TITLE: Regional Policy Brief on building urban resilience during and after COVID-19.

Contents

ABBREVIATIONS

Summary

COVID-19 pandemic has brought about multitude of changes in the way we live, work, communicate, commute, and organise in cities. It has not only caused devastating damages to people's health and livelihood, but also forced cities to adopt to the lockdown and other preventive measures, paving ways for some fast-forwarded changes.

Asian and the Pacific cities were at the forefront of addressing health, economic and social crises. As the centre of economic activities and home to the billion population, many cities have struggled to survive through this crisis. Despite this difficulty, some have tried to seize this opportunity to rapidly transform urban both social and built environment into the one fit for SDGs era.

Evidence and stories from cities demonstrate that challenges highlighted through this pandemic were not new in origin; they were indeed existing vulnerabilities that predates the pandemic, rooted in the socio-economic structures of this region. High informality, low quality urbanisation, gender and wealth inequalities, lack of social protection floor, limited diversification and circularity of economy, and deteriorating environmental conditions are some of pre-existing vulnerabilities that have worsen during the pandemic. Moreover, while cities have played a vital role in addressing the pandemic and citizens' concerns against limited fiscal and political space, further decentralisation and enhancement of local governments are needed for inclusive recovery processes. Where adequately empowered in terms of its revenue and human resources, cities have accelerated digital transformation and tackled climate change through the COVID-19 response and recovery measures.

As Secretary General Antonio Guttieres puts it, the SDGs and Paris agreement are the blueprints for the COVID-19 recovery efforts. Address on goals and targets, especially ones that are regressing or with limited and slow progress, is going to tackle the root causes of various issues manifested during the pandemic. It is therefore suggested that countries and cities should prioritise “Green Recovery” and build back better, ensuring that no one is left behind.

This policy brief aims to inform national and local governments of the complexity of challenges arising from the COVID-19 pandemic and propose some policy recommendations. ESCAP in partnership with a number of regional partners has proposed 15 policy pathways across four thematic pillars in “The Future of Asian & the Pacific Cities" report in 2019, namely the future of Urban and Territorial Planning, Urban Resilience, Smart and Inclusive Cities, and Urban Finance. This was further revisited to provide elaboration in “The Future of Asian & the Pacific Cities in the Post-COVID-19 Era." Building on these regional consensuses, this policy brief suggests some operationalisation of those policy pathways in the context of building urban socio-economic resilience.

To address challenges and issues exposed during the COVID-19 pandemic and accelerate progress on the future vision of inclusive, safe, resilient and sustainable cities through Green recovery will require focused efforts on the four thematic priorities:

1. Plan the foundations of a sustainable future. Considering that the pandemic has no boundaries and severely impacted unplanned dense settlements, all cities need to adopt a plan that takes into consideration liveable spatial environment and inclusive urban governance across natural and socio-economic boundaries to ensure healthy, resilient green recovery, such as through a framework of 15-minute city, which ensures both adequate density and space.

2. Guard against future risks. As shocks and stresses multiple by existing vulnerabilities, such as air pollution exacerbated COVID-19 impacts, cities must focus on climate resilient urban development which improves land governance and prioritises pollution and decarbonisation and promote diversification and circularity of local economy.

3. Capitalize on frontier technologies to develop people-centred smart cities. People-centred approach requires urban leaders to tackle digital divides, strengthen smart city capabilities in local governments, and peer-learn from each other through regional cooperation, while safeguarding the individual privacy in increased use of track and trace technologies.

4. Mobilize financing to invest in sustainable urban solutions. Local governments must adopt innovative financing tool to leverage benefits of green recovery and sustainable urban development such as through land value capture, while strengthening human capabilities to manage such tools. Cities should be able to access green finance for infrastructure investment and empowered further through both capacity development and decentralisation.

Addressing broader environmental challenges while responding to the COVID-19 pandemic is ambitious, this policy brief tries to provide some recommendations on how cities can operationalise policy pathways in implementing green recovery to build a resilient city. It necessarily involves all levels of governments to make them happen and so the horizontal and vertical cooperation would be a key. It is at hands of local governments to turn this pandemic into an opportunity for accelerated transformation to deliver on Sustainable Development Goals, Pairs Climate Agreement, and New urban Agenda.

INTRODUCTION

COVID-19 Pandemic and Asia-Pacific

The COVID-19 pandemic has had a significant impact on the Asia-Pacific region. Many cities became hotspots of COVID-19 outbreaks, prompting strict mitigation and containment measures implemented by a number of governments in the region. While the spread of the virus was contained to varying degrees across the region, lockdown measures also led to significant social and economic crises.

Since cities account for 80% of the global GDP, the socio-economic impacts have spread beyond urban areas. The economic fallout of COVID-19 has resulted in an estimated loss of 81 million jobs and an additional 22 - 25 million employed persons pushed into extreme poverty within the Asia-Pacific region.[1] Lockdown measures also disrupted regional supply and value chains and harmed consumer and financial confidence.[2] Already inadequate urban basic services have been overwhelmed by the pandemic. While the pandemic have strained public health capacities and necessitated containment measures, these health responses and urban lockdown overwhelmed waste management facilities. Limited educations became further inaccessible due to school closures and lack of digital alternatives, resulting in losses of schooling and learning and, consequently, in productivity losses. While there were some positive environmental outcomes, such as reduction of air pollution[3], GHG emissions[4], and decreased energy use[5], these trends would be temporary without robust green recovery actions, as some data have already indicated that they were returning to the pre-pandemic level.[6]

These impacts were not equal between and within countries. Many of vulnerabilities which predate the pandemic defined and exacerbated the COVID-19 impacts on economic, social, and environmental aspects. These include lack of digitalisation, social protection floor, health facilities, and adequate infrastructure for housing, WASH, communication, and waste management, among others. Marginalised members of society, including migrants, and those living in extreme poverty, historically suffer more during social or economic shocks due to pre-existing social conditions and higher exposure to risks which has also been the case during the pandemic to economic vulnerabilities and unequal access to basic services.[7] Ultimately, the number of negative economic, social and environmental externalities

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[1]ILO. (2020) Asia-Pacific Employment and Social Outlook 2020, Navigating the crisis towards a human-centred future of work

[2]https://d2rpq8wtqka5kg.cloudfront.net/554425/open20200422100800.pdf?Expires=1614547112&Signature=Q0M9nNnuhP07UJ6TT7aogaGt9EETRBhJmF3kN3XG~c14uKzyisnCJQ3dQ93H07R8jzhCT5YEFRSJaLAJB5PXlJ1SkcHJWP1Bzc7iSUdAsJSrpsts5Na3s-3goTt4bDkSOdubwCB1YixUYN-2LdK7NwqTI-K5~M5T4Sor~CsQolJUh4LwmofSoDTchBsO6oqA02LVB1NeGFXzsxoXGArThvl~JfK4cXspXiwFG8JT0KZIn26XoduJcAICZBi2o6b8pMZnU8WZHZ5oDp7j0XH2sp3Qi3kDC6F5c22tCNS0h10QPI2WTAyOvwF9mAu~FN8NMhxNmoHUgcS3ZOxCFWG9qA__&Key-Pair-Id=APKAJVGCNMR6FQV6VYIA

[3] United Nations. (2020) COVID 19 in an urban world

[4] Ibid

[5] Bertram et al. (2021) "COVID-19-induced low power demand and market forces starkly reduce CO2 emissions", Nature Climate Change, Vol. 11, pp. 193-196.

[6] Economist. (5 September 2020) "Air Pollution is returning to pre-covid levels"

[7] Wade, Lizzy. (15 May 2020) An unequal blow. Science. Vol. 368, Issue 6492, pp. 700-703.

stemming from COVID-19 may dissolve many of the Asia-Pacific region's social, environmental and economic achievements and slow down its progress toward the 2030 Agenda and its SDGs.

BUILD BACK BETTER

However, this new crisis also brought great opportunities, pushing countries and cities to take full advantage of green approaches, technological advances and decentralised systems that will allow cities and cultures to adapt to new ways of interacting, working, and commuting, prompting new initiatives to improve the local environment leading to increasing the quality of life. While these changes were slowly taking place before the pandemic, the nature of this COVID-19 pandemic necessitated rapid adoption of those changes and transformation into more digitalised society.

In particular, due to the COVID-19 pandemic and the responses, the region's cities have realised more than ever the values of positive changes, some of which are highlighted below, that help cities redevelop and adapt;

- Improved health and quality-of-life outcome through clean air and decarbonisation[8] : Heavily air-polluted cities have seen the improved air quality during the lockdown[9]. As these are temporary, decarbonisation is a key priority that will maintain and improve air quality, decrease environmental degradation, increase quality of life and be a major boost to local economic activity. Adaptation options that also mitigate emissions can provide synergies and cost savings in most sectors and system transitions.[10] For example, transitioning to electric mobility could create new jobs and economic opportunities, especially if supported by a strong partnership between the transport and energy sectors.[11]
- Boosted efficiencies and more informed decision making through accelerated digital transformation in private and public sectors: For example, from June 2017 to July 2020, the average share of customer interactions that were digital increased by 31% in the Asia Pacific region.[12] Not only does increased digitisation have the potential to boost efficiencies, but also increased resilience against future economic shocks[13]. Also, discussion around smart cities, particularly in the wake of the COVID-19 pandemic, has focused on new technologies and increased data collection to solve or optimise complex logistical problems. One issue limiting the region's adoption is a significant digital divide which must be addressed if further technological adaption is to make way for further improvements in infrastructure and social equality.[14]

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[8] UNESCAP. (December 2020) Green reset: the case for greening the COVID-19 recovery through cities.
[9] Partnership for Action on Green Economy. (2020) COVID-19 Data Monitor. https://datastudio.google.com/u/0/reporting/fda0ecd7-f29c-4d0d-87a2-47cb6f91c852/page/kEyTB
[10] IPCC. (2018) Summary for Policymakers. In: Global Warning of 1.5° .
[11] The World Bank Group. (December 15, 2020) Transport decarbonization: How do we make the economics work? The World Bank.
[12] LaBerge, Laura. O'Toole, Clayton. (October 5, 2020) How COVID-19 has pushed companies over the technology tipping point – and transformed business forever. McKinsey & Company.
[13] "The general counsel in a resilient world: Connect to the future." Deloitte. https://www2.deloitte.com/global/en/pages/legal/covid-19/accelerate-digitization-increase-resilience.html
[14] UN ESCAP. (2020) Measuring the digital divide in the Asia-Pacific Region for the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP).

- Greater roles given to local and regional governments: Many cities played a vital role in public health responses to better deal with the virus spread and distribution of emergency relieves[15]. Some cities demonstrated greater leadership and foresight, being recognised as leaders of green recoveries, such as through the case of transforming car lanes to bicycle paths and pedestrians to distance each other. However, the pandemic has also exposed limited, varying opportunities for cities to respond to public health and long-term development concerns effectively and creatively and build resilient green economy. This gave a further rise to the needs of decentralisation to sub-national and local governments as appropriate and greater capacity to respond better.

OBJECTIVE OF THIS POLICY BRIEF

Above-mentioned changes are important and should be further encouraged considering the commitments made in 2015 to achieve the sustainable development by 2030 and to address the larger global climate crisis. Countries and cities will greatly benefit from peer-learning and knowledge sharing to this end. This report therefore aims to inform national and local governments of the COVID-19 impacts in the region and draw on good regional practices that can be implemented to assist the recovery initiatives from the effects of the COVID-19 pandemic with a view to support design, implement, and monitor sustainable, resilient, and inclusive COVID-19 recovery.

The brief propose policy recommendations, following the framework of four thematic pillars suggested in *The Future of Asian & Pacific Cities (2019) report*, which identifies 15 policy pathways for sustainable cities. These four pillars are urban and territorial planning, urban resilience, smart and inclusive cities, and urban finance. Moreover, new findings and updates complemented by *The Future of Asian & Pacific Cities: Transformative Pathways Towards Sustainable Urban Development In The Post Covid-19 Era (2020)* provided additional insights and perspectives in the context of the COVID-19 pandemic.

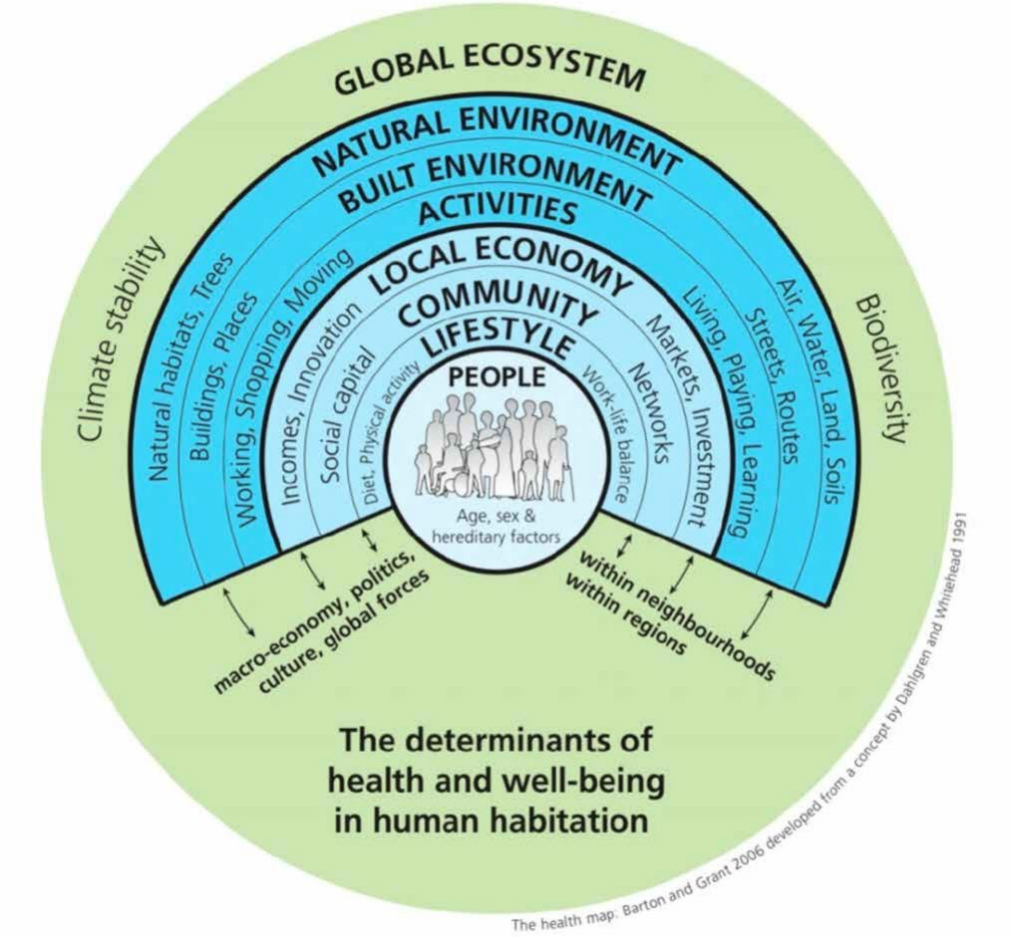
This Regional Policy Brief is produced as part of the global project "Building urban economic resilience during and after COVID-19" which is funded by UNDESA UNDA Rapid Response Funds and implemented by the five UN Regional Economic Commissions with support from UN-Habitat and the UN Capital Development Fund. The project is designed to support cities to design and implement a sustainable recovery plan and to promote the "recovering better" principle by including measures for planning and building resilient cities in sixteen cities across the five regions from Asia and the Pacific, Africa, Middle East and North Africa, Europe, and Latin America.

[15] UN-Habitat. (2021) Cities and Pandemics: Towards a More Just, Green and Healthy Future.

BACKGROUND

ESCAP's report in 2020 demonstrated that the impacts of the COVID-19 vary across countries and societies and the socioecological determinants of health have explanatory powers in understanding this difference and identifying necessary interventions (Figure 1). "Responding to the COVID-19 Pandemic" report, published by ESCAP, ADB, and UNDP provided a strong case for implementing policies, which address vulnerability and marginalisation that predate the pandemic, because of its exacerbated impacts that produce the new poor and vulnerabilities in this region (Figure 2). Failing to address drivers of unequal, unsustainable recovery would further polarise the society and widen inequality within the society (ESCAP, ADB and UNDP, 2021).

Figure 1: The Socioecological Determinants of Health Map



Source: (Barton and Grant, 2006)

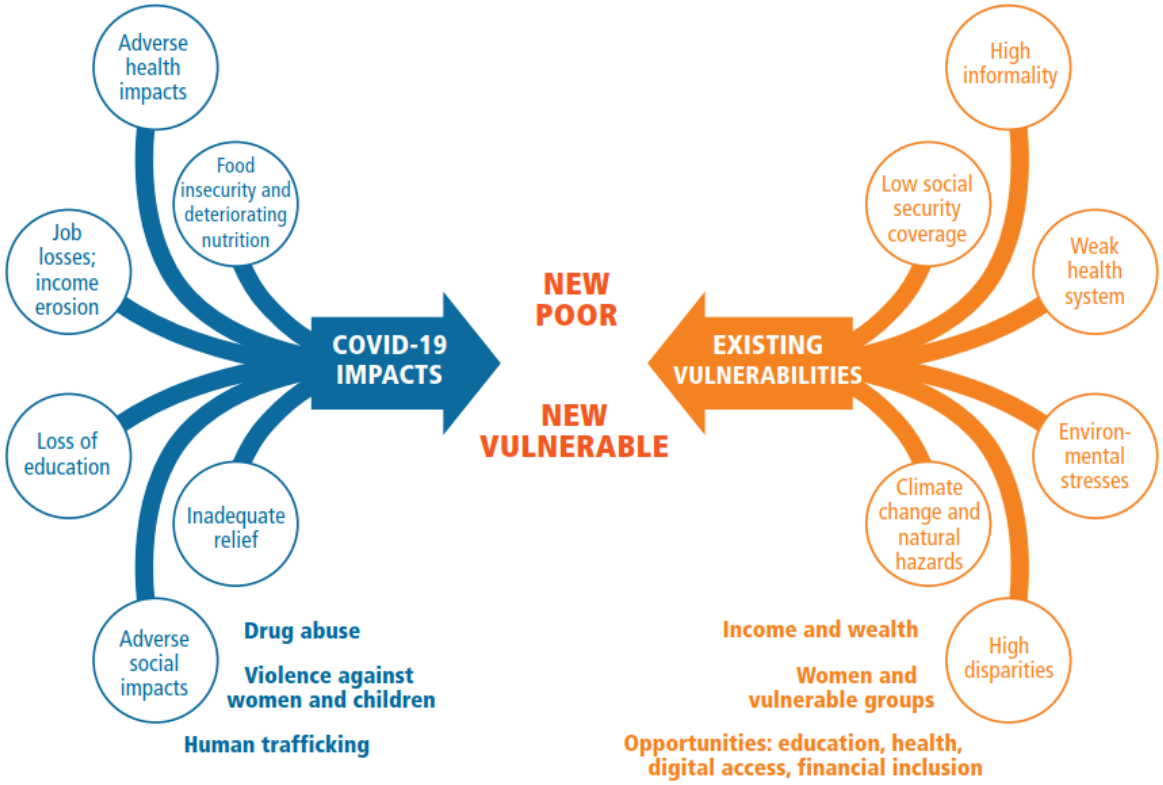


Figure 2: COVID-19 exacerbates pre-existing vulnerabilities. Source: Responding to the COVID-19 Pandemic: Leaving No Country Behind (ESCAP, ADB, and UNDP, 2021)

This section therefore starts with an overview of socio-economic and environmental impacts of the COVID-19 pandemic and its preventive measures and examines some of pre-existing urban vulnerabilities and how these are intensified during the pandemic in this region.

Regional Urban SDGs Snapshot and COVID-19 Impact

According to the ESCAP's annual progress report in March 2021, neither the region nor any of its five sub-regions were likely to meet any of the 17 SDGs by 2030[16] Most concerning is that according to current projections by ESCAP, 20% of the SDG indicators will be worse off in 2030. Evidently, across all dimensions of sustainable development, the COVID-19 pandemic has further hampered the progress and possibly reverted some achievements so far, therefore resulting in further slowdown and regression across many goals and targets.[17]

[16] UN ESCAP. (2020) Asia and the Pacific SDG Progress Report.
[17] UNDESA. (2020) UN DESA Policy Brief #81: Impact of COVID-19 on SDG progress: a statistical perspective.

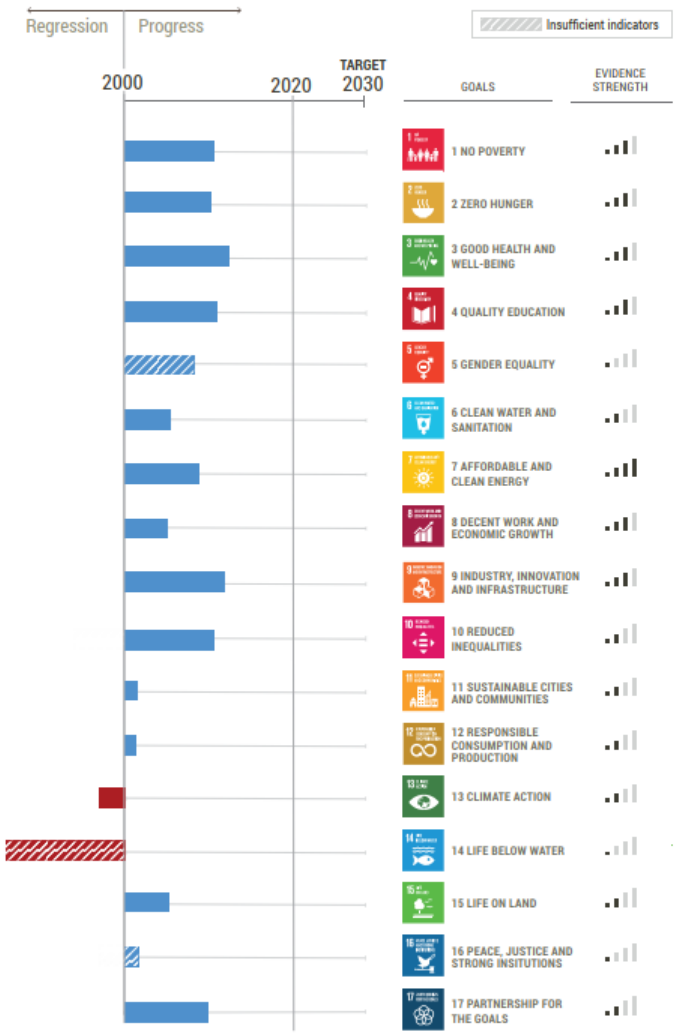


Figure 3 SNAPSHOT OF SDG PROGRESS IN ASIA AND THE PACIFIC, 2020[18]

Economy

Prior to the outbreak, the Asia-Pacific region was already experiencing economic uncertainty. Economic growth estimates in the Asia and the Pacific region had already shifted downwards from 5.1 per cent in 2018 to 4.4 per cent in 2019[19]. The outbreak of COVID-19 further accelerated this trend, with the region's major economic systems of tourism and trade highly impacted. At the same time, regional value chains and freedom of movement were significantly hampered. Further, the slowdown in global economic activity also greatly affected demand-driven growth in the region both for local industry and trade and tourism.[20]

Major economic sectors of tourism and trade have been dramatically altered, while a drop in global demand has decimated parts of the region's manufacturing sector. Labour markets have witnessed a major fallout; as a result, affecting some of the region's most vulnerable populations. The World Bank has estimated that as many as 11 million people in the Asia Pacific region were pushed into poverty in 2020, mostly due to the direct and indirect fallout

[18] UN ESCAP. (2021) Asia and the Pacific SDG Progress Report. ESCAP.
[19] ILO. (2020) Asia-Pacific Employment and Social Outlook.
[20] IFC. (May 2020) COVID-19 Economic Impact.

from COVID-19 as daily wage earners had lost their source of income and months of lockdown have depleted their savings.[21] [22] These economic impacts were particular felt by those already marginalised in the society. For example, in Vietnam, 61% of job losses in the second quarter of the 2020 are informal workers.

This economic fallout is likely to further hamper the SDGs progress, as the region is only on track to achieve less than 10 percent of the SDG Target by 2030[23]. Of concern is how the effects of COVID-19 present further obstruction to many of these current targets, considering risk and vulnerability for many of the region's poor are accelerated and government funding is diverted into other short-term solutions to the COVID-19 problem. Further, the lack of government revenues has been heightened over the past 12 months, leaving governments without the fiscal space needed to implement infrastructure initiatives that focus on implementing clean energy projects and any form of environmental mitigation. Debt in the region has also increased significantly, on average by more than 3% of GDP across the region[24]. There is a strong possibility that these areas will see a gradual worsening in the coming years as their importance is secondary to some basic income indicators.

Environment

The region is particularly lacking progress on environmental issues, specifically carbon emissions, renewable energy consumption, air quality and waste management. This is of specific concern to the Asia-Pacific region due to the region's high vulnerability to heat waves, flooding and sea-level rise. It is estimated that 252 million people in the region will be subject to coastal flooding by 2050 unless clear plans for decarbonisation are adopted.[25] In part, limitations on some of the regions' LDCs' government budgets have hampered these initiatives to take off. Further, the decreased government revenues due to the current economic slowdown will make it difficult to finance such initiatives moving forward.

There have been some positive environmental outcomes as a result of the lockdown as well. Due to the reduced traffic congestion and energy consumption as well as partial modal shift to a safer mobility, such as bicycle, several cities in China, India, and other South Asian cities noted decreased CO and NO2 emissions. This included reducing CO and NO2 by 20-30% in parts of east China during lockdown periods.[26] Similarly, some studies have also highlighted the improved quality of surface and groundwater during lockdown periods. However, air quality soon returned to pre-lockdown levels once lockdowns were removed.[27]

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[21] World Bank. (2020) East Asia and Pacific in the time of COVID-19.
[22] Martin, A., Markhvida, M., Hallegatte, S. *et al.* (2020) Socio-Economic Impacts of COVID-19 on Household Consumption and Poverty. *EconDisCliCha* **4,** 453–479.
[23] ESCAP. (2021) Asia and the Pacific Sdg Progress Report 2021.
[24] IMF. (April 2020) Fiscal Monitor.
[25] EY. (November 2020) Why decarbonization should top Asia-Pacific board agencies.
[26] Aerosol and Air Quality Research. (July 2020) Impact Assessment of COVID-19 on variations of SO2, NO2, CO and AOD over East China. Volume 20, Issue 7.
[27]Ayyoob Sharifi, Amir Reza Khavarian-Garmsir, (2020) The COVID-19 pandemic: Impacts on cities and major lessons for urban planning, design, and management, Science of The Total Environment, Volume 749.

Society

The Asia-Pacific region has made some significant progress, albeit inadequate, in some areas over recent years. For example, while this region is not on track to achieve any of goals, it has established most promising foundation to meet 2030 deadline around SDG 3 (Good health and well-being) by improving maternal and child health, vaccination coverage and malaria prevention and SDG 9 (Industry, innovation and infrastructure) through increased access to mobile networks and reduced carbon dioxide emissions per unit of manufacturing value-added.[28] However, lack of progress against various goals and targets suggest that society was not fully capable of handling the crisis, resulting in devastating impacts. There is a risk that the fallouts could have significant long-term effects on the region's socio-economic landscape.

Notably, the pandemic has worsened poverty trends and divisions, increased risk and vulnerability for some of the region's poor, and further exacerbated lines of access to quality work, education, and health based on countries, wealth, gender, and migration status. Lockdowns and business closures have drained even small amount of savings within the poor communities and have pushed them into severe poverty, which may possibly have multi-generational impacts. Children are especially vulnerable in this context and have already experienced negative consequences; lack of incomes increased levels of child labour, malnutrition, among others, which will negatively impact education attainment.
Education is one of the areas where devastating impacts have been recorded, with an estimated 6.7 million learners at risk of dropping out of school.[29] Learning losses due to COVID-19 range from 8% of a learning adjusted year of schooling in the Pacific region, where most of schools have been open, to 55% in South Asia with its longest school closures recorded[30]. While some parts of countries in the Asia-Pacific offered the online schooling, the attainment gap is likely to increase considering a lack of stable internet connection at home and low computer ownership, among other concerns[31].

High spatial densities without adequate WASH access, caused by lack of urban planning, have resulted in urban epicentres. While higher-income populations can isolate themselves, dwellers in informal settlements had no means to physically distance each other both living and working. Since they are not provided with access to affordable housing and basic amenities, this condition continues to pose both health and developmental challenges to cities.

Women have been particularly impacted by the pandemic and the measures taken to control it. Women account for an estimated 70% of workers in the health and social sector[32] and have thus faced significant risk of infection as healthcare providers, particularly in situations where inadequate protective equipment was provided. As primary healthcare providers, women also have a key role in communicating health risks to the populace at large, thus

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[28] UNESCAP. (2021) Asia And The Pacific SDG Progress Report 2021.
[29] UNESCAP. (2021) Progress Report 2021.
[30] ADB. (2021) Learning and earning losses from COVID-19 school closures in developing Asia. Network on Education Quality Monitoring in the Asia-Pacific (NEQMAP).
[31] Ibid.
[32] WHO. Gender Equity in the Health and Social Sector.

engaging with women is crucial for combatting serious health shocks.[33] Some COVID-19 response policies have significantly impacted women. Lockdowns to prevent the spread of the virus have led to a rise in domestic violence in many countries, with women being unable to access support services to help them leave unsafe domestic environments, exacerbated by the economic stress resulting from the pandemic.

Regional Recovery Scenarios and Issues

The impacts of COVID-19 have been diverse and so would be the recovery context. Countries and cities need to understand the specific context in which this region is situated and how that would potentially play out in planning and implementing long-term recovery plans. In short, bearing in mind that necessity of containment measures will continue considering current Vaccine access inequality and COVID-19 pandemic has drained both savings and sources of income of local governments, the recovery policy should continue to have health-centred approaches and focus on resilience building interventions that would strengthen the city's capacity (economic, financial, social, and environmental) to withhold future shocks and stresses. Since lack of economic diversification created fragility in many urban areas, supporting SMEs and building local economic base would be needed. Regression and slow progress around environmental goals and targets of the SDGs must be prioritised. Many cities have not been able to fully utilise the benefits of digitalisation due to huge digital divide exists within and between countries.

Strict measures in Asia-Pacific

Comparatively, the responses to COVID-19 from the Asia-Pacific were initially more stringent than other global responses.[34] This included both internal and external lockdowns, a decrease in internal migration and tourism as well as partial restrictions on internal movement. Singapore, India, the Philippines, and Thailand implemented strict measures, only permitting the opening of essential services in some areas, and entrance restrictions to foreign visitors were implemented in nine regional economies.[35] In India, for example, a nationwide lockdown was implemented on March 25, 2020 that effectively shut businesses, offices, schools, places of worship, shopping malls, and other public spaces where groups typically congregate.[36]

Containment procedures have brought negative environmental, social, and economic externalities. Low levels of social security and limited government budgets have made it difficult for some sectors of the economy to weather the storm. Micro and small enterprises have tended to be the first impacted by the economic consequences of the pandemic but the last to recover as business conditions improve.[37] Given the micro nature of some of these sectors, coupled with centralised governments, has made it difficult to accurately assess and

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[33] Smith, Julia. Overcoming the 'tyranny of the urgent': integrating gender into disease outbreak preparedness and response. Gender & Development, Volume 27, Issue 2, pp 355-369.
[34] OECD. (2020) Health at a Glance: Asia/Pacific 2020: Measuring Progress Towards Universal Health Coverage.
[35] Ibid
[36] Agarwal, S., A. Bhanot, and G. Goindi. (2005) Understanding and Addressing Childhood Immunization Coverage in Urban Slums. *Indian Pediatrics* 42 (7): 653–663.
[37] ILO. (2020) Asia-Pacific Employment and Social Outlook.

respond to the immediate issues of the crisis and how to plan for a more resilient future. Further capacity building and autonomy are needed from local governments to respond more accurately to the immediate needs and long-term goals for cities to recover from the fallout of the pandemic.

Global Inequality – different level of responses

While the region also holds some of the world's most developed economies, it is home to some of the least developed and most fragile. The respective government responses in the region are not equal. Major economies like Japan, China, Singapore, and South Korea have been able to implement expansive mitigation campaigns coupled with expansionary economic and social support to assist with the fallout of the pandemic.[38] For example, Japan implemented a total fiscal package worth 234 trillion yen equivalent to 40% of Japan's GDP and an array of other trade, monetary, financial, and small business measures to assist the economic fallout, health, and social issues linked to COVID-19.[39] Other small island states and other LDCs do not hold the economic clout to deliver comprehensive rescue and assistance packages for their respective populations. For example, in Afghanistan, the government was only able to place 0.1% of GDP for urgent health needs, such as establishing testing labs, including at border crossings, setting up special wards to boost hospitalisation and care capacity, procuring the most critical medical supplies.[40]

This global recession since the last one in 2008 have impacted countries differently and further widened the inequality between and within countries. Several governments in the region provided fiscal rescue packages and assistance programs to ease the economic fallout from the crisis. Numerous projects were implemented to assist those falling into unemployment or joblessness, and the significant loss of income some sectors were met with due to travel restrictions or other lockdown measures. This included tax cuts, lower repayment conditions for personal and business loans, government support for financial institutions, cash handouts, among other economic packages to ease the burden and fallout of COVID-19. For example, in Thailand, on March 7, 2021, the government reduced a withholding tax from 3 per cent to 1.5 per cent, implemented tax deductions for wages, and issued VAT refunds to entrepreneurs.[41] In Cambodia, $50 million set aside for low-interest loans for struggling SMEs, while the government put aside between $800 million to $2 billion to help the economic recovery.

Policy responses have been critical for countering the economic slowdown and flow-on effects within the labour market. There is some evidence that policies to support enterprises to retain workers, albeit on reduced hours, have prevented what would otherwise be larger job losses in the region.[42] However, this is largely skewed along the lines of government capacity. For example, Singapore's government has set out two separate stimulus packages, totalling around 12% of GDP, including wage subsidies, direct support to households, and aid

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[38] Peeri NC, Shrestha N, Rahman MS, et al. (2020) The SARS, MERS and novel coronavirus (COVID-19) epidemics, the newest and biggest global health threats: what lessons have we learned? Int J Epidemiol, 49(3):717–26.
[39] UNESCAP. (4 November, 2020) Japan COVID Country Brief.
[40] UNESCAP. (4 November, 2020) Cambodia COVID Country Brief.
[41] UNESCAP. (4 November, 2020) Thailand COVID Country Brief.
[42] UNESCAP. (May 2020) Combating COVID-19 in Asia and the Pacific: Measures, Lessons and the Way Forward.

for the food, aviation, and tourism sectors. Hong Kong's recent budget announced cash handouts of HK$10,000 (US$1,283) for each permanent resident adult and a 100% write-down of salary taxes for companies.[43] In India, public investment via interest-free loans to states was introduced to decentralise some of the policy response and business-support packages focusing on assisting micro, small, and medium-sized enterprises non-bank financial companies with access to credit and cash.

Many low and low middle-income economies in the region also hold higher proportions of informal employment. The longevity of the COVID-19 economic fallout will require significant planning and assistance if sustainable recovery is to be met. Greater assistance will be needed either from international organisations or IFIs to boost the lack of fiscal space currently available in low and medium-income countries.

Lack of budget in building back better

Financial responses have come at an enormous cost to government budgets. The combination of an economic contraction and increased government expenditure has led many governments in the Asia Pacific region to fall into debt.[44] According to the IMF, fiscal deficits in the region are expected to increase by more than 3% of GDP in 2020 compared to 2019.[45] This may be a major challenge as governments attempt to implement new, modern policy post-COVID-19, especially as governments aim to invest and develop new capacities and technologies. Bearing this fiscal limitation in mind, governments should aim to align green, pro-poor, COVID-19 recovery policies in order to maximise the impacts of financial responses on longer-term policy objectives.[46]

Similarly, local governments face budgetary challenges when it comes to planning the recovery. While financial capacities of cities vary across the region and within countries, most cities are dependent on their national governments for policy reforms or finance. Considering that urban challenges are central to economic, social, and environmental challenges, decentralised frameworks and fiscal devolution could provide opportunities to better allocate resources. Local governments with autonomy in allocating funds and prioritising city planning, infrastructure, or social policies could plan and implement in line with their specific long-term vision.[47] Towards this end, cities need to build their capacities step by step, prioritise economic diversification and attract projects that build a tax base to enable local governments to exercise more authority from the central government. The above may be key in some long-term challenges of increasing technological updates, developing greener, healthier cities and providing much-needed infrastructure and services to rapidly urbanised areas.

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[43] Sum Lok-Kei, Kimmy Chung. (February 2020) Hong Kong Finance minister shoots down lawmakers' proposal to seek approval for cash handout separately from police funding in government budget. South China Morning Post.
[44] OECD. (2020) Health at a Glance: Asia/Pacific 2020: Measuring Progress Towards Universal Health Coverage.
[45] IMF. (April 2020) Fiscal Monitor.
[46] OECD. Are countries in the Asia-Pacific region implementing a "green recovery? What more can be done?
[47] OECD. (2018) Road and Rail Infrastructure in Asia: Investing in Quality, The Development Dimension. OECD Publishing, Paris.

Diversification needs in cities

A lack of economic diversification has also greatly affected some regional economies. Tourism, specifically, has been largely affected by COVID-19 and is a major economic foundation for the region. In 2018, the Asia-Pacific region recorded 348 million tourist arrivals, accounting for US$ 442 billion in tourism receipts and 5 per cent of total exports.[48] The consequences are now being felt significantly in some countries. In Fiji, 279 hotels and resorts have closed since the outbreak, with 25,000 workers losing their jobs[49], while similar employment trends have been witnessed across the Pacific.[50] Developing new industries may be key in diversifying the region's economic systems and building regional resilience.

Environmental challenges

The Asia-Pacific region's struggle to achieve its environmental SDGs has unfortunately worsened due to the impacts of the COVID-19 pandemic. Despite the fall in emissions achieved during extensive periods of lockdowns, general waste has grown. With cities lacking the needed infrastructure, budget and management capacity to take care of such waste, environmental issues are now mounting. A key challenge will be for regional cities to implement much needed infrastructure to improve the environmental challenges currently being witnessed. As the region will be one of the worst affected by climate change, with an estimated 252 million people at risk of coastal flooding, the need to decarbonise and find greener economic development platforms is paramount.[51]

Some regional economies, such as South Korea, have committed to achieving zero-carbon emissions by 2050 by heavily investing in renewable energies and introducing penalties such as a carbon tax.[52] Japan and China have also set out their own carbon-neutral goals.[53] However, China is still the world's largest carbon emitter, contributing to 28% of the world's carbon emissions despite its low emission per capita, while the region also holds five of the top ten carbon emitters.[54] That said, while the region is the global carbon emitter, it is also a leader in new green initiatives. Further, perusing a green recovery past after COVID-19 could greatly assist the region's labour market and local economies greatly impacted by the pandemic. Green investment is generally more labour-intensive and expanding in these areas could strengthen local economic systems in the short term and increase sustainability and resilience in the longer term.[55]

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[48] ILO. (April 2020) COVID-19 and employment in the tourism sector; Impact and response in Asia and the Pacific.
[49] S. Chanel. (15 Apr. 2020) 'It's catastrophic': Fiji's colossal tourism sector devastated by coronavirus. The Guardian.
[50] World Bank. (Jan 18, 2021) Reskilling and Labour Migration vital to the Pacific's economic recovery.
[51] EY. (November 2020) Why decarbonization should top Asia-Pacific board agencies.
[52] Ibid
[53] Chatham House. (April 2021) Regional Cooperation for Green Growth in Asia.
[54] Union of Concerned Scientists. (Aug 2020) Each country's share of CO2 emissions.
[55] IMF. (March 2021) Asia-Pacific, the Gigantic Domino of Climate Change.

Pre-Existing and New Vulnerabilities in Asia-Pacific Cities

Although Asia-Pacific has experienced pandemics in the past and initially responded successfully[56], the region suffers from a number of vulnerabilities that have expanded during the current pandemic. This includes issues of structural inequalities and lack of quality urbanisation, informal economy, poor performance around environmental goals and targets, decentralisation, and persistent digital divide. Rapid urbanisation mixed with structural inequality has made many urban centres epicentres for COVID-19, and externally dependent economic frameworks have affected local labour markets and trade. Moreover, a lack of adequate infrastructure and urban planning has resulted in major environmental concerns. These issues have been compounded by the regions labour markets, specifically the significant portion which is involved in informal employment.

The impacts of the pandemic have been wide-ranging in the region. Structural inequality and lack of quality urbanisation have made it difficult to implement physical distancing and mitigation measures in overcrowded urban centres [57], disproportionately affecting marginalised groups, such as low-income population, migrant workers as well as women. Below section would elaborate some of those impacts.

Structural Inequalities and Lack of Quality Urbanisation

Pre-COVID-19

While planned urbanisation can bring significantly positive outcomes (urban premium), as cities can provide better access to goods and services for their residents, many Asia-Pacific cities have grappled with the urban-rural migration and expansion of informal settlements. Consequently, one of the major challenges faced by urban areas is the high percentage of the population living in overcrowded slums, without access to basic services or opportunity.[58] When rapid urbanisation outpaces the development of needed infrastructure to support growing populations without addressing structural inequalities, the urban benefits might turn into urban penalty which disproportionately affect the those in lower social ladders.

During the Pandemic

Much of the media attention around the spread of COVID-19 has focused on the role of high-density urban environments in spreading the virus. However, studies looking at COVID-19 transmission both within and across countries have found that density is not a strong predictor of infection and spread on a per capita basis, and in fact that when socio-economic

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[56] OCED. (2020) Chapter 2. The impact of the COVID-19 outbreak on Asia-Pacific health systems", *Health at a Glance: Asia/Pacific 2020: Measuring Progress Towards Universal Health Coverage*, https://www.oecd-ilibrary.org/sites/aaa5448f-en/index.html?itemId=/content/component/aaa5448f-en

[57] OECD. (23 July 2020). OECD Policy Responses to Coronavirus (COVID-19) Cities policy responses.

[58] Baker, Judy L. Gadgil, Gauri U. (2017) East Asia and Pacific Cities: Expanding Opportunities for the Urban Poor." Urban Development; World Bank, Washington, DC.

factors are controlled for, urban density may be associated with a lower infection rate.[59] It is the combination of socio-economic risk factors and density, 'economic geography' rather than purely 'spatial geography' that determines infection risk.[60]

Urbanisation mixed with structural inequalities made more impoverished communities more vulnerable to COVID-19 containment. OECD noted that "cities marked with inequalities, inadequate housing conditions and a high concentration of urban poor are potentially more vulnerable than those that are better resourced, less crowded and more equal."[61] In low-income, high-density neighbourhoods or informal settlements, residents are much more likely to have jobs (often in the informal economy) that require interactions with others and are more likely to live in families with multiple generations present single dwelling. They are also less likely to have access to appropriate sanitation and green public spaces. For example, the per capita floor area for the poorest 60% of city dwellers in India is below the recommended floor area for the prisoners.[62] Under such conditions, social distancing is an impossible task.

Moreover, the closure of public transport and inadequate provision of services has taken away income-earning opportunities from poor communities and has limited access to new opportunities[63]. During the lockdown, some urban dwellers were not able to access to daily necessities (such as water, food, medicines) and basic urban services, forcing them to return to their hometown or break the lockdown, resulting in the wider virus spread into rural areas.

The lack of appropriate housing, waste treatment and sanitation facilities, and transport as well as basic urban services has hindered public health measures[64]. While the pandemic has brought attention to these issues, they are not stemmed from the pandemic itself but rather from the structural inequalities and unplanned urbanisation, combined with under-supported local governments. Some of these major issues could be addressed through enhanced fiscal federalisation or fiscal devolution to empower local governments, enabling more targeted infrastructure and policy responses.

Informal Economy

Pre-COVID-19

Currently, 1.3 billion of the world's 2 billion informal employees work in the Asia-Pacific region and contribute to 68% of the region's employees. This makes the Asia-Pacific region extremely fragile and susceptible to economic shocks compared to other global labour markets.[65] Further, the region's dependency on foreign remittance receipts was largely

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[59] Hamidi et al. (July 2020) Longitudinal analyses of the relationship between development density and the COVID-19 morbidity and mortality rates: Early evidence from 1,165 metropolitan counties in the United States', Health Place.

[60] Lall, Somik. Wahba, Sameh. (June 2020) No Urban Myth: Building Inclusive and Sustainable Cities in the Pandemic Recovery. World Bank.

[61] Ibid

[62] Sharifi and Khavarian-Garmsir. (20 December 2020) The COVID-19 pandemic: Impacts on cities and major lessons for urban planning, design, and management", Science of The Total Environment, Vol. 749.

[63] Bird, J. , Kriticos, S. and Tsivanidis, N. (2020) Impact of COVID - 19 on public transport. IGC.

[64] Iyengar KP, Jain VK. (2021) COVID-19 and the plight of migrants in India Postgraduate Medical Journal;97:471-472.

[65] ILO. (2018) Women and men in the informal economy, a statistical picture.

exposed when global economies shut down and enforced strict lockdown measures. Remittances to Asia and the Pacific, amounting to $315 billion in 2019, are an important and stable source of income.[66] Remittance receipts decreased by 11% in 2020, hampering many low-income households' economic security blanket.[67] The region has also had limited progress in SDG 8 "sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all".[68] This has consequently played a significant part in how vulnerable the labour markets are in the region. With such high informal employment, economic shocks have proven to be hugely destabilising for communities with no financial security, welfare, or assets dependent on day-to-day work.

During the Pandemic

Unfortunately, sectors that largely comprised informal workers (tourism, textiles and apparel, and domestic work) were most affected by the COVID-19 pandemic and associated measures, leading to a major decline in employment or reduced working hours for those in these industries. For example, three-quarters of those employed in the tourism sector in the region are employed informally. According to the ILO, working hours decreased by an estimated 15.2 per cent in the second quarter and by 10.7 per cent in the third quarter of 2020, relative to pre-crisis levels.[69] It is estimated that nearly 80 per cent of domestic workers in Asia and the Pacific region have experienced a reduction in the number of hours of work and earnings as well as job losses. As a result of COVID-19, migrant workers and IDPs similarly are seeing major economic loss due to labour market disruptions. It is estimated that job cuts in the region have reduced wage income to range from $359 billion to $550 billion.[70] Due to the loss of income in the informal sector, masses of migrant workers have attempted to return home. However, some were unsuccessful and are now trapped without an income in their host communities, as border closures prevented them from returning home. Mass migration and population movements may have also increased the spread of the virus as individuals travelled through numerous urban and rural environments.

The impact of the pandemic on the labour market has had severe social effects across the region. As in other pandemics, the economic fallout mainly affected marginalized and vulnerable groups and widened pre-existing inequalities throughout the region.[71] Nearly half of young workers in the region are employed in the four sectors hit hardest by the crisis. This is one of the reasons that young people face greater labour market disruption and job loss than adults due to COVID-19.[72] Further, the forced suspension of education and training institutions may affect transitions to and within labour markets and the continued development of human capital in the region.[73] This issue has also been adversely affected by the regions digital divide. For example, as migrant workers returned home or to rural areas,

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[66] ADB. (August 2020) COVID-19 Impact on International migration, Remittances, and recipient Households in Developing Asia.
[67] The World Bank. (October 2020) COVID-19: Remittance Flows to Shrink 14% by 2021.
[68] ILO. (2020) Asia-Pacific Employment and Social Outlook.
[69] ILO. (December 2020) 81 million jobs lost as COVID-19 creates turmoil in Asia-Pacific labour markets.
[70] ADB. (August 2020) COVID-19 Impact on International migration, Remittances, and recipient Households in Developing Asia.
[71] Wade, Lizzy. (May 15, 2020) An unequal blow. Science, Vol 368, Issue 6492, pp. 700-703.
[72] ILO. (2020) Tackling the COVID-19 youth employment crisis in Asia and the Pacific.
[73] Ibid

there was a loss of access to urban technologies such as high-speed internet. As over 183 million (or 32%) three- to 17-year-old school-aged children in the region did not have internet access at home, their children could not access remote learning in villages due to poor connectivity.[74] [75]

Women have been significantly affected by the pandemic. Those who were predominantly employed in sectors that were the hardest hit by the pandemic suffered the most. Tourism, textiles and apparel, and domestic work are examples of such industries that suffered due to economic slowdowns during the pandemic and sectors where women are overrepresented.[76]

The region includes six of the ten largest remittance recipients globally.[77] Previously in times of crisis, households could still depend on income receipts from family or friends abroad via remittances to compensate for the local economic decline. However, COVID-19 has largely disrupted external labour markets. Consequently, as labour activities for migrant workers decrease, so do remittance receipts, significantly affecting household income, consumption, and economic stress, effectively removing the economic security blanked in which local households could depend during times of domestic economic downturn or crisis. In 2019, remittances to the Asia Pacific were estimated to be $315 billion. It is estimated that in 2020, remittance receipts in the Asia Pacific region decreased by 18.3%.[78] This has exposed other structural vulnerabilities that may have previously been assisted by external assistance.

Environmental challenges

Pre COVID-19

Unsustainable growth in Asia-Pacific region has creating more burden on our natural environment. In SDGs snapshot, it was reported that the material footprint per unit of GDP in Asia-Pacific is far higher than the world average. Material Footprint/$ was 1.16kg/$ globally and 1.82kg/$ in Asia Pacific in 2017. Between 2005 and 2017, per capita consumption of natural resources increased by 58 per cent and domestic material consumption. Likewise, in relation to target 12.4, Urban areas in the region generate about 1.21 million Mt of municipal solid waste a day. By 2025, this amount will more than double.[79]

Certainly, the growing material consumption has equally posed a challenge to the climate crisis. Asia and the Pacific has emitted 16.75 billion metric tons of carbon dioxide emissions in 2020, which was larger than the emissions of the rest of all other regions combined that year.[80] [81] Forest fire significantly increased in 2019 and deforestation in Asia-Pacific is

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[74] UN news. (2020) Bridging Asia-Pacific digital divide vital to realize tech benefits.
[75] Reuters. (February 2021) Use tech to bridge the digital divide in East Asia and Pacific.
[76] APEC. (2020) Women, COVID-19 and the Future of Work in APEC.
[77] ADB. (August 2020) COVID-19 Impact on International Migration, Remittances, and Recipient Households in Developing Asia.
[78] ADB. (August 2020) Tracking covid-19's devastating toll on asia's remittances.
[79] ESCAP. (2021) SDGs Snapshot SDG12.
[80] Dabla-Norris, Era. Et. Al. (March 24, 2021) Fiscal Policies to Address Climate Change in Asia and the Pacific. IMF.
[81] Tiseo, Ian. (July 23, 2021) Carbon dioxide emissions worldwide from 1965 to 2020, by region". Statistia.

expected to rise, which are contributing to the increased emission.[82]Moreover, the transport sector is a leading cause, accounting for 51.9 per cent of the total oil consumption and contributes to nearly 13.5% of the total CO2 emissions, for which road vehicles are largely responsible.[83]

Closely intertwined with the carbon emission, air quality has been the major environmental challenge. About 4 billion people, around 92 per cent of the region's population, are exposed to levels of air pollution that pose a significant risk to their health, exceeding the World Health Organization (WHO) Guideline. Strikingly, one third of global death caused by air pollution occurs in Asia and the Pacific.[84] While sources are varying, urban and heavily industrialised areas with high population density are driving the air pollution.[85]

During the Pandemic

In the beginning of the pandemic, following the strict lockdown measures, many of most polluted cities in the region have seen the clear air. Lockdown measures had the unforeseen short-term positive environmental impact of decreasing carbon emissions. In China, carbon emissions dropped as much as 25% at times when lockdown measures were in place.[86]

However, lockdown measures have also brought about many other environmental challenges in cities. Hazardous waste production has grown, as has municipal waste, which is currently overwhelming many urban areas.[87] Major Asian cities, such as Bangkok, Hanoi, Kuala Lumpur, and Manila have experienced significant volume increase of the medical waste; about 154 - 280 tons more medical waste was produced per day compared to the pre-pandemic 154 - 280 tons more medical waste per day than before the pandemic.[88] Inadequate and inappropriate handling of medical waste and ceased waste collection service in some part of cities during the lockdown has further led to significant health and hygiene related concerns[89], especially among informal settlements.

In the effort to prevent the spread, health responses as well as measures such as wearing a mask and using disposable items, significantly contributed to waste volume increase. While these efforts were necessary, this might reverse years of momentum building and awareness raising to reduce plastic waste pollution, much of which will end up in shorelines and in the sea.[90] A major contributor to this has been an increase in household plastic and medical waste. Such examples include a total of 247 tonnes per day of medical waste in Jakarta, 180 tonnes per day of medical waste in Kuala Lumpur, increased extra plastics waste of 1334 tonnes in Singapore, and total production of 245 tonnes per day medical waste in Bangkok

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[82] UNEP. (2020) Emissions Gap Report.
[83] UNESCAP. (September 2020) Virtual Expert Group Meeting on Climate Change mitigation and adaptation for transport in Asia and the Pacific.
[84] D. Nery, Maria Cristina. (May 2, 2018) One third of global air pollution deaths in Asia Pacific." WHO.
[85] Climate and Clean Air Coalition. (2019) Air pollution measures for Asia and the Pacific.
[86] Myllyvirta, Lauri. (Feb 2020) Analysis: Coronavirus temporarily reduced China's CO2 emissions by a quarter.
[87] IFC. (June 2020) COVID-19's impact on the waste sector.
[88] ADB. (2020). "Managing infectious medical waste during the COVID-19 pandemic".
[89] UNEP and IGES. (2020) Waste Management during the COVID-19 Pandemic: From Response to Recovery.
[90] Benson , Nsikak U. Bassey, David E. Palanisami, Thavamani. (2021)
COVID pollution: impact of COVID-19 pandemic on global plastic waste footprint. Heliyon, Volume 7, Issue 2.

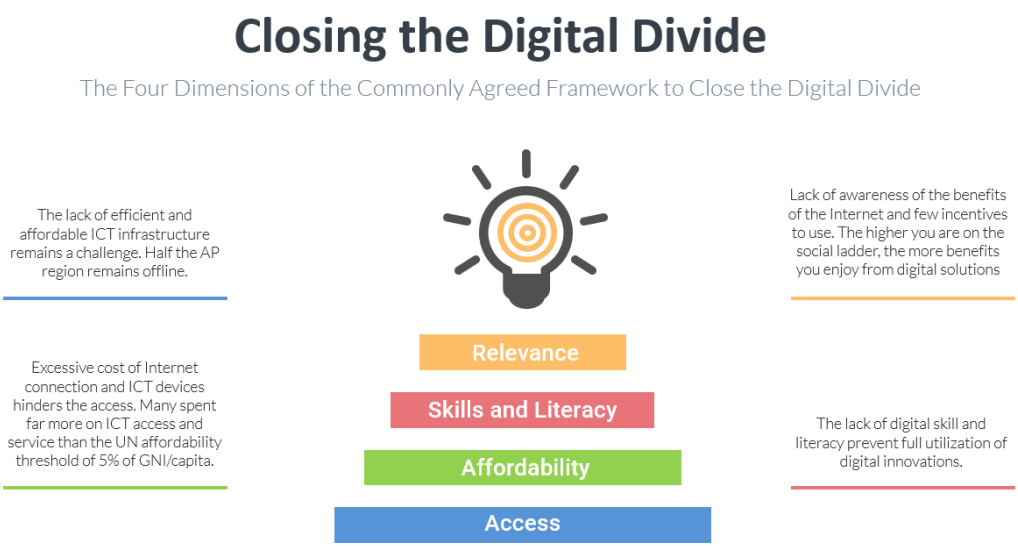
during 2020.[91] The increase in waste production has led to challenges and highlighted inadequate waste management procedures and facilities in the Asia Pacific.

Local governments must ensure that urban density does not become a casualty of the COVID-19 pandemic. Urban density can provide a platform for more effective solid waste management given the high population concentration in close proximity. One direction that may solve the issue of overwhelming waste is via decentralised waste treatment, lowering transportation and operating costs while also increasing local autonomy to respond to disease transmission through solid waste handling and consequences of medical waste surge on current municipal waste treatment and disposal systems.[92]

Digital Divide

Pre-COVID-19

Digitalisation transformation has been playing a critical role in building sustainability in cities and responding to the pandemic safely and effectively[93]. While technological innovations can assist cities and the region in general to build social, environmental, and economic resilience, there are several issues that could undermine its benefits. UNDESA provided the four dimensions of the Commonly Agreed Framework to close the digital divide, namely access, affordability, skills and literacy, and the awareness and relevance.



World Economic Forum has a similar list, highlighting six issues as "critical gaps in the digital divide" – namely, fixed network coverage, penetration and speeds, Mobile connectivity, affordability gap, and Digital literacy[94]. These gaps are seen at not only individual and household levels but also at business levels.

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[91] Raveena, S.M., Aris, A.Z. (2021) The impacts of COVID-19 on the environmental sustainability: a perspective from the Southeast Asian region. *Environ Sci Pollut Res*.
[92] Bhargavi N. Kulkarni, V. Anantharama. (2020) Repercussions of COVID-19 pandemic on municipal solid waste management: Challenges and opportunities, Science of The Total Environment, Volume 743.
[93] UN. (2021) Report of the Secretary-General Roadmap for Digital Cooperation.
[94] World Economic Forum. (2020) Accelerating Digital Inclusion in the New Normal. PLAYBOOK.

Although East Asia and the Pacific have the fastest-growing internet penetration globally, access to the internet is not equitable across this region; almost 52% of the region's 4.3 billion people are still offline and consequently, may be denied access to such innovations. Women and girls often have less access to technology and the internet than men and boys, either because they cannot afford it or because social norms consider that 'technology is for men'. ITU noted that "(w)hile, on average, 41.3 per cent of women and 48.3 per cent of men used the Internet in Asia and the Pacific in 2019, globally 48.3 per cent of women and 55.2 per cent of men used the Internet that year."[95]

ITU and A4AI reported in 2020 that except three countries among the developing Asian and the Pacific countries the majority of the population do not have affordable fixed broadband connection.[96] The internet uptake is significantly linked to age, education and income level[97].

In order to fully benefit from the advanced technologies, the communication infrastructure must be robust to provide high-speed, quality internet for full mobilisation of IoT solutions. Examining the quality of service delivered at the user level shows that some of major cities remain with relatively poor internet which underperform the cities with successful IoT implementation(Perkins, 2020). This divide could exacerbate existing inequalities and leave cities and communities more vulnerable if not addressed.

Upgrading digital literacy would unlock many digital benefits. As the urban areas are increasingly connected, the local governments have to be able to collect and understand data to meaningfully utilise them. Countries and cities also need to ensure that workers will keep up the pace with the technological changes. A recent report indicates that "to keep pace with technological change, the number of workers applying digital skills in these countries (Australia, India, Indonesia, Japan, Singapore, and South Korea) will increase by over five-fold from 149 million workers today to 819 million workers in 2025."[98]

Finally, lack of awareness of value addition by internet could hinder wider adoptions of the technology. Moreover, many disadvantaged groups have insufficient incentives to go online, due to lack of contents in their local languages.[99] There has also been a usage gap observed; the people on the higher social ladders use the internet for more informational, educational, political, work and career enhancing purposes, while population with lower education and social class use the internet for entertainment, chat or simple communication, and e-shopping.[100]

During the Pandemic

At the regional level, the high-income economies significantly advanced on the digital transformation across different spectrum of their societies, while low-income economies

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[95] ITU (2021) Digital trends in Asia and the Pacific 2021: Information and communication technology trends and developments in the Asia-Pacific region, 2017-2020. p.20.
[96] ITU. (2020) ICT price trends: Measuring digital development. ITU Publications.
[97] OECD. (2020) Digital Economy Outlook 2020.
[98] Alphabeta. (2021) Unlocking APAC's Digital Potential: Changing Digital Skill Needs and Policy Approaches. APAC Digital Skill Index 2020.
[99] UNDESA. (2021) UN/DESA Policy Brief #92: Leveraging digital technologies for social inclusion.
[100] Zillien N, Hargittai E. (2009) Digital distinction: Status - specific types of internet usage. Social Science Quarterly;90(2):274-29.

progressed little on this end, where many of 50% of regional offline population are concentrated. They not only failed to capitalise this COVID-19 pandemic as digitalisation opportunity, but also suffered more due to its low connectivity, low digital technology diffusion, among other challenges. There is a risk that economic recovery will be skewed toward the better off and marginalise vulnerable groups and poorer countries.

As discussed earlier, access to quality internet and computer is uneven across the region, resulting in widening the inequality, such as the educational outcomes. For example, while in lower-middle income economies, 41% have internet access at home, only 18% of households on average have a computer, forcing children to attend to virtual schools and take courses, if offered at all, on mobile, if they own them. This is predicted to result in a larger learning loss in lower income groups. If these issues are not addressed, there may be significant long-term costs for the current generation, specifically as skills like digital literacy become essential in the workforce.[101]

Digital solutions have provided means to continue employment and public services. However, these do not provide the equal support across different occupations and favoured relatively high-income groups. These jobs which cannot be done at home tend to be low-wage and at risk of future automation.[102] Likewise, SEMs and Informal sectors have been disproportionally affected. While online transaction and internet users have significantly increased, the access to such mechanism remains limited for SMEs. Indonesia, Malaysia, Singapore, Thailand, the Philippines and Vietnam have seen 40 million more people came online for the first time in 2020. Average number of consumers' cash transactions declined from 48% pre-COVID-19 to 37% post-COVID-19, while frequency of e-Wallets transactions increased from an average of 18% pre-COVID-19 to 25% post-COVID-19. Considering various barriers to utilise e-commerce for SMEs (e.g. high transaction fee), supporting digital inclusion and transition of SEMs in expanding digital economy is crucial.

In order to ensure the digital transformation benefit all, countries and cities have to make great efforts to close this digital divide.

[101] Hulshof, Karin. Bridging the digital divide for Children and Adolescents in East Asia and Pacific. UNICEF.
[102] Tumin, Siti Aiysyah. (2020) Covid-19 and Work in Malaysia: How Common is Working from Home? London School of Economics.

POLICIES TO RECOVER BETTER

With the distribution of vaccine and high-level of hygiene practices built over the years, as UNSG states, "there's some light at the end of the tunnel." Both national and local governments have already drafted their recovery and regeneration plan. They represent alternative trajectory of **green recovery**, departing from the old, grey development model. This section briefly examines some of those emerging trends and discuss wider applicability in the Asia-Pacific region.

Decarbonisation and Circular Economy

Positively there have been innovations in response to the pandemic to diversify economic activity and systems to build resilience, increase social inclusion and decrease environmental impacts. An example of this has been the development of green initiatives and ways of transforming the urban environment. COVID-19 has highlighted key green initiatives such as the benefits of decreased air pollution, decarbonisation, and revitalisation of natural assets. This provides new opportunity as seen in a new wave of post COVID-19 reforms.[103]

Numerous organisations have launched initiatives promoting green or low carbon agendas in the Asia Pacific region.[104] While some of these are on the national scale, others are promoted within cities. This includes a $200 million loans to support Xiangtan municipal government in China to shift to low-carbon, resilient, and smart city development.[105] Through low emissions, local governments focus on reducing environmentally harmful pollutants and GHG emissions from heating, cooling, lighting, and food systems, reducing noise, building carbon-neutral infrastructure, and promoting sustainable passenger and freight mobility. This would have the benefit of reducing the long-term impact of carbon emissions, which could potentially place 252 million people at risk of coastal flooding in the Asia Pacific region by 2050[106].

Cities are also prioritising healthy local environments where air, water, soil, and other natural resources that sustain life and health are protected and nurtured. Circular development initiatives have also been used to use recyclable, sharable, and replenishing resources to end the linear model of producing, consuming, and discarding. Estimates suggest that a circular economy transition alone can deliver at least 100,000 new jobs in just three to four material flows.[107] Further, green investments can create new labour markets and increase economic resilience in the long term.[108] As many governments cannot afford to 'spend twice' when

[103] UNESCAP. (December 2020) Green reset: the case for greening the COVID-19 recovery through cities.
[104] UNESCAP, 'Decarbonization Policies in Support of Sustainable Maratime Transport in Asia and the Pacific'
[105] ADB, (October 2020) $200 million in ADP Loans to Demonstrate a low-Carbon and Resilient Coty Growth Model in Xiangtan, PRC.
[106] EY. (November 2020) Why decarbonization should top Asia-Pacific board agendas.
[107] Nikolova, Aneta. Mesiano, Riccardo. (July 10, 2019) "Circular Economy – Making Sustainability Part of the Solution in Asia-Pacific." UNESCAP for Medium.
[108] Chatham House. (April 2021) 'Regional cooperation for green growth in Asia',

tackling the issues of COVID-19 recovery and green initiatives, the alignment of COVID-19 recovery with green recovery plans is vital.[109]

Digitalisation

In building urban socio-economic resilience and designing green recovery, urban digital transformation is necessarily part of the solution. During the pandemic, the digital tools have provided effective solutions to various measures, including case identification, track and trace, public information dissemination, remote work, evaluations of policy interventions, hygiene business practices (contactless services and installation of home delivery platforms) and many more.[110] Digital connectivity, when reliable, supported people to stay home and continue their employment, education, and service delivery to prevent the spread. Zhejiang University (ZJU) in China was able to develop 5,000 online courses two weeks into the experiment since 24th February 2020, allowing graduate and post-graduate students to continue their tertiary education[111].

Digitalisation and smart city development play an essential role in many green solutions that cities are currently exploring. While remote work, when everyone works from home one day a week, will only save about 1% global oil consumption for road passenger transport per year – more than the annual CO2 emission of the Greater London[112], it can significantly improve the air quality, by reduction of the number of cars and improving traffic congestion as the lockdown has demonstrated.[113] Smart grid and local energy generation will have to be digitally connected to produce, distribute, and consume electricity wisely.[114] Smart meter and energy management can reduce the building energy consumption and carbon emission. These solutions, when holistically integrated, can benefit cities greatly. In Yokohama, Community Energy Management System was introduced to achieve efficient energy management which includes installing energy management systems in 4,200 households, deploying 2,300 EV, and setting up 37MQ of renewable energy generation, resulting in the reduction of 39,000 tonnes of CO2 emissions.[115] [116]

Moreover, digital solution would be effective in ensuring no one is left behind in urban areas by providing necessary identify and social protection floor for the informal workers. For example, the "digital trinity" system which consists of three components as means of interaction between the government and the people: mobile services, a digital identification

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[109] UNESCAP. (December 2020) Are countries in the Asia-Pacific region implementing a "Green Recovery"? What more could be done?
[110] Budd, J., Miller, B.S., Manning, E.M. *et al. (2020)* Digital technologies in the public-health response to COVID-19. *Nat Med* 26, 1183–1192.
[111] World Economic Forum. (2020)How a top Chinese university is responding to coronavirus.
[112] Crow, Daniel and Millot, Ariane. (2020) Working from home can save energy and reduce emissions. But how much? IEA.
[113] Ju, Min Jae. Oh, Jaehyun. Choi, Yoon-Hyeong. (January 2021) Change in Air Pollution Levels after COVID-10 Outbreak in Korea. 1, Science of The Total Environment, Vol. 750.
[114] Egerter, Amy. Hopkins, Greg. Mandel, Jamie. Verhaar, Harry. (2018) Energy Efficiency And Electric Vehicles How Buildings Can Pave The Way For The Global Ev Revolution.
[115] IEA. (2016) Energy Technology Perspectives 2016. OECD Publishing, Paris.
[116] SUSTAINIA. (2018) Yokohama: City-Wide Rollout Of Smart Energy Management.

system, and digital payment systems.[117] This is named JAM in India, which is an integral part of Digital India for SDGs.[118] As a whole, it provides unique digital identity to more than 1 billion people and 1.05 billion mobile subscribers, enhancing digital inclusion for the marginalised groups. Through this, about 280 million new bank accounts were opened and 647 billion Rupees were deposited.[119] Digitalisation, where prioritised appropriately, can be an effective means to address urban inclusivity and support productivity.

Decentralisation

Decentralisation means the transfer of powers and responsibilities, be it political, administrative, or fiscal, from the national government to sub-national government bodies.[120] It is also addressing reconfiguration of the functional relationship between the central and sub-national governments towards "a more co-operative and strategic role for national/federal governments."[121] New Urban Agenda has recognised the importance of decentralisation, including specific references to fiscal one, in creating better urban governance[122]. When cities are given necessary financial means and human capacities, they can create meaningful opportunities for building resilience and respond to developmental challenges better.[123] For example, climate public expenditure reviews (CPEIRs) conducted by UNDP have noted decentralisation process as an important process to ensure that climate change related public spending are responsive to local needs and contexts and able to reach the most marginalised.[124]

Municipal governments in the Asia-Pacific region must be given sufficient fiscal autonomy and reactivity to adapt to spending needs, generate revenue and raise capital to develop infrastructure and deliver services that strengthen the capacity and competitiveness of local enabling environments. Where adequate capacity is given, local governments can create meaningful opportunities to increase local resilience. For example,

OBSTACLES

However, for these new initiatives to effectively take place, there are several obstacles that countries and cities must overcome. With high informality in many cities of the Asia-Pacific, addressing digital divide is prerequisite for any meaningful, urban digital transformation. Reliable and accessible internet at affordable price and increasing digital literacy among local communities would be essential for digitalising public service and business operations. Lack of investment in the basic infrastructure is a bottle neck for many urban challenges, including not only this digital divide, but also public transport, transition to renewable energy,

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[117] Gelb, Alan. Mukherjee, Anit. Navis, Kyle. (2020) Citizens and States: How Can Digital ID and Payments Improve State Capacity and Effectiveness? Center for Global Development.
[118] Ministry of Electronics & Information Technology (MeitY). Digital India for Sustainable Development Goals Pathways for Progress.
[119] Ibid
[120] OECD. (March 2019) Making Decentralisation Work: A handbook for policy makers.
[121] Ibid. p.3
[122] United Nations. (2016) New Urban Agenda.
[123] ESCAP. (2019) Future of Asian and the Pacific Cities.
[124] Ibid

municipal waste management among others. While effective, efficient solutions are available, cities are, however, not equipped with necessary human and financial resources and regulatory support.

There is a need for adequate fiscal devolution and increased support for local governments to strengthen capacity to design and implement recovery and long-term plans.[125] Fiscal reforms to enable recovery from the COVID-19 pandemic play a vital role in creating healthy, liveable, and environmentally sustainable development outcomes. They can assist in investment mobilisation in new infrastructure, deploy new spending programs to reach informal labour markets, and accelerate investment in 'greener' outcomes. Further, significant uptake in smart city solutions is needed, but capacity is insufficient at local levels. There is a need to make major investments in local governments so that they can utilise all the present opportunities to make a smarter and greener shift.

[125] ESCAP. (October 2020)The Future of Asian and pacific cities.

Policy Recommendations - The Action Plan

OVERVIEW

Future of Asian & Pacific Cities

Actions taken in the context of COVID-19 recovery would be decisive of the cities of 2030 and beyond. Building sustainable cities that can meet the changing needs of the future generation require fundamentally different approach from the past ones, breaking up with the business-as-usual approaches. This includes new ways of thinking, working, collaborating and partnering with a diverse set of stakeholders. To this end, UNESCAP and UN-Habitat in partnership with the Asian Development Bank, Centre for Livable Cities Singapore, the EU, The Rockefeller Foundation and the UNDP, have developed 'The Future of Asian and Pacific Cities'[126] report in 2019. Subsequently, in response to the COVID-19 pandemic and its global consequences, UNESCAP has engaged with regional experts and published 'the Future of Asian and Pacific Cities: Transformative Pathways Towards Sustainable Urban Development In The Post COVID-19 Era.' Both publications are built around four essential pillars of urban sustainability, namely urban and territorial planning, urban resilience, smart and inclusive cities, and urban finance. In brief, "a sustainable future occurs when urban and territorial planning lays a foundation; resilience guards against future risk; smart cities deploy the best technology for the job; and financing tools help pay for it all." Following these four pillars, this section provides policy recommendations that should be considered in developing recovery plans in cities. The policy recommendations listed here have also been chosen with two other considerations in mind: the impact of these policies on vulnerable and marginalised communities within urban environments and how COVID-19 recovery can operate within the broader framework of increasing urban sustainability over the longer run.

A sustainable future occurs when urban and territorial planning lays a foundation; resilience guards against future risk; smart cities deploy the best technology for the job; and financing tools help pay for it all.

Increasing Urban Sustainability Over the Longer Run

Modelling conducted by the C40 Cities Climate Leadership Group[127] found that under an 'accelerated green recovery,' in which capital stimulus for a green recovery was carried out and finished by 2023, could halve emissions by 2030 and lead to the creation of 50 million

[126] UNESCAP. (October 2019) The Future of Asian and Pacific Cities 2019: Transformative Pathways Towards Sustainable Urban Development.
[127] Ibid

sustainable jobs in urban environments by 2030. The modelling was based on a 'model city' for East and Southeast Asia characterised by high-density settlement and a carbon-intensive energy grid. This demonstrates that the recovery process offers an unprecedented opportunity to 'build back better' and ensure that the economic recovery is also green, intending to support the goal of keeping global heating below 1.5 degrees while simultaneously providing the creation of millions of sustainable jobs.[128]

Notwithstanding the severe health, economic, and social impacts of the COVID-19 pandemic, it has led to some positive environmental effects. As previously noted, lockdowns resulting from the pandemic have led to a significant reduction in air pollution in urban environments,[129] with some cities registering declines of well over 50%. The falls in industrial activity, transportation, and air travel has also led to a considerable reduction in C02 emissions. However, if efforts are not made to ensure that any recovery and urban transformation after the pandemic is a 'green recovery,' a return to pre-pandemic emissions, pollution, and associated environmental degradation is highly likely.

Any policy recommendations for urban recovery after COVID-19 must therefore consider the broader imperative to increase urban sustainability in the face of the threat from climate change. Thus, the policy recommendations listed here were chosen with a 'green recovery' in mind.

[128] C40 cities. (2020) Mayors' Agenda for a Green and Just Recovery
[129] Venter et al. (August 11, 2020) COVID-19 lockdowns cause global air pollution declines. PNAS.

URBAN AND TERRITORIAL PLANNING

The impact of the COVID-19 pandemic on urban environments has clear implications for urban and territorial planning, particularly with regards to city governance, urban planning and design, and residential density and usage or zoning. Most of the data on the impact of the pandemic in urban environments thus far has centred on air quality issues, health and socio-economic impact of COVID-19. The data on other issues that exist gives some understanding of how governance and urban planning might be done better in the future to 'build back better'.[130]

Urban Governance

COVID-19 has exposed the challenges of administrative boundaries which do not correspond to the socio-economic and environmental functioning areas, making it difficult to implement containment measures and to provide assistances. Even where emergency response plans existed, the fragmented nature of urban governance made responding to a crisis more difficult and resulted in reduced adaptation capacity. COVID-19 underscores the need for coordinated responses to emergencies and accentuates the risks associated with uncoordinated and heavily bureaucratic approaches to crisis management. At the national level, effective multi-level governance and leadership in setting strategy and guidelines to support coherent responses and clear roles and responsibilities among levels of government are contributing factors to effective urban governance.

In building back better, a more flexible and adaptable urban governance is required to mobilise and coordinate multiple policy sectors and adopt urban and territorial-based approaches. This includes approaches with long-term planning, thorough pre-event planning, and coordination across sectors and stakeholders. Fostering multi-level and multi-stakeholder engagement, including with the private sector, civil society, associations of subnational governments and other consultative bodies, and harnessing regular communication with community and citizens would be crucial for wide adoption and fast implementation of new visions and policies. They can become agents of changes, enhancing accountability, transparency and information dissemination, and mobilising resources through partnerships.

The responses to COVID-19 are revealing the untapped potential in understanding and investing along with the urban-rural continuum through territorial development to realise the synergy between different functioning areas and benefits of spatial connectivity and enhanced productivity. Utilising urban and territorial planning as a tool for building resilience could help cities to be better prepared for future health, socioeconomic and climate-related shocks. Planning for a more circular, sustainable city necessarily leverages these urban-rural linkages and ensure no one and place is left behind.

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[130] Sharifi, A, Khavarian-Garmsir. (2020) The COVID-19 pandemic: Impacts on cities and major lessons for urban planning, design, and management' Science of the Total Environment, Volume 749.

Urban Spatial Environment

As discussed in the pre-existing vulnerability, socio-economic risk factors play a huge role in determining infection risk. The relationship between density, socio-economic disadvantage, and virus transmission has several policy implications. When trying to combat future pandemics, data on density, informal settlements, and socio-economic disadvantage should be immediately used to identify potential transmission hotspots. One such 'hotspot detector,' constructed by the World Bank[131], uses not only density but also 'liveability' (people per unit of floor space), as well as service and transit facilities, which allows for identifying potential transmission hotspots within equally dense urban environments. While 'liveability' (floor space) was found to be a better metric for predicting disease spread than density per se, this does not mean that the optimal solution is to sacrifice all density safeguards to maximise living area and thus 'liveability,' as excess building height can reduce density and liveability and increase construction costs. Instead, there is an optimal level at which construction costs are optimised, liveability is maximised, and urban resilience receives the greatest boost.

Achieving the optimal density for cities would also allow planners to incorporate more green space in urban environments. Open spaces or public areas can play a key role in disease spread mitigation efforts, not only creating a space but also providing temporary quarantines and medical facilities. Efforts to provide more green spaces in urban environments will also increase liveability for residents and help to reduce carbon emissions if done in tandem with other efforts to increase public transport use and the walkability and cyclability of urban neighbourhoods to reduce non-pedestrian traffic in urban environments.

As noted earlier, residents in informal settlements in urban environments have a much higher risk of infection during disease outbreaks. Thus, ensuring appropriate finances are available to upgrade infrastructure in informal settlements should be a high priority for future urban planning. In response to the COVID-19 pandemic, many city authorities have sought to increase access to sanitation and healthcare by installing hand washing facilities at the entrances to informal settlements, providing buckets and soap stations, and increasing the number of public handwashing facilities in city centres.[132] Beyond temporary emergency increases in access to sanitation and healthcare, cities should prioritise permanent upgrades in informal settlements regarding WASH facilities, access to electricity, and access to green public spaces. It is vital to engage residents of informal settlements in the planning and implementation of these upgrades.

15 Minutes Cities

One concept increasingly being touted as a method of 'building back better' for environmental sustainability and future outbreak prevention and mitigation is the concept of the '15-minute city.' [133] In a 15-minute city, most if not all daily needs of an urban resident in terms of work, shopping, recreation, healthcare, and community life could be met within a

[131] Bhardwaj et al. Cities, crowding, and the coronavirus: Predicting contagion risk hotspots.
[132] C40 Knowledge Hub. (July 2020) Upgrading Informal Settlements to reduce COVID-19 risk and strengthen cities' recovery.
[133] C40 Knowledge Hub. (July 2020) How to build back better with a 15-minute city.

15-minute walk or bike ride from their place of residence. The COVID-19 pandemic brought the need for such a concept into sharp relief: in areas where all services could be provided within such a short distance could be locked down, restricting travel in a modular fashion between areas within a city, without overly impacting on the quality of life of residents in the locked-down area. Furthermore, the pandemic has potentially removed some of the stumbling blocks that had previously made the 15-minute city concept seem impossible. The widespread advent of remote working since March 2020 greatly reduced the need to travel long distances for work. The pandemic had the effect of giving an 'unlikely boost' to efforts to achieve sustainability in cities.[134]

There are considerable obstacles to the practical implementation of the 15-minute city concept. It starkly contradicts the prevailing urban planning trend of the last century: zoning large areas by usage and mass transit from residential to commercial areas. It is a difficult concept to implement in a piecemeal fashion and thus requires a concerted, city-wide 15-minute vision to be implemented effectively. It also stands at odds with some developments concerning smart cities, particularly in response to the pandemic, where technology-centric approaches to mitigation have attempted to minimise rather than increase human interaction.[135] However, a proximity-based planning approach acts as a failsafe that can act in tandem with the smart cities concept at scale and highlights that a smart-cities only approach is not enough when dealing with emergencies requiring mass restrictions of movement, social distancing, curfews, and other similar measures.

[134] Moreno et al. (January 2021) Introducing the "15-minute City": Sustainability, Resilience, and Place Identity in Future Post-Pandemic Cities. Smart Cities.
[135] Ibid

URBAN RESILIENCE

Urban resilience refers to the capacity for urban systems and settlements to absorb, utilise or even benefit from perturbations, shocks and stresses"[136] while still maintaining essential functions. The World Bank's model [137] for evaluating urban resilience contains five benchmarks: Robustness, inclusion, coordination, reflectiveness, and redundancy. Robustness refers to the integrity and strength of infrastructure and urban systems. Inclusion is a measure of whether resilience in a city extends to all communities and groups. Coordination looks at the ability of cities to cooperate across sectors when faced with stresses or shocks. Reflectiveness measures whether cities learn from past shocks and incorporate these lessons into future planning. Redundancy looks at whether cities have multiple pathways for managing risks or are instead dependent on single solutions, which lead to a loss of resilience if they break down.

Climate Resilience Urban Development – Land Governance

An example of increasing urban resilience in post-COVID-19 urban environments would be through a focus on climate-resilient urban development. This requires the governance framework outlined above to be incorporated into development decision making, and for risk management and risk assessment to be incorporated into the development process.

One way cities could best pursue climate-resilient urban development would be by focusing on appropriate land use and governance.[138] This requires land-use policies that are informed and shaped by climate-risk and land tenure arrangements as they currently exist. Providing infrastructure and enhancing tenure security for informal settlements is crucial for both pandemic and climate change mitigation, as it allows for residents of informal settlements to reduce their exposure to climate risk and provides incentives to begin climate change adaption measures.

Slum and informal settlement upgrading to support those in vulnerable settlements will also allow for the implementation of new building standards and codes that are specifically tailored to be energy-efficient and climate-resilient to the specific climate risks faced in that region. However, this may necessitate the relocation or readjustment of some existing informal settlements. This would have to be done only through meaningful stakeholder consultation mechanism that empower those who would be most affected.

Diversification of Local Economy

COVID-19 has exposed how fragile large-scale economic chains could be. To improve urban economic resilience, cities should set a policy priority that promotes small and medium city development as alternate economic hubs, including an idea of 15 minutes city. These emerging approaches can support integrated spatial-economic planning that fosters public, private, and people partnerships for efficient and innovative solutions towards net-zero urban development. Through these, cities can set green recovery plans and implement

[136] Sara Meerow, Joshua P. Newell, and Melissa Stults. (2016). "Defining urban resilience: A review".
[137] World Bank Group. (October 2019) Building Urban Resilience: An Evaluation of the World Bank Group's Evolving Experience (2007-2017).
[138] Ibid

"proximity production and consumption patterns that valorise diversification and MSMEs."[139] [140] [141]

However, diversification and decentralisation would go hand in hand in order for cities to create meaningful opportunities for resilient economy. To make a progress on decentralisation, policy makers should focus on building local capacities and prioritise developing local and diversified economy which provide a new tax base.

One such example could be explored is renewable energy. Ministry of Environment, Japan, reported that more than 90% of Japanese local governments are in deficit of "energy price", meaning that they are, as local economy, paying unneglectable amount of money for the energy sources from outside and resulting in financial outflow. The majority has more than 5% of Gross Regional Products going outside of their own local jurisdiction. For example, Shimokawa town's energy price was about 900 million USD in 2013. To tap into this financial outflow, the town has decided to invest in sustainable biomass energy and boilers, utilising the local forest. In 2016, the town has saved 19 million USD in budget and spent 8 million USD for supporting families with children. Biomass industry grew from 10 million USD in production to 45 million USD with more monetary benefits are observed across relevant industries such as transport and forestry, creating sustainable local jobs across the board.[142] This supports local production and consumption of energy and local value chain. Since they are not dependent on the global supply chain, they are resilient in case the supply chain is cut off.

Prioritisation of Environment in Recovery

As the vaccine access inequality will likely to pose continued public health threats of COVID-19 on the Asia-Pacific countries, handling the medical waste safely would be essential. There are several resources that policy makers can consider when implementing better medical waste management[143]. Local governments need to further strengthen its capacity to handle the medical waste and to respond to difference in volume as the cases and spread have waves. Moreover, in the long-run, cities need to be able to both reduce the absolute amount of waste produced and used in cities. Robust 3R (Reduce, Reuse, Recycle) policy, programmes, and infrastructure at local level are needed to tackle the municipal waste. The Asia Pacific recycled plastics market size is projected to reach USD 25.7 billion by year of 2025; cities can seize the opportunity by enhancing local MSMEs and informal sectors who are already engaging in waste collection and recycle.

Cities should also consider prioritising cleaning air to build healthy sustainable city. Several policy recommendations to consider. Cities should accelerate a transition to clean energy. Since energy production and use is the biggest source of air pollutants, shifting to the renewable energy and providing a clean energy source for people who have no access to clean fuels or technologies for cooking would significantly reduce air pollution. Policy makers

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[139] ESCAP (2020) FoAPC in the Post COVID-19 era.
[140] ADB (2020) Livable Cities: Post-COVID-19 New Normal.
[141] UN (2020) Policy Brief: COVID-19 in an Urban World.
[142] Ministry of Environment, Japan. (2018) Chapter 2. "Creation of a regional recycling and symbiosis zone to help solve regional problems". *Annual White Paper on the environment.* p.28
[143] UNEP and IGES. (2020) Waste Management during the COVID-19: Pandemic From Response to Recovery.

should also enhance public transport and EV use, reducing the number of private passenger vehicles on road and creating more inclusive cities by providing the better access. Lastly, countries and cities should pursue further regional cooperation as one jurisdiction alone cannot solve this issue. Urban-rural and city region collaboration should be strengthened to this end[144].

[144] ESCAP. (2019) Future of Asian and the Pacific Cities Report.

SMART AND INCLUSIVE CITIES

Discussion around smart cities, particularly in the wake of the COVID-19 pandemic, has focused on the potential for new technologies and vastly increased data collection to solve or optimise complex logistical problems like traffic management and more efficient healthcare or communicating information. However, it is important to note that a smart city's concept is broader than this narrow focus on data ingestion and subsequent optimisation. **Instead, smart cities are urban environments that leverage the power of information to improve liveability for their inhabitants and therefore must strive for increased citizen participation, inclusivity, and sustainability.**

A focus on smart and inclusive cities would also ensure that the smart city framework was both techno-driven and human-driven. The techno-driven approach sees technology as the driving force for creating solutions to urban problems, as the technology forms the basis for new forms of social organisation, social systems, and social problem-solving. In contrast, the human-driven approach is centred on people, with technology helps solve problems only to the extent that it also supports and reinforces existing norms on human behaviour and freedom. Under this mixed approach, technology can be used to allow for better citizen engagement and government accountability. [145]

There are clear reasons why a focus on smart cities is particularly applicable to meeting the challenges arising from the COVID-19 pandemic and the broader goal of increasing sustainability in the Asia-Pacific region, where increasing amounts of energy are consumed by city infrastructure, and pollution in urban environments poses a particular challenge. Of the 100 most polluted cities globally, 99 are in the Asia-Pacific Region, and in the city-states of Singapore and Hong Kong, buildings account for up to 90% of energy usage.[146] In such urban environments, the ability of smart city infrastructure to reduce emissions, minimise congestion and pollution, and optimise energy usage is vital.

Closing the Digital Divide

As discussed earlier, enabling smart cities would require countries and cities to address the sources of digital divide. Referring to the earlier four dimensions of the commonly agreed framework to close the digital divide, first of all, cities have to have the adequate physical infrastructure to provide access to internet for all. Considering almost 52% of the region's 4.3 billion people are still offline, this challenge remains the most pressing one. To this end, expand viable smart city funding mechanisms by enabling cross-sector partnerships would potentially fill in both knowledge and funding gaps[147]. This approach potentially provides solutions to affordability issue as well by taking the advantage of the technological leap flog and avoiding large infrastructure investment cost. For example, ADB financed project "Asia-Pacific Remote Broadband Internet Satellite Project" provides access to the internet in remote areas in Southeast Asia and the Pacific at the affordable cost with reliable

[145] Kummitha, R K R, 'Smart technologies for fighting pandemics: The techno- and human-driven approaches in controlling the virus transmission' Government Information Quarterly, Volume 37, Issue 3, 2020.
[146] Daniel Ong, 'Why are smart cities booming in Asia Pacific?' May 2019
[147] ESCAP. (2019) Future of Asian and the Pacific Cities Report: Policy Pathway for Smart and Inclusive Cities 5.

connection. This kind of approach reduces the high marginal cost to reach the last mile of offline areas.

Smart City Capability in Local Governments

When cities are looking into becoming a smart city, be it smart and inclusive mobility (e.g. Seoul Metropolitan Government, South Korea, providing better night bus services[148]), or better environmental protection (Luang Prabang, Lao PDR, collecting extensive data through sensors and GIS to monitor the condition of its wetland ecology[149]), there are several components to what the city should pay attention.

The foundation is that a smart city must have the physical infrastructure for data ingestion. This is most thought of as sensors and devices placed throughout the urban environment to monitor the movement and usage of infrastructure and facilities. It could also include the use of privately owned sensors and devices and the interaction between private and public sensors and ensuring appropriate avenues for data collection from the public. For example, apps that allow for the public reporting of accidents or emergencies or feedback forms enabling citizens to share ideas on improving urban policy.

The second critical component is to have appropriate communication and connectivity networks and data storage. This allows for the data to be stored and processed and for different collection points and networks to communicate.

The third component is data ingestion and orchestration. This is where the data that has been collected and stored is transformed and put to use by applications, analytics and interfaces. Examples include simple displays of data in real-time on a dashboard, showing when city services are being or not used or need to be fixed or replaced. It could also be as complex as using the stored data as the training set in a machine learning model to carry out predictive analytics and modelling. For example, by using data collected on traffic activity to allocate resources to areas where the accidents are likely to occur.

To this end, there are two key challenges for smart city implementation. The first is to avoid the 'firehouse' approach to data[150], that is, simply making reams of data available without the appropriate analytical tools. The overuse of data without making its uses transparent can result in the opposite problem: privileging data-intensive policy tools at the expense of transparency and inclusion. In recent years there have been concerns that technologies like facial recognition are overly intrusive and violate the right to privacy and the presumption of innocence.[151]

Any discussion of using smart and inclusive approaches to 'build back better' in a post-COVID-19 world must begin with policies that ensure each smart cities component has been

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[148] ESCAP. (2019) Enhancing mobility infrastructure for inclusive accessibility. Chapter Smart and Inclusive City, *FoAPC*.
[149] ESCAP. (2019) Enhancing mobility infrastructure for inclusive accessibility. Chapter Smart and Inclusive City, *FoAPC*.
[150] Flowers, Michael. (October 18, 2013) Beyond Open Data: The Data-Driven City." Data-Smart City Solutions.
[151] O'Flaherty, Kate. (August 10, 2020) The future of facial recognition: the impact on smart cities. Smart Cities World.

appropriately financed and examined. One way to do this is to make sure each component has properly been addressed in an overarching smart city plan, which has obvious overlap with the future of urban planning.

Safeguarding the individual privacy

The COVID-19 pandemic has demonstrated the usefulness of smart city technology in a public health emergency. However, the key concern here is data security; countries and cities must first "adopt cybersecurity safeguards in both digital and physical urban infrastructure development planning"[152]. This pandemic highlighted the importance of data protection protocols and data sharing policies, given the unprecedented increase in collecting and using personal information by municipal and state authorities.

The public must know that the data being collected has been appropriately secured and encrypted. Smart cities face unique security challenges[153] owing to the range and number of sensors, devices, networks, and servers (both public and private) that must be linked together to form the broader smart cities infrastructure. The risk is magnified by the fact that smart city operation systems directly and immediately impact the physical landscape of the urban environment. Thus, security breaches can lead not just to loss of data but potentially disable city infrastructure, lead to physical damage, and even loss of life. The urgency of the pandemic may be used as a pretext for lack of transparency around data collection and storage, increasing the risk of privacy violations.

Peer-Learning and Regional Cooperation

Any such plan would have to allow for a certain degree of flexibility and adaptability as well. As smart city technology is changing so rapidly, there are often issues with adapting new systems that must communicate with legacy systems. There is also a myriad of 'smart solutions' and approaches that cities could implement. At this early stage, it is not clear which are most likely to succeed and which approaches best balance privacy and efficiency concerns. There are clear links here with issues surrounding the future of urban resilience. One way to promote best practices in smart city design is to promote smart city organisations where cities can share knowledge on the implementation and use of different approaches, policies, and infrastructure. For example, the ASEAN Smart Cities Network (ASCN) aims to facilitate cooperation on smart city development between different cities, link cities with private sector investors across the region, and promote the smart cities concept and help secure funding from transnational partner organisations such as the World Bank and Asian Development Bank.[154]

[152] ESCAP. (2019) Policy Pathway for Smart and Inclusive City 3. FoAPC.
[153] Deloitte Insights (2019) Making Smart Cities Cybersecure.
[154] https://asean.org/storage/2019/02/ASCN-Concept-Note.pdf

FUTURE OF URBAN FINANCE

As the UN Secretary-General has repeatedly advocated for, the SDGs and Paris agreement should guide the recovery effort[155] to tackle the larger triple environmental crises, namely the climate change, waste and pollution, and the nature and biodiversity loss[156]. In the short run, the post-COVID-19 recovery should focus on immediate job and livelihood and plans that take account of any future COVID-19 flare-ups, outbreaks, and associated quarantine and restriction measures.[157][158] In the longer run, post-COVID-19 recovery must focus on long-term development, resilience to future shocks, and decarbonisation and building a sustainable society. Planning for sustainable, climate-focused recovery must take special care not to result in 'stranded asset costs' by investing in technologies that are not future-proof or in decline or by placing projects in areas particularly susceptible to the future effects of climate change.

The issue of the future of urban finance looms large in the post-COVID-19 era. In order to increase urban planning capacity, build urban resilience, and develop smart city infrastructure, cities will have to spend large amounts of money on infrastructure, technology, and human resources capabilities. At the same time, economic activity in most cities in the Asia-Pacific region has been severely curtailed by the pandemic, leading to significant falls in economic output and tax revenue. All of this is taking place in the broader context of fast-paced urban development, with the population of urban areas in the Asia-Pacific region is expected to grow by 1.2 billion over the next thirty years.

Even before the pandemic, cities in the Asia-Pacific regions were facing many public financing challenges. The ADB estimated that the infrastructure gap for economic and social infrastructure in 2017 was 907 billion dollars. One of the main challenges for urban environments has been finding the 'missing middle' of urban infrastructure finance,[159] which consists of projects for medium and large cities with high economic viability but would be funded over a 10 to 20 years payback period. For larger, commercially viable projects such as toll roads or airports, financing through public-private partnerships (PPPS) or market borrowing is viable options. Conversely, local municipal budgets are generally sufficient to fund basic services such as roads and parks, particularly in smaller cities. However, for larger-scale projects that are not immediately commercially viable, local funding is insufficient, but larger funding sources are often not available. Many of the policy suggestions discussed previously, such as increasing housing, improved water access and sanitation (especially for informal settlements), and large-scale smart city infrastructure investment, fall into this category.

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[155] UNSDG. (April 2020) A UN framework for the immediate socio-economic response to COVID-19.
[156] "Prevention versus cure: the climate and health agendas". UNEP. https://www.unep.org/news-and-stories/speech/prevention-versus-cure-climate-and-health-agendas
[157] UNESCAP. (2020) Socio-Economic Response to COVID-19: ESCAP Framework.
[158] World Bank. (April 2020) Planning for the economic recovery from COVID-19: A sustainability checklist for policymakers.
[159] UNESCAP. (2018) Empowering Cities to Implement the 2030 Agenda and New Urban Agenda.

Against these background, efforts should be made around maximising land value capture, creating enabling environment for local governments, and promoting green finance.

Land Value Capture

One high-potential method for funding infrastructure projects is the extended use of land-based financing or land value capture (LVC). Value capture financing seeks to capture some of the unearned increase in value that comes from infrastructure projects. It is most associated with large transport infrastructure projects. For example, extending public transport by building a new train station raises the value of the land surrounding the train station. Capturing some of this increase in value through various instruments would allow for the project to be financed.

This approach is particularly applicable for post-COVID-19 green infrastructure, as investments to mitigate climate change and improve climate resilience and urban environment could potentially lead to large increases in value in the long run. The few earlier studies have shown that green and resilient infrastructure such as bike lanes, pedestrian paths, and vegetation are expected to increase land value. The same is true to improving urban environment. For example, in Mexico, air quality improvement in PM10 has increased a marginal willingness to pay (MWTP) of US$440.31 per property for the period 2006–2013. Similar increases are observed for PM2.5, O3, and SO2 are US$880.63, US$623.78, and US$2091.50, respectively [160] . In China, through the empirical estimates from 117 observations, the study has confirmed "air quality does have a discernible impact on housing prices beyond the publication bias." While the most appropriate instrument for capturing this value increase is unclear[161], given the potential impact on land values of factors associated with climate change like increased flood risk and coastal erosion, and given the fact that many green infrastructure projects fall into the 'missing middle,' the potential for LVC to fund climate infrastructure is promising.

Strengthening Human Resources Capabilities in Sub-National Governments

National governments should consider strengthening the enabling environment for local governments, including through appropriate multi-level governance mechanisms and support (e.g., relaxed fiscal rules, reduced red-tape) to allow for this kind of infrastructure spending above the merely local scale. While decentralisation is increasingly recognised as desirable and even necessary, national legislation has not always transferred sufficient power to the local level. In order to produce public goods, city governments need the authority not just to plan and design them but also to finance and pay for them. Since many urban infrastructures would directly benefit the inhabitants, this would enable better accountability and democratic governance at local levels. Furthermore, cities may not always have the institutional capacity to carry the burden of financing large infrastructure projects or a sufficient portfolio of assets that show expertise and capacity. This will limit investment, even where cities have been vested with the power to carry out the works. Therefore, national

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[160] Chakraborti, Lopamurda. Heres, David. Hernadez, Danae. "Are land values related to ambient air pollution levels? Hedonic evidence from Mexico City." Environment and Development Economics. Vol. 24. Issue 3. pp. 252 – 270. 2019.

[161] Lincoln Institute of Land Policy. (July 2019) Exploring the use of Land Value Capture Instruments for Green Resilient Infrastructure Benefits: A framework applied in Cali, Colombia.

governments must help build institutional capacity at the local level, oversee capacity development through reporting frameworks, and provide guarantees and risk-sharing in the initial stages of local decision making.

Green Finance Facilities

Post COVID-19 urban financing must focus on strengthening the capacities of cities and local governments to design and implement sustainable, resilient and inclusive recovery, with a special emphasis on 'green finance' strategies.[162] Green finance in this context may refer to economic recovery packages with a focus on the environment, green-orientated capital market instruments such as green bonds or sustainability bonds, funding for brown-to-green transition projects, and green finance catalytic mechanisms which aim to actively promote investment in green projects and industries by de-risking larger scale or more speculative investment in green projects, infrastructure, and technologies.

One prominent example of a green recovery package is the 'European Green Deal' which aims to achieve net carbon neutrality among the 27 EU member states by 2050. A broad regulatory and legislative framework will touch every aspect of EU budgetary spending, with the aim to direct all these areas towards achieving net-carbon neutrality, catalyse green investment, and create new jobs in green industries. The European Green Deal has now incorporated specific programs which aim to mitigate the impact of the COVID-19 pandemic without shifting the targets related to net carbon neutrality. It provides an example of how green finance strategies can draw on a national or even multinational legislative and regulatory environment as the base of support for increased green financing.

Specific green financing strategies that might be pursued by local governments in partnership with national authorities might include the creation of national-level green-financing catalytic facilities. One of the major constraints on increased funding for green infrastructure projects is the failure to attract private capital because of the perceived risk of these projects. Creating a finance facility, rather than funding or support for just a single project, allows for an increased scale of private funding to be attracted, greater efficiencies in administration and faster timescales, and project risk to be diversified across different sectors and geographic regions.[163]

Green-focused capital market instruments are key to green financing strategies, particularly in the immediate post-COVID-19 period. These instruments could include COVID-19 recovery transition bonds, which have a low or zero-coupon period in recognition of low projected revenues as the broader economy recoveries after the pandemic, sustainable impact bonds with rewards for meeting or exceeding green targets, and brown to green transition bonds to allow high carbon emission organisations access to funding to promote transition to green industries and prevent governments from straying from green targets because of the urgency of post-COVID-19 economic recovery.

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[162] Asian Development Bank. (2020) Green Financing Strategies for Post-COVID-19 Economic Recovery in Southeast Asia.
[163] Ibid, p.48