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WORLD ECONOMIC FORUM

Indian Cities in the Post-Pandemic World

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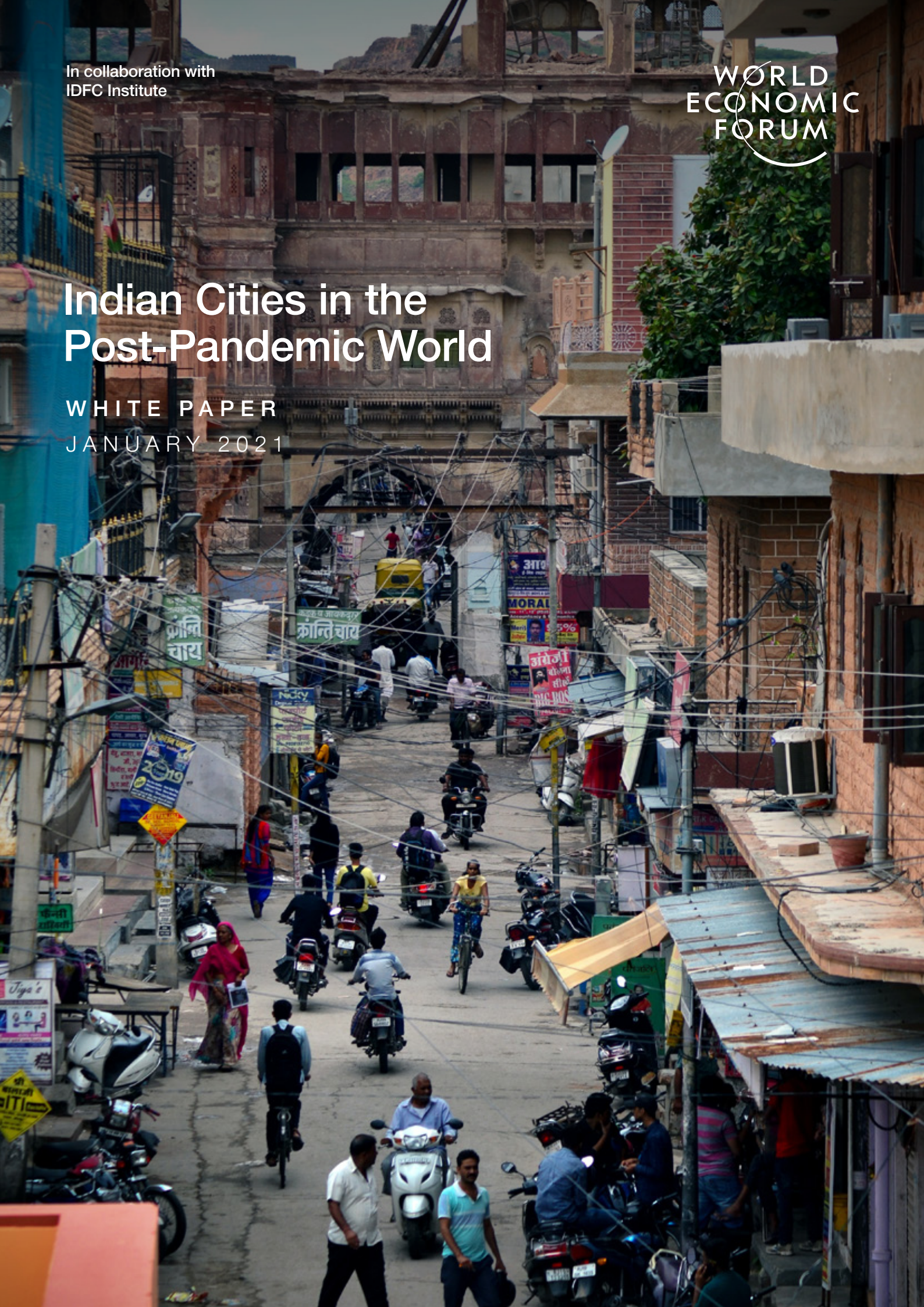

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Foreword

The pandemic can be a turning point in India's urban journey if we draw the right lessons and translate them into lasting change.

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For much of 2020, the COVID-19 pandemic upended life as we know it. The combined health and economic shocks have affected the livelihoods of millions of households, disrupted business activities and exposed existing fault lines. Yet, as we enter 2021, with vaccine delivery already underway, global leaders can start to turn their attention towards recovery. As we rebuild, we must keep in mind the challenges that the pandemic has forced us to confront, issues we have ignored for too long – from the massive displacement of migrants across cities to broken healthcare systems in even the world's richest countries.

It is now crucial to reflect not only on how best to return to growth, but also how to build back better with economies that improve outcomes for people and the planet. It is equally important that we draw the right lessons and translate them into lasting change. As the pandemic ravaged dense cities, from New York to Mumbai, much was said about the death of city life, and there was concern about the future of the world's centres of growth, innovation and opportunity. However, as the architect Norman Foster reminds us, "If you want to look far ahead, then first look far back." Amid every pandemic, from the bubonic plague to the Spanish flu, pundits have foretold the death of cities. And yet they have emerged stronger every time. Several cities have also proved to be remarkably resilient in the face of the COVID-19 pandemic despite their densities. But what made these cities so resilient? Instead of looking at density as the culprit, can we change our management of density to retain the attendant agglomeration benefits that drive growth?

This white paper, developed through a collaboration between the World Economic Forum and the IDFC Institute, seeks to unpack lessons that will allow Indian cities to build back stronger, while focusing on the agglomeration benefits that will drive economic recovery. The lessons are wide-ranging. They include greater decentralization to local governments, which will allow for more proximate and empowered disaster response. They require a rethinking of archaic planning laws that stifle the construction of housing and lead to overcrowding, allowing epidemics to spread. They emphasize the urgent need to provide universal access to basic urban services such as water and sanitation. And they prioritize inclusivity by addressing the biases and impediments faced by women and vulnerable populations in accessing urban opportunities.

Implementation will not be easy. It will require a realignment of the political economy in a country that has long ignored its cities. It will require a rethinking of governance, plus innovative financing solutions. Yet we can think of no better urban thinkers than the contributors to this white paper to provide insights that will navigate us through these difficult questions. We want to express our deep gratitude to the experts Shlomo Angel, Bimal Patel, Richard Green, Sahil Gandhi, Alain Bertaud, Shivanand Swamy, Shamika Ravi, Shruti Rajagopalan, Jessica Seddon, Patrick Lamson-Hall, Lizzette Soria Sotelo, Shilpa Phadke, Sameera Khan, Shilpa Ranade, Anup Malani and Chinmay Tumbe for their valuable time and inputs, which helped shape the ideas and recommendations presented in this white paper.

In every crisis, there is opportunity. The pandemic has been a crisis like no other. We can only hope that we also look back on it as the turning point in India's urban journey.

Executive summary

The COVID-19 pandemic has been devastating for cities, but it presents an opportunity to rethink and make them healthier, more inclusive and more resilient.

Half the world's population live in cities, generating 80% of global GDP. By some estimates, 70% of India's GDP comes from its cities. The unfolding COVID-19 pandemic has been catastrophic for cities, which also account for most of the contagion.

This was a long time coming; some of the biggest epidemics in recent history have disproportionately affected cities. The bubonic plague, the Spanish flu and the cholera pandemic devastated urban areas globally, including in India, where inadequate infrastructure exacerbated the damage. Kolkata[1] in West Bengal was hit by the cholera health emergency in 1964 due to a confluence of factors including climate, geography and poor water sanitation. Open drains and unsanitary garbage disposal were major contributors to the outbreak of plague in Surat,[2] Gujarat, in the 1990s. The city of Hyderabad[3] has been transformed and shaped by diseases, accompanied by consequent improvements in its sanitation systems.

According to official estimates, 31% of India's population is urban; other standard international definitions estimate the share at between 50% and 65%. Around 25–30 people migrate to Indian cities from rural areas every minute.[4] As urban spaces become denser, the cost of living in cities increases for all inhabitants. Most big cities in India have wide economic disparity, with expansive slums and a large urban poor population.

In 2010, the McKinsey Global Institute estimated[5] that "about 25 million households in India – 35% of all urban households – cannot afford housing at market prices and around 17 million of these households live in slums." When COVID-19 hit Mumbai, India's financial capital and densest city, a study[6] revealed that most infection hotspots were either in or close to informal settlements. The lack of public spaces, overcrowding and the proliferation of slums have contributed to the spread of COVID-19, and slum residents in turn have suffered from additional health burdens due to poor living conditions. While it has often been argued that slums and teeming streets are simply inevitable in urban areas, they are actually a result of poor planning.

The impact of the pandemic has been profoundly uneven on different population groups and our cities have failed vulnerable populations, including low-income migrant workers, who have suffered the dual blows of lost income and weak social-protection coverage.

The pandemic has also laid bare gender-based imbalances in public and private life in urban areas. While coronavirus fatality rates are higher among men, it is women and girls who will likely shoulder the brunt of the pandemic's socioeconomic impact, as the United Nations pointed out in *The Impact of COVID-19 on Women.*[7]

For cities to function optimally and drive growth, these inadequacies and disparities will need to be addressed. Cities are our path to growth as we rebuild. Like epidemics in the past, the COVID-19 pandemic provides important lessons that can be translated into policy objectives to achieve both immediate and longer-term goals for a comprehensive urban reforms agenda.

For instance, the pandemic has demonstrated the importance of transport, including public transport and shared mobility options, in keeping urban life moving in times of crisis. While city authorities figure out ways to deal with the short- and medium-term impact of COVID-19 on transport, they can also bring about positive long-term change in terms of how transport options are designed in Indian cities.

Climate change and pollution are going to be a significant threat to cities in the near future; we need policies and systems that combat them. Indian cities, which regularly feature among the most polluted cities in the world, experienced a dramatic decline in nitrogen dioxide levels[8] and particulate matter levels in the air during the lockdown period. However, such benefits are short-lived without concerted policy action, and cities are seeing a rise in pollution levels as the pandemic-imposed stoppage ends.

The pandemic and its aftermath present an opportunity to rethink cities, build back better and create a new urban paradigm – one that enables multiple stakeholders to act as planning and delivery partners for cities to be healthier, more inclusive and more resilient.

Methodology

This report compiles insights and recommendations from global experts to create a new urban reforms agenda in the aftermath of the pandemic.

This report aims to analyse the most pressing urban challenges highlighted and exacerbated by the COVID-19 pandemic and provide insights for translating the lessons learned from the pandemic to an urban reforms agenda. The insights have been compiled through extensive interviews and consultations with global experts across seven thematic pillars as follows:

1. **Planning:** Shlomo Angel, Professor of City Planning, Marron Institute, New York University (NYU); and Bimal Patel, President, CEPT University and Head, HCP Design, Planning and Management.

2. **Housing:** Richard Green, Director, Lusk Center for Real Estate, University of Southern California (USC) and Professor, Sol Price School of Public Policy and Marshall School of Business, USC; and Sahil Gandhi, Post-Doctoral Scholar, USC, and Fellow, Centre for Social and Economic Progress.

3. **Transport:** Alain Bertaud, Senior Research Scholar, Marron Institute, NYU; and Shivanand Swamy, Executive Director, Centre of Excellence in Urban Transport, Research and Development Foundation, CEPT University.

4. **Public health:** Shamika Ravi, Non-Resident Senior Fellow, Brookings Institution; and Shruti Rajagopalan, Senior Research Fellow, Mercatus Center, George Mason University and Fellow, Classical Liberal Institute, NYU School of Law.

5. **Environment:** Jessica Seddon, Visiting Research Fellow, Chadha Center for Global India, Princeton University; and Patrick Lamson-Hall, Research Scholar Marron Institute, NYU.

6. **Gender:** Lizzette Soria Sotelo, Policy Specialist – Safe Public Spaces, UN Women; and Shilpa Phadke, Sameera Khan and Shilpa Ranade, authors of *Why Loiter: Women and Risk on Mumbai Streets*.

7. **Vulnerable populations:** Anup Malani, Lee and Brena Freeman Professor, University of Chicago Law School and Professor at the Pritzker School of Medicine; and Chinmay Tumbe, Assistant Professor, Indian Institute of Management, Ahmedabad, and author of India *Moving: A History of Migration*.

1 Planning

Restructuring urban planning, reforming urban governance and improving space and expansion management can increase economic productivity.

Urban areas have always been vulnerable to disease outbreaks, and because of the high rates of contact between people in daily life, Indian cities face additional problems. This chapter presents the views of Shlomo Angel and Bimal Patel on whether and how city design will change with the pandemic, the importance of urban infrastructure, and the specific policies needed to ensure that urban spaces can mitigate the impact of COVID-19 and increase economic productivity.

1.1 Short- and medium-term impact

The COVID-19 outbreak has revealed the fragilities of existing infrastructure and urban living. Lessons that cities learned during past epidemics are noteworthy. For example, the late 19th-century plague outbreak in Bombay (now Mumbai) led to the creation of the City Improvement Trust[9] in 1898. The trust was set up to administer the cleaning of unhygienic areas in the city and improve living conditions in low-income areas.

However, today, the Indian urban planning regime seems to have failed and infrastructure is undersupplied,[10] whether from lack of clean water access or poor service quality in public hospitals. Both experts explained that there is not enough land allocated for public transport or public open spaces, which would allow for better public services and less concentrated streets. During the pandemic, the consequences of poor planning were evident, with citizens living in densely populated slums unable to maintain physical distancing, or with an insufficient supply of water to maintain proper hygiene measures. These factors have made Indian cities even more prone to the spread of the novel coronavirus.

Japanese cities present almost the opposite picture,[11] with more space for streets and public open areas, taller buildings to accommodate growing commercial ventures and residential demand, and an efficient transport system. These qualities seem to have contributed to Japan's more or less effective management of the crisis. Both Angel and Patel argued that the lack of space and inadequate infrastructure in Indian settlements cannot be attributed only to mistakes made in the past, but are also the result of a faulty paradigm. They highlighted the lack of attention paid to providing for space and well-managed infrastructure.

The way we plan and design our cities needs to fundamentally change to prepare for and protect ourselves from future health crises – and also to raise the standard of living for all urban residents.

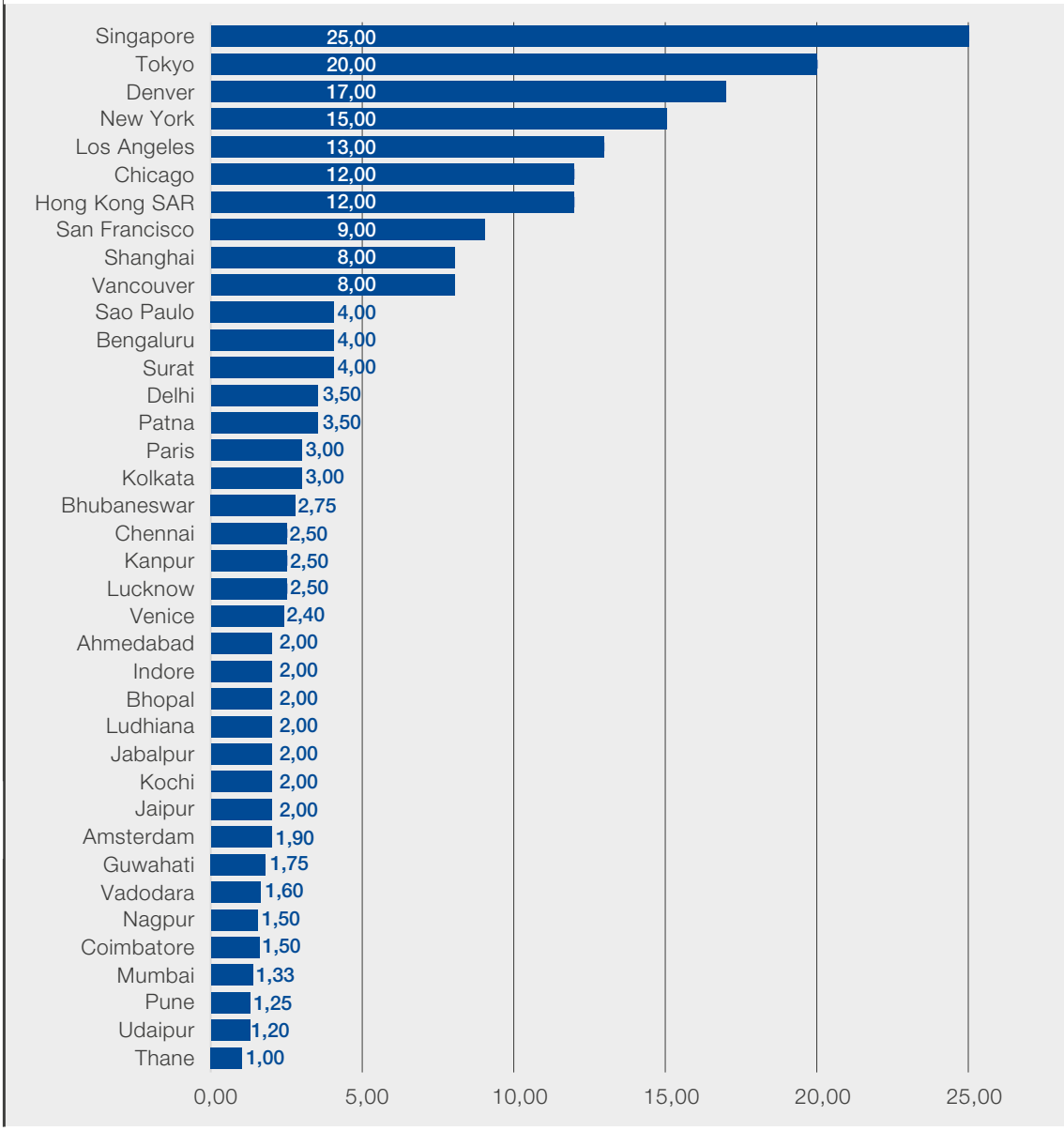
1.2 What should policy-makers do in the short, medium and long term?

First, both experts emphasized that revamping our cities is a long-term process, so radical changes would be premature and costly. Drastic actions undertaken to bring about major change almost always incur very high costs. During the 1850s, the renovation of Paris by Baron Haussmann reshaped the city but it was costly in terms of onerous legislative battles and the execution of public works.[12] In the aftermath of COVID-19, Indian policy-makers should not rethink cities from scratch. Patel explained that we should adopt the right mindset; this means restructuring the profession of urban planning and reforming the training of city planners. The conventional approach of planners and experts is to try and precisely design our cities for the future. However, as we cannot predict the future, Patel suggests that we make more flexible plans.

Angel cautioned that poorly managed expansion could lead to sprawl, which goes against the fundamental principles of how cities function and thrive.

Second, Angel and Patel emphasized that managing population density is imperative. The current policy of trying to impose artificial constraints has proven counterproductive. The COVID-19 virus spreads[13] exponentially when people are in close proximity to each other and have no means to stay 2 metres (6 ft) apart. We have seen many arguments for reducing density and encouraging people to move out of major metropolitan regions by planning towns and villages better or by building up Tier 2 and 3 cities (50,000–99,000 and 20,000 to 49,999 citizens, respectively).[14] However, Angel stated that we should think of ways to reduce overcrowding in streets, buildings and trains, rather than reducing the number of people that reside in Indian cities. This lack of proper infrastructure can be tackled by reimagining the way we plan our cities. In addition to enabling the physical distancing necessary, it could help reap agglomeration benefits such as knowledge spillovers and lower transaction costs, and enhance economic productivity. Both experts explained that **allowing for more floor space and changing the archaic regulations that do not make optimal use of the available land can help cities house more people more comfortably.** To do so, policy-makers have a choice: Angel mentioned that they can either decide to densify and build cities vertically or go horizontal by forcing their residents to move out. Patel explained that building vertically means easing zoning restrictions, increasing the permissible Floor Space Index (FSI, i.e. the designated amount of floor area that can be built on a plot of land) and eliminating height restrictions to allow for taller buildings. Such a move could actually increase the amount of area available per person and keep us further apart. At the same time, if there is no room for densification, planning for future horizontal spread is necessary. However, urban expansion in the periphery needs to be well planned. Angel cautioned that poorly managed expansion could lead to sprawl, which goes against the fundamental principles of how cities function and thrive. Both experts added that **we need to be careful not to fall into the trap of restricting land use and densification as a reaction to the pandemic.**

FIGURE 1 **Planning Floor Space Index (FSI) restrictions in cities**



Third, Patel discussed how decentralized urban governance will have to be adjusted for better-planned cities. During the COVID-19 crisis, we have seen a top-down approach among the central, state and city authorities. However, this is not a sustainable way of functioning in a federal democracy. In the future, it is crucial that city-level bodies are made more independent and autonomous so that they can proactively control the way in which their urban areas develop and function. It is important to help elected mayors,[15] who can employ knowledge of local needs and capacities, and provide adequate responses to their communities.

1.3 Looking ahead

Angel was of the opinion that cities are resilient and will recover from the COVID-19 crisis. However, both experts believe it is crucial that Indian policy-makers use the health emergency to alter the underlying policies according to which our cities are managed. At the same time, they should not make short-sighted decisions such as reducing the population density in cities; this would ultimately affect their longer-term economic productivity.

2 Housing

Ensuring affordable housing and prudent density management in Indian cities can improve desirability and reduce proneness to pandemics.

To understand how the lessons learned from the novel coronavirus can be translated into better housing policies, we interviewed Richard Green and Sahil Gandhi. They discuss how to encourage more affordable housing and better manage density.

2.1 Short- and medium-term impact

During the national lockdown, the outflow of migrant workers from cities and lockdown restrictions on on-site activities affected the construction sector and housing markets. This pushed the Real Estate Regulation Authorities (RERA) to reconsider processes due to delays in areas such as delivery and payments. For example, the Gujarat RERA authority instituted Order 33[16] to grant relief to more than 80% of the ongoing projects that would likely be completed in the next four years.

In the formal sector, the return of workers to their home towns and villages reduced the demand for rental housing. For example, in Mumbai,[17] rent levels dropped significantly. The exodus of labourers leaving for their villages[18] or smaller towns has stalled construction activities in cities. It is difficult to predict when the activity will return to its pre-COVID-19 level. However, it is safe to assume that the 65% of the labour force[19] that is informal and cannot work from home will return to working at job sites.

2.2 What should policy-makers do in the short, medium and long term?

Policy-makers may have a rare opportunity to reimagine the housing sector by improving living standards in high-density areas and enabling formal and safe housing. The experts detail two specific suggestions:

1. **Produce safer, affordable housing – provide public housing and encourage land tenure**

A first step in revamping the housing sector is increasing the supply of formal affordable housing. Both experts argued that land tenure should not be a precondition to providing adequate infrastructure.[20] Rather, **land tenure security and provisions of basic services should be improved in informal settlements**. The Slum Networking Project[21] in Ahmedabad was successful in doing this. There, partnerships between the local government, NGOs, private players and slum dwellers encouraged people to increase investments for upgrading their homes. However, this model could be slowed down in slum pockets built on private properties, as it depends on the private owners' willingness to sell or give away their land. It would be useful to analyse how tenure differences in slum pockets have led to differences in infrastructure provision, and how those differences have led to different COVID-19 outcomes.

Green also suggested encouraging governments to provide public housing, or keep land in the public sector so as to create affordable dwellings. While there is no one-size-fits-all solution, learning from experiences around the world can help find methods that are better adapted to Indian cities.

In the 1950s, the Hong Kong government saw an opportunity in the Shek Kip Mei Fire disaster, which left more than 50,000 immigrants from Mainland China homeless. It expropriated the demolished households and gave tenants in return a unit in the newly constructed public housing societies, thereby raising the standard of safety in living conditions. In more recent decades, the government of Singapore developed a public housing scheme in which people owned flats that sat on top of a heavily subsidized long-term government ground lease.

> Green mentioned that certain countries, such as South Korea, have been able to overcome these complications in ways that may be worth emulating.

This generated a market in which people could buy and sell that property to anyone else who was eligible (about 85% of the country).

Green highlighted how international organizations usually prefer the approach of establishing formal infrastructure and then having individuals build incrementally on serviced lots. However, the challenge is to ensure good-quality construction and optimal land assembly. Mexico's experience reveals that individuals either overbuild their houses as "do-it-yourselfers" or, worse, build inadequate structures. Also, single-family buildings are less economical to develop than large multifamily properties that require several land parcels to be assembled together. Here, the idea of land condominiums – where many people own small shares of many plots – could be considered, too, but this also creates governance issues. Green mentioned that certain countries, such as South Korea, have been able to overcome these complications in ways that may be worth emulating. For example, the government of South Korea recently came up with a rapid solution to ensure affordable rental accommodations for young renters and one-person households coming to the cities, by converting empty offices and hotels into public housing units.[22]

2. **Manage density better – revise repressive regulations**

In response to the risk of infection in crowded slums, policy-makers would argue for reducing densities. However, Green cautioned that **policies should ensure a minimum standard of living for poor people within the city core instead of relocating them outside cities**. The reason is simple economics: the cost of transport. In order to avoid spending money on transport, the poor live in very small parcels of space close to their workplaces, such as in slums. For richer sections of society, transport is linked to the opportunity cost of time, in which an hour of commuting has both monetary and temporal implications, making the city centre the most attractive option for them as well.

Broadly, Gandhi and Green discussed how **creating affordable housing requires rethinking repressive development regulations**. Many of the current regulations designed to control density, such as a cap on FSI, distort housing markets. The underlying rationale behind these rules is that density is dangerous and puts additional stress on infrastructure in a way that is unmanageable. However, Indian cities are already densely populated and arbitrary directives fail to accommodate this population in formal housing. Moreover, continued migration into cities in search of economic opportunity is inevitable; this will add to the housing stress. A first step would be to eliminate such rigid regulations to make housing markets responsive to demand.

2.3 Looking ahead

Studies in China[23] and the US[24] show that the spread of COVID-19 is a result not just of density but of multiple factors such as access to infrastructure, overcrowding and contact structure, and socioeconomic conditions. People being consistently packed together is not sustainable. Planning well for density and making housing more affordable, available and accessible would make our cities more desirable, and perhaps less prone to pandemics.

3 Transport

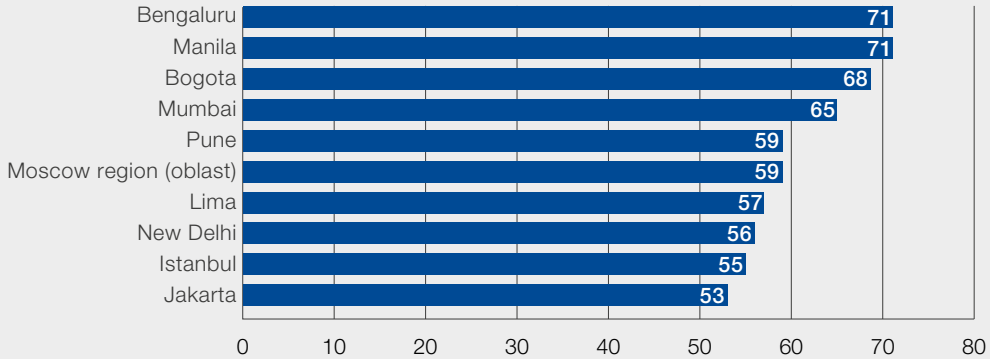
The pandemic presents an opportunity to transform urban transport and enact long-lasting adjustments aligned with the changing demand for mobility.

The COVID-19 pandemic has demonstrated the importance of transport in making urban life possible. As public transport consultant Jarrett Walker has written, "in a pandemic we're all 'transit dependent'".[25] To better understand the impact and long-term effects of COVID-19 on transport, we interviewed Alain Bertaud and Shivanand Swamy.

3.1 Short- and medium-term impact

As public transport slowly reopens in India, the short- and medium-term effects on urban transport could be sizeable. Recent perception studies have shown that 36%[26] of people who previously travelled by trains will probably switch to using individual vehicles or other private transport options in the next few months. This is a worrying prospect, given that roads in Indian cities are already clogged. The 2019 TomTom Travel Index featured four Indian cities in the top 10 most congested cities in the world, with Bengaluru ranking equal first.

FIGURE 2 **The world's most congested cities**



Source: Author's visualization based on 2019 TomTom Travel

It is clear that the implementation of physical distancing protocols is likely to affect demand for public transport for the next few years. Both experts stated that we are likely to see a rise in both ownership and usage of modes of transport with small footprints, such as private vehicles and scooters. While bicycle usage and pedestrianization have been cited as viable options for European cities post-pandemic, such commuting options would not work for Indian cities. This is due to their size and the large distances that residents have to cover when commuting to work. Further, warm and humid climatic conditions limit the use of bicycles in most cities without the option of a shower and change of clothes when travelling from home to work. Hence, the authorities will need to cater to the increased demands for private, individual mobility and accordingly tailor their policies.

From the supply side, Swamy stated that the temporary termination of public transport during the lockdown effectively broke down a multitude of relationships between authorities and the employees that operate mass transport systems such as trains and buses. This particularly affected private operators, which could not pay their workers. Consequently, many of their workers migrated back to their home towns or villages. Hence, in the coming months, it will be critical to mend these relationships and enable more transport options from trains to private operators, such as Uber and Ola, to resume their operations smoothly.

3.2 What should policy-makers do in the short, medium and long term?

> Minibuses provide a smaller footprint and run at faster speeds than large urban buses.

It is crucial that officials carefully monitor what is happening in their cities. Data will be key. If authorities can regularly collect data on questions such as the number of people who would prefer to use a motorcycle over an underground railway, they will be able to understand the trends that develop after the pandemic and, in turn, be able to respond with policies favourable to these emerging commuting preferences. Thus, it is important that authorities try to offer viable alternatives with equivalent commuting times such as minibuses that facilitate some amount of physical distancing requirements. Moreover, minibuses provide a smaller footprint and run at faster speeds than large urban buses. Other options could include small, air-conditioned electric scooters such as the Toyota-I-road,[27] which is visible on the streets of Tokyo.

Source: Toyota Europe https://www.toyota-europe.com/world-of-toyota/concept-cars/i-road

Urban transport was already heading towards the use of such travel options. In fact, as mentioned by Swamy, **the pandemic offers policy-makers a chance to enact long-lasting changes by moving from the principle that the individual car is the most rapid mode of transport in large metropolitan areas in favour of other commuting modes**.

With that in mind, Bertaud added that the structure of large Indian metropolises has changed over the past 20 years, with an increased dispersion of jobs away from the traditional central business districts (CBDs) towards multipolar sub-centres. This structural change does not favour the traditional radio-concentric networks of rail and large buses. Hence, the challenge is to adapt the current supply of multimodal modes of transport to the new demand for commuting trips, while increasing the travel speed across metropolitan areas. According to Bertaud, this can be achieved by:

1. Offering the possibility of combining intermediate public transport (IPT) trips, including by motorcycle, with commutes that use rail and express buses.

2. Carefully managing the use of urban roads via improved traffic management (adding lane markings and traffic lights) as well as removing obstacles such as on-street parking and rubble that reduce road capacity for both pedestrians and motorized traffic.

Bertaud also emphasized that long commuting times hinder cities' economic productivity, a loss that can be measured by looking at cities as labour markets. Faster mobility enables firms to access a wider pool of workers, and enables workers to access more jobs in cities. People often move to cities such as New Delhi or Bengaluru because of the millions of jobs available there. However, the high rate of congestion impedes the number of jobs that can be reached within one hour's commuting time. **Ultimately, mobility should be designed as a catalyst for maximizing the number of employment opportunities that a person can access within 60 minutes of where they reside. This cannot happen without authorities shifting focus by integrating the individual movement of IPT with the collective movement of rail and express buses through high-capacity, small-footprint transport options.** An example of such integration is Singapore's land transport system, which has introduced new point-to-point transport services in combination with integrated transport hubs.

From a governance standpoint, Swamy stated that to improve the management and coordination of different kinds of mobility providers, authorities should work to ensure that the regulations followed by individual agencies are compatible with each other. To this end, organizations such as a Unified Metropolitan Transport Agency, which set rules and coordinate between different operators, have been established in a few cities including Mumbai.[28] However, these bodies are often honorary in nature without much authority. Ultimately, it is critical that such agencies are provided with real powers to encourage more efficient urban mobility across different modes of transport.

3.3 Looking ahead

No one can be sure whether the impact of COVID-19 on urban transport is a passing hiccup or a permanent feature. Hence, it is essential that city officials walk the streets and understand how the demand for different kinds of transport is changing. By doing so, they will be able to mitigate the repercussions of COVID-19 for mass transport and mobility, and provide viable travel options and policies.

4 Public health

The pandemic has exposed significant gaps in urban public health systems. Focus on budgets, governance and data can help improve the public health system in Indian cities.

The novel coronavirus pandemic has laid bare the dire need to revamp public health in India and ensure effective responses to such a crisis in the future. To understand how lessons from COVID-19 can be translated into policy objectives for better healthcare, we interviewed Shamika Ravi and Shruti Rajagopalan.

4.1 Short- and medium-term impact

The most immediate effect of the pandemic has been the near-collapse of Indian cities' public health systems. Low capacity distorted policy-makers' incentives and affected public healthcare across the board. Apart from the needs of COVID-19-infected patients not being met, patients with other diseases such as tuberculosis (TB) were not receiving adequate care, owing to outpatient departments being shut down, medical staff being diverted to COVID-19 response and travel restrictions within cities.[29]

Ravi stated that urban residents are generally exposed to a range of health problems. Respiratory diseases as a result of air pollution have dramatically increased over the past 25 years. India hosts six out of the 10 most polluted cities[30] in the world, with New Delhi being the most polluted capital city. One of the main contributors to pollution is traffic congestion, which stems from faulty urban planning. Ravi highlighted that it is not just big metropolitan regions such as Mumbai and Bengaluru that are affected; smaller cities like Kanpur and Patna also grapple with high levels of pollution. This has resulted[31] in high mortality and disease burdens for residents. While rural areas also face issues related to pollution, with higher adoption of clean energy these challenges can be tackled at a household level unlike in cities.

Ravi further argued that better city planning is needed, especially in urban agglomerations where every district has similar existing administrative systems. Moreover, crowded areas such as slums need to be prioritized immediately. **Technology and communication platforms could be used to provide real-time information to better manage the supply of healthcare services.**

4.2 What should policy-makers do in the short, medium and long term?

Rajagopalan argued that we need more fiscal federalism in addition to political federalism.

Three areas in which the public healthcare system can improve are budgets, governance and data.

A pandemic is a rare event; only a handful of countries globally have demonstrated the capacity to handle a crisis of the magnitude of COVID-19. Moreover, Rajagopalan highlighted that if we were fully armed to deal with such outbreaks, on a regular basis, healthcare facilities would run at 70–80% excess capacity; this would break healthcare finances. However, we need to be equipped administratively to be able to adapt and respond quickly to such emergencies. Currently, insufficient resources are allocated to train doctors and retain talent. **Ravi recommended that the marshalling of resources to augment health capacity needs to go hand in hand with the changing nature of diseases, e.g. from communicable to non-communicable, and for future needs.** Additionally, boosting primary healthcare to ensure the prevention of diseases is imperative in a populous country such as India with low state capacity to manage the demands of secondary or tertiary care.

On governance, **Rajagopalan argued that we need more fiscal federalism in addition to political federalism**. Kerala's decentralized health system and resilient local self-government increased its COVID-19 responsiveness, both in providing services to infected people and in isolating potential cases. Ravi stated that the disparities in state responses indicate a management problem, that is, mobilizing limited resources for the best outcome. Hence, public health needs to become a foundation of governance and growth.

Additionally, **city governments need to be empowered so that they can raise funds and tackle public health and sanitation locally**. Elected representatives need to spend locally raised revenue on matters aligned with the needs of the local community. Instead, the tendency has been to centralize functioning, even in times of crises. Locally raised revenue is shared with the state government, and revenue-raising powers also favour state governments. Spending decisions happen at the state or central level, which leaves no autonomy for local bodies even in times of crisis. The 12th schedule of the Indian Constitution outlines the functions that could be devolved to local governments but does not mandate raising their own revenues; hence powers are rarely devolved, especially in poorer states.

Rajagopalan emphasized that, since local governments are not responsible for their own funding, their policies suffer. A study[32] by the Indian Council for Research on International Economic Relations reveals that total municipal revenues as a share of GDP for 37 municipal corporations has declined from 0.49% in 2012–2013 to 0.45% in 2017–2018. Own revenues, raised by local governments, have reduced from 0.33% to 0.23% of GDP in the same time period. Property tax collections and leasing of public lands are steady sources of locally raised revenue (if property is accurately enumerated and objectively valued, and land is priced at market rates). Furthermore, protocols on spending are necessary both in emergencies and standard times, but local authorities, which have knowledge of on-the-ground realities, should be empowered and be responsible for these decisions.

Lastly, it is necessary to collect and collate real-time data to bridge the gaps between the demand and supply of healthcare services. On the demand side, Ravi mentioned that data on disease incidence, accessibility issues and quality of existing facilities and services ought to be collected. On the supply side, information on existing healthcare infrastructure and personnel training is needed. Such data could benefit a wide range of sectors. At the other end, Rajagopalan suggested that the incentives to collect data need to be aligned. For instance, if water was allocated through a system where prices reflected its relative scarcity, all related data would automatically be generated. Even the problems inherent to collecting data on the informal aspects of cities, such as slums, can be resolved by integrating slum leaders into formal governance systems. They can then provide granular knowledge on property rates in the slums, public services required and so on. This would provide a holistic picture of the existing healthcare system and areas for change.

4.2 Looking ahead

There is a lot of room to upgrade the public health system. This pandemic presents a window to transform public health in cities, and grow economies with a more robust and hale population.

5 Environment

Prioritizing air pollution issues, open spaces and disaster preparedness in reforms to reconstruct cities post-pandemic could be vital in improving urban environments in Indian cities.

Pandemics are not the only threat to our cities; climate change and pollution will be a major challenge in the near future. In this section, we present the views of Jessica Seddon and Patrick Lamson-Hall on how the citizen and government response to COVID-19 provides insights for tackling larger problems pertaining to urban environments.

5.1 Short- and medium-term impact

According to both experts, in the medium term we may see shifts in economic geography, air pollution, and public and open spaces.

Seddon highlighted that COVID-19 brought to light the disparities between the rich and the poor in several cities. Not unexpectedly, those with more means were better able to protect themselves, either by staying within gated communities or by leaving cities altogether. The poor left India's cities in larger numbers than the rich, but the difference was that they were forced to do so in ways that threatened their lives and health – for instance, daily wage workers walked hundreds of miles or crowded into available transport to try and reach their village homes.[33] At the same time, the interconnectedness of lives across income and other divides became apparent – even the wealthy could not isolate from the vulnerability and risks felt in the poorest communities. Lamson-Hall emphasized that this recognition may result in improved conditions for the poor (in terms of access to basic services and housing) and encourage cooperation to address other challenges of urban environments.

According to both experts, in the medium term we may see shifts in economic geography, air pollution, and public and open spaces.

1. **Economic geography**
   Seddon argued that larger cities may grow more slowly as people move to smaller towns or as more offices institute work-from-home measures. This would mean job opportunities move elsewhere, too. In India, where large metropolises are extremely populous and dense, some shift in economic geography to Tier 2 and 3 cities may be desirable. This implies there may be less congestion and pollution in metropolitan regions. However, such changes will be beneficial only if smaller towns and cities have the necessary infrastructure investment to support growth in their populations. The real danger is that these places lack the capacity to invest in sustainable infrastructure. They may instead prioritize prestige projects, such as building a large highway, which may be unsustainable for the environment and ultimately not contribute to socioeconomic development.

2. **Air pollution**
   According to Lamson-Hall, the pandemic and consequent lockdown caused a palpable decline in air pollution. Yet it is not the case that all emissions stopped completely. In Seddon's view, air pollution in India is the product of many small contributors. Some of the decrease in particulate matter comes from there being fewer vehicles on the road, but some economic activity was still ongoing. For example, a primary source of particulate matter, municipal solid waste that is incinerated, continued regardless of the lockdown. Her conjecture was that once the economy opens up completely, people will be more inclined to use private transport, so we may in fact see a rise in emissions, pushing them even higher than pre-COVID-19 levels. On the other hand, according to Lamson-Hall, citizens have now experienced what cleaner air feels like. This could lead to citizens demanding better air quality and a call for action, including not only regulation but also new patterns of public investment to support lower emissions.

3. **Public and open spaces**
   Seddon stated that even after the pandemic subsides, there may be reluctance to use public spaces. There are two ways to solve this. The first is through digital surveillance, which potentially involves serious invasions of privacy, e.g. certifying whether individuals are healthy enough to be allowed access to public spaces. The second is through massive investment in public health so that, even if there are outbreaks, the infrastructure is not overwhelmed and the outbreaks can be quelled effectively. Unfortunately, there is a greater chance that the response will involve increased surveillance, as we are already seeing a government preference for it.

5.2 What should policy-makers do in the short, medium and long term?

As we recover and reconstruct our cities, prioritizing the following will be vital for facilitating better outcomes with respect to urban environments.

1. **Air pollution**
   According to Seddon, the first step is to identify the different contributors to air pollution and ascertain which ones can be managed through policy at a local level and which require broader support from higher levels of government. Reducing vehicular emissions requires the "avoid, shift, improve" strategy, that is, avoiding unnecessary travel, shifting to public transport and improving vehicles. Both Seddon and Lamson-Hall were of the opinion that there needs to be a greater emphasis on changing the roots of pollution rather than banning it at the end of the exhaust pipe.

2. **Open spaces**
   Seddon recommended creating open spaces strategically and maintaining them aggressively. This includes cleaning up public streets and pooling parcels of unused land to create substantial areas of public open space. This would require creating a comprehensive public space strategy at the city level. Lamson-Hall suggested taking advantage of the economic slump to buy vacant lots at low prices, in order to add open spaces in existing neighbourhoods. While Seddon stated that such a policy is important for keeping the city attractive and also for resilience, Lamson-Hall highlighted its benefits for disaster management, particularly in times such as a pandemic, when public spaces can be requisitioned for building large isolation centres.

3. **Preparing for disasters**
   Lamson-Hall stated that the millions living in cities along India's coast are vulnerable to rising sea levels and natural disasters such as cyclones. **A disaster management framework needs to have hard infrastructure, arterial networks and large open spaces.** Major arterial roads allow rapid movement of people and goods in and out of the city. Large open spaces can also be useful for staging relief and shelter activities. Moreover, governments need to recognize that in the near future parts of our cities will become inhabitable due to constant flooding, and plan for moves inland.

5.3 Looking ahead

Seddon highlighted the need for collaboration between cities, towns and villages that form single economic geographies for disaster management and response. However, there are trade-offs in preparing for climate change in developing countries such as India, where such efforts may seem like a luxury compared to the immediate concerns of poverty alleviation.

6 Gender

Institutionalizing gender focus in urban reforms, increasing women's participation in decision-making and addressing gender-based impediments to access can help improve urban gender equality.

COVID-19 has revealed several inequalities in our cities, particularly in terms of gender divides. This chapter presents the views of Lizzette Soria Sotelo, Shilpa Phadke, Sameera Khan and Shilpa Ranade on how cities need to change their outlook towards gender equality, and what policies need to be prioritized to mitigate the effects of COVID-19 in India in a gender-inclusive manner.

6.1 Short- and medium-term impact

The pandemic could cause gender gaps to widen. As Khan highlighted, increased time at home has expanded domestic responsibilities such as cooking, cleaning and child-rearing, which women tend to take on more than men. Another outcome of staying at home has been spikes in domestic violence. Working mothers could face the additional stresses of managing their jobs in both professional and personal settings.

Phadke asserted that it is important to keep women in the workforce. While weak economies have led to job losses and pay cuts across the board, women's labour-force participation in India has declined from ~37% in 2005 to ~24% in 2019. Soria pointed out that the rise in remote working and online education due to the pandemic may exacerbate this trend given the digital divide between men and women. Despite India being the world's second largest internet market, less than a third[34] of internet users are female. Educational enrolment of schoolgoing girls may also see a decline; data[35] for the past few months shows a spike in child marriage figures, compared to the same period last year.

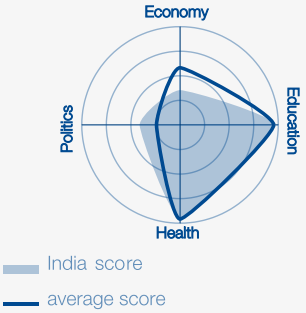
An important feature of inclusive cities is accessible public spaces that can be enjoyed by all. **Soria observed that the way in which we use public spaces in our neighbourhoods is changing; it is important to integrate considerations for women's safety.** She added that to comply with physical distancing, in some Latin American cities authorities decided to institute sex-segregated mobility days as men and women each account for roughly half the population. The result: grocery shops (another public space) being largely empty on the days for males and teeming on female days. This increased women's risk of contracting the virus. Soria highlighted another unintended consequence, that members of LGBTQI+ and transgender communities, not aligned with these categories, were subject to police brutality when they went out on either day.

FIGURE 3 | **Global Gender Gap Report 2020: country profile and selected indicators for India**

India

score
0.00 = imparity
1.00 = parity
0.668

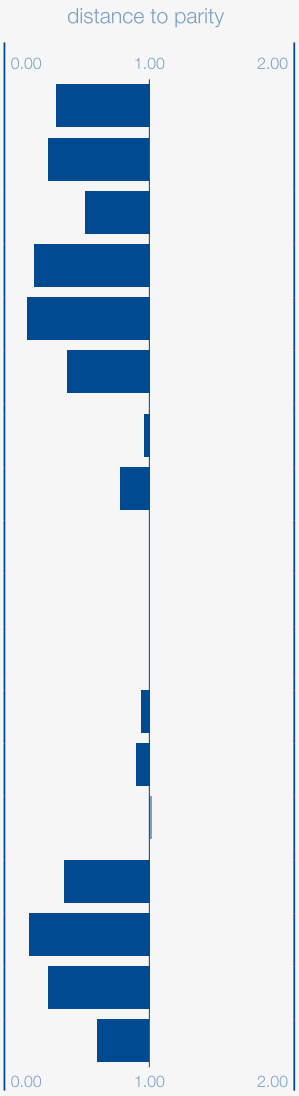
rank
out of 153 countries
112



	2006 score		2020 score	
Global Gender Gap Index	**98**	**0.601**	**112**	**0.668**
Economic participation and opportunity	110	0.397	149	0.354
Educational attainment	102	0.819	112	0.962
Health and survival	103	0.962	150	0.944
Political empowerment	20	0.227	18	0.411

COUNTRY SCORE CARD

	rank	score	avg	female	male	f/m
Economic participation and opportunity	**149**	**0.354**	**0.582**			
Labour force participation rate, %	145	0.304	0.661	24.8	81.6	0.30
Wage equality for similar work, 1-7 (best)	117	0.555	0.613	–	–	3.89
Estimated earned income, int'l $1,000	144	0.206	0.499	2.3	11.1	0.21
Legislators, senior officials and managers, %	136	0.158	0.356	13.7	86.3	0.16
Professional and technical workers, %	132	0.434	0.756	30.3	69.7	0.43
Educational attainment	**112**	**0.962**	**0.954**			
Literacy rate, %	127	0.799	0.899	65.8	82.4	0.80
Enrolment in primary education, %	1	1.000	0.757	93.0	91.6	1.02
Enrolment in secondary education, %	1	1.000	0.954	62.4	60.9	1.02
Enrolment in tertiary education, %	1	1.000	0.931	29.1	27.2	1.07
Health and survival	**150**	**0.944**	**0.958**			
Sex ratio at birth, %	149	0.910	0.925	–	–	0.91
Healthy life expectancy, years	134	1.020	1.034	59.9	58.7	1.02
Political empowerment	**18**	**0.411**	**0.239**			
Women in parliament, %	122	0.168	0.298	14.4	85.6	0.17
Women in ministerial positions, %	69	0.300	0.255	23.1	76.9	0.30
Years with female/male head of state (last 50)	4	0.642	0.190	19.5	30.5	0.64



SELECTED CONTEXTUAL DATA

General Indicators	female	male	value
GDP, US$ billions	–	–	2.27k
GDP per capita, constant '11, intl. $1000	–	–	6.98
Total population, million people	649.6	703.1	1.14k
Population growth rate, %	1.03	1.01	1.02
Population sex ratio (female/male), female/male ratio	51.98	48.02	1.08

Work participation and leadership	female	male	value
Labour force, million people	79.86	287.4	0.22
Unemployed adults, % of labour force (15-64)	5.42	5.54	0.98
Workers employed part-time, % of employed people	n/a	n/a	n/a
Gender pay gap (OECD only), %	–	–	n/a
Proportion of unpaid work per day, female/male ratio	n/a	n/a	n/a
Advancement of women to leadership roles, 1-7 (best)	–	–	3.92
Gender parity in tech roles, 1-7 (best)	–	–	4.77
Boards of listed companies,% board members	13.80	86.20	0.16
Firms with female majority ownership, % firms	2.80	97.20	0.03
Firms with female top managers, % firms	8.90	91.10	0.10

Access to finance	female	male	value
Right to hold a bank account & get credit, 0-1 (worst)	–	–	0.25
Inheritance rights for daughters, 0-1 (worst)	–	–	0.50
Women's access to land use, control & ownership, 0-1 (worst)	–	–	0.25
Women's access to non-land assets use, control & ownership, 0-1 (worst)	–	–	0.25

Civil and political freedom	female	male	value
Year women received right to vote	–	–	1935
Number of female heads of state to date	n/a	n/a	2
Election list quotas for women, national, yes/no	n/a	n/a	No
Party membership quotas, voluntary, Yes/no	n/a	n/a	No
Seats held in upper house,% total seats	11.48	88.52	0.13
Right to equal justice, 0-1 (worst)	–	–	0.25
Right to travel outside the country, 0-1 (worst)	–	–	0.00

Family and care	female	male	value
Mean age of women at birth of first child	n/a	n/a	27.4
Average number of children per woman	n/a	n/a	2.24
Women's unmet demand for family planning, % women 15-49	–	–	12.90
Right to divorce, 0-1 (worst)	–	–	0.50
Child marriage, % women 15-19	–	–	21.50
Length of maternity/paternity leave (days), weeks	n/a	n/a	n/a
Wages paid during maternity/paternity leave, % annual gross wage	n/a	n/a	n/a

Education and skills	female	male	value
STEMS, attainment %	26.93	36.61	0.74
Agri., Forestry, Fisheries & Veterinary, attainment %	0.40	1.07	0.37
Arts & Humanities, attainment %	6.23	4.93	1.26
Business, Admin. & Law, attainment %	16.52	19.05	0.87
Education, attainment %	11.07	7.16	1.55
Engineering, Manuf. & Construction, attainment %	7.19	16.35	0.44
Health & Welfare, attainment %	3.96	2.51	1.58
Information & Comm. Technologies, attainment %	6.00	7.05	0.85
Natural Sci., Mathematics & Statistics, attainment %	13.75	13.20	1.04
Services, attainment %	0.47	0.24	1.92
Social Sci., Journalism & Information, attainment %	34.42	28.44	1.21
Vocational training, attainment %	n/a	n/a	n/a
PhD graduates, attainment %	n/a	n/a	n/a

Health	female	male	value
Maternal mortality, deaths per 100,000 live births	–	–	145
Prevalence of gender violence in lifetime, % women	–	–	28.7
Law permits abortion to preserve a woman's health, 0-1 (worst)	–	–	0.25
Births attended by skilled personnel, % live births	–	–	81.40
Antenatal care, at least four visits, % women 15-49	–	–	66.00

Phadke observed that while in the past two decades the demand for female access to public spaces had become mainstream, the pandemic could undo these gains. Hence, immediate strategies need to include a gender lens. Soria suggested that if, for instance, an additional walking lane to allow a 2 metre (6 ft) distance between people or special cleaning measures for better sanitized areas were established, these measures could perhaps outlive COVID-19 and increase the safety and accessibility of public spaces for women via more road space and cleaner toilets.

6.2 What should policy-makers do in the short, medium and long term?

According to both experts, in the medium term we may see shifts in economic geography, air pollution, and public and open spaces.

Soria emphasized that it is critical to have a gender focus in reforms that are part of cities' recovery plans.

Ranade highlighted that traditionally, as city planners were men, the city was designed for a person who was male by default. In the future, a gender focus needs to be institutionalized in all organizations involved in city planning. Ranade and Soria said that the most effective way to achieve this is to increase the participation of women and other diverse groups so that aspects such as safety, access and ease of mobility become integral to the process rather than an afterthought.

Soria asserted that creating safer streets and public spaces involves answering the following questions: Can one see and be seen? Can one be heard? Is the space clean and accessible? An additional consideration is ensuring that spaces have sufficient bystanders of different genders at various times of the day. Ranade suggested mixed-use zoning. On mixed-use streets, businesses are open late into the night, keeping them well lit, active and therefore safer. Diversity of land use can also offer more women opportunities to engage in the workforce, with businesses being closer to home, and encourage men to share care responsibilities in their neighbourhoods.

Similar principles need to be followed in planning public transport. Soria postulated that, in the aftermath of COVID-19, mass transport is likely to undergo a change as administrators decide to reduce the number of trains and buses or limit the number of passengers. In making these decisions, transport planners should consider women's safety and mobility needs. Khan and Soria posited that, for this, they need to hear from women bus users about how to design better services and improve accessibility and safety for those making their way home from the station at unusual hours.

Soria stated that for interventions to have impact, they need to be scaleable throughout the city and replicable in other cities. Use of inclusive technology and innovation can help achieve this.

In terms of essential infrastructure, such as water and sanitation, measures that remove gender-based impediments to access and use are essential. For instance, as Phadke said, when sanitation facilities are created, increasing the number of public toilets, and factoring in strategic locations and providing for lighting, water and doors that lock, will allow women to use them conveniently. Soria echoed Phadke and said that plans to alleviate water issues should include ways to reduce the burden of collecting water that is borne by women.

To tackle incidences of domestic violence, Soria suggested devising solutions so that bystanders inside homes, community members and neighbours can come to the aid of survivors in collaboration with authorities and women's rights organizations. It is also critical to engage men and boys. Recent evidence showed that messages about prevention of domestic violence were more effective for men if they were mixed with messages related to COVID-19 or health. Finally, she pointed out that addressing gender equality is also about societal interventions. This can be done through constant conversation and communication in the media, in the workplace, in schools and at home.

6.3 Looking ahead

Cities have prided themselves on being spaces of innovation, diversity and a higher quality of life. However, in most instances, women have been left on the sidelines. As cities open up, they need to be designed better by involving more women in planning and decision-making. Above all, they need to reclaim their welcoming characteristics: Cities belong to everyone and everyone has a right to cities.

7 Vulnerable populations

Post-pandemic reforms should strive to make cities more inclusive and improve the living standards of urban vulnerable populations.

COVID-19 revealed various gaps in cities' response to vulnerable populations. To understand how lessons learned from the novel coronavirus can be translated into policy objectives for a more inclusive society, we interviewed Anup Malani and Chinmay Tumbe. In this chapter, vulnerable populations encompass the economically disadvantaged, spanning slum dwellers, the homeless and low-income migrants.

7.1 Short- and medium-term impact

Nationally, slums form 17.4% of urban households, accounting for roughly one-third of India's population (Census 2011). Moreover, they constitute the densest parts of cities; more than 40% of Mumbai's population occupies slums (Census 2011). Both Malani and Tumbe spoke of the impact of the national lockdown on slums. Around April and May, when contagion was high in these dense areas, several structural issues became prominent. For instance, Dharavi (India's largest slum) has a population density of 66,000[36] per square kilometre, with hundreds of people sharing one toilet and with inadequate water access; thus, physical distancing and hand hygiene were difficult to follow. Furthermore, non-salaried workers tend to live in these neighbourhoods. As avenues of employment closed, their earnings plummeted.

Tumbe argued that, since cities are "labour markets", migration is inevitable – but shocks such as COVID-19 typically change migration patterns. Possibly owing to lost jobs and depleted earnings, March and April saw a huge outflow of migrants as they headed back to their villages and smaller towns. Other than this reverse migration, it is likely that the pandemic will also alter future migration patterns. He said that migration is usually community-based and crises tend to realign sectors and corridors; people enter and build new communities or new migrant streams. For instance, in Mumbai, the rise of taxi/autorickshaw drivers hailing from the states of Uttar Pradesh and Bihar is likely an effect of a well-oiled migration corridor.

While the exact repercussions remain to be seen in the case of the novel coronavirus, the pandemic has brought to the forefront the value of migrant workers. In an extreme example, in May, trains departing Bengaluru were initially cancelled[37] since property developers did not want their labourers leaving the city, even though construction was on hold. Here, it is worth mentioning economist

Jean Dreze's recent proposal, Decentralised Urban Employment and Training (DUET),[38] which is an urban counterpart to the government's current MNREGA scheme for rural employment. This idea has received widespread attention; it aims to increase job opportunities and safety nets in urban India in a decentralized manner.

Getting the economy ticking again means getting labour back to cities. Hence, Tumbe highlighted, wage hikes and other concessions are likely in the near future, especially in sectors that are driven largely by migrant labour. While such incentives are useful in the short to medium term, further reform is imperative for urban sustainability.

7.2 What should policy-makers do in the short, medium and long term?

Three potential areas of reform to benefit vulnerable groups – data, service delivery and land – are outlined below.

First, as Tumbe observed, this pandemic has given us a sense of numbers. For example, it was assumed that there were 1–1.5 million interstate migrants in Gujarat. With COVID-19, the state government undertook an exercise to generate a roster of migrants. The data revealed 2.1 million individuals; but this is not a complete list. Actual numbers could be 50–100% more than previous official estimates. Better cataloguing of migration is important to gain a more accurate understanding of cities. Migration data from the 2011 Census was released only in 2019. Tumbe posited that more regular urban surveys which provide an overview of who lives in cities, how many have access to services, and other indicators on a real-time basis could be a significant step forward. Simultaneously, he added, building a diversity index of migrants is needed to aid policy decisions for those who live out-of-state. Additionally, diversity is known to drive innovation while also reducing violence; collecting data on these parameters can go a long way in encouraging safe, equitable and resilient cities.

Second, **as Malani remarked, governments should ideally provide more services to improve hygiene in informal settlements, including a reliable water supply, permanent electricity connections and the provision of essential goods**. While civil society has stepped up and provided food and water to informal settlements, this method is fragmented and is not scaleable; only governments can provide these services efficiently. Tumbe suggests that one way to stimulate service delivery is via ration card portability across the board e.g. for insurance, health benefits, food subsidies etc. The number of second-generation migrants is growing, but despite being born in cities, these people don't always have access to claims that city residents would. This is especially true for those born to migrants who settle in states showing a preference for native populations in granting access to welfare schemes.[39] Portability of social security can also provide real-time information on migration and diversity. The "One Nation One Ration Card" policy is in play, but several challenges exist, including district coordination and political backlash. Yet such measures could help people climb the income ladder and move out of the slums.

Third, Malani noted, the issue of land is a roadblock to service delivery. Slums often find themselves on public or private land that both categories of owner are unwilling to give up, leading to legal battles and the displacement of vulnerable groups. He observes that one answer is intelligent land reform, similar to the Singaporean model discussed by Green in the Housing section of this report. However, fragmented land could create fragmented property rights that need creative solutions. Hence, providing services, eliminating cross-subsidies, and charging slum dwellers market prices for land, electricity and other goods could possibly satisfy all groups involved. Another potential solution, according to Malani, is shifting to formal housing. This rehabilitation could be feasible if it is in situ, as mentioned in the Slum Rehabilitation Act 1995, which protects occupants from expropriation. If not, additional challenges may arise. Currently, slums are conveniently located near jobs markets, e.g. business and residential clusters. Moving housing to remote areas could reduce employment opportunities and add additional strains as urban peripheries often lack integration with public transport systems that connect them to the city centre.

7.3 Looking ahead

Our approach to the post-pandemic world needs to be fundamentally different, especially in understanding how the plight of vulnerable communities can be effectively addressed. **While we don't know if infectious diseases will be a higher burden in slums in the future, this crisis provides an opportunity to implement policy changes that could boost the standard of living of low-income sections of society.**

8 Conclusions

Rebuilding cities post-pandemic is an opportunity to address historical challenges and bring about long-term positive reform.

Well-designed and governed cities can be dynamic centres that spur innovation, drive economic productivity and provide citizens with a good quality of life. COVID-19 is an opportunity to address historical urban challenges in rebuilding cities after the pandemic, bringing about positive long-term change. Below is a set of recommendations for policy-makers.

Planning

1. Restructure urban planning and reform the training of city planners to overcome poor land use and artificial scarcities
2. Allow for more floor space within cities and change archaic regulations that do not make optimal use of available land, thereby reducing overcrowding on streets, in buildings and on trains
3. Improve the management of urban expansion and plan for future horizontal spread
4. Reform the governance structure of cities; support elected mayors and make city-level bodies more independent and autonomous

Housing

1. Produce safer, affordable housing; provide public housing and encourage land tenure
2. Revise repressive regulations to manage density better and make housing markets responsive to demand

Transport

1. Monitor trends in cities to provide feasible and viable transport options aligned with changing demand for mobility
2. Enact long-lasting changes and discourage excessive personal car use by offering viable alternatives with equivalent commuting times
3. Adapt the current supply of multimodal transport by offering the possibility to integrate IPT with rail and buses; improve the management of urban road use via improved traffic management and road capacity
4. Streamline the taxation of transport services so that it is paid for by all city dwellers
5. Ensure compatibility of regulations followed by individual mobility providers to improve management and coordination

Public health

1. Increase fiscal and political federalism via increased power to city governments and local authorities to both raise and spend own-revenue
2. Reduce information asymmetries; collect and collate real-time data to bridge gaps between the demand and supply of healthcare services
3. Bolster health capacity in cities by increasing the number of trained healthcare personnel; ensure that infrastructure has adequate functional capacity, aligned with current and future demands

Environment

1. Identify different contributors to air pollution and categorize according to whether they are manageable by policy at local levels or require support from higher levels of government
2. Provide greater impetus on changing the roots of pollution rather than banning it at the “end of the exhaust pipe”
3. Devise a comprehensive public-space strategy at the city level to create open spaces strategically and maintain them more aggressively
4. Invest in hard infrastructure for increased disaster preparedness; create major arterial networks and roads to allow rapid movement of people and goods in and out of the city in a relatively short time period
5. Encourage collaboration between cities, towns and villages that form single economic geographies for disaster management and response

Gender

1. Institutionalize gender focus in reforms that are part of cities' recovery plans and in all organizations involved in city planning

2. Increase the participation of women and other diverse groups such as planners, decision-makers and citizen voices in city planning

3. Increase the safety and accessibility of public spaces and improve mobility for women via safer streets and public transport, and mixed-use zoning

4. Institute measures to remove gender-based impediments to access and use essential infrastructure such as water and sanitation

5. Increase the number of public toilets that are clean, safe and placed in strategic locations

6. Raise the duration of water-supply availability and augment infrastructure to improve household access to water to reduce the burden of collecting water borne by women

7. Facilitate societal interventions for gender safety and equality such as constant conversation and communication in the media, in the workplace, in schools and at home

Vulnerable populations

1. Catalogue migration and generate more regular urban surveys to understand city composition, variation in access to services and other indicators on a real-time basis

2. Build a diversity index of migrants to aid policy decisions and government schemes for out-of-state individuals

3. Provide more public services such as water and electricity to informal settlements

4. Encourage service delivery through ration card portability

5. Engage in intelligent land reforms such as slum upgradation and in situ shifts to formal housing

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