

Urban Sanitation in India: Post-independence Trajectories, Challenges, and Policy Responses

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ABSTRACT

Urban Sanitation is crucial for sustainable development and optimal health. The post-independence era had unparalleled proliferation of urban slums in India, attributed to swift rural-urban migration, urban economic restructuring, and the extension of cities into peri-urban areas. Urban sanitation in India intricately linked to rapid urbanization, population expansion, and socio-economic inequalities. Notwithstanding substantial governmental initiatives and infrastructure investments, the industry persists in contending with insufficient sanitation coverage, inadequate waste management, and the consequent health risks. This communication analyses the condition, obstacles, policy structures, technological solutions, and prospective developments for urban sanitation in India after independence.

Keywords: Urban Sanitation, The Community Development Program, Millennium Development Goals, Swachh Bharat Mission AMRUT

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INTRODUCTION

India confronts considerable sanitation issues in urban areas and metropolitan regions. Urban sanitation in India since independence has undergone a complex and multifaceted evolution, influenced by rapid demographic changes, accelerated urbanization, shifting policy paradigms, and persistent infrastructural challenges. India's urban sanitation history is comprehensive, characterized by a legacy of both initiatives and shortcomings. These experiences provide insights that can enhance the effectiveness and impact of novel policy measures. Urban sanitation in India has progressed from basic garbage disposal systems during the colonial era to more organized municipal management following independence. Initial endeavours concentrated chiefly on drainage and fundamental sewage systems in urban zone (Sharma and Singh, 2009). The 1980s and 1990s witnessed the development of targeted initiatives such as the Central Rural Sanitation Programme, which subsequently impacted urban sanitation strategies. The initiation of the Swachh Bharat Mission (SBM) in 2014 signified a fundamental transformation, prioritizing comprehensive sanitation access, behavioural modification, and infrastructural advancement. This report conducts a critical analysis of India's urban sanitation progress since Independence. It emphasizes significant advancements, factors, and challenges from the colonial era to the present day. The analysis is framed from a comprehensive public health perspective.

Technically a sanitation system must fulfil the following criteria: Gathering and segregate human waste, securely transport this garbage, and subsequently process it prior to its reuse or environmental discharge (Carr, 2001). Sanitation includes services including excreta management, solid waste disposal, and contaminated water treatment. Since the time of independence, the establishment of sanitation initiatives in India has been a primary concern for both governmental and non-governmental entities, considering the substantial obstacles the nation encounters in providing adequate sanitation access (Chandana and Rao, 2023). Historically, insufficient sanitation and ineffective waste management systems have led to many public health problems, with open defecation and water source contamination prevalent in numerous rural regions.

The purpose of urban sanitation is to mitigate health risks by effectively managing environmental factors within cities that contribute to disease and poor living conditions. In the Indian context, the significance of urban sanitation is multifaceted, as it directly influences public health, environmental sustainability, and overall quality of life. With rapid urban expansion and increasing population density, cities face mounting pressure on existing sanitation infrastructure, making the provision of clean and hygienic living conditions a persistent challenge. Inadequate sanitation systems often lead to the contamination of water sources, improper waste disposal, and the proliferation of disease vectors. Consequently, this can result in the spread of waterborne diseases such as cholera, typhoid, and dysentery, posing serious threats to public health. Moreover, poor sanitation increases healthcare expenditure, disproportionately affecting economically vulnerable

Historical Foundations of Urban Sanitation in the Indian Context

The awareness of sanitation in India has progressed over more than a century through four distinct periods, reflecting the socio-political environment of each era. The colonial era from the 1860s to the late 1940s facilitated substantial urban institutional development and generated many overlooked grassroots remnants that are essential for sanitation research and future urban planning initiatives. The public health paradigm in the early twentieth century emphasized water supply and environmental sanitation, often neglecting the management and treatment of excreta. Although still insufficient by global standards, access to piped water undoubtedly facilitated a significant reduction in the city's disease burden prior to independence. Sanitation yields substantial returns on investment for any developmental initiative; nevertheless, in India, it has largely been overlooked for most of the post-independence era. A comprehensive knowledge of the sanitary economy necessitates the examination of the seminal works created by the city's initial engineers (Chakravarti and Chatterjee). A plethora of modern archival documents reveals sanitary matters in urban historical scholarship (Kumar et al., 2011). In the past century, maintaining sanitary conditions in metropolitan areas has consistently been a problem, especially in a country with a population exceeding 1.5 billion. India confronts numerous challenges, including insufficient sanitation infrastructure, a scarcity of public toilets, and ineffective waste management procedures.

Urban India experiences a significant deficiency in infrastructure for secure garbage collection, transportation, and treatment, applicable to both on-site and networked systems (Wankhade, 2015). A significant number of urban impoverished individuals reside in congested housing conditions that present numerous health risks, including Mold, rodents, and the potential toxicity of lead paint, all of which can lead to infections, diseases, and accidents (Singh et al., 2022). To overcome the situation government has implemented several policies time to time. Sanitation policies are essential for the efficient advancement of infrastructure, waste management systems, and hygiene promotion. Governments are responsible for formulating legislation that ensure sanitation services are delivered equally and sustainably, while also adhering to environmental and public health standards. According to the Millennium Development Goals, India is obligated to ensure enhanced sanitation for at least fifty percent of its urban populace by 2015 and complete access by 2025. In light of this, the Ministry of Urban Development established the National Sanitation Policy in 2008. The National Urban Sanitation Policy recommended that state governments establish comprehensive urban sanitation policies and City Sanitation Plans at the state level (Bhagat, 2014).

Public Health Frameworks and Sanitation Policies (1947–1980s)

Initial efforts focused on establishing basic sanitation infrastructure, primarily driven by public health concerns. Urban sanitation was largely fragmented, with limited coverage and reliance on conventional sewerage systems in major cities. The focus was on water supply and drainage, with sanitation often secondary. Subsequent to independence in 1947, India had a swift demographic transition characterized by a movement from a rural-centric to an urban-centric population and a decline in mortality rates (Vyas, 1960). By 1961, over one-third of the population was urbanized, and by 2001, more than 340 million individuals resided in cities and towns. Urban death rates decreased from over 23% in the 1940s to under 1% in the early 2000s; nevertheless, urban infant mortality rates remained more than double the national average. Public health continued to be a primary purpose of planning; hence it was incorporated inside the Planning Commission. Urban planning, housing, and health intersected both the Health and Urban Planning sectors. The General Plan for Health and Medical Education, formulated by the Planning Commission during the initial five-year plan, provided additional momentum for health by asserting that it was “the most appropriate time to envision a fundamentally new approach” to health in light of the demographic transition. Between 1947 and 1980, water and sanitation initiatives were implemented,

resulting in the approval of 244 urban water supply projects, 65 urban sewerage schemes, and 228 rural water supply schemes (Chandana and Rao, 2023).

The state-defined urban system emerged, and the primary health care policy advocated for integrated multi-sectoral and multidimensional health treatments due to the inter-sectoral connections essential for achieving the Health for All objective. The initial five-year plan articulated the justification for the advancement of national programs through Urban Planning. The All-India Institute of Hygiene and Public Health identified indoor plumbing as a long-term goal in a report on Urban Health in the Calcutta Metropolitan Area, while urban sanitation received renewed focus during the revision of the fifth five-year plan. The Framework for Monitoring Basic Services, particularly regarding water delivery, facilitated the formation of the sub-sector. For the past thirty years, there has been a focus on housing, urban land development, rural-urban linkages, and recreation, which fall outside the scope of Urban Development (Shaw, 1996). Consequently, sanitary arrangements within the context of Urban Development were also delineated, and primary and secondary data on urban water supply reveal a lack of critical information at both the national and state levels. The initiative "A New Thrust into Urban Water Management" was significant for the Guidelines pertaining to Figure and Background Products. Urban Development encompassed Open Drains, House Drainage, Bathing Facilities, House-Connected Toilets, Septic Tanks, and Public Latrines; the educational and institutional sector addressed Public Awareness and Plumbing Education (Kedia, 2022).

In 1954, The Community Development Program was implemented, which represents the inaugural nationwide sanitation initiative; however, its effectiveness was curtailed by resource limitations and insufficient community involvement. The CDP is aimed to empower rural communities by promoting decentralized planning and decision-making, fostering participation from villages in the development process.

Structural Reforms, Urban Infrastructure, and Service Delivery (1980s-2000s)

During this period, India initiated substantial economic liberalization beginning in 1991, encompassing deregulation, a decrease in state control, and the promotion of private sector involvement. The reforms sought to enhance efficiency and promote growth, influencing urban governance and infrastructure development. Liberated from planning constraints of a centrally directed economy while still dependent on public funding, urban governments struggled to adopt uniform service delivery systems suited to their local realities. The changes resulted in heightened spending in urban infrastructure, including roads, water supply, sanitation, and housing. The speed and quality of infrastructure development differed significantly among cities, frequently limited by institutional capability and financial deficiencies. Decentralization initiatives aimed to empower local entities (Municipal Corporations and Urban Local Bodies) for enhanced governance; however, challenges such as insufficient budget, bureaucratic inefficiencies, and a deficiency in technical skills hindered progress. Sanitation services in urban India from the 1980s to the 2000s encountered considerable obstacles despite structural reforms. Urban local authorities, authorized by the 74th Constitutional Amendment Act (1992), were tasked with sanitation service delivery; however, constraints in budget, technical expertise, and governance hindered their performance.

The structural improvements and policy changes from the 1980s to the 2000s provide a crucial foundation for subsequent sanitation programs. Nonetheless, the period exposed considerable deficiencies in service provision, particularly for disenfranchised urban demographics. The experience underscored that decentralization and market-oriented policies were inadequate without robust institutional backing, sufficient resources, and inclusive planning to provide equitable sanitation coverage in Indian cities.

National Sanitation Campaign Programs and International Influence (2000s-Till Date)

During this phase shift from isolated infrastructure projects to integrated frameworks emphasizing community participation, decentralized governance, and public-private partnerships takes place. Key policy initiatives such as the National Urban Sanitation Policy and Swachh Bharat Mission emerged during this phase, focusing on open defecation elimination, waste management, and sewerage system improvements through combined technological, behavioural, and institutional reforms (Barnard, 2013; Singh, 2019). India has implemented five national sanitation programs since gaining independence, with the Swachh Bharat Mission-Grameen being the largest sanitation initiative globally (Seth and Jain, 2023). The 21st century signified a paradigm shift with the implementation of extensive, mission-oriented projects. The Jawaharlal Nehru National Urban Renewal Mission (JNNURM) (2005–2014) concentrated on the enhancement of urban infrastructure, encompassing sewage and solid waste management. It underscored improvements like enhanced governance, fiscal sustainability, and public-private collaborations. The Swachh Bharat Mission, initiated in 2014, represented a pivotal transformation in

India's sanitation framework. This national project aimed to eradicate open defecation, enhance solid waste management systems, and promote a culture of cleanliness in urban and rural areas (Bansal and Verma, 2020). The primary goal of the mission was to guarantee universal access to household toilets, thus enhancing dignity, public health, and environmental sustainability. By endorsing the vision of "Clean India," the Mission recognizes sanitation not only as essential to health but also as a prerequisite for national prosperity. The Swachh Bharat Mission recognizes that the lack of toilets can lead to increased health problems, chronic malnutrition, stunting, and underweight children. Progress in infrastructure provision is accompanied by an emphasis on behavior change, which the Mission considers crucial for effective sanitation access. Indeed, social networks and peer pressure can bolster sanitation practices beyond the mere provision of toilet blocks (Anand Asokan, 2017).

The program has been pivotal in the establishment of millions of toilets nationwide, markedly decreasing the incidence of open defecation. In addition to infrastructural construction, the mission has prioritized behavioural change via awareness campaigns, community engagement, and educational outreach (Chattopadhyay, 2019). The government, in partnership with local entities, non-governmental organizations, and private stakeholders, has diligently integrated sanitation as a fundamental component of India's development plan. The effort has improved hygiene standards and helped to broader socio-economic advancement by boosting quality of life and mitigating health concerns linked to inadequate sanitation.

The Atal Mission for Rejuvenation and Urban Transformation (AMRUT), initiated in June 2015, aims to enhance urban infrastructure in 500 cities, focusing on sewage and water delivery systems. This effort also focuses on improving essential urban infrastructure, stormwater drainage, green spaces, and amenities for non-motorized transport (Bittu and Rao, 2024). A cumulative investment of 82,222 crore has been allocated to 5,873 projects under the AMRUT initiative (Ministry of Housing and Urban Affairs, 2021; MOUD, 2015). The Smart City initiatives, overseen by the Ministry of Urban Development, seek to modernize urban infrastructure by incorporating advanced technologies to enhance waste management and sanitation services (Bittu and Rao, 2024).

In recent decades, India has significantly advanced its sanitation infrastructure and promoted behavioural change through many projects and regulations (Dasgupta et al., 2023). Access to sufficient sanitation services is widely seen as essential for public health and sustainable development. Current urbanization, industrialization, population expansion, and climate change impose further limitations on the provision of sanitation services and the management of sanitation infrastructure. Consequently, proactive management of sanitation and waste disposal is crucial to guarantee safe, sustainable, and sanitary access to sanitation for all. Emerging innovations are effectively addressing collective sanitation needs by improving access to sanitation facilities, enhancing sewerage management, eliminating contaminants from wastewater before disposal, and offering alternative low-cost treatment processes where conventional systems are impractical. The principal areas of innovation in sanitation encompass advanced on-site wastewater treatment, urban faecal sludge management, greywater separation and treatment, resource recovery, novel containment systems, waste-to-wealth technologies, and waste management strategies aimed at mitigating flooding. Sanitation's significance is not limited to hygiene; it is intricately linked to sustainable development. The incidence of waterborne diseases is considerably reduced by access to proper sanitation, which can be a significant public health concern, particularly in developing countries. Due to such practice India has experienced a decrease in the prevalence of diseases such as cholera, dysentery, and diarrhoea, which frequently disproportionately affect the impoverished, as a result of the improvement in sanitation. This not only improves public health but also alleviates the economic burden associated with healthcare expenses and decreased productivity.

CONCLUSION

Urban sanitation in India has experienced a significant transition propelled by governmental initiatives, technical innovations, and increasing public awareness. Despite significant advancements, ongoing difficulties in infrastructure, governance, financing, and behaviour require resolution through coordinated, inclusive, and sustainable strategies. Confronting these difficulties necessitates a comprehensive strategy that integrates infrastructural enhancement, behavioural modification programs, and regulatory reforms. Enhancing wastewater treatment, augmenting sanitation staff training, and advocating for community-driven initiatives are essential for sustainable success. Attaining universal access to clean and dignified sanitation will markedly enhance public health, environmental conservation, and equitable urban growth.

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