations of people and goods and identifying options for transport modes and routes to reduce time and carbon emissions. They could help fully integrate public and private transport services and shared vehicle use; and they could improve the infrastructure and delivery of public services, such as water supply, wastewater management, drainage, solid waste collection, transport, reuse, recycling, resource treatment, and other integrated applications.

⁶⁷ Yoon et al., *Smart City Pathways*.

- (iii) **Crowd sourcing data collection using a variety of applications and technologies.** This could be in the form of data from smartphone locations, as well as voluntary information delivery that could provide feedback loops among urban systems, system managers, and individual users of services, thereby creating many opportunities for the private sector to develop new smart-city applications.
- (iv) **Integrated use of information and communication technology for real-time operations management.** The use of algorithm-based and cloud-based hydraulic models for water, wastewater, and drainage systems should be promoted. And they should be linked to green sponge-city infrastructure to improve resilience. For instance, this infrastructure could support leak-detection methods for better water resource management, wireless meter reading for water supply, and reductions in nonrevenue water through the installation of sensors and pressure gauges that transmit real-time information. Indicators should include system, resource-use, and energy-efficiency gains, and reductions in carbon emissions.

C. Healthy and Age-Friendly Cities

114. **Healthy and age-friendly cities.** Short-term policies should review, revise, and refine the division of responsibilities among the relevant government ministries to ensure cross-sector cooperation. The implementation of the Healthy China 2030 Plan should continue, and it should incorporate lessons from international experiences. Health, defined as “a dynamic state of well-being emergent from conducive interactions between an individual’s potentials, life’s demands, and social and environmental determinants,”⁶⁸ is a fundamental right of every human being, according to WHO. In the near term, policies on healthy and age-friendly cities should be integrated with those on universal urban services and public transport. Similarly, policies on building design and public service accessibility should be integrated into the Healthy China 2030 Plan.

115. **Health impact assessment and healthy and age-friendly city action and management plan.** Short-term policies concerning sustainable urban development should require all projects to have a framework for a health impact assessment (HIA) and for a healthy and age-friendly city action and management plan (HACAMP) mandatory for all cities and new projects, similar to environmental impact assessments and environment-management plans. An innovative cross-sector HIA will effectively assess and manage health risks, as well as the potential impact of urban master plans, planned projects, and map-mitigation measures. It will also serve as the basis for the development of a HACAMP, with actions to enhance positive health drivers; and it will include an urban health monitoring and management program.

116. An HIA and a HACAMP are jointly prepared and administered by city planners and public health and medical specialists. This approach emphasizes the importance of the urban determinants of health, and acknowledges that cities looking to become healthy need to invest more in public and community health; healthy lifestyles; disease prevention; climate resilience; improved social services; universal urban design, to ensure accessibility to residents of all ages and to the physically impaired; and age-friendly public transport that is integrated into the urban landscape and public spaces. The mainstreaming of HIAs and HACAMPs in cities in the PRC is expected to contribute to the achievement of the Healthy China 2030 Plan and of the healthy cities objectives. The expected outcomes include reduced health-care expenditures, increased productivity, a better quality of life, and the well-being of urban residents.⁶⁹

⁶⁸ J. Bircher and E. G. Hahn. 2017. Will the Meikirch Model, a New Framework for Health, Induce a Paradigm Shift in Healthcare. *Cureus*. 9 (3). p. e1081. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5383372/>.

⁶⁹ N. Habib, S. Rau, S. Roth, F. Silva, J. Shandro., *Healthy and Age-Friendly Cities*.

D. Urban Rehabilitation Making Existing Urban Areas Livable

117. **Retrofit existing urban areas from the last 40 years.** The transformation of the PRC from an upper-middle-income country into a high-income country will require innovations in its ecosystems, including the creation of intellectually, culturally, and economically vibrant urban places. A thorough retrofitting of existing urban areas including those from the last 40 years will aim at making them livable, sustainable, and attractive to companies offering knowledge-based jobs and to a highly qualified workforce. In the short term, policies should be initiated; investment programs piloted; and the paramount task of profoundly transforming—physically and institutionally—many of the existing urban areas and buildings (mostly dating to the 1980s or later) should be implemented. This will be very challenging, requiring detailed and place-specific assessments and solutions, intensive engagement with local residents and communities as well as actions in the short, medium, and even the long term.

118. There is also the potential for infill development within existing cities and urban areas; it could help conserve scarce land resources, achieve higher densities, and make urban areas more efficient. Infill development would require close consultations with residents, owners, and other stakeholders. Further, systems of small livable streets need to be introduced into the superblocks that were built up in complex configurations, following building codes for safety distances, solar exposure, firefighting regulations, and other requirements. Green spaces need to be reassigned and redesigned. Setbacks from the wide roads should be reconsidered, and building types and uses may have to be transformed. Local governments should facilitate pilot development programs. An enabling factor would be the above-mentioned local government finance reform to enable sustainable funding and minimize the need for new greenfield development. This would promote more retrofitting of the many existing urban areas, making the cities livable and sustainable. Private investment in these areas will be critical, and there should be an emphasis on combining new areas with older ones.

119. **A focus on infill development and avoid and minimize new greenfield development.** One way to diminish the need for new greenfield development is to prioritize infill development, as it can help meet demand based on realistic short-term projections regarding population and economic trends, while preventing any further overdevelopment. Short-term policies should strongly encourage the retrofitting and rehabilitating of existing urban areas, adapting them to new uses when necessary. The government should start by identifying and utilizing potential areas for infill development, and only then assess very carefully the need for any new greenfield development, with a view to engaging in it only when necessary. If there is a need to develop new urban areas on greenfield land, independent experts should first conduct careful and realistic demand assessments. Policies need to consider the importance and sustainability of investments, local government debt, and operations and management, to proactively address any instances of oversupply of land, infrastructure, and assets, which typically occur in more remote locations, small and medium-sized cities and towns, and even in some rural areas; and instances of inadequate supply of infrastructure and assets, which typically occur in peripheral areas of the coastal city clusters.

120. In the short term, a comprehensive overall spatial, capacity, and quality stocktaking, geocoding, and mapping should be carefully conducted on industrial, commercial, institutional, and residential land and assets in urban areas, as well as infrastructure and service facilities. This should be followed by a detailed assessment and mapping of population trends and economic activities. Forecasts should be carried out, and scenarios postulated, in a scientific manner on a macro, city-cluster, and micro scale to ensure that reasonable population and economic forecasts can serve as bases for short- and medium-term planning. The goal is an optimal utilization of existing land, assets, and infrastructure, so overcapacity or overuse on a city-cluster or meta-regional scale should be reduced through concerted and coordinated incentives and restrictions.

E. Urban–Rural Integration and the Upgrading of Towns and Villages

121. Short-term policies need to continue, as does work on urban–rural integration. The strengthening of linked systems of small cities, towns, and villages should occur in close coordination with the PRC's new rural vitalization policies, and it should incorporate lessons from successful domestic and international experiences.⁷⁰ One domestic experience from which lessons can be learned is the systematic consolidation of smaller villages into larger ones. These actions are needed due to the vast numbers of very small natural villages, which are difficult to link and serve with infrastructure and basic public and commercial services. International lessons on the linking and upgrading of systems of small cities, towns, and villages, and on agricultural modernization and value chain linkages, could also successfully improve peoples' lives without the need for all rural residents to move to the cities.

122. Urban–rural integration and rural vitalization policies and action plans should include, for the short term:

- (i) improved, coordinated planning and systematic medium- and long-term investment programming, including the integration of housing, economic, and industrial development in small cities, towns, and villages;
- (ii) enhanced economic development, including job creation, promotion of farm upscaling, improved quality of produce (i.e., green food), integrated value chains, expanded food processing and other light industries, and service sector development in small cities, towns, and villages;
- (iii) upgraded infrastructure, public services, and links between and among small cities, towns, and villages;
- (iv) reform or phaseout of the dual *hukou* system and rural land policy to enable farm upscaling and land market development;
- (v) improved ecosystem planning and management through environmental protection, reduction of pollution from chemical fertilizers and pesticides, water source protection and water safety, and wastewater and solid waste management;
- (vi) promotion of self-administration through enhanced management systems within local communities and governments;
- (vii) coordinated, equitable public service delivery for health, education, technical and vocational training, social security, opportunities for further social inclusion for low-income households, and cultural facilities and institutions; and
- (viii) improved public finance mechanism and fundraising for infrastructure, coupled with a promotion of enabling environments for private investment and small and medium-sized enterprises.⁷¹

F. City Cluster and Metropolitan Governance Coordination

123. **Key policy recommendations for city cluster governance and urban–rural integration.** A key task for the short term is to create synergies among cross-boundary institutions, plans, and budgets, and linking hinterlands. Addressing the challenges, policies, incentives, and governance mechanisms should involve the continued development of city cluster-level institutions with the authority and budgets to strengthen the mechanisms for top-down planning in each city cluster territory, and it should involve the facilitation of horizontal cooperation. In the short term, the focus should be on strategic planning and managing key infrastructure. In the short and medium terms, policies should include the following:

⁷⁰ ADB. 2018b. Memorandum of Understanding between the Government of the PRC and ADB on Supporting Rural Vitalization in the People's Republic of China. Signed on 29 August 2018. Beijing.

⁷¹ ADB. 2019d. *Technical Assistance Completion Report: Strategy for Inclusive and Green Development of Small Cities, Towns, and Villages in Jiangxi Province*. Manila. <https://www.adb.org/sites/default/files/project-documents/49024/49024-001-tcr-en.pdf>.

- (i) coordination of economic and industrial development at the city-cluster level;
- (ii) stronger integration of labor markets, through improved connectivity and social-protection system policies that facilitate labor mobility;
- (iii) creation of unified strategic city-cluster master plans and land use plans, in coordination with the various municipalities, and considering urban–rural integration and small town and village development aligned with the NUP and with the PRC’s rural vitalization strategy;
- (iv) development of a cluster-wide commuter transport system linking cities, towns, and villages under the management of a cluster-level authority;
- (v) planning and protection of connected open green spaces and recreational systems;
- (vi) streamlined governance through a consolidation of city-cluster institutions, reducing the need for local administrative entities;
- (vii) development and integration of rural towns and villages, providing improved connectivity and linking urban public services, value chains, green spaces, and ecosystem services such as water resources and flood risk management (a critical area of work in the short term for improving opportunities for rural residents within commuting distance of cities and within clusters, and for reducing disparities); and
- (viii) the development of eco-compensation mechanisms for the municipal-to-municipal scale, as one form of cooperation across local administrative boundaries.

124. **Key policy recommendations for governance coordination.** Until 2035, or the “New Era,” the PRC should establish government cooperation mechanisms across vertical and horizontal boundaries and sectors. A serious effort should be made to overcome the systemic gap between strong national government systems, policies, and infrastructure-development programs, and strong municipal governance and infrastructure systems. This should be achieved through the following measures:

- (i) Build on, strengthen, and develop policies, incentives, and institutions at the city-cluster level to enable top-down as well as horizontal cooperation, with responsibilities and budgets for governance; planning; and the management of key infrastructure, services, and facilities.
- (ii) Expand and integrate single-issue cross-boundary cooperation, in such areas as transport planning, functional zoning, environmental red line planning, *hukou* and social insurance transferability, and eco-compensation.
- (iii) Harness the extensive social capital, local knowledge, and community-engagement potential within city clusters by involving the private sector and citizens in planning, financing, donating, and volunteering time.
- (iv) Establish cooperation mechanisms for the critical review of the city cluster plans and the participation of local governments in the plans’ formulation and implementation, encouraging the participation of more local jurisdictions. As of 2020, all 19 cluster plans were completed and approved. Some of the plans seemed to need more integration at the city-cluster level. Thus, it is important that coordinated planning continues and is strengthened, so that the plans can become truly cluster-wide in scope.
- (v) Multidisciplinary domestic and international experts should be involved to ensure that the government’s strategies optimize the use of scarce resources and are realistic.
- (vi) Cluster plans should eventually encompass entire clusters, including the urban and rural areas. There should be a meaningful identification and assessment of those priority investments that would produce significant cross-jurisdictional benefits, be in the interest of cluster integration, help build broad acceptance and ownership of projects, and ensure the efficient use of capital.
- (vii) Institutions facilitating cooperation across jurisdictional boundaries should incorporate the interests of all levels of government within the city clusters.
- (viii) Identification of possible financing should be carried out, in consultation with national and provincial stakeholders.

125. **Key policy recommendations for economic and industry cluster development coordination.** In the short term, policies and incentives should be enacted to further strengthen the institutionalization of economic development cooperation among cities and towns within clusters to achieve a healthy balance between cooperation and competition (i.e., “coopetition”). This could be achieved through the following actions:

- (i) Cooperation should include the promotion of specialized industry clusters, coordinated product-chain integration, joint place-branding and marketing strategies to attract companies, R&D, manufacturing in targeted industries, joint conferences and exhibitions, and joint tourism marketing and services.
- (ii) City cluster-wide economic development task forces should be established. Moreover, industrial parks, technology commissions, and bureaus for small and medium-sized enterprises should develop plans for building economic clusters, promoting the circular economy, developing the private sector, and integrating supply chains throughout the cluster.

126. **Key policy recommendations for labor market integration and coordination of public facilities and services.** In the short term, policies and incentives should aim to improve the integration of labor markets, both geographically and systemically, through an increased ease of mobility; provision of cluster-scale public facilities and services; and continued progress toward nationwide transferability of residence and insurance policies, possibly piloted at the city-cluster level. Two complementary actions in support of labor-market integration and coordination would be as follows:

- (i) As an immediate task, the labor and education bureaus of local governments should coordinate with industrial commissions and key local economy stakeholders to assess human resources and coordinate labor-pool development throughout their city clusters, matching current and future skills needs within their clusters.
- (ii) It is very important to align vocational and other types of post-secondary education with the needs of the emerging economies in the city clusters.

127. **Key policy recommendations for land use planning and land use efficiency.** In the short term, the efforts that began with the 13th plan should be further strengthened, for example, through coordinated formal urban master plans and land use plans at the city-cluster level, based on evidence-based and realistic population and economic-development forecasts. Other measures should be as follows:

- (i) Integrate the planning of key industrial, commercial, and residential areas; and ensure an adherence to the principle of compact, mixed-use development around transit stations.
- (ii) A master planning task force involving local governments in each city cluster, with support from domestic and international experts, should carry out a critical review to ensure that land use planning is coordinated, founded on realistic demands throughout the city cluster, and reflects a large-scale and possibly very long-term perspective.
- (iii) The United Nations forecasts that the population in the PRC will start to decline around 2045. This should be taken into consideration. Accordingly, an oversupply of industrial, commercial, and residential land should be avoided, and realistic growth boundaries should be established.

128. **Key policy recommendations for connectivity and transport networks and public transport.** In the short term, policies are recommended that require (i) cluster plan preparation, (ii) implementation of the first phases of city cluster-wide commuter rail networks and other public transport, and (iii) shared mobility service systems. Further, core cities should be linked with large, medium-sized, and small cities and towns in their clusters to take workers to jobs; students to classrooms; patients to hospitals; and

visitors to museums, concert halls, theaters, and parks—all within a 1–1.5-hour commute within the city cluster region. Inside such a travel circle, smaller-scale circles should be identified, as Shanghai has already done. In addition, a transport and multimodal mobility task force should be established comprising local governments and local and foreign institutions and experts. The task force would review plans, assess connectivity constraints, and plan for adequate and prioritized investments, in accordance with land use plans. The goal would be to realize compact TOD.

129. Key policy recommendations for open-green-space planning and environmental protection.

In the short term, policies and enabling mechanisms and incentives should be adopted to coordinate the planning and protection of ample and robust open-green-space systems, including the identification, implementation, and enforcement of environmental red lines throughout the city clusters, thereby optimizing the availability of multiple ecosystem services to generate many benefits for the cities and their citizens. In pursuit of these objectives, the following steps should be taken:

- (i) The provincial environmental redlining plans that were prepared under the 13th plan should be reviewed and amended to include more open green spaces and ensure strong systems and networks of open green spaces with functioning ecosystems.
- (ii) The local governments should formalize and approve such plans and enforce a principle of no-build policies outside the consolidated urban areas without higher-level formal approvals for land use change.
- (iii) The territorial “system of two speeds” of models in the PRC should be strategically strengthened, with the speeds identified as (a) high-speed urban development, focused on high-density cities, to carefully manage their further expansion to prevent overdevelopment; and (b) slow-speed restricted or curtailed development, focused on the complementary open green spaces, which would be protected; these areas would include farmland, national and provincial parks, forests, wetlands, wildlife habitats, and cultural heritage sites.
- (iv) As an immediate step, an open-space and environmental protection task force should be established, composed of local officials from the city cluster region. This task force would work with master-planning and transport task forces to analyze and map bioregions, ecosystems, habitats, forests, wetlands, and farmland, and to assess the pressures from urbanization.
- (v) The environmental red-line mapping exercises that are ongoing in the cities should be extended to their entire city cluster areas, while urban-growth boundaries and open-green-space systems should be planned comprehensively. A broad participation by many residents and other stakeholders will create shared ownership and support, and will promote enforcement of such measures.

G. Policy Alignment and Cross-Sector Coordination

130. The PRC has enacted many excellent national policies and pilot programs, some of which were included or referred to in the NUP and 13th plan. However, local implementation remains a challenge, due to a lack of technical capacity and/or financial resources, or to differing policies and agendas. A review and alignment of policies and responsibilities will be critical in the short term. As to finance, cities in the PRC are typically dependent on fiscal transfers from higher levels of government. Lessons from pilots in 2011 that tested the use of property taxes in Shanghai and Chongqing to regulate the housing market had limited success, mainly because they only applied to second homes and the charges were minimal. Cities were encouraging residents to invest in real estate, as these investments support urban development and expansion, and land leases remain a key source of income for local governments.

131. The government announced in March 2019 that a new property tax law would be submitted for consideration by the State Council. This law should be enacted nationwide as soon as possible, as a levy against soaring property values. The announcement noted that the law would maintain the tax-free threshold for residential units at about 40–60 square meters per person, and would give cities authority over the actual tax rates. User fees and utility charges have been gradually making the delivery of urban services more financially sustainable, including water supply and wastewater management, with policy development assistance from ADB. There is, however, significant room for improving the sustainability of local government finance through further policies developed in the short term.

132. **Alignment of policies and sustainable local finance.** To make cities livable, a fundamental transformation of policies, planning regulations, and practices are urgently needed in the short term. To achieve this transformation, it will be necessary to align policies and areas of responsibility across various sectors and levels of government, and to enable sustainable local-government finance. An example for integrated planning arrangement and setting of targets is in Figure 5. The following measures will help accomplish that:

- (i) The PRC should continue its administrative reforms, and it should promote formal and informal arrangements for working together across sectors, and across horizontal and vertical boundaries within the government, to transform institutions and practices, and implement good policies. A method of interdepartmental and cross-jurisdictional cooperation should be formally established and steered by the top leadership. Such multidimensional planning, management, and administration would include a unified platform for mapping and establishing key performance indicators, and for monitoring achievements.
- (ii) Generally, overlapping and conflicting policies should be reduced or removed, as well as perverse incentives that hinder sustainable development.
- (iii) A priority should be to improve the fiscal and taxation system to ensure sustainable local government finance, specifically, through such reforms as a standardized property tax throughout the country and a fiscal-transfer system based on the number of permanent urban residents in any local jurisdiction.⁷²
- (iv) To support the provision of urban services, a more comprehensive system of taxes and user fees should be developed based on the principle of linking taxes to services to make them acceptable and transparent to citizens.
- (v) In the short term, it will be critical to align the responsibilities and objectives that inform master planning, land management, urban planning, zoning, the setting of land use codes, land-use change management, urban-development land allocations, environmental protection and redlining, farmland protection, water source protection, water-resource-quality and flood-risk management, energy systems, grid-enabled distribution of renewable energy sources, and other areas.
- (vi) Land management should be unified to cover construction in both urban and rural areas; abandoned rural homesteads should be returned to rural collectives, voluntarily and with compensation; and population density in existing urban areas should be increased.

⁷² Options for sustainable municipal finance are provided, for example, in R. M. Bird and E. Slack. 2015. *Is Your City Healthy? Measuring Urban Fiscal Health*. Toronto: University of Toronto Press.

Figure 5: Illustrations of Integrated Planning and Urban Management across Sectors **A Sample of Green Economy Performance Indicators**

Item	Examples of Quantified Eco-Efficiency Sub-Targets	Descriptions	Target (%)	Real t1 (%)	Real t2 (%)
1	Green economy (overall)	Degree of potential self-sufficiency—regional, circular, synergetic, locally added value	55	X	X
1-1	Rate of potential economic self-sufficiency	Proportion of the total needs that can be supplied through local resources and production	60	X	X
1-2	Rate of local economic cycles: local resources, local production, local consumption, and local reuse and recycling	Proportion of total resources and products realized in full life cycles in the city, cluster, or region	50	X	X
1-3	Rate of externalities internalized, evaluated, and accounted for	Proportion of traditional externalities internalized in the valuation and accounted for in the books	30	X	X
1-4	Rate of economic activities in “green sectors”	Proportions of workers and investments in “environmentally correct” businesses	50	X	X
1-5	Rate of local resources used in local building, manufacturing, and consumption	Proportions of all used materials, water, energy, and other resources acquired locally	80	X	X
1-6	Rate of local by-products and waste reused and recycled locally	Proportions of processes that are industrial synergies, and that occur in recycling industries	60	X	X
1-7	Rate of “green consumption”	Amount of consumption that is ecologically responsible and based on eco-efficiency	40	X	X
1-8	Rate of local consumption of local and regional products	Amount of total consumption that is entirely local	45	X	X
1-9	Rate of locally added value to local resources	Proportion of value added to raw resources within the territory that raises local incomes	65	X	X
1-10	Rate of locally researched, developed, and produced goods	The number of researchers and engineers employed, and the amount of innovation and prototype development	35	X	X
1-11	Rate of ownership by individuals of productivity	How much individual ownership in companies and institutions, how many small and medium-sized companies, cooperatives?	65	X	X
1-12	Rate of local and regional cooperation between the public and private sectors	Proportion of coordinated and joint actions among administration, businesses, and the public?	80	X	X

Source: S. Rau. 2010. *Emerging Third Tier Metropolises in Central China: Sustainable, Educated, Niche, Clean, Aesthetic; A Recipe to Build and Sustain Their Gravity to Balance Urbanization in China?* Paper for the 46th International Society of City and Regional Planners (ISOCARP) Congress. Nairobi. 19–23 September. http://www.isocarp.net/Data/case_studies/1826.pdf.

133. The lessons that can be learned from international best practices concerning cross-sector coordination can be found in certain cities in western countries that have specific green agendas and strong local leadership. In US cities like Portland (Oregon), Chicago, and Seattle, green agendas bring administrative departments and community organizations together, due to the understanding that collaboration and citizen participation generate better ideas and policies; and a widely shared sense of ownership of the planning process generates support, as well as an emotional bond of the people with their cities. Many lessons can also be drawn from international practices concerning local taxes and user fees. Most countries levy taxes on property, which is often the most important component of local taxation, even well above 90%, as in the case of Australia, Canada, and the United Kingdom. Another possible source of financing for infrastructure development is land value capture, which comes in different forms, including tax increment financing, which is used a lot in Chicago; supplementary business property taxes, used to finance public transport, as in the case of London; sales of building rights to promote density around transit stations, which is done in Toronto; or, as in the case of Hong Kong, China, charges for real estate development rights, used to support public transit development.

134. **COVID-19 and the impacts of policy responses.** The policies recommended above remain highly relevant during the pandemic, and they will continue to be relevant after the pandemic is over. For instance, government programs should be implemented and strengthened to improve the coverage and quality of water supplies; wastewater and solid waste management (including medical waste management); and the cleanup of polluted air, water, and soil in both urban and rural areas. The impacts of the crisis demonstrate that the resilience of local communities and larger urban areas is very important, both for responding to health crises and managing the aftereffects. The principles of TOD, as well as compact city principles (e.g., mixed-use and walkable environments, protection of open spaces and green infrastructure) remain valid and should continue. Directly related to the health impacts of COVID-19 is the increasing importance of policies to make cities healthy and age-friendly. The mainstreaming of ADB's recently developed health impact assessment (HIA) and healthy and age-friendly city action and management plan (HACAMP) should be promoted throughout the country for existing and newly planned urban areas, given the need to respond to communicable and infectious disease crises. The outbreak of this pandemic, and maybe similar outbreaks in the past, may have been caused by illegal wildlife trading activities. And they may have been accelerated by the situation in the markets themselves, where a great biodiversity of species is held in close confinement, creating significant stress for animals and humans alike, and reducing the ability of their immune systems to fight viruses. A logical response would therefore be to work to eliminate the illegal wildlife trade. Further, markets where animals are legally traded must be redesigned and relocated outside urban areas; and there should be a meat-certification system that allows only frozen meat to be shipped into urban areas.

H. Long-Term and Large-Scale “Bridge to the Future”

135. **Long-term: a collective vision for future development.** The PRC should develop a long-term vision that can serve as a sustainable “bridge to the future,” but the foundations of that bridge must be built in the present. There are no obvious and simple solutions to the challenge of harmonizing the near-term need for sustainable urban development with the long-term issues of massive population loss and demographic transition. These considerations are critical for urbanization planning, given that current actions relating to cities, trunk infrastructure, land use, parcels, etc. are lasting and very long-term investments and structures. So, getting things wrong now (e.g., oversupply) will have severely adverse effects on the economy, environment, and individuals well into the future. It will be very challenging to do everything right; therefore, innovative approaches to designing the future will be needed. We would like to suggest the consideration of a highly inclusive, open process of generating discourse about a common vision, with wide participation across regions, generations, and the whole spectrum of society. Engaging people in a discourse about the future they want may be an innovative way to generate solutions, and to garner support through broad ownership. The PRC's strength, the stability of its government, and

its social cohesion make it possible to engage in long-term planning with confidence. This unique feature has informed long-term strategic planning in the PRC, as seen in large-scale programs like the Belt and Road Initiative and the Yangtze River Economic Belt, among others. Another enabling factor may be the fact that people across the country, and across the generations, are savvy when it comes to ICT. They are early adopters of digital technology, whether for sharing information over social media, engaging in business-to-business and business-to-client relations, making payments, developing smart infrastructure, and other activities.

136. **International lessons.** International examples of such processes do exist on a smaller scale. For example, in Chicago, business community initiatives and regional workshops have drawn up long-term scenarios and plans for the future. However, there are no international cases that can provide lessons or models for handling a challenge of the magnitude of the halving of a country's population. Population decline has been predicted for parts of the world, and has already occurred to a moderate extent in certain western countries, and in some countries in Eastern Europe and Central Asia, particularly in the remote rust-belt regions and regions with harsh climates. Subregional programs for managing population decline have included the demolition of selected infrastructure and assets to reduce the burden of operation and maintenance, and to reduce the oversupply in the real estate market. (Note the stabilized prices, for example, in some affected regions in eastern areas of Germany in the mid-1990s.) Other best practice cases may be the comprehensive stimulus programs for cities or regions that have experienced economic decline, for instance, due to aging industries and depleted resources, such as Pittsburgh in the US, Newcastle in the United Kingdom, and the Ruhr Valley in Germany. Again, the challenge confronting the PRC will be uniquely massive. As a further complication, it will also be regionally differentiated, with coastal global cities remaining strong and remote regions losing out the most.

137. **Large-scale: meta-regional or national planning for the extended coastal region applying a “territorial system of two speeds.”** In the near term, there should be policies to prepare and implement large-scale plans for the entire coastal region, for limiting continued growth, avoiding sprawl, and protecting green spaces. The coastal region is the most densely populated area in the PRC (even in the world), and further urbanization should be managed, to contain the further expansion of the already very large city clusters throughout the entire territory, a policy that we might call “meta-regional planning.” We would now even extend this concept to the entire territory east of the “Hu” line between Heihe in the northeast and Tengchong in the south where 94% of the country's population resides. In the long term, it will be critical to preserve the scarce natural and land resources of the region to effectively plan effective protection of open-green-space systems and the natural environment, and to ensure high levels of benefits from multiple ecosystems. As noted above, the increasing urbanization and concentration of urban development in the region's city clusters, and key cities in particular, would benefit from such a two-speed system with complementary green-space protection, as illustrated in Figure 6 and described below:

- (i) **High-speed.** Urban development focused on high-density, economically high-performing, city-cluster agglomeration regions, including world-class cities, but also encompassing second- and third-tier cities and integrated rural hinterland. The goal would be to reasonably restrict further development to the clearly defined, consolidated urban areas, within which development would be permitted, and outside of which development would not be permitted. The purpose would be to avoid extensive land consumption and the oversupply of industrial, commercial, and residential land and construction.
- (ii) **Slow-speed.** A complementary approach focused on large-scale open green spaces, where development would be forbidden or highly restricted, and the emphasis would be on protection and conservation. These spaces would include farmland, UNESCO heritage sites, forests, wetlands, water resource protection zones, wildlife habitats, ecological preserves, national heritage sites, and national and provincial parks. They would provide various types of ecosystem services, including those related to recreation, and the opportunity for people to experience and enjoy traditional nature-based lifestyles.

Figure 6: Proposed Framework for a Protected System of Natural, Cultural, and Agricultural Land to Complement Compact City Clusters

PRC = People's Republic of China.

Notes:

1. These diagrams illustrate a framework proposed by the author in 2011, at a conference in Tianjin, People's Republic of China (PRC). It is centered on a two-speed approach to spatial and socioeconomic development in the coastal region of the PRC, with concentrated, high-speed development in dense urban zones, and a complementary system of slow-speed and highly restricted development in large-scale, green spaces (e.g., national and provincial parks, farmland, nature reserves, biodiversity habitats, and heritage sites), representing "slow-speed," highly restricted development, with an emphasis on nature and heritage protection.
2. In the panel on the top left, the images show, from left to right, population densities; locations of cities; two-tiered city clusters as mega-urban regions; and the high-speed, high-performance territories, and population magnets.
3. The panel on the top right shows proposed national heritage and ecological sites in the coastal region, which could serve as the "slow-speed" component of the framework.
4. The panel on the bottom left also shows green areas suggested for protection under the two-speed system highlighting rivers, valleys, estuaries, and wetlands, as well as ecological areas, parks, and cultural sites.
5. In the panel on the bottom right, the diagrams show how planning for "in-between" green spaces might intersect with planning for the city clusters surrounding Beijing, Shanghai, and Guangzhou.

Sources: (i) S. Groff and S. Rau. 2019. China's City Clusters: Pioneering Future Mega-Urban Governance. *American Affairs*. III (2). pp. 134–50. <https://americanaffairsjournal.org/2019/05/chinas-city-clusters-pioneering-future-mega-urban-governance/>; (ii) S. Rau. 2011b. *People's Republic of China Coastal Region National Heritage Park Network: Potential Large-Scale Cultural, Agricultural and Ecological Conservation in the World's Most Populated Region. A Proposal. A Planning Essay*. Paper presented at the Academic Committee of Foreign Studies in Urban Planning of Urban Planning Society of China 2011 Annual Conference: Between the Old and the New – Interaction and Coordination. Tianjin. November 2011; (iii) S. Rau. 2011a. Territory + High-Speed Rail – (Agriculture–Zones + Eco-Parks + Seashores). Proposal for Strategic Planning of China's Coastal Region Starting with No-Build Zones. In M. Schrenk, M. Popovich, and P. Zeile, eds. *Change for Stability: Lifecycles of Cities and Regions; The Role and Possibilities of Foresighted Planning in Transformation Processes*. Proceedings of the 16th International Conference on Urban Planning, Regional Development and Information Society. Essen, Germany. 18–20 May. Schwechat-Rannersdorf, Austria: Competence Center of Urban and Regional Planning (CORP).

138. As mentioned, the urban high-speed approach and the green-space slow-speed approach follow their own distinct spatial and socioeconomic models and they are equally valuable, and are interconnected and mutually reinforcing (i.e., the urban agglomeration model that also engages and integrates with its rural and natural hinterland, and the green model providing natural, cultural, and other ecosystem services and sustainable agriculture. The concept of “speed” not only relates to the process of development, but also to the pace and intensity of human action and interaction, economic output and development, population and urban built-up density, and human experience, and in the perception of being in the respective types of places and territories. These complementary spaces would offer a balance between two equally valuable spatial and socioeconomic models, and they would benefit and reinforce one another. This two-speed scenario would also contribute to climate-change resilience and low-carbon lifestyles and systems on a large scale. Functional zone planning, which started under the Eleventh Five-Year Plan, 2006–2010 and the Twelfth Five-Year Plan, 2011–2015, attempted to address the problems of these two types of spaces, but there is a need for further effective implementation and for the creation of a clear and attractive vision when defining the roles and the future of these urban, natural, agricultural, or cultural spaces.

139. Outstanding progress has been made in promoting the concept of the four functional zones (i.e., key development zones, optimization development zones, restricted development zones, and forbidden development zones) since the Eleventh Five-Year Plan, 2006–2010; in promoting large-scale regional development programs like the Belt and Road Initiative, Yangtze River Economic Belt, and the revitalization of the northeast; and in planning, financing, constructing, and operating massive national-level infrastructure networks such as expressways, high-speed rail, waterways, south-to-north water diversion, and power transmission. Plans for an environmental redlining as part of a national zoning system based on the four types of functional zones on a national scale have been developed and mapped. However, the environmental red lines were drawn rather conservatively. There are national parks and provincial parks, and state and provincial forests, that have benefited from a successful reforestation program, but there is still room for improving the percentage of the PRC’s total land area that is forested. The China Council for International Cooperation on Environment and Development has recently made proposals for larger-scale environmental protection zones.

140. International lessons may not be totally applicable to planning on the scale that the PRC must engage in, but some aspects could be relevant. For instance, the EU has plans to designate different roles for its various regions, and has implemented some development policies on that basis. The US has a national park system, as well as the Appalachian Trail, a public footpath running 3,000 kilometers through wooded and pastoral land across 14 states. India has recently started planning 11 economic corridors, covering most of the country, with ADB supporting the corridor along the east coast.⁷³ The Ganges River Valley is comparable in population to the PRC’s coastal region, but is significantly less urbanized. In Southeast Asia, in the Greater Mekong Subregion, urban development coordination along regional corridors is also promoted.⁷⁴

⁷³ ADB. 2016a. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranchise Financing Facility, Policy-Based Loan, Technical Assistance Grant, and Administration of Grant to India for the Visakhapatnam-Chennai Industrial Corridor Development Program*. Manila. <https://www.adb.org/sites/default/files/project-document/197801/48434-002-005-rrp.pdf>.

⁷⁴ ADB. 2015b. *Greater Mekong Subregion Urban Development Strategic Framework, 2015–2022*. Manila. <https://www.adb.org/sites/default/files/institutional-document/173139/gms-urbandev-framework-2015-2022.pdf>.

V. CONCLUSIONS

141. The short and medium terms, or the next 5–15 years until 2035, is the “New Era” for the PRC, a period that will be critical for future urbanization in the country (and worldwide). It is therefore essential to design a solid and sustainable bridge into the future, and to start building the foundations now. Urban areas are where everybody and everything comes together; where most people live; where all sectors contribute and most investments and assets are placed; and where economic value, goods, services, and culture are produced. They are also the places where most resources are used; land is consumed; and where waste, pollutants, and carbon emissions are generated that contribute to climate change, exposing people and assets to the associated risks. Cities and city clusters are complex territorial and socioeconomic systems that also have the potential, and the need, to be an integral part of the solutions for sustainable development. This will require fundamental changes in economic thinking, values, and practice, so that the economy and cities can become green. It requires a revision of policies and administrative regulations; new partnerships among public, institutional, and private players; and innovative governance across local administrative boundaries and levels of government.

142. Sustainable finance and integrated cross-sector and interjurisdictional solutions are urgently needed. The PRC has started to be a global leader in climate and environmental action, which is very encouraging, and the government has developed and implemented many excellent programs. However, in light of the many significant challenges the PRC is facing, more needs to be done. City clusters, cities, towns, and villages need to be front and center of the action. The people's well-being—to be achieved in a sustainable and holistically green manner—needs to be prioritized, so that urban places are made livable and green, where people and a diversity of animal and plant life can thrive.

143. The recommendations offered in this paper are still relevant for the PRC, even in the wake of the COVID-19 pandemic, as they were prepared with the likely medium- and long-term impacts on urban and urban–rural development in mind. The recommendations already include healthy and age-friendly city development, linking urban and urban–rural policy making, planning, and management. They also cover public health issues, especially the health benefits of green and livable cities. Stronger consideration will be given to inclusive development and vulnerable groups, including people in remote rural regions, low-income people in urban and rural areas, people with infirmities, the elderly, women, and children. It is very important to ensure that micro, small, and medium-sized enterprises are supported, so they can endure and/or successfully transform themselves during the crisis. The COVID-19 outbreak and similar infectious diseases in recent years provide some clues as to the correct responses regarding urban planning and management, including more rigorous planning for resilient communities, connected open-green-space systems, measures to ensure that food-supply chains are safe, updated wet markets that have improved sanitary conditions, abolishment of wildlife markets in cities and urban areas, and a strictly enforced crackdown on illegal trade in listed wildlife species. Also, solid waste management and effective and sustainable medical waste management will need to be significantly improved.⁷⁵

⁷⁵ ADB. 2020. *Managing Infectious Medical Waste during the COVID-19 Pandemic*. Manila. <https://www.adb.org/sites/default/files/publication/578771/managing-medical-waste-covid19.pdf>.

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Bridge to Future Livable Cities and City Clusters in the People's Republic of China

Policy Opportunities for High-Quality Urban Development

The achievements in rapid urbanization and industrialization of the People's Republic of China (PRC) over the past 40 years were historic. But they came at high environmental and social costs. By 2050, the country will be a high-income, four-generation urban society. Yet, according to the United Nations, the PRC's population will have halved by 2100. Many cities will lose population and businesses. This will be equally historic and requires urgent action. The author recommends focusing on urban rehabilitation and retrofitting to make cities more livable—with a green circular zero-waste economy, aiming at low-carbon, climate-resilient cities—and making cities healthy and friendly for people of all ages.

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