
DICHOTOMY OF URBAN INDIA: CHALLENGES OR OPPORTUNITY

Tanveen Kaur, National Law University, Jodhpur

Introduction

Urban expansion has altered the flood risk profile for many locations, and more than two-thirds of the urban population is at risk. India has many cities along the coast and in the flood plains of major rivers. As urbanization increases impermeability, areas with previously low flood risk are experiencing flooding. For example, cities in the upper parts of watersheds, such as Bangalore, Hyderabad, and Indore. Pluvial flooding risk is growing more rapidly. Climate change and urbanization patterns are the main drivers of stormwater related or pluvial flooding risks, with a forecasted increase in risk of 3.6 to 7 times by 2070. The increasingly uncertain and intense rainfall associated with climate change and more-erratic monsoons together with increases in areas of impervious surfaces associated with urban expansion is creating frequent flooding, resulting in damage and service disruptions.

Storm surges and rising sea levels will continue to threaten many low-lying urban areas close to India's coasts. Storm surges and tropical cyclone events can cause an exceptional increase in sea level and trigger flooding along the coast. It is also projected that sea level rise due to climate change will affect coastal cities. The risk of swollen rivers overflowing their banks threatens many urban settlements that have expanded into low-lying areas. Riverine flooding impacts an average of 30 million people annually, especially in the regions surrounding Mumbai and Kolkata. Some cities are considerably more exposed to flooding; Surat, for example, faces a combination of riverine, pluvial, and coastal flooding¹.

Challenges for more-efficient urban services and better quality of urban life

Climate change and urban settlement growth patterns are increasing disaster risk in Indian cities. The key factors contributing to urban disaster risk—hazard, vulnerability and exposure—are compounded by climate change and how the urbanization is taking place in

¹<https://thedocs.worldbank.org/en/doc/d67ef885fc1c5b4ca43cf4465b3e7241-0310012025/original/Urban-Resilience-India.pdf>

India.

- i. Some of the main hazards affecting Indian cities are flooding, landslides, earthquakes, cyclones, storm surges, glacier melt, heat waves, and water scarcity. Climate change is affecting rainfall patterns and intensity as well as temperatures, increasing flooding, extreme heat, and water scarcity impacts.
- ii. Increasing vulnerability or propensity to damage in many cities is largely driven by old infrastructure designed for a smaller population and by infrastructure design standards that take inadequate account of levels of stormwater runoff. Urban vulnerability is also driven by new infrastructure and buildings that do not include measures to reduce extreme heat or flooding impacts.
- iii. Exposure to hazards in Indian cities is greatly increased by new settlement growth in hazard-prone areas. Added factors are the lower adaptive capacity of residents living in low-lying and high-risk urban areas, for e.g. day labourers working in extreme heat who may not have access to health care and safety nets.
- iv. Flooding is a growing challenge for most Indian cities. Climate change is affecting the intensity, frequency and variability of rainfall events. In addition, rapid urban settlement growth has created large impervious surfaces which increase runoff and reduce infiltration capacity, resulting in higher peak discharge. Existing drainage infrastructure is often only able to cope with limited rainfall intensity and is frequently blocked or encroached. In new development areas, there is often a lag in installing stormwater drainage infrastructure. These conditions, together with the intense rainfall associated with the Indian monsoon, create frequent flooding in Indian cities and often result in damage and service disruptions.
- v. Pluvial flooding disproportionately affects the urban poor. Pluvial flood zones are often concentrated in low-lying and poorly drained areas, where the urban poor typically live. Global analysis shows that cheaper housing and accessibility to jobs influence the decisions of the urban poor to live in these high flood-risk areas.²

² Mega city regions exceed 20 million in population and are hubs of economic activity. The three at risk are Mumbai-Pune-Nashik, Chennai-Coimbatore Trichy, and Greater Kolkata Asansol.

- vi. Storm surge and tropical cyclone events can cause an exceptional increase in sea level and trigger coastal flooding in coastal cities. India is frequently affected by tropical cyclones (typhoons), particularly during the monsoon season that runs from June to October.
- vii. The fluvial flood hazard is a serious threat to many Indian cities. Weather patterns affected by climate change, combined with the abundance and size of major river channels, mean that many cities are highly exposed to fluvial flooding.
- viii. Urban expansion and the construction of water management infrastructure have significantly altered the fluvial flood risk profiles of Indian cities. The density of river networks in India, notably the Ganges and its tributaries, means that most cities are located near a river and are potentially exposed to fluvial flooding.

Heat stress in Indian cities is intensifying, and mortality from heat waves could increase by 128 percent by 2050. This would equate to a rise from 144,000 to 328,500 heat-related deaths per year by 2050 under a high-climate change scenario, an increase of 128 percent.

Opportunities for more-efficient urban services and better quality of urban life

Major cities are already planning for low-carbon growth, and there is enormous potential for further reduction in greenhouse gas emissions. Reduction in this emission below the historical trend is anticipated in some but not all cities, with emissions projected to drop by 2050 in four of the five cities analysed (Chennai, New Delhi, Indore and Thiruvananthapuram). There is great potential to increase these reductions further.

- i. A low-carbon pathway can be achieved by increasing the efficiency of the urbanization process and the share of renewable energy in electricity production. Specifically, reduction can be best achieved through combinations of interventions, including encouraging urban compactness and density; modernizing municipal services, especially solid waste management; building green, energy-efficient housing; and investing in public transportation and moving away from fossil fuel-based transport.
- ii. Well-planned compact cities have the potential to reduce energy consumption and emissions, improving liveability. Urban expansion, if not managed well, not only increases exposure to climate impacts but exacerbates urban challenges of access to

basic services, congestion, and air pollution.

- iii. Compact cities through integrated urban planning, and transit-oriented development approaches can reduce energy consumption and emissions, enhance resilience, and reduce air pollution, improving liveability and quality of life. In the cities this report analyses, the most-ambitious green urban policy scenario requires extra investment costs for adaptation and low-carbon growth, although these investments would allow for savings from urban expansion and maintenance costs. Development of well-planned, compact cities accompanied by green areas, amenities, and clean public transportation will improve liveability and the quality of life of urban residents.
- iv. Many cities have limited green space per inhabitant and limited access to urban amenities such as parks and public transport. There is a need and an opportunity to manage urban expansion better, which would greatly improve urban liveability. For example, a city that has more green space and tree canopy cover will have cleaner air and better walkability and better ability to adapt to heat waves. Clean public transportation and greater access to services and markets increase employment. A city that can recover more quickly from disaster shocks and ensure business continuity will be more liveable and more competitive.
- v. Green, resilient municipal services, especially sustainable Solid Waste Management (“SWM”), are critical for efficient, low-carbon urban development. Modernization of solid waste management system covering the entire value chain from household segregation to recycling, and leveraging a wide range of technologies—such as clean collection vehicles and anaerobic digestion plants shows significant emissions reduction in all cities assessed, attributable to a combination of better management of bio degradable waste, reduced landfilling, and improved methane capture. Many Indian cities such as Indore are already benefiting from such investments, supporting green jobs and biogas production.
- vi. Reducing emissions from the SWM sector will require a mitigation roadmap with clear priorities, milestones, and timeframes. Modernization also has costs, and therefore cost recovery would be essential. To modernize solid waste management, it will be necessary to adopt the regulatory, policy, and operational framework and increase financial sustainability through improved cost recovery.

- vii. There are significant opportunities for improving energy efficiency, resilience, and emissions reduction in existing and new houses. The housing sector generates substantial emissions, which can be reduced through building improvements such as installation of rooftop solar panels and adopting green housing design parameters. Emissions are generated throughout the life cycle of production, construction, use, demolition, and rebuilding. Green housing design practices such as roof and wall insulation and efficient glazing can be incorporated into all new buildings, which would reduce energy consumption and emissions from the housing sector substantially by 2070.
- viii. Incremental costs for increasing energy efficiency and reducing emissions vary based on choice of intervention, with installation of rooftop solar panels being the most cost-effective. It is estimated that the incremental cost for installing rooftop solar panels on all existing housing stock in 2022 is roughly 3 percent of the total construction cost, translating to about \$150 per person at a total cost of \$210 billion. For future housing stock, the extra cost of green housing interventions on new house construction (improvement in building envelope, wall materials, ventilation, and windows) would be \$50 per person, adding up to approximately \$66 billion for every decade between now and 2070. Upfront incremental costs vary across different income groups. Simulation shows that even all-in measures of solar roofs and efficient envelopes can be recouped within three years for housing for high- and middle-income households, suggesting that introducing mandatory requirements for housing for these people could be feasible, but the initial costs of green housing for lower-income households could be high. Therefore, it is essential to provide incentives and support to these groups to enable them to adopt green measures.

Many actions to reduce emissions will also ease air pollution and related health challenges in India's cities. Improvements in road transportation, together with improved municipal waste management and a transition to cleaner energy, would greatly reduce air pollution.

Suggestions

- i. Different city types face different challenges in India. The coastal cities are facing land subsidence and infrastructure damage due to flooding and other hazards; other cities are facing water scarcity and air pollution; hill cities have different challenges.

- ii. While the mitigation discussion often centres on carbon dioxide, other emissions such as methane, carbon monoxide, plastic pollution, heavy metal/ toxic compounds pollution, and particulate matter are equally pressing and critical issues for cities.
- iii. The fragmentation of functions across multiple departments and levels (national, state, city) is an underlying urban governance challenge in India that also impacts governance of climate risk. This makes the challenge complex, including data collection across departments, across sectors (e.g., energy, transport), and for the private sector, which has to deal with multiple stakeholders and regulators.
- iv. The urban planning process is currently unable to fully account for environmentally sensitive planning that accounts for water and flood risk management and other resilience priorities.
- v. The insufficient number of urban planners and the absence of master plans in several Indian cities undermine effective urban planning and climate risk management.
- vi. Urban sprawl is a growing concern for several cities, moving away from a compact form and toward more carbon intensive ways. Traffic management is a need in most cities. Urban waterfront and river management need attention in Indian cities.
- vii. Non-motorized transport, though promoted by national schemes, does not receive adequate attention or financing. » Areas where support is needed include: (i) supporting developing good proposals where good models already exist; (ii) bus service plans for Tier 2 cities on a Public Private Partnership model; and (iii) extending support for operational expenditure (not just capital expenditure).
- viii. There is a need for trip-data to support better decision making. Data exists with different stakeholders and companies for their specific projects.
- ix. There needs to be a narrative in which waste is seen as a “resource” rather than merely something that needs to be ‘disposed of’. Recently the private sector has started working in this area but there are huge need and opportunity to involve more private sector actors.
- x. There is a multiplicity of stakeholders from the generation of waste to final disposal.

The World Bank can support this sector by addressing the fragmentation problem through standardized guidelines and frameworks that do not currently exist. There is also a need to work with future “waste generators.” This is being addressed by some stakeholders by working with children and youth.

- xi. A study on climate change impact on micro, small, and medium enterprises in India has been carried out covering various sectors, which highlights the interconnectedness of the urban and rural sectors. While the industries may be in cities, the value chains extend to rural areas. Programming for urban transition must also account for this linkage and integration.
- xii. Despite much effort, green buildings only capture 5 percent of the market. The biggest barrier to this is lack of information and awareness at the consumer level, including misinformation that these buildings are costlier. There is a need to work on public and developer perceptions that green buildings can have good payback.
- xiii. The lack of a “single window” approval process is a big deterrent for adoption of green buildings as the permissions process is very cumbersome. Streamlining this process along with creating a single platform where interested consumers can access the latest technologies and designs is needed. There is also a need to work on strengthening the Energy Conservation Act further.
- xiv. There is existing urban flood modelling work undertaken for cities like Delhi and Kolkata, including development of a flood early warning system for Kolkata.
- xv. There are no platforms for citizens to engage with and offer solutions to the urban planning and city governance processes with respect to climate change. Some cities have created this, but nothing like this exists for risk governance and climate actions. There is a need for localized planning, such as ward-level planning, as the impacts of climate change are often localized even within a city.
- xvi. There is a need to create revenue models that also account for the environmental service and not just financial viability, which would help businesses that have to deal with the complexity of multiple revenue streams (e.g. in waste, different components have different uses) and competition from conventional production lines (e.g. electricity

from waste vs. electricity from solar).

- xvii. Smaller cities do not budget for technical staff for risk assessment or data collection. Even where there are budgets, staff attrition and turnover are very high.
- xviii. There is no dedicated platform that can bring together city authorities and experts on discussions of resilience and low carbon interventions. The people who can be brought together keep changing depending on consultants/experts engaged with the city at that time.

Conclusion

The catalysation of urban livelihoods, employment opportunities, and poverty alleviation in India requires a comprehensive, multi-stakeholder approach that transcends traditional policy silos.

Thus, the dualistic structure of urban livelihoods: the rapid expansion of the gig economy and the persistence of the informal sector need inclusive strategic decision making at all levels of the system—government, industry, academia, and civil society. The informal sector has been traditionally absorbing workers in millions, providing a bedrock for them to survive or live with subsistence.

Without formal engagement and social protection, workers continue to face low wages, long working hours and hazardous conditions, making them susceptible to further poverty and exploitation. On the other hand, the gig economy's expansion comes with flexibility, creating new employment avenues, but often is under non-traditional and unregulated working arrangements. Though the gig economy is reshaping service delivery and creating opportunities, the precarious working conditions are similar to those in the informal sector, especially for location-based platform workers (e.g. delivery systems). Moreover, gig work remains primarily an urban phenomenon fuelled by a large youth population and the widespread adoption of digital technologies and smart phones.

Across the urban economies, women, transgenders, also play a critical role in shaping access, opportunity and vulnerability. With a double burden where women are expected to manage distinct categories of work simultaneously such as household (domestic and care work), and productive (paid work) the impact on female labour force participation, leads to lower

engagement in formal employment, time poverty, and gender inequality. Thus, the care economy is gaining momentum for demands of intergenerational care (child, the disabled, and elderly care) becoming a critical factor for economic growth. Recognising that unpaid care work constrains women's labour force participation, a priority focus needs to be placed on developing supportive care infrastructure and formalising care work as a livelihood.

In order to harness the advantageous position of demographic dividend, decision making agencies including government, industry, academia, and civil society organisations have to play a crucial role in shaping policies and implementing actions bridging the gaps of economic growth and poverty alleviation. Systemic integration of actions at central, state, and city level with partnership from the private sector and civil society organisation is necessary. Clear roles should be defined for central, state, private, and civil society organisations where responsible agencies can formulate national policy frameworks, lead on-the-ground implementation, invest in worker welfare and training, and finally ensure grassroots service delivery ensuring that programmes are responsive to community needs.

Lastly, the lack of climate-resilient infrastructures exacerbates both occupational and residential vulnerabilities for weak communities. There is a need to develop social infrastructure around economic hubs within and around cities—such as resting areas, water dispensers, washrooms equipped with bathing facilities, changing spaces, and so on to support the well-being and dignity of workers and vendors.³

³ ASSOCHAM-Primus. (2025). The rising Gig Economy of India. Primus Partners. Retrieved December 11, 2025, from <https://www.primuspartners.in>