



Analysing India's Smart Cities: Outlining The Benefits And Drawbacks Of Their Effects On The Environment And Health

¹Akash Dixit,²Prateek Dixit

¹Assistant Professor, ²Assistant Director

¹Department of Urban and Town Planning,

¹Shri Rawatpura Sarkar University, Raipur, India

Abstract: This study looks at how the MoHuA, India, smart cities mission and other urban development initiatives affect the country's health and environment. The study assesses the challenges and deficiencies in tackling India's unique urban health and environmental issues, as well as the possible health and environmental consequences. In order to fill these gaps, the WHO, World Bank, and urban health specialists have established models that could be useful for initiatives in India, as the report further examines. The article's conclusion called for "descriptive urban health frameworks," as defined by urban health professionals, to address some of the issues raised by India's Smart Cities initiatives.

Index Terms - smart city, sustainable environment, health and environment, urban health frameworks, urban development, and urban health.

I. INTRODUCTION

According to United Nations estimates, the global urban population has grown significantly—by nearly 367 million people—and is projected to triple by the year 2050. With this rapid expansion, both urbanization and industrialization are expected to rise sharply in the coming decades. Such large-scale growth implies that India's urban residents will increasingly confront serious environmental and health-related challenges. As climate change intensifies and public health indicators worsen under the pressures of late capitalism, it becomes crucial to examine the emerging issues within cities and their implications for human well-being. Urban health has consequently become a key area of research and policy attention, with India reaffirming its commitment to several international frameworks addressing these concerns. Galea and Vlahov—pioneers of the contemporary urban health movement—define urban health research as the study of “the relationship between the urban environment and the population distribution of health and disease” (Galea & Vlahov, 2005: 342).

In alignment with its national objectives for sustainable urban development, the Government of India, through the Swachh Bharat Abhiyan, has instituted a comprehensive framework of indicators and survey methodologies designed to evaluate the impacts of urbanization on cleanliness, hygiene, and sanitation across rural and urban settlements. A core priority of this initiative is the eradication of open defecation and the advancement of fundamental sanitation and public health standards throughout the country. Complementing these efforts, the Smart Cities Mission (SCM)—launched on June 25 as a collaborative undertaking between the Ministry of Housing and Urban Affairs (MoHUA) and the governments of various states and union territories—has identified one hundred cities and towns for integrated urban transformation. The Mission aspires “to drive economic growth and enhance the quality of life of citizens by enabling local area development and harnessing technology, particularly that which facilitates smart outcomes.” This initiative envisions Indian cities as livable, inclusive, and sustainable urban environments characterized by robust economies and diverse opportunities for socio-economic advancement.

To enhance the overall effectiveness of the Smart Cities Mission (SCM), the Ministry of Housing and Urban Affairs (MoHUA) has launched several complementary initiatives aimed at strengthening digital governance, data management, and institutional capacity within urban systems. The National Urban Digital Mission (NUDM), inaugurated on February 23, 2021, seeks to establish a unified digital framework to facilitate data accessibility, interoperability, and capacity development across Indian cities. Among its key components, the India Urban Data Exchange (IUDX) serves as an open-source platform that provides real-time data on a broad spectrum of urban indicators, thereby enabling evidence-based policy decisions. Similarly, the Smart Cities Open Data Portal has been developed to foster innovation and the creation of data-driven urban solutions, while the Smart Code initiative addresses cities' software and technological requirements by delivering digital tools to tackle a range of urban challenges.

Furthermore, the National Urban Learning Platform (NULP) functions as a capacity-building mechanism designed to promote leadership development and collaborative learning through virtual training programmes. It aggregates expertise and facilitates knowledge exchange among diverse stakeholders within the urban ecosystem.

To assess the quality of urban life and institutional performance, MoHUA has introduced the Ease of Living Index (EoLI) 2020 and the Municipal Performance Index (MPI) 2020, covering 111 Indian cities. The EoLI evaluates citizen well-being and identifies gaps in urban policy, planning, and implementation, providing insights for targeted improvements. In the 2020 rankings, Bengaluru and Shimla secured the top positions in their respective population categories (above and below one million), while Srinagar and Muzaffarpur ranked lowest. The MPI 2020, which assesses the administrative and operational efficiency of municipal bodies, placed Indore and New Delhi at the forefront of their respective categories, whereas Guwahati and Shillong were positioned at the bottom of the rankings.

Aims and Objectives

The Smart City initiatives discussed above illustrate both the potential and the inherent limitations of India's approach to urban development. While the Indian government has made significant strides in addressing the challenges posed by rapid industrialization, globalization, and economic privatization, these advances have often coincided with escalating environmental degradation and public health crises. Consequently, many Indian cities face the risk of becoming increasingly unlivable and unsustainable.

Smart City projects in India, therefore, operate at a crucial intersection—seeking to reconcile the objectives of economic growth with the imperatives of environmental sustainability and public health. The complex interplay between urban expansion, environmental stressors, and human well-being necessitates a holistic and inclusive developmental framework.

In this context, the present study aims to critically examine the impact of rapid urbanization on human health and the environment in India, with particular emphasis on the following objectives:

1. To analyze the relationship between urbanization, industrialization, and their cumulative effects on environmental quality and public health in Indian cities.
2. To evaluate the effectiveness of national urban programs, such as the Smart Cities Mission and Swachh Bharat Abhiyan, in promoting sustainable and health-oriented urban development.
3. To identify key challenges and policy gaps that hinder the creation of livable and equitable urban environments.
4. To propose integrated strategies for enhancing urban resilience, environmental sustainability, and the overall quality of life in rapidly urbanizing contexts.

What both the **Swachh Bharat Abhiyan** and the **Smart Cities Mission** fail to adequately incorporate are comprehensive **health, environmental, and safety indicators** that are central to global frameworks for sustainable urban development. These dimensions are only partially represented within India's smart city programs, in contrast to international standards set by organizations such as the **World Health Organization (WHO)**.

The **WHO** emphasizes a multidimensional approach to assessing urban well-being through a series of **core health and sustainability indicators**. These indicators measure progress in areas such as **social equity, environmental integrity, and sustainable urban growth**. For instance, the WHO identifies **slum housing**

improvements as a key health determinant—evaluated through the availability of **safe, resilient, and climate-adapted structures** equipped with **clean energy sources and basic urban utilities**. Similarly, **urban air quality**, assessed in terms of particulate matter concentrations and adherence to **WHO Air Quality Guidelines**, remains a critical measure of environmental health.

Further, the WHO underscores the importance of **healthy and efficient transport systems**, particularly those that prioritize **safety and the promotion of sustainable mobility options**, including walking, cycling, and public transit. Another crucial aspect is **urban safety**, with **intentional homicide rates** serving as a proxy for broader indicators of social stability and community well-being.

In addition, the WHO proposes a set of **governance indicators** that evaluate the extent to which cities integrate health considerations into **urban planning, building regulations, and environmental monitoring systems**, including those for **air and water quality** as well as **sanitation**. Complementary indicators assess access to essential **urban services**—such as **healthcare facilities, green spaces, fresh food markets, and waste management systems**—as key determinants of urban public health and sustainability.

By contrast, India's current urban programs remain predominantly focused on **infrastructure modernization and economic growth**, often overlooking these critical health-centered and ecological benchmarks. Aligning national initiatives with **internationally recognized urban health frameworks** could therefore enhance the long-term sustainability, livability, and resilience of Indian cities.

In addition to the frameworks developed by the World Health Organization, **multilateral institutions such as the World Bank** have also advanced comprehensive strategies for urban development and environmental management. The **World Bank's Corporate Strategy on Urban Development** (World Bank, 2000a) explicitly addresses the **urban environment** as a core dimension of enhancing urban livability and sustainability. Similarly, the **Corporate Environment Strategy** (World Bank, 2001b) underscores the interdependence between environmental integrity and human development, emphasizing three overarching goals: **improving the quality of life, enhancing the quality of economic growth, and safeguarding the quality of regional and global commons**. Together, these priorities illustrate the World Bank's evolving recognition of environmental sustainability as central to the urban agenda.

This conceptual foundation laid the groundwork for the establishment of the **Urban Environment Thematic Group** in **2002**, which sought to broaden the traditional “**brown agenda**”—initially identified during the **1992 Earth Summit**—to encompass a wider spectrum of urban environmental concerns. The expanded framework integrated elements of both environmental and urban development strategies, and articulated **four key urban environmental goals**, which collectively aimed to align sustainable growth with improved urban livability and ecological resilience.

Goal 1: Protect and enhance environmental health in urban areas.

Goal 2: Protect water, soil, and air quality in urban areas from contamination and pollution.

Goal 3: Minimize the urban impact on natural resources at the regional and global scales.

Goal 4: Prevent and reduce the effects of natural disasters and climate change on cities.

Among the most pressing threats to urban environments in India are air pollution, water contamination, and the collapse of waste management systems. The provision of basic urban amenities remains a critical challenge across many cities, reflecting systemic deficiencies in infrastructure and governance. These shortcomings have been documented in numerous city development plans prepared under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM, 2011).

For instance, studies indicate that over 60 per cent of Mumbai's population reside in slum settlements, where inadequate housing and limited access to basic services exacerbate environmental and public health risks. Residents of these areas frequently face toxic water and air quality, insufficient sanitation facilities, open defecation, and poor waste management, all of which contribute to adverse health outcomes. These

environmental stressors are compounded by socioeconomic vulnerabilities, including low income levels, limited access to education and healthcare, high incidences of crime and violence, and gender-based violence, reflecting a broader pattern of social and economic marginalization. Collectively, these conditions underscore the urgent need for integrated urban planning strategies that address both environmental hazards and structural inequalities to promote healthier, more resilient cities.

One of the most critical determinants of urban health is water quality, particularly the management of wastewater, which remains an often-neglected factor despite its role as a carrier of both infectious and non-infectious diseases. In India, only approximately 35 per cent of wastewater from Class I cities (with populations exceeding 100,000) and Class II towns (populations between 50,000 and 100,000) is treated, posing significant risks to public health (Bhardwaj, 2005).

Urban development initiatives address environmental and health objectives through a range of sector-specific projects. Water and sanitation programs primarily focus on the provision of essential services, including the construction of sewage lines, stormwater drainage systems, and treatment plants, as well as improvements in overall water quality. Investments in sewerage and drainage infrastructure are managed under broader urban development projects, which also encompass slum upgrading, disaster mitigation, solid waste management, and other essential municipal operations.

Environmental projects target waste management and reuse, including the treatment of toxic and hazardous waste, effluent management, pollution control, reduction of greenhouse gas emissions, and the phase-out of ozone-depleting substances. Similarly, energy projects focus on improving energy efficiency, promoting renewable energy sources, reducing greenhouse gas emissions, and supporting district heating programs, particularly in regions such as Europe and Central Asia.

In the domain of urban mobility, transportation initiatives aim to reduce vehicular emissions and often provide resources for air quality monitoring systems, contributing indirectly to public health improvements. Given the recurring issues with water pollution, effective wastewater management remains a top priority, as untreated or inadequately treated wastewater continues to pose severe health hazards to urban populations across India.

Conclusion

Cities are inherently complex systems, and achieving sustainable and healthy urban environments remains an exceptionally challenging objective. No single intervention—or even a combination of initiatives—can fully address the multifaceted issues that shape urban health and sustainability. The challenges are inherently interconnected, with overlapping social, environmental, and infrastructural determinants. Key indicators such as urban air quality, municipal solid waste management, water supply and sanitation, and urban energy consumption remain inadequately incorporated within existing Indian assessment frameworks, limiting the effectiveness of current urban programs.

The integration of Smart City initiatives with public health planning offers a critical opportunity to influence population health outcomes. Urban-scale factors—including housing, transportation, social services, and other municipal services—exert significant direct and indirect impacts on the health and well-being of urban populations. As highlighted in the 2016 Lancet review by Giles-Corti et al., urban and transportation planning can shape health through multiple pathways. For instance, transport policies influence the modal share of

commuters, affecting population-level exposure to traffic hazards, air pollution, noise, and sedentary behaviors, all of which have profound implications for human health, environmental quality, and overall well-being.

Addressing these challenges requires integrated, multisectoral approaches that align urban development, environmental management, and public health planning. Only through such holistic frameworks can Indian cities progress toward becoming sustainable, resilient, and health-promoting urban environments.

An alternative perspective on urban health emphasizes its dynamic and multidimensional nature, recognizing that it is both shaped by and exerts influence upon a wide array of social, environmental, and infrastructural factors. Consequently, urban health extends beyond the mere assessment of population health status or the identification of individual-level health disparities. A comprehensive approach also requires addressing broader questions: What are the implications of poor health for urban development? Is the healthcare system adequately equipped to respond to (re-)emerging diseases such as HIV, tuberculosis, dengue, and diabetes? How do urban lifestyles shape health outcomes, and to what extent are they influenced by the growing burden of disease? Moreover, how can urban environments be designed to promote healthier living conditions, for example, by minimizing vector breeding and improving sanitation?

To better integrate health and environmental considerations into Smart City agendas, I propose the adoption of a qualitative urban health framework that triangulates diverse datasets across multiple sectors and concerns. Such an approach allows policymakers and urban planners to holistically assess the interconnections between environmental quality, social determinants, and population health outcomes, thereby enabling more effective and targeted interventions.

References:

1. Galea, Sandro, and D. Vlahov. 2005. "Urban Health: Evidence, Challenges, and Directions." *Annual Review of Public Health*, 26: 341-365
2. Ministry of Urban Development, Smart City: Mission Statement & Guidelines, New Delhi: Government of India, June 2015.
3. Rumi Aijaz, "India's Smart Cities Mission, 2015-2021: A Stocktaking," ORF Special Report No. 155, August 2021, Observer Research Foundation. Accessed at: ORF_SpecialReport_155_SmartCitiesMission.pdf (orfonline.org)
4. Anthony G. Bigio, Bharat Dahiya, 'Urban Environment and Infrastructure: Toward Livable Cities.' The World Bank. 2001
5. JNNURM (2011). List of mission cities. Online: <http://jnnurm.nic.in/nurmudweb/missioncities.htm> (15.10.2011)
6. Chandrasekhar, S. & T. Gebreselassie (2008). Exploring the intra urban differences in economic well-being in India, in: Radhakrishna, R. (ed.). India development report 2008. Delhi: Oxford University Press, pp. 87-95
7. Bhardwaj, R.M. (2005). Water quality monitoring in India – achievements and constraints. IWG-Env., International Work Session on Water Statistics, Vienna, June 20–22, 2005

8. Giles-Corti B, Vernez-Moudon A, Reis R, Turrell G, Dannenberg AL, Badland H, Foster S, Lowe M, Sallis JF, Stevenson M, Owen N. City planning and population health: a global challenge. *Lancet*. 2016 Dec 10;388(10062):2912-2924. doi: 10.1016/S0140-6736(16)30066-6. Epub 2016 Sep 23. PMID: 27671668.
9. Internationales Asienforum, Vol. 43 (2012), No. 1–2, pp. 13–32

