Urban Overcrowding and Disaster Vulnerability: Policy Gaps in Informal Housing – Evidence from Lucknow Fire Incident

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Abstract

Rapid urbanization in Indian metropolitan cities has led to the proliferation of informal settlements characterized by high population density, inadequate infrastructure, and limited regulatory oversight. These conditions significantly increase vulnerability to urban disasters, particularly fire hazards. The recent fire incident in Lucknow on 15 April 2026, which rendered over a thousand residents homeless after destroying hundreds of shanties, highlights the critical risks associated with unplanned and overcrowded settlements. This study investigates the relationship between urban overcrowding and disaster vulnerability through a case study approach, focusing on the affected settlement in any metropolitan city. The research integrates spatial assessment, policy review, and field-based observations to evaluate the existing gaps in urban planning frameworks, fire safety infrastructure, and governance mechanisms. Particular attention is given to issues such as narrow access routes, lack of emergency services, use of flammable construction materials, and absence of risk-sensitive land-use planning.

The findings reveal significant deficiencies in policy implementation, including weak enforcement of building regulations, inadequate integration of informal settlements into formal planning systems, and limited community awareness regarding disaster preparedness. Furthermore, the study identifies institutional fragmentation and reactive governance as key contributors to recurring vulnerabilities. The paper proposes a strategic framework for enhancing safety in informal housing, emphasizing inclusive planning, infrastructure upgrading, risk-informed zoning, and community-based disaster management. By addressing these policy gaps, the research aims to contribute toward building resilient urban environments and reducing disaster risks in rapidly expanding cities.

Key words : Rapid urbanization, vulnerabilities, overcrowded settlements, disaster management.

Introduction

Urbanization in India has accelerated rapidly over the past few decades, driven by rural-to-urban migration, economic opportunities, and demographic expansion. However, this growth has not been matched by adequate housing and infrastructure development, leading to the emergence and expansion of informal settlements across metropolitan regions. These

settlements, often characterized by overcrowding, substandard housing, and lack of basic services, present significant challenges to sustainable urban development.

In cities like Lucknow, informal housing has become an integral yet neglected component of the urban fabric. Typically located on marginal lands such as riverbanks, railway edges, or vacant public land, these settlements develop outside formal planning regulations. As a result, they lack proper road networks, drainage systems, water supply, and emergency access routes. The use of temporary and highly flammable materials further increases their susceptibility to hazards, particularly fires.

The fire incident Lucknow serves as a critical example of how urban overcrowding and infrastructural deficiencies can amplify disaster impacts. The destruction of hundreds of shanties and displacement of over a thousand residents underscores the urgent need to address safety concerns in informal settlements. Such incidents are not isolated but reflect systemic issues embedded within urban governance and planning frameworks.

This research aims to examine the intersection of overcrowding and disaster vulnerability in informal housing, with a focus on identifying policy gaps that exacerbate these risks. By analyzing the Lucknow fire incident through spatial, infrastructural, and governance lenses, the study seeks to highlight deficiencies in existing planning mechanisms and propose strategies for risk reduction.

The significance of this research lies in its contribution to the discourse on inclusive and resilient urban development. Addressing the vulnerabilities of informal settlements is essential not only for disaster mitigation but also for ensuring equitable access to safe living conditions. The findings aim to inform policymakers, urban planners, and stakeholders in developing proactive and integrated approaches to urban risk management. (Underhill, 2025)

Literature Review

The study of informal settlements and their vulnerability to disasters has been widely explored across disciplines such as urban planning, disaster studies, and social geography. Existing literature consistently identifies informal housing as a product of rapid urbanization, poverty, and inadequate policy frameworks, particularly in developing countries.

One of the foundational perspectives in this domain conceptualizes informal settlements as zones of **multi-dimensional vulnerability**. According to recent studies, these settlements are often located in hazard-prone areas and exhibit a combination of physical, social, economic, and environmental risks. These factors collectively increase susceptibility to disasters such as fires, floods, and earthquakes. The absence of formal infrastructure, including access roads, water supply, and emergency services, further amplifies disaster impacts.

Work on fire risk in informal settlements highlights that such risks are not merely technical but deeply embedded in **social and structural inequalities**. Disaster Studies literature argues

that disasters are shaped by vulnerability rather than hazards alone. Research by Laura Hirst and Helen Underhill emphasizes that conventional fire safety approaches focus excessively on engineering and technical solutions, often neglecting socio-cultural dimensions such as gender, power relations, and lived experiences. Their work proposes a “fire justice” framework, suggesting that vulnerability is socially constructed and unevenly distributed across populations .In the context of Indian cities, informal settlements are characterized by overcrowding, inadequate service provision, and insecure tenure. Studies on urban slums indicate that while they may offer better access to opportunities compared to rural areas, they consistently underperform in terms of basic services like sanitation, water, and electricity. This infrastructural deficit contributes significantly to health and safety risks, including fire hazards. Furthermore, high-density built forms, narrow pathways, and the use of combustible materials such as tin sheets and plastic exacerbate fire spread and limit emergency response. Another important strand of literature focuses on **urban morphology and spatial structure**. Advanced spatial analysis techniques reveal that informal settlements exhibit highly compact and irregular layouts, which restrict accessibility and ventilation. These morphological characteristics are directly linked to increased disaster vulnerability, especially in fire incidents where evacuation and firefighting access become critical challenges. (Matthew Abunyewah, 2018)

Policy-oriented research highlights significant gaps in governance and planning frameworks. Informal settlements are often excluded from formal urban planning processes, resulting in a lack of risk-sensitive land-use planning and inadequate enforcement of building regulations. Scholars argue that current approaches tend to be reactive rather than preventive, focusing on post-disaster relief instead of long-term risk reduction strategies. Recent literature also calls for **inclusive and community-based approaches** to disaster risk reduction. There is growing recognition that top-down interventions are insufficient without incorporating local knowledge, community participation, and socio-cultural dynamics. Integrating informal settlements into formal planning systems, improving infrastructure, and promoting awareness are identified as key strategies for enhancing resilience.
In summary, the literature establishes that disaster vulnerability in informal settlements is a complex outcome of spatial, socio-economic, and institutional factors. However, there remains a critical gap in translating these insights into effective policy implementation, particularly in rapidly urbanizing cities like Lucknow. This study aims to bridge that gap by linking theoretical insights with empirical evidence from the recent fire incident. (Wisner, 2004)

Research Methodology

This study adopts a **mixed-method approach** to examine the relationship between urban overcrowding and disaster vulnerability in informal settlements, using the fire incident in Lucknow (15 April 2026) as a primary case study. The methodology integrates qualitative and quantitative techniques to provide a comprehensive understanding of spatial, infrastructural, and policy-related factors.

Research Design

This study adopts a mixed-method approach to examine the relationship between urban overcrowding, informal housing, and disaster vulnerability, with specific reference to illegal encroachments in Lucknow. A case study methodology is employed, focusing on the fire-affected informal settlement (April 2026) to understand ground realities and systemic issues. Primary data is collected through structured household surveys (30–50 samples), field observations, and informal interviews with residents, municipal officials, and fire service personnel. The survey captures key variables such as occupancy density, construction typology, access to basic services, fire safety awareness, and previous disaster experiences. A physical survey is conducted to measure lane widths, identify encroached areas on roads, drains, and public land, and document building materials and spatial layout. Secondary data is sourced from government reports, planning documents, and disaster management guidelines issued by National Disaster Management Authority. Spatial analysis is carried out using GIS tools such as QGIS to map density, accessibility, and encroachment patterns. A policy review is undertaken to examine gaps in regulations related to informal settlements and illegal encroachments, focusing on issues of enforcement and integration into formal planning systems. The study further develops a vulnerability assessment framework based on physical, infrastructural, and institutional parameters. Data is analysed using both quantitative techniques (density calculations, percentage analysis) and qualitative methods (thematic interpretation of interviews). This integrated methodology enables identification of key risk factors, governance gaps, and planning deficiencies contributing to disaster vulnerability. (Kelman, 2020)

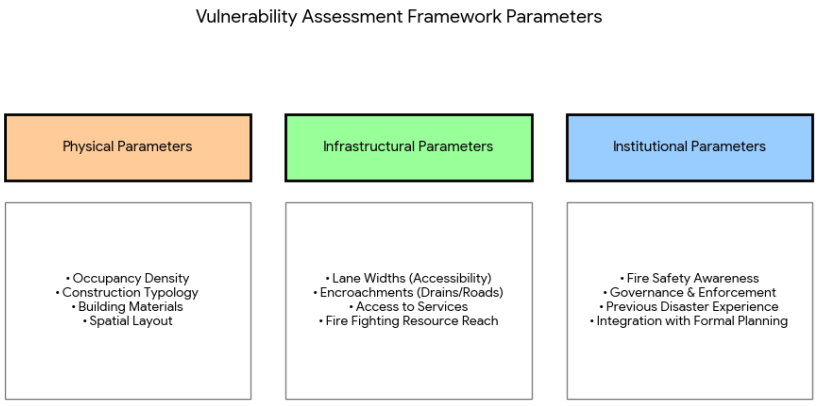

Figure 1 Vulnerability Assesment Framework Perameters

Based on the mixed-method research methodology provided, I have developed three graphical representations to visualize the study of the **Vikas Nagar informal settlement fire (April 2026)** in Lucknow. These charts illustrate the research workflow, the analytical framework, and the specific risk factors contributing to disaster vulnerability in the area.

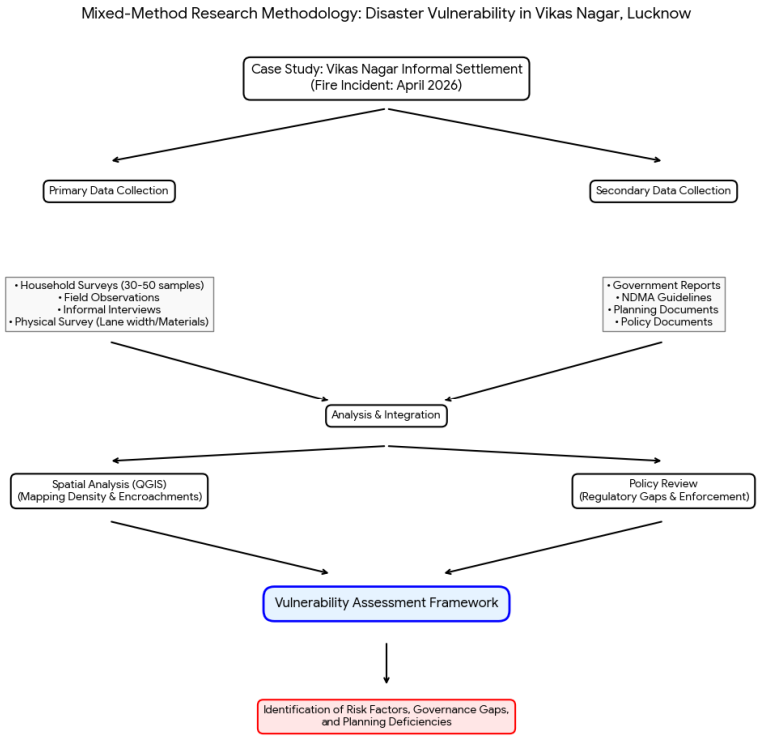

Figure 2 Mixed Methods Research Methodology: Disaster Vulnerability in Vikash Nagar Lucknow

1. Research Methodology Flowchart

This chart maps out the integrated approach, showing how primary field data (surveys and physical measurements) and secondary policy reviews feed into the spatial analysis and the final vulnerability assessment.

2. Vulnerability Assessment Framework

This diagram breaks down the three core parameters—**Physical, Infrastructural, and Institutional**—that your study uses to assess the settlement. It highlights the specific variables like lane widths, construction materials, and fire safety awareness mentioned in your text. (India., 2016)

3. Risk Factor Analysis: Vikas Nagar Settlement

Based on the case study context of the April 2026 fire in Vikas Nagar, this chart represents the key "ground reality" factors your methodology aims to capture, such as high occupancy density and illegal encroachments that hindered fire service access. (India, 2026)

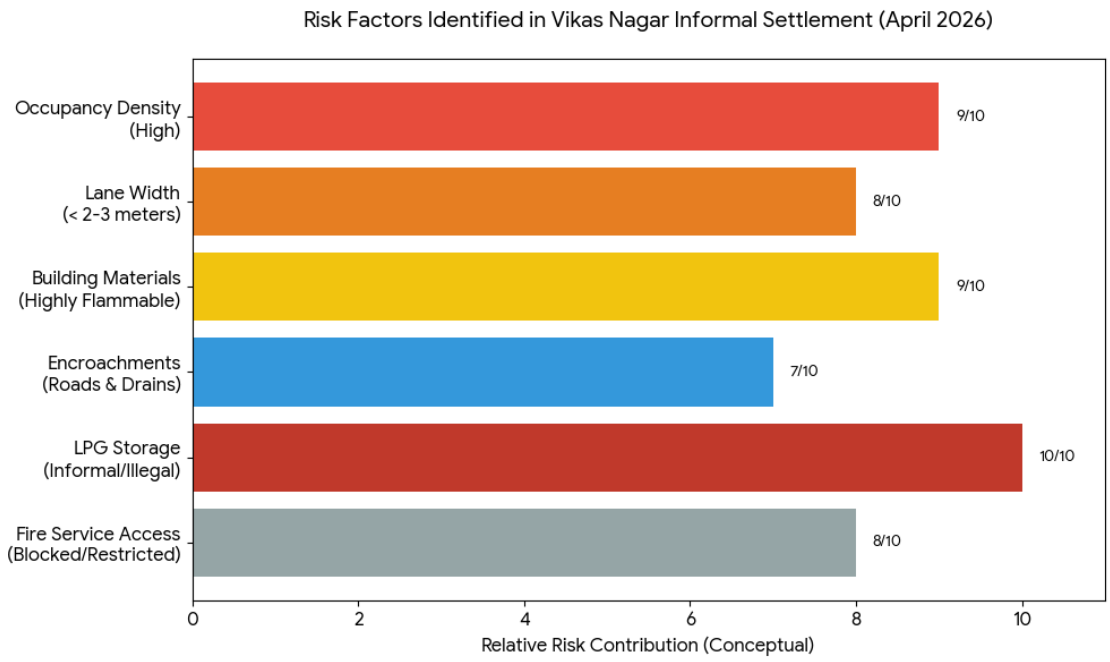

Figure 3 Graphical Representation of Risk Factor in Vikas Ngar Informal Settlement

Case Study:

Urban Overcrowding and Fire VulnerabilityLocation: Vikas Nagar Informal Settlement, Lucknow (April 2026)

1. Introduction- The Vikas Nagar informal settlement, primarily inhabited by migrant workers and daily-wage laborers, serves as a critical example of the intersection between high-density urban living and disaster vulnerability. On April 15, 2026, a catastrophic fire decimated the cluster, providing a grim backdrop for this research.

2. Site Context & Demographic Profile Location: Situated on PWD-owned land in Sectors 11 and 12, Vikas Nagar, along the Ring Road. Population Density: High-occupancy jhuggi clusters with over 280 shanties packed into a narrow land parcel. Demographics: Primarily migrant families from neighbouring districts (e.g., Barabanki); high concentration of children and elderly. Housing Typology: Non-permanent (Kutcha) structures built with highly flammable materials, including plastic sheets, bamboo, and scrap wood.

3. The Disaster Event: April 15, 2026Trigger: An electrical short circuit caused by faulty, overloaded wiring. Escalation Factors: * LPG Explosions: Nearly 50 illegally stored/mini LPG cylinders exploded, creating a "fireball" effect that made the blaze visible from 2km away. Climatic Conditions: Temperatures exceeding 40°C and strong winds accelerated the spread across flammable roofing. Impact: 2 children deceased, 300 homes destroyed, and over 1,000 people rendered homeless.

4 Application & Field Observations Following the mixed-method approach, the following "ground realities" were documented during the field survey: A. Physical & Infrastructural

Parameters Access Constraints: Lane widths were measured at less than 1.5–2 meters in most areas. Encroachments by stalls and stored waste prevented 6 fire tenders from reaching the core of the fire, forcing fire service personnel to operate from the perimeter. Construction Hazards: 90% of dwellings used "low-cost" plastic covers which, while providing immediate shelter, acted as fuel for the fire. B. Spatial Analysis (GIS Findings)Mapping Encroachment: QGIS mapping revealed that 30% of the public drain area and 15% of the adjacent road width had been occupied by informal extensions, significantly reducing the "disaster buffer zone. "Density Hotspots: Analysis showed a density of 12–15 persons per 100 sq. ft. in the worst-affected sectors. C. Institutional & Policy Gaps Lack of Integration: Interviews with municipal officials revealed that while the land is PWD-owned, the settlement was not included in formal fire safety audits or the city's master plan. Regulatory Enforcement: Policy review indicates a "governance vacuum" where illegal electricity tapping and LPG storage continue without oversight due to the informal status of the land.

Conclusion

Urban overcrowding acts as a multiplier for fire risk; what would be a localized short circuit in a planned colony becomes a settlement-wide disaster in Vikas Nagar. Encroachment-Access Paradox: Economic necessity leads residents to encroach on lanes, which directly compromises their own safety by blocking emergency services. Climate Intersectionality: High summer temperatures in Lucknow reduce the "flashpoint" of materials, making informal settlements "tinderboxes" during April–June.6. Proposed Mitigation Framework Physical: Implementation of "Fire Breaks" (widened lanes every 50m) and transition to heat-resistant, non-flammable temporary shelters (as initiated by the True Hope Foundation post-incident). Institutional: Decentralized fire response kits (sand buckets/extinguishers) managed by a community-led "Disaster Committee. "Policy: Formal recognition of informal clusters in the

Lucknow City Development Plan (CDP) to ensure basic safety infrastructure (legal electrical meters, communal LPG banks).

The case of the Vikas Nagar informal settlement in Lucknow clearly demonstrates that urban overcrowding is not merely a spatial or infrastructural issue, but a deeply embedded governance and rights-based challenge. The April 15, 2026 fire exposes how the combination of high density, unsafe construction practices, and limited institutional oversight transforms everyday risks into large-scale disasters. The study confirms that vulnerability in such settlements is systemic—arising from planning exclusion, regulatory gaps, and socio-economic marginalization rather than isolated technical failures.

A conclusion of this research is that informal settlements exist within a paradox of visibility and neglect. While they are integral to the functioning of urban economies, they remain excluded from formal planning frameworks, disaster preparedness systems, and infrastructure provisioning. This exclusion directly contributes to unsafe living conditions, as seen in restricted access routes, lack of fire safety mechanisms, and hazardous energy practices. The findings reinforce that reactive governance—focused on post-disaster relief—must be replaced with proactive, risk-informed, and inclusive urban planning strategies. ((2016), 2016)

From a legal and constitutional standpoint, the conditions observed in Vikas Nagar raise critical concerns regarding the protection of fundamental rights. Under **Article 21 of the Constitution of India**, the *Right to Life* has been expansively interpreted by the Supreme Court of India to include the right to live with dignity, which encompasses access to safe shelter, basic services, and a healthy environment. The hazardous living conditions and absence of fire safety infrastructure in informal settlements represent a failure to uphold this fundamental right.Further, **Article 14 (Right to Equality)** is implicated, as the exclusion of informal settlements from urban planning and safety frameworks creates unequal access to protection and public services. Residents of such settlements are disproportionately exposed to risks compared to those living in planned areas, highlighting systemic inequities in governance.

The research also aligns with judicial precedents such as *Olga Tellis v. Bombay Municipal Corporation*, where the Supreme Court recognized the right to livelihood as an integral part of the right to life, acknowledging that eviction or neglect of informal settlers without adequate alternatives violates constitutional protections. Similarly, planning frameworks must balance regulation with rehabilitation and inclusion. statutory mechanisms like the **Disaster Management Act, 2005** mandate risk reduction, preparedness, and coordinated response. However, the exclusion of informal settlements from formal disaster planning reflects a gap between legal provisions and ground-level implementation. This indicates the need for integrating informal settlements into city-level disaster management plans and enforcing accountability across agencies.

Therefore, the conclusion emphasizes that addressing disaster vulnerability in informal housing requires a **rights-based and legally informed approach**. Urban planning must move beyond treating such settlements as illegal encroachments and instead recognize them as legitimate habitats requiring safety, infrastructure, and governance support.

A comprehensive strategy should include:

- Legal recognition and inclusion of informal settlements in city development plans
- Enforcement of minimum safety standards without displacement
- Provision of secure tenure or transitional rights to enable infrastructure investment
- Integration of disaster risk reduction into planning policies
- Strengthening institutional accountability and coordination

Ultimately, building resilient cities is not only a matter of technical planning but also of upholding constitutional values of equity, dignity, and justice. The Vikas Nagar case underscores that without inclusive governance and legal integration, urban growth will continue to reproduce vulnerability, particularly among the most marginalized populations.

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