

83

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Towards Sustainable and Inclusive Cities: The Case of Kolkata

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ABSTRACT

India's metropolitan cities are the testing ground for policy innovations on areas as wide-reaching as economic and infrastructure development, land-use planning, provision of civic amenities, and housing. Indeed, cities are presumed to be dynamic and vibrant, attracting greater investments and contributing to economic growth. However, recent spatial and demographic growth behaviours of India's metro cities are posing challenges to nurturing their sustainability and inclusivity. This special report studies the challenges facing Kolkata—India's oldest metropolitan city and administrative capital of West Bengal—vis-à-vis the country's Smart Cities Mission. The report discusses issues pertaining to Kolkata's haphazard urban expansion and the various measures taken by the Government of West Bengal and the city authority to maintain its liveability and sustainability. The report concludes with recommendations for efficient and effective policy interventions.

(This report is part of ORF's series, 'Urbanisation and its Discontents'. Find other research in the series here: <https://www.orfonline.org/series/urbanisation-and-its-discontents/>)

INTRODUCTION

Cities are generally regarded as epicentres of higher opportunities and productivity,¹ serving as vehicle for accelerating economic growth and regional development. India's metro cities are the testing ground for vital policy decisions regarding economic and infrastructure development, land-use planning, civic amenities and housing. They are the prime investment basin for both national and international players for the country's smart economic growth.

However, India's urban transformation—many characteristics of which, analysts attribute to *liberalisation, privatisation* and *globalisation*—as well as the country's impressive growth since the economic reforms of the 1990s, has given rise to myriad challenges of uniform distribution of such growth across India's diverse population.² This calls into question the sustainability and inclusiveness of such cities. Metro cities are multi-municipal mega urban entities and have experienced huge vertical and horizontal expansion in the last couple of decades. Such colossal urban growth, coupled with the influx of migrant population from surrounding smaller towns/cities and rural hinterlands, exert tremendous pressure on existing infrastructure bases and public resources, and create a negative impact on the overall quality of life across cityscapes.

Furthermore, the socio-spatial and financial gap between the rich and the poor have widened over time. In cities, the poor have limited access to essential public and private goods and services (e.g. quality housing, education, job, civic

amenities and services), which produces an extremely unequal and segregated distribution of opportunities.³ Kolkata is not an exception to these rules of exclusionary urban growth and endemic spatial poverty, which creates and maintains an intricate poverty trap that puts tremendous stress on health, earning potentials, political participation and the overall well-being of the population.⁴ Efficient policy prescriptions are, therefore, necessary to curtail these adversities in Kolkata to ensure equitable, sustainable and inclusive growth, in line with the Sustainable Development Goal 11.

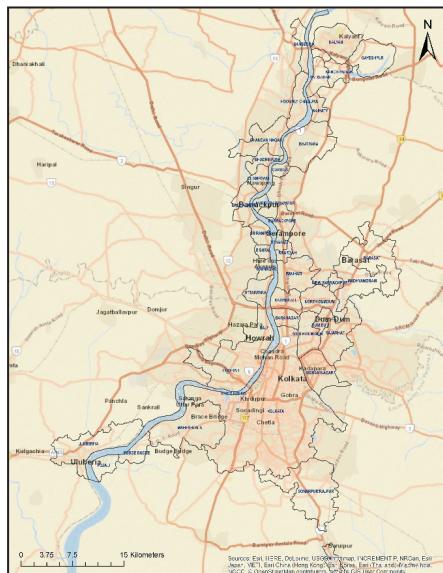
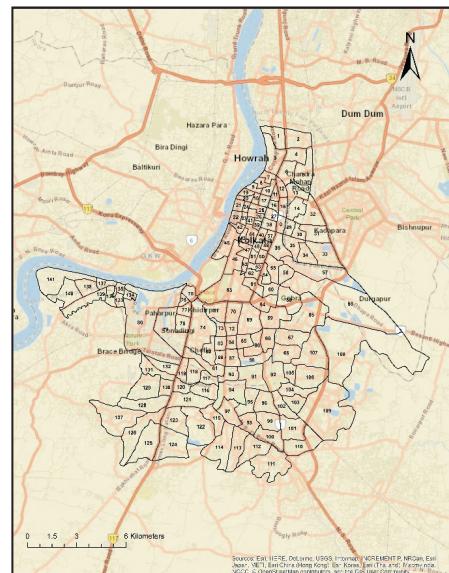
KOLKATA CITY: AN OVERVIEW

Kolkata, the administrative capital of the Eastern Indian state of West Bengal, is the 14th largest city in the world⁵ and was India's first metropolitan entity. The city stretches north–south along the eastern bank of River Hooghly (Ganga) in the famous deltaic Bengal basin and about 75 km west from the Bangladesh international border. It has the coordinates of 22.5726°N and 88.3639°E. Soils are mainly alluvial. Most of the city area was originally a wetland and has been reclaimed over time to accommodate a burgeoning population.⁶ The rest of the undeveloped areas, popularly recognised as the East Kolkata Wetlands, have been demarcated as “wetland of international significance” by the Ramsar Convention (1975).⁷

Kolkata is popularly known as the ‘cultural capital of India’ and the ‘City of Joy’.⁸ It has grown from a colonial port city to a giant megalopolis with a population of over 14 million.⁹ The city is well connected to different parts of India as well as South-East Asian countries via the National Highway 34, Kolkata–Delhi and Kolkata–Chennai Golden Quadrilateral Roads, and Netaji Subhas Chandra Bose International Airport. Figure 1 shows the administrative jurisdictions of Kolkata Urban Agglomeration (KUA) and Kolkata city district (Kolkata Municipal Corporation / KMC; wards: 141; population: 4.5 million), covering an area of 1,886.67 sq. km and 205 sq.km, respectively.

Kolkata's history dates back to 1690, when the East India Company arrived in Bengal for trade. Job Charnock, a Britisher, is considered to have founded the city in 1690, with three villages: Sutanati, Kolkata and Gobindapur.¹⁰ Established as an East India Company trading centre, Kolkata (then *Calcutta*) served as India's capital city under the British Raj, until 1911.

Being the only mega agglomeration hub of economic, political and business activities as well as the educational and cultural pivot of Eastern India, Kolkata has held enormous geopolitical importance since the colonial era. The city is

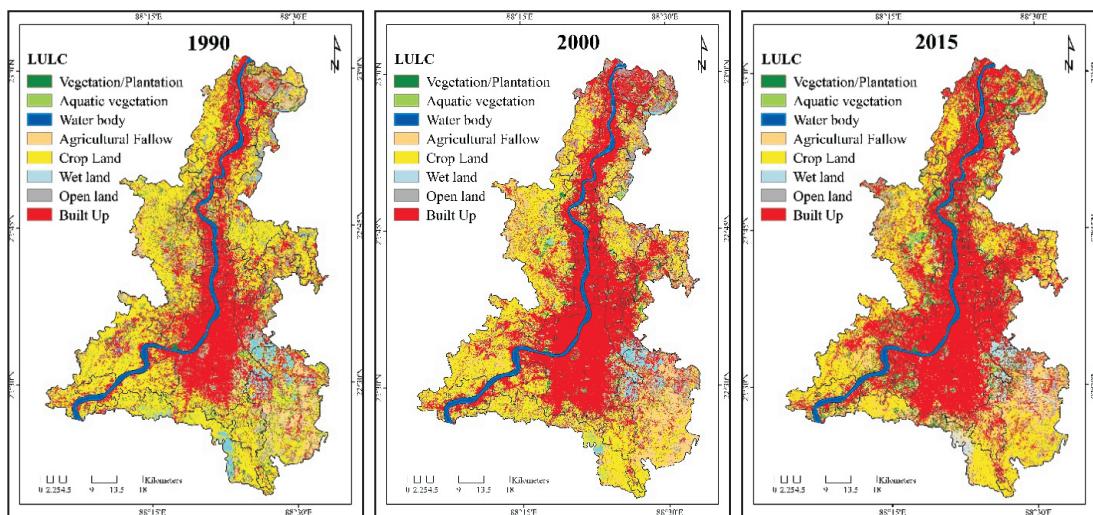
Figure 1: Administrative Map**a. Kolkata Urban Agglomeration****b. Kolkata Municipal Corporation**

Source: Prepared by authors.

considered the most popular livelihood destination for thousands of migrant labourers from the neighbouring states of Uttar Pradesh, Bihar and Odisha and from the hinterland of West Bengal. Haphazard, unplanned and colossal urban growth have caused strain on Kolkata's urban structure and socioeconomic resources, transforming the city into a "premature metropolis,"¹¹ primarily due to the huge influx of cross-border migration, first during India's independence in 1947 and later in the aftermath of the 1971 Bangladesh Liberation War.

The city's role as the nucleus of labour employment and economic opportunities attracted both short- and long-distance internal migration for the next couple of decades. Some efforts were made to divert the processes of urbanisation and industrialisation to other areas of the state, e.g. by developing some secondary cities such as Asansol, Durgapur and Siliguri. However, for the most part, this onslaught of migration remained unchecked,¹² and Kolkata experienced escalating horizontal and vertical urban expansions. The city has witnessed an unplanned higher built-up growth around the peripheries, resulting in encroachment of agricultural land and persistent urban primacy (see Figure 2). Current land use in Kolkata is characterised by an extremely dense built-up core along with large-scale linear residential development in its adjoining peripheral areas. To sustain the growing population and its economic and commercial needs, the city has been subject to large-scale development of infrastructure at an accelerated rate, in several directions.

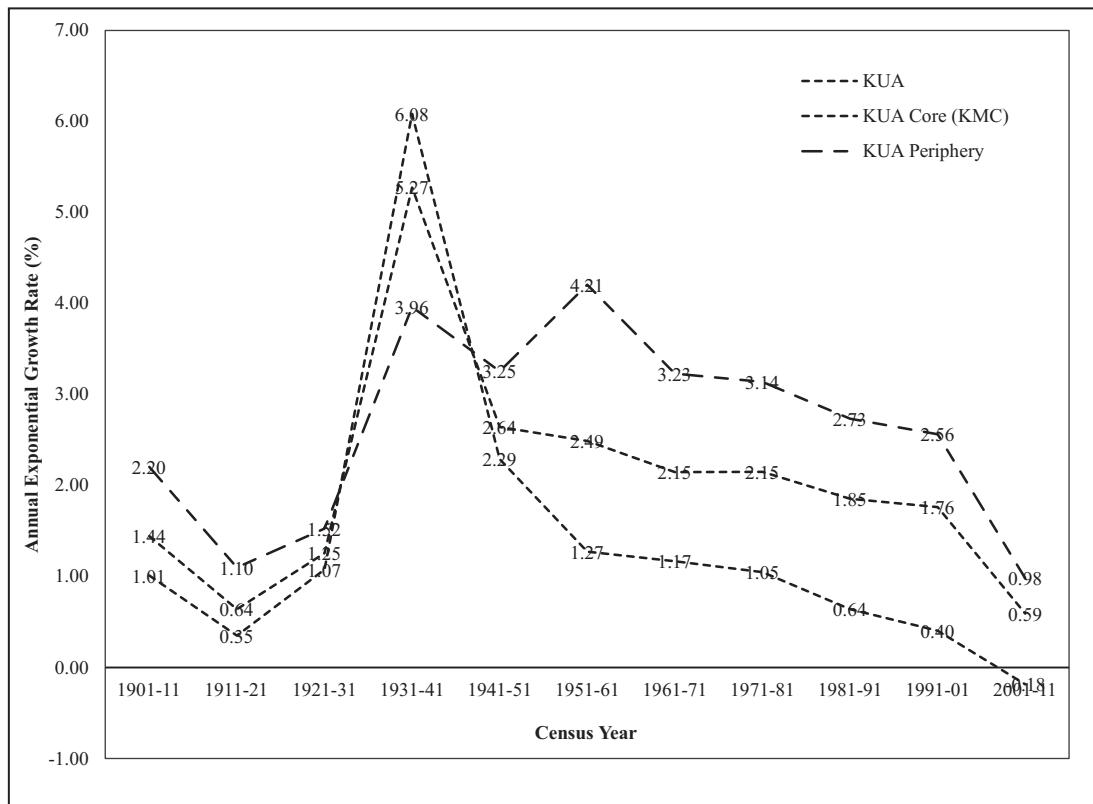
Figure 2: Trajectories of Land Use/Land Cover Change across the KUA since the 1990s



Source: Prepared by Dr. Mehebub Sahana, lecturer at IGCMC, WWF-INDIA, New Delhi, using Landsat 4-5™ and Landsat 8 satellite images.

Kolkata's demographic growth trend has been irregular over the decades, primarily due to its conspicuous socioeconomic and political trajectories. For example, during the first half of the 20th century, Kolkata recorded a higher population growth rate; however, beginning in the 1960s, the growth rate diminished. The population in the KUA, especially in its peripheral area, currently grows at a much higher rate than in the KMC, which even recorded a negative population growth rate of -0.18 percent (see Figure 3). There may be several reasons for this, such as the city core being saturated in terms of population absorption and available built-up areas, its plight further highlighted by the stagnant economic health of the city; acute shortages of required infrastructure and services; and increased cost of living, including stringent land-use regulations, which may have weakened the capacity of the KMC to sustain a growing population. Moreover, improved transport systems have facilitated daily commute, allowing individuals to move to residential locations around city peripheries where land and low-cost housing is easily available. This, too, fuels the rapid growth of peripheries.¹³

This unplanned peripheral growth has exerted a huge strain on the existing land, economy and basic infrastructure of the city. Consequently, the rise in urban spatial poverty has become more evident in terms of the quality of housing stock available, water, sanitation, and sewerage. This is exacerbated by the failure of both local and state governments to manage these issues through effective urban policies.

Figure 3: Demographic Growth Dynamics of Kolkata since 1901

Source: Computed by authors using Census data from various years.

The Indian government's approach to capital disbursement for development has been highly urban, with a "big city bias." As a result, people from rural and small towns/cities continue to flock to Kolkata, find their livelihoods in the gradually increasing informal sectors. They reside in *bastis*/squatter settlements. About 31.35 percent of city residents (1.41 million) are currently living in 5,600 *bastis*,¹⁴ with derelict housing; critically disproportionate access to drinking water, sanitation and solid-waste management; overcrowding; segregation from the rest of the city; lack of proper pavement and walkways; higher health risk; and increased risk of delinquency. Table 1 reports housing characteristics, the degree of access to certain essential services and assets possessions at the household (HHS) level in KMC as well as in urban West Bengal in 2011. The housing ownership rate is 56 percent for KMC, while the corresponding figure for urban West Bengal is much higher at 76 percent. Further, the housing market in Kolkata is plagued with supply-side constraints, especially for middle- and low-income HHS (owning as well as renting), despite effective demand. There is also a desperate need to ensure greater tenure security, which is not addressed adequately in housing reform measures.¹⁵

Table 1: Housing Characteristics, Access to Essential Services and Assets

ASPECTS	KMC (% HHS)	URBAN WEST BENGAL
Housing Characteristics		
Permanent house	93.1	81.8
Good condition residential houses	65.3	56.1
Concretised roof	57.8	48.4
Burnt brick wall	80.9	71.7
Concrete wall	10.1	7.4
Cemented floor	74.5	67.5
Mosaic floors / floor tiles	16.3	7
No exclusive room	4.3	3
Have only one room	42.5	41.7
Have at least two room	28.3	31.7
Ownership housing	56	75.6
Rented housing	39.9	20.4
Access to Essential Amenities and Services		
Treated tap water	84.9	50
In-house drinking water	72.4	56.2
Electrified Hhs	96.2	85.1
In-house latrine	94.9	85
Flush latrine with piped sewer system	43.4	13.6
In-house bathroom	81.8	60
Closed drainage	81.3	24.4
LPG/PNG	64.7	48.2
Separate kitchen	72.2	65
Access to Finance and Assets Possession		
Personal bank account	83.8	68.2
Television	84.6	68.1
Computer/laptop with internet	14.2	6
Mobile phone	65.5	61.3
Two wheelers	12.2	14.5
Car	8.9	4.4

Source: Authors' computation based on 2011 Census data.

While the KMC performs better in terms of providing electricity and access to in-house latrines, there is a huge spatial inequality in the provision of these

essential services across the neighbourhoods of the KMC. Recent studies suggest that some neighbourhoods with a disproportionate concentration of poor households receive a markedly lower level of basic amenities and services as compared to the city average.¹⁶ Quality of services is inadequate, highly haphazard and lack proper monitoring. It is thus necessary to empower local bodies by strengthening their institutional capacities and infrastructure bases to meet unmet service demands and ensure equitable distribution of quality amenities and civic services.

So far, the government has taken some reform measures to restore the economic glory of Kolkata. These include the development of New Township (e.g. Rajarhat-New Town, West International City and Eastern Metropolitan Bypass); and housing/real estate-sector reforms through public-private partnerships (PPP) models, financial deregulation and privatisation of public rental housing.¹⁷ Consequently, since 2000, there has been an economic resurgence in the city, e.g. thriving IT industries and business parks in Bidhannagar and Rajarhat-New Town in Greater Kolkata. The city's IT sector has grown at a rate of 70 percent per annum, twice that of the country average.¹⁸ There has also been a surge in investment in Kolkata's booming real-estate sectors. Various reputed MNCs and TNCs as well as health, educational and research institutions have established their headquarters/ regional offices in the city e.g. Birla Corporation, Bata India, ITC Limited, Unitech, Ericson, TCS, DLF, TATA medical college, Coal India, Damodar Valley Corporation, Aliah University, St. Xavier's University, Amity University, ORF, and Techno India Group of university/colleges. The commencement of the Nathu La in Sikkim as an important trade link has put Kolkata in an advantageous location. Despite these developments, however, Kolkata persistently struggles with endemic spatial poverty, traffic congestion and pollution.

URBAN GOVERNANCE AND PLANNING: THE ROAD TO A SUSTAINABLE AND INCLUSIVE CITY

By a royal charter, Kolkata became a corporation body on 4 September 1726, comprising a mayor and nine aldermen. Since then, several laws have been passed and amended to improve municipal governance. Sir Surendranath Banerjee—the first minister of local self-government in West Bengal and an architect of Calcutta Municipal Act, 1923—first introduced the provision for election of a mayor in the municipal government of Kolkata. A significant reform has been the enfranchisement of women. Some proximate municipalities, namely Cossipore, Maniktala, Chitpore and Garden Reach have been merged with Kolkata. Later, however, Garden Reach was separated. The first elected mayor of the KMC was Chittaranjan Das, and Subhas Chandra

Bose was his CEO. On May 1952, with the enactment of the Calcutta Municipal Act, 1951, the KMC was envisioned as a policymaking, directive and rule-making civic institution; the executive parts were largely left in the hands of the commissioner. The Chairman of the Calcutta Improvement Trust was made the ex-officio Councillor.¹⁹

However, despite several amendments over the next two decades, the 1951 Calcutta Municipal Act failed to provide appropriate guidelines for the better governance of a problem-ridden metropolis. The Government of West Bengal superseded the corporation in 1972. The Kolkata Metropolitan Development Authority (KMDA)—formed in 1970 under a Presidential Ordinance and later sanctioned under the KMDA Act, 1972—functioned essentially as a statutory development authority under the administrative control of the Ministry of Urban Development, Government of West Bengal, with the goal of administering major developmental activities (planning and infrastructure) in the Kolkata Metropolitan Area (KMA). The KMDA derives its power and functions from the West Bengal Town and Country Planning Act, 1979.

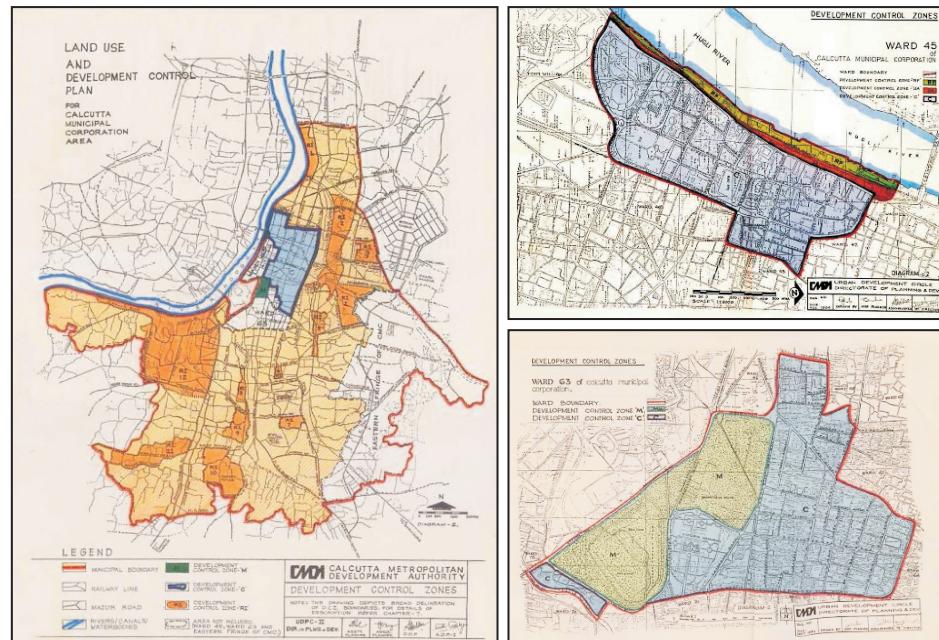
The KMA and the KUA, the third largest urban agglomeration of India, together consist of four municipal corporations, i.e. Kolkata, Howrah, Chandannagar and Bidhannagar; 36 municipalities; and 24 Panchayat Samities; it will have 21.1 million population by 2025.²⁰ During 1970–81, the KMDA worked as a common development agency in the KMA, since most its constituent Urban Local Bodies (ULBs) were under suspension, with no elected representative in place. The KMDA has since functioned in collaboration with the elected ULBs, working towards efficient governance and holistic development. Moreover, with the enforcement of the 74th Constitutional Amendment Act, 1992 and the West Bengal Metropolitan Planning Committee (WBMPC) Act, 1994, the process of decentralised planning and development gained momentum in the KMA. In the 2000s, following the provisions of the WBMPC Act, the Kolkata Metropolitan Planning Committee (KMPC) was formed in the KMA. The KMPC has 60 members, amongst whom 40 are the elected representatives of constituent ULBs. The WBMPC mandates the KMPC to prepare the draft development plan for the KMA, with regards to the plans designed by the individual ULBs. Under it, the KMPC must also oversee the developmental activities launched by various state and central government agencies within the administrative jurisdiction of the KMA, to ensure that such activities are in accordance with the development plans. With the passage of time, the KMDA has become the technical secretariat of the KMPC.

Since its formation, the KMDA has received both plan and non-plan budgetary allocations from central and state governments and others external

agencies (e.g. the World Bank) to execute various urban infrastructure development projects such as the construction of flyovers, roads and bridges underpasses; water supply; and sanitation. For instance, during 1974–92, a major portion of the KMDA's capital works programme, under the three phases of Calcutta Urban Development Programme (CUDP), came from the World Bank (WB) and was allocated by the central government. In 1992, however, the WB-sponsored CUDP was discontinued. Beginning 1996, the KMDA has received central government assistance under the centrally sponsored Calcutta Megacity Programme (CMP) for capital works projects, although the actual support received has been much less than the estimated amount. Additionally, the KMDA received funds under the state plan and other programmes—assisted by both the central and state governments—for capital works. In recent years, the KMDA has received an annual average of INR 250 crore for capital works, from the various external sources. It is expected to make a quantum jump in the coming years, as funds will start flowing under various centrally sponsored urban development schemes, such as AMRUT and PMAY-HFA 2022, and other PPP projects.

The KMDA's functions broadly cover three domains: planning for development, project implementation and regulatory functions. In addition to this, the KMDA acts as a nodal agency, providing consultancy services and implementing projects on behalf of various government departments and institutions. Thus, the KMDA has carried out several projects in diverse sectors of civic infrastructure, such as water supply, sewerage and drainage, traffic and transportation, township and area development, housing and slum improvement, commercial complexes, and parks and playground.²¹ According to the guidelines of the West Bengal Town and Country (Planning and Development) Act, 1979, the KMDA must prepare existing Land Use Maps and Registers (LUMRs) for various ULBs within the KMA to help them prepare Land Use and Development Control Plans (LUDCPs) for those sub-areas (see Figure 4).

The KMDA must prepare LUMRs and LUDCPs in the manner outlined in the Act. Since the official approval of LUDCPs often takes a long time, as an interim measure, Development Control Regulations (DCRs) are usually drafted and enforced to control unregulated and haphazard land use and development. The responsibility of enforcing LUDCPs and DCRs are delegated to the individual ULBs, while the KMDA retains enforcement power in particular areas and zones. The KMDA also executes various planning exercises, ranging from perspective plans to the formulation of investment programmes; it must continually upgrade perspective plans and sectoral development plans to keep up with changing socioeconomic, physical and other contexts.

Figure 4: Land Use and Development Control Plan, KMC

Source: Kolkata Metropolitan Development Authority, accessed 27 January 2019,
http://kmdaonline.org/ludcp/home/ludcp_municipality_search.

In 2015, the union government launched its new urban agenda, aiming to develop 100 smart cities across the country. According to Smart City Mission's (SCM) guidelines, these cities will have adequate civic amenities and services; affordable housing; smart transport solutions; efficient governance and participation of citizens; safe, secure and sustainable city environment for all, with particular emphasis on the elderly, children and women; and accessible healthcare and education.²² While the SCM's agenda and methods of implementation have triggered a debate in the academic and political spheres, it is crucial to examine critically the extent to which smart cities can help achieve a sustainable and inclusive city (SDGs Goal 11, put forth by the UNDP).

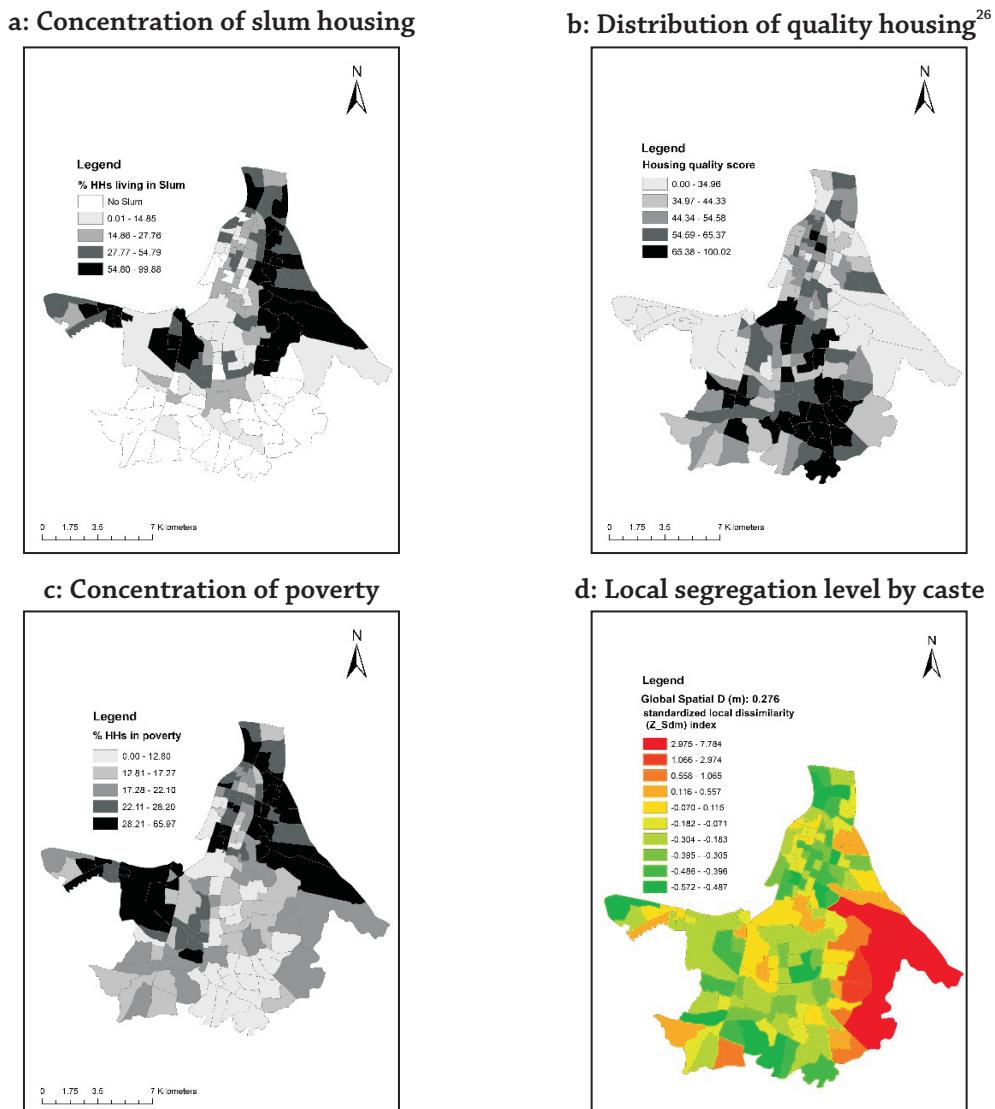
Inclusive Governance

Inclusive governance is key to improving service delivery to the residents and the productivity of the city, which can be achieved by ensuring the provision of basic infrastructure and services to all. Additionally, various stakeholders should be engaged in decision-making processes, through multitiered governance systems. According to the World Bank, the term “inclusion” refers to the process of enhancing the ability, opportunity and dignity of people, based on their ability to participate in society.²³

This definition of inclusion, however, has been criticised on the ground that it excludes systemically marginalised sections of the population. A holistic version of “inclusion” requires the dismissal of discriminatory exclusions; generation of

equitable markets, services and spaces; and the protection of human rights of the deprived groups.²⁴ Therefore, adequate, affordable and equitable provision of housing, essential amenities and public services for all is critical in making cities inclusive. According to recent estimates, 18.78 million HHs suffer from acute housing shortages in urban India, 95 percent of whom are from the economically weaker section (EWS) and the low-income populace (LIP).²⁵ This holds true in Kolkata as well, as this city suffers from endemic spatial and economic inequality in terms of housing, civic services and income inequality. Slum population in Kolkata is around 31 percent, while their presence is concentrated in central and north-eastern parts of the city (see Figure 5a). Figures 5b, c and d show the sheer magnitude of HHs living in derelict housing conditions with meagre access to essential urban amenities and services. These accommodations are dangerously overcrowded, residentially segregated on caste/religious lines and marked by a socio-culturally unacceptable environment.

Figure 5: Geography of Socio-spatial Inequality in Kolkata



Source: Computed by authors using 2011 Census data.

Another aspect of inequity is seen in neighbourhood income disparity, which is evident in the spatial concentration of poverty (% BPL HHs) and the degree of spatial poverty (housing and urban services). In line with national trends, Kolkata exhibits an escalating income inequality between the rich and the urban poor, as the monthly income of 80 percent of its population is below INR 5,000, making them EWS and LIP.²⁷ Economic poverty in Kolkata is mainly concentrated in poor neighbourhoods, where most residents are employed in the unorganised informal sector, which is characterised by low wages, exploitation and job insecurity. Such spatial and economic poverty not only affect people's health, education and employment outcomes but also determine the degree to which they can access the city's economic and socio-physical resources and opportunities.

The city government has taken ambitious welfare measures to address the growing unmet need for adequate housing, basic amenities and jobs, through various centrally sponsored flagship programmes such as JnNURM, AMRUT, SCM, PMAY-HFA 2022, and the National Urban Livelihoods Mission. However, financing, stakeholder engagement, production and delivery mechanisms have proven to be 'poor blind', thus systemically bypassing those who are already disadvantaged and fuelling the spatial reproduction of urban poverty. For instance, in the name of redevelopment and slum rehabilitation, an estimated 200,000 slum dwellers were evicted during 2004–06, in major cities, including Delhi, Mumbai, Kolkata and Ahmedabad.²⁸ Less than half of these HHs were rehabilitated: while some built slums again, others were left homeless. Even amongst the rehabilitated HHs, many were disconnected from their basic source of livelihoods as their new housing locations were far away from the city core.²⁹

As with other metro cities, Kolkata has a problematic housing tenure system, characterised by various types of exclusionary practices. For instance, its rental housing market is predominantly informal in nature, and prospective tenants often face unfair treatment on religious lines.³⁰ Housing discrimination against Muslim tenants is often so severe that despite their ability to afford a good house in a preferred location, they are forced to reside in isolated neighbourhoods, perpetuating involuntary residential segregation based on religion. This phenomenon is gradually beginning to affect the so-called cosmopolitan and progressive '*Bengali bhodrolok (Bengali gentlefolk)*' culture as well.

Finally, due to exclusionary and faulty spatial planning and development of the city, public spaces and major affordable transport links (metro rails), the cultural and aesthetics infrastructure of the city (e.g. parks, libraries,

community halls) are not easily accessible to the disadvantaged groups. Moreover, in the name of redevelopment, the ‘builder raj’ in real-estate sectors and the politician–land mafia nexus have transformed the city’s residential landscapes tremendously. Consequently, the sociocultural fabric of neighbourhoods is threatened due to rapid gentrification.

Sustainability

A vital component of a smart city is sustainability, which can be threatened by excessive exploitation of resources. While many have blamed poverty, it is the elite and the middle-class that are primarily responsible for this environmental degradation because of the higher degree of their consumption.³¹

Air pollution is one of the most critical forms of environmental degradation, and out of the 100 most-polluted global cities, 37 are from India.³² Recent trends record that Kolkata’s air quality has been severely compromised.³³ Fifty years ago, most Indian cities were self-sufficient in terms of their daily water requirement.³⁴ Today, due to excessive extraction of groundwater, high-rise construction and unregulated built-up expansion, subsurface water levels have been depleted, causing structural scarcity of water resources.

Kolkata’s natural ecosystem has also been damaged by unplanned spatial urban growth along its eastern periphery. To make this newly developed city a green or smart city, authorities planted 10,000 trees. Tolly Canal (of the then Calcutta) has been severely degraded and is now called the Tolly Nallah; this is largely due to the failure to preserve the earlier system of the city. Therefore, the focus should be on the ‘ecology of the city’, not the ‘ecology in cities’. Solid-waste management and wastewater management, too, remain challenges for the KMC.

Kolkata’s hybrid urban context and its associated problems pose huge challenges for its socio-environmental sustainability.

Sustainable Urban Economy

The city authorities have been focused on enhancing the economic health of Kolkata. Given the city’s strategic location, the economy of this city has been dominated by manufacturing and services. Much of the urban poor population—comprising street vendors and hawkers—is engaged in informal sectors.

In recent years, tourism, retail, IT industries, share-riding apps (OLA/Uber/Bike Taxi), nursing, health, education and domestic services, trade and commerce, real estate, and transport communications have emerged as employment-generating sectors in Kolkata. Both local and migrant populations are employed in these sectors, where construction is particularly dominated by migrant labourers from the surrounding hinterland. Work participation rate increased from 37.6 percent to 39.9 percent, during 2001–11 and holds the sixth position in the state.

However, according to Census data, Kolkata has recorded a decline in main workers from 94.5 percent in 2001 to 87.8 percent in 2011. Only four percent of the workers are engaged in HHs industry; other workers (mostly service sector) make up the greater proportion of the main workforce, i.e. 94.6 percent in 2011. Since the economic liberalisation of the 1990s and the adoption of Structural Adjustment Programmes (SAP), the role of the government has changed from that of the provider to a facilitator, and there has been an increase in the engagement of private actors in the mainstream of economy. Thus, these new economic policies have revived the depressed economic condition (1960s–1990s) of Kolkata. However, with just 40 percent of the total population in the workforce and a burgeoning floating population, Kolkata's economic situation leaves much room for improvement.

Sustainable Resource Management

In recent years, amidst unregulated urban growth and rising middle-class consumerism, concerns regarding environmental degradation and the depletion of natural resources have been the focus of the municipal authority. For instance, the KMC supplies 300 million gallons (MG) of drinking water per day, sourced from River Hooghly. Most of the water is supplied to HHs after being treated and purified at five treatment plants; it is distributed through 24 booster pumping stations and three headworks located in various parts of the city. The KMC also took up the task of refurbishing 18 MGD capacity water treatment plants at Palta by shifting to 20 MGD modern filtered water treatment plants. Work is also underway to enhance the water-generation capacity of the Garden Reach water treatment plant, from 185 MG to 210 MG. Under the AMRUT scheme, refurbishment of the Tallah Tank is currently ongoing and is set to be finished in the next two years. Under the aegis of the ADB funding, a water-loss management project has been initiated in wards one to six. Water metres have been installed in various houses in wards five and six, to assess water loss and to plug leakages in the existing system of water connectivity.³⁵ However, despite such progress in water-resource management,

the age-old underground water network is yet to be upgraded; its proper mapping is pending as well. Consequently, the KMC did not make much headway in keeping water from being contaminated. A recent research by the All India Institute of Hygiene and Public Health showed the water supplied by the city authority to have high levels of bacterial contamination.³⁶

Keeping Kolkata clean and hygienic has been a major challenge to the civic body as the city generates 2,500 metric tonnes (MT) of solid waste per day. The KMC undertook the uphill task of disposing 18.25 lakh MT of garbage on an average in 2018–19, at the Dhapa landfill site. Since this site has been almost filled up, another landfill site is currently being constructed at Mouza Chapna, under HIDCO. Additionally, the KMC identified land at Rasapunja (Bishnupur, South 24 Parganas) for solid-waste treatment and disposal. Kolkata now has 6,500 bins across the city's roadside, with a total capacity of 240 litres, to be used by pedestrians and shop owners. To prevent littering on the roads, another 6,000 similar bins are set to be procured. To modernise the primary collection system, the KMC has procured around 100 battery-operated hydraulic dumpers, placing them at various neighbourhoods; these are working efficiently. With the assistance of labourers employed under the West Bengal Urban Employment Scheme, the KMC works hard to keep the city clean and beautiful. For better transportation of waste, 76 modern scientific waste compactor stations, with 149 portable/stationary compactors, were installed. The Solid Waste Management Department also implemented vehicle tracking systems, along with post-implementation support and maintenance for a five-year duration, for monitoring of the vehicles engaged in municipal-waste transportation. To convert organic market waste into bio-CNG, bio-CO₂ and compost, 5 MT market waste was processed daily at the Dhapa landfill site, for which the Department of Urban Development and Municipal Affairs of the Government of WB sanctioned INR 1.01 crore out of 4.06 crore.

Another challenge is managing the city's sewer and wastewater outlet connectivity. Despite the continuous efforts of the KMC, the condition of sewerage and drainage in Kolkata is not satisfactory due to the lack of timely cleaning and monitoring. The KMC has focused heavily on the development of this sector in recent years, including the improvement of drainage system from 79 Regent Estate to Ramakrishna Park (Ward No. 96) and the renovation of drainage links along BB Chatterjee Road (Ward No. 67 and 91). Work is also underway in several neighbourhoods to convert surface drainage to a subsurface system and to enhance drainage and sewer systems. Mechanical sewer cleaning has also commenced, and modern technologies have been added to existing infrastructure. For cleaning sewer lines and manhole chambers

across the city, the KMC has added 15 sets of new power-bucket machines and 40 new manhole de-silting machines.

Sustainable use of energy resources has been the city government's priority. The KMC took the initiative to install LED light posts across Kolkata's major roads, thoroughfares, flyovers and surroundings, under the "Green City Mission." This will lower energy costs considerably. High masts have also been put up for effective illumination. A grid-connected solar project, with 15 kW capacity, has been set up at the Deshapriya Park under the HUDCO CSR fund. The KMC also set up 6-kW and 7.8-kW solar energy projects at the Jatin Das Park and the Maddox Square Park respectively. More such projects are set to come up in other areas such as the College Square, the Patuli Uponagari Uddyan and the Deshbandhu Park.

Safety and Resilience

For a city to be 'smart', it must be safe and resilient in the face of hazards, natural or man-made, and socio-political unrest, including issues of law and order. Kolkata has a dangerously congested residential layout, extremely narrow roads and massive traffic volumes. Therefore, the city's road-safety situation has received increasing attention in recent years. The government's latest initiative, the "Safe Drive Save Life" campaign, to increase road-safety awareness across the state is commendable. Pedestrians walkways are frequently encroached—fully or partially—by informal establishments/ hawkers or by car parking (due to a scarcity of dedicated parking spaces).

Most constructed buildings (residential, commercial as well as industrial)—including roadside informal markets/eateries—are severely vulnerable to fire accidents, as they often violate fire-safety norms. Kolkata has witnessed several such deadly mishaps in the recent past.

Furthermore, safety in public spaces remains a cause of concern. The city authority has installed hundreds of CCTV cameras in major junctions, traffic signals, buildings, shopping malls, parks and squares for real-time surveillance. The Kolkata police are also promoting a new mobile-based safety app, Bondhu, a single-window application that will allow citizens to reach out to the police.

Due to its geographic location and its underlying geologic structure, Kolkata is highly prone to earthquakes, flooding and cyclones.³⁷ These natural/man-made disasters are further exacerbated by planning violations in the city, the lack of integrated infrastructures and efficient institutional risk-

reduction strategies, and a lack of preparedness.³⁸ To make the city more resilient, adequate and efficient planning, as well as stringent safety norms at all levels, must be adopted and enforced.

Urban Mobility

Being a multi-functional and polycentric city, with only six percent road space and a narrow street layout, Kolkata has been struggling with a bottleneck situation due to an escalating vehicular population. While the city provides many affordable public transport options, including buses, yellow taxis, suburban railways, metro, tram, auto-rickshaws, sharing transport modes (Bike-taxis, OLA/Uber) and ferries,³⁹ there has been an increase in personal motorised modes of transport. The preference for owning personal vehicles is largely based on the economic capability of an individual or a HH.

Kolkata has an extensive bus network, covering every part of the city. However, it is inadequate. Due to a lack of holistic transport planning, the city has witnessed several traffic-related problems, including frequent vehicular accidents. Recent studies show that 51 percent of the road fatalities occurred at signalised intersections, due mainly to the use of mobile phones while driving and the blatant violation of traffic signals.⁴⁰

Given the decrease in public spaces in Kolkata, providing integrated, smart, adequate, accessible and affordable means of transport facilities; meeting the unmet demand for parking spaces; and promoting safe, secure and inclusive urban mobility pose significant challenges to the city government. Urban mobility affects the city's environment, health, education, employment and internal security, which in turn impact the city's overall socioeconomic liveability, sustainability and vibrancy.

CONCLUSION

Despite various urban development and welfare policies/programmes under the aegis of both national and state governments and other development agencies, Kolkata is yet to become a sustainable and inclusive city. While some sectors—e.g. real estate, IT, tourism, and physical infrastructure—have progressed significantly since the economic liberalisation, at the micro-level, spatial inequalities persist in terms of adequate housing, access to essential amenities and civic services, and the financial well-being of residents. Moreover, issues continue to pose challenges to making Kolkata a sustainable and inclusive city: unregulated built-up growth, planning violations,

mismanagement of municipal waste, environmental degradation, traffic congestion and restricted spatial mobility, unsafe public spaces, exclusionary social practices, and unaffordable technology-driven infrastructure.

This report recommends the following measures to make Kolkata more inclusive, sustainable, safe and resilient.

- a. Adequate and effective participation of citizens in the governance process and '*reform in the reform process*' by identifying and eliminating the loopholes in the existing multi-tiered governing structures must be ensured to allow the city authority to fix the issues of vulnerable populations.⁴¹
- b. To make the city inclusive, it is important to reframe the processes of urban planning by incorporating more holistic approaches of city development, e.g. multi-sectoral comprehensive policies/schemes instead of a sector-specific developmental approach. For instance, to promote good health, it is necessary to provide good housing, amenities, nutrition, employment, education and clean energy. Simply providing healthcare services and employment will not yield the expected outcome.
- c. Targeted and location-specific welfare schemes for quality shelter, jobs, potable water etc., must be prescribed to curb evident spatial inequalities.
- d. Inexpensive and rapid transport should be made available for all to address the issue of increased geographical distance between housing and jobs for the working class.
- e. Public spaces should be made accessible and safe for children, women, people with special needs and the elderly. The preservation and conservation of heritage sites, public spaces and natural ecosystems must be strengthened, and measures should be taken to protect such spaces from further encroachment.
- f. Environmental hazards, climate-change adaptation strategies and disaster risk-reduction measures must be taken into consideration while framing a city plan. Provisions for adequate, integrated and affordable technology-driven infrastructures and institutional preparedness is key to combatting environmental disasters.
- g. For proper safety measures, vulnerable areas (e.g. inner street, parking lot, subways) must be well-lit and better monitored using CCTV cameras and frequent police patrolling; pedestrian walkways should be free from illegal

encroachment and made accessible for all, including the differently abled and elderly. 

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