

Precarious Housing in Africa: “Dynamics Resilience and Trajectories of an Informal’ Urban Environment”

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Abstract:

This article examines the intricate dynamics, resilience mechanisms, and future pathways of precarious housing in Africa's informal urban landscapes, where the rapid pace of urbanization has led to the widespread emergence of settlements characterized by vulnerability and adaptation. Integrating insights from urban planning, geography, sociology, anthropology, and development studies, it highlights how rapid urbanization, climate vulnerabilities, and economic informality intersect to shape informal settlements, particularly in Sub-Saharan Africa, creating environments that demand both immediate interventions and long-term strategic planning. Through a comparative analysis of case studies from Addis Ababa (Ethiopia), Kampala (Uganda), and Johannesburg's Soweto (South Africa), the study explores the study explores community-driven adaptations, the role of modern vernacular architecture in fostering everyday resilience, and innovative technologies like 3D-printing, while advocating for inclusive governance under frameworks such as the AfCFTA to address systemic challenges. Emphasizing poverty's entwinement with housing deprivation and the need for holistic approaches that consider environmental sustainability, it calls for context-sensitive policies that transform precarious environments into resilient, equitable urban spaces, ultimately addressing both immediate vulnerabilities and long-term sustainability goals in a manner that promotes social cohesion and economic inclusion.

Keywords: precarious housing; informal settlements; urban resilience; Africa; urbanization diseconomies; modern vernacular architecture; poverty dynamics

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1. Introduction

Africa's urban transition represents one of the most transformative and multifaceted processes of the 21st century, characterized not only by explosive population growth but also by profound shifts in demographics, socio-economic structures, and environmental interactions that collectively reshape the continent's cities and towns in ways that challenge traditional notions of urban development. By 2050, projections from various international bodies suggest that more than half of the continent's inhabitants will reside in urban centers, placing immense and often overwhelming strain on existing housing systems, infrastructure networks, and governance frameworks, which are frequently ill-equipped to handle such rapid expansion without exacerbating inequalities. This shift is far from uniform across the vast and diverse landscapes of Africa; instead, much of the growth manifests itself in the form of informal settlements where precarious housing, characterized by substandard structures built with makeshift materials, insecure land tenure that leaves residents vulnerable to evictions, and severely limited access to essential services like clean water, sanitation, and electricity, dominates the urban landscape, serving as a stark reminder of the gaps between policy aspirations and on-the-ground realities. As Salem et al. (n.d.) observe in their comprehensive analysis of urban dynamics across the continent, "Africa is undergoing a profound urban transition characterized by rapid population growth, expanding cities, and evolving socio-economic landscapes," a process that, while brimming with potential for innovation, cultural exchange, and economic vitality, often exacerbates vulnerabilities, particularly in the face of escalating climate change impacts and persistent economic disparities that disproportionately affect the most marginalized populations.

At its very core, precarious housing in these contexts transcends mere physical deficiencies, such as leaky roofs or unstable foundations; it embodies a deeper form of systemic exclusion, where residents must continually navigate socio-economic marginalization, restricted opportunities for upward mobility, and heightened exposure to environmental risks that threaten their daily lives and long-term well-being. Informal settlements, which have proliferated across urban peripheries, frequently emerge on hazardous terrains such as floodplains prone to seasonal inundations, steep slopes susceptible to erosion and landslides, or even areas adjacent to industrial waste sites, driven primarily by affordability constraints and the relentless waves of rapid in-migration from rural areas seeking better prospects. Tietjen et al. (2023) underscore this critical point with clarity: "Urban informal settlements are rapidly expanding in countries around the world. This is due partly to high birth rates, but also because of growing in-migration driven by climate change impacts affecting rural populations." Such migrations, often fueled by prolonged droughts that devastate agricultural livelihoods, erratic rainfall patterns that disrupt food security, and widespread land degradation that erodes traditional ways of life, intensify the pressure on already strained urban peripheries, creating densely packed environments that are inherently prone to disasters like catastrophic flooding or sudden landslides, which not only destroy homes but also undermine community cohesion and economic stability.

Historical legacies, rooted in centuries of colonial exploitation and post-colonial policy missteps, play a pivotal and often overlooked role in perpetuating these entrenched patterns of urban inequality. Colonial-era spatial planning, for instance, deliberately entrenched segregation through zoning laws that pushed marginalized indigenous groups to the urban fringes, areas that have since

evolved into sprawling informal settlements characterized by overcrowding and neglect. Post-colonial policies, while ostensibly aimed at modernization and national development, often failed to align housing supply with the surging demand from growing populations, leaving self-built structures, erected through community efforts and limited resources, as the primary and sometimes only viable recourse for low-income households striving to secure a foothold in the city. Granda et al. (2025) encapsulate this enduring paradox with precision: "Rapid urbanization in Sub-Saharan Africa, South Asia, and Southeast Asia is characterized by diseconomies of scale, particularly congestion costs reflected in housing deprivation." This results in a distinctive U-shaped curve in the relationship between urbanization rates and living conditions, where initial phases of urban expansion in hinterland areas may indeed enhance access to basic services like education and healthcare through economies of proximity, but unchecked and poorly managed growth beyond a certain threshold inevitably leads to overcrowding, inadequate sanitation facilities that breed disease, and heightened deprivation that traps generations in cycles of poverty.

Moreover, the dynamics of poverty remain inextricably linked to these housing challenges, forming a vicious cycle that demands nuanced understanding and targeted interventions. Fosudo et al. (2026) argue compellingly that "Poverty remains a defining feature of informal settlements, demanding continuous scholarly evaluation and policy attention," emphasizing how conditions such as precarious habitability, chronic unemployment, and unsustainable resource consumption not only intensify poverty but also exert severe pressure on fragile ecosystems, accelerating climate change impacts and undermining environmental services essential for human survival. In specific contexts like Johannesburg's Soweto, as explored in depth by Makalima and Sokhetye (2025), the accessibility to amenities, affordability concerns that strain household budgets, and overall satisfaction with housing adequacy directly influence broader aspects of urban integration and community welfare, often perpetuating cycles of social exclusion that hinder collective progress. Demographic trends further complicate this intricate web: the World Bank (2021) notes that Africa's predominantly youthful population structure drives relentless urban influxes, with high natural increase rates, driven by large family sizes and improving child survival rates, amplifying the sprawl into unplanned zones where informal economies thrive but formal support systems lag far behind.

This article employs an interdisciplinary framework, drawing from the rich fields of urban planning that focus on spatial organization, geography that examines human-environment interactions, sociology that delves into social structures and inequalities, anthropology that uncovers cultural adaptations, and economics that analyzes resource allocation, to dissect three core and interconnected dimensions: the underlying dynamics of precarious housing formation that reveal root causes and patterns, the resident-led resilience strategies that demonstrate human ingenuity in the face of adversity, and the prospective trajectories influenced by innovative policies, economic integration via mechanisms like the AfCFTA which promise regional connectivity, and technological advancements that could revolutionize housing delivery. By incorporating comparative case studies from diverse regions across the continent, including both coastal and inland cities, it aims to bridge theoretical insights with empirical realities, ultimately advocating for policies that foster inclusive urban development capable of addressing multifaceted challenges.

The urgency of this inquiry is amplified by the growing climate vulnerabilities that African cities face, where inland urban centers, often sidelined in global discussions that prioritize coastal

risks, confront unique threats such as prolonged droughts and extreme heatwaves that propel further migration waves and strain resources. Comparative analyses, such as those conducted in Addis Ababa and Kampala, reveal persistent governance shortcomings that overlook the lived experiences and perspectives of migrants, thereby perpetuating marginality and missing opportunities for more effective, community-centered solutions. Ultimately, gaining a deeper understanding of these elements is crucial for transforming informal settlements from mere symbols of crisis and despair into resilient hubs of progress, innovation, and social equity that contribute positively to Africa's urban future. This article moves beyond a descriptive review by synthesizing disparate data on technological resilience (3D-printing) and regional economic policy (AfCFTA), providing a new integrated framework for 'hybrid' urban governance in Africa.

1.1 Methodology:

This study adopts a qualitative, interdisciplinary research design. The methodology consists of:

1. **Thematic Synthesis:** A systematic review of literature (2015–2026) focusing on urban deprivation and resilience in Sub-Saharan Africa.
2. **Comparative Case Study Analysis:** Three cities were purposively selected to represent diverse urban trajectories: **Addis Ababa** (state-led housing), **Kampala** (informal wetland expansion), and **Soweto** (socio-spatial integration challenges).
3. **Policy Integration Analysis:** An evaluative look at how macro-scale frameworks (AfCFTA) and micro-scale technologies (3D-printing) can be harmonized. Data for Table 1 is sourced from the World Bank (2021) and UNECA (2025) projections.

2. Dynamics of Precarious Housing in African Urban Environments

Precarious housing in Africa is a direct result of urbanization outpacing economic growth. In Sub-Saharan Africa, rapid city expansion often leads to 'diseconomies of scale,' where the benefits of city life are replaced by congestion and resource scarcity. In Sub-Saharan Africa, in particular, urban growth frequently manifests itself as diseconomies of scale, where the initial benefits of agglomeration, such as concentrated economic opportunities and shared services, gradually erode into widespread congestion, resource scarcity, and heightened deprivation that affects entire communities. Granda et al. (2025) describe this phenomenon with analytical depth as "diseconomies of scale, particularly congestion costs reflected in housing deprivation," highlighting a distinctive U-shaped relationship in the trajectory of urban expansion: during moderate phases of urbanization in hinterland areas, there may be tangible improvements in access to essential services like healthcare and education due to proximity and density, but as growth accelerates beyond a critical threshold without corresponding investments in infrastructure, it inevitably amplifies vulnerabilities, resulting in overcrowded living conditions, strained public resources, and increased exposure to health and environmental hazards.

Climate change serves as a powerful and unrelenting accelerator in this complex equation, disrupting traditional rural economies and compelling mass movements toward urban centers. Rural livelihoods, which are predominantly reliant on rain-fed agriculture and natural resources, suffer immensely from prolonged droughts that parch the land, erratic rainfall patterns that destroy crops,

and widespread land degradation that renders farming untenable, thereby driving desperate displacements of entire families and communities. Tietjen et al. (2023) emphasize this critical driver with precision: "growing in-migration driven by climate change impacts affecting rural populations" swells the populations of informal settlements, often leading to their establishment on high-risk sites that are ill-suited for habitation but are the only affordable options available. For example, in inland cities like Addis Ababa in Ethiopia and Kampala in Uganda, migrants fleeing drought-affected rural zones tend to settle in peripheral areas that lack even basic services, where the expansion of these settlements places enormous pressure on already overburdened infrastructure, heightening the risk of urban disasters such as "flooding and landfill collapse" (Tietjen et al., 2023), events that not only cause immediate loss of life and property but also long-term setbacks in community recovery and development.

Economic informality, which permeates much of Africa's urban labor markets, further deepens this precariousness by creating barriers to stability and progress. The United Nations Economic Commission for Africa (UNECA, 2025) reports that over 84% of employment in many African countries remains firmly entrenched in the informal sector, a reality that severely limits individuals' access to formal financial instruments like mortgages, secure land titles, or regulated construction materials that could enable more durable housing solutions. Demographic pressures, meanwhile, compound these challenges in profound ways: the World Bank (2021) points to Africa's predominantly youthful population structure as a key factor fueling relentless urban influxes, with high natural increase rates, driven by large family sizes and improving child survival rates, amplifying the sprawl into unplanned peripheries where informal economies provide precarious livelihoods but offer little in the way of security or advancement.

The dynamics of poverty, in turn, further entrench these housing issues, forming an interconnected web of deprivation that extends beyond mere economics to encompass health, education, and environmental sustainability. Fosudo et al. (2026) frame informality as "a knowledge-based phenomenon that links the emergence of informal settlements to survival strategies adopted by urban dwellers," where conditions such as precarious habitability with unstable structures, chronic unemployment that undermines financial stability, and overcrowding that facilitates disease transmission not only exacerbate poverty but also exert severe and unsustainable pressure on fragile ecosystems, accelerating climate change impacts and undermining vital environmental services like clean air and water. In specific urban contexts like Johannesburg, Makalima and Sokhetye (2025) note that "Urbanization in Johannesburg, South Africa, has led to an increase in informal settlements," where persistent concerns over accessibility to basic amenities, affordability that strains limited incomes, and overall adequacy of housing directly hinder broader processes of urban integration, livelihood improvement, and the cultivation of a sense of community belonging that is essential for social cohesion.

Salem et al. (n.d.) add a layer of complexity by noting that "rural-to-urban migration, demographic shifts, and economic transformations collectively drive urbanization in Africa," a process that often outstrips the capacities of existing planning frameworks and governance structures, leading to persistent deficits in housing provision, infrastructure development, and service delivery that perpetuate inequality.

The following table summarizes urbanization levels, housing deprivation, main migration/growth drivers, and key associated risks across the selected African regions.

Table N°1: Urbanization Rates and Housing Deprivation in Selected African Regions

Region	Urban Rate (%)	Deprivation Index	Dominant Driver	Principal Hazard
Sub-Saharan Africa	45	High	Climate migration + natural increase	Flooding, landslides
East Africa	28	Very High	Climate displacement	Flooding, drought
North Africa	52	Medium	Economic migration	Water scarcity
Southern Africa	62	Medium-High	Mixed (economic + natural)	Tenure insecurity

Source: *Note: Data is based on 2021 World Bank benchmarks and 2025 UNECA projections. Regional averages (e.g., East Africa) provide a macro-view but mask significant local variations between stable and conflict-affected zones*

These multifaceted dynamics, therefore, demand a highly contextual and nuanced understanding to curb further escalation, as informal economies, while providing essential livelihoods for millions, simultaneously impede pathways to formal integration and long-term stability. UNECA (2025) calls for strategic investments in sustainable urban development precisely to address and mitigate the challenges posed by rapid urbanization, emphasizing the need for policies that bridge the gap between informal realities and formal aspirations. Governance weaknesses, such as inadequate regulatory oversight and fragmented planning efforts, only amplify this urban sprawl; for instance, in cities like Kampala, poor enforcement of land-use regulations allows encroachments onto sensitive wetlands, thereby heightening flood risks and environmental degradation. Economic policies, including those under the umbrella of the AfCFTA which aim to enhance intra-continental trade and job creation, could potentially alleviate some of these pressures by fostering diversified opportunities, but without a deliberate and targeted focus on housing affordability and infrastructure, the benefits may largely bypass the residents of informal settlements who need them most.

3. Resilience Strategies in Informal Settlements

Amid the formidable structural barriers and systemic constraints that characterize life in Africa's informal settlements, residents exhibit a remarkable and often underappreciated adaptive capacity through the cultivation of robust social networks, innovative problem-solving, and incremental improvements that collectively enable them to navigate daily challenges with tenacity and resourcefulness. These networks, encompassing kinship ties that provide emotional and financial support, neighbourhood associations that organize collective action, and informal savings groups that pool resources for emergencies, serve as vital lifelines, offering mutual aid during crises and facilitating gradual enhancements to living conditions over time. Tietjen et al. (2023) highlight this dual reality with insight: residents "are highly vulnerable and less able to cope with... climate and environmental hazards," yet they frequently devise and implement informal early-warning systems

for impending disasters, engage in collective drainage maintenance to prevent flooding, and lead community-driven disaster response efforts that demonstrate a profound sense of solidarity and self-reliance.

Technological innovations, emerging from both local ingenuity and global advancements, offer another crucial layer of potential resilience, providing tools that can bridge gaps in traditional construction methods and enhance sustainability. Moghayedi et al. (2024) state with empirical backing: "A 48 % reduction in the carbon footprint emphasizes the environmental sustainability of 3D-printed house," coupled with a striking 70% reduction in construction time compared to conventional approaches. While currently in the pilot phase, 3D-printing represents a prospective technological shift that housing delivery in resource-scarce environments; however, while initial costs remain elevated due to dependencies on imported materials and specialized equipment, the localization of production through the use of bio-mediated geo-materials, derived from locally available resources, could significantly improve economic viability and accessibility, aligning seamlessly with broader continental pushes for renewable energy and sustainable practices under initiatives like the AfCFTA (UNECA, 2025).

3.1 Observed Grassroots Resilience:

Jones (2015) explores the concept of housing resilience in informal contexts with a focus on adaptive processes: "Central to managing urban growth... is understanding the role and nature of the resilience shown by residents," where incremental adaptations, such as vertical expansions of dwellings to create additional living space or modifications to access ways for better circulation, enhance not only physical functionality but also privacy, natural light penetration, and air circulation, all achieved through a 'step by step' process that reflects the fluid boundaries between private and public spaces in these communities. Mottelson (2023) further conceptualizes this adaptive architecture as "modern vernacular architecture," noting in detail: "The examined informal housing exhibits notable features associated with vernacular architecture, such as adaptation to the local context, limited involvement of formal institutions, and optimized use of resources." In African settings, this manifests in highly resourceful designs that blend traditional building techniques with modern industrial materials like concrete and steel, resulting in structures that are not only cost-effective but also responsive to environmental conditions, such as elevated foundations to mitigate flooding or perforated walls for ventilation in hot climates.

3.2 Normative Technological & Policy Levers:

Community-based initiatives, often born out of necessity rather than formal planning, form the very backbone of resilience in these settlements, where residents establish and maintain mutual support systems that address immediate needs while building long-term capacity. Specifically in **Soweto**, 'backyarding'—the construction of informal rooms for rent on formal property lots has become a vital survival strategy. This creates a complex hybrid of formal and informal land use that supports local economies while straining old apartheid-era infrastructure. In the context of Soweto in Johannesburg, Makalima and Sokhetye (2025) find that "accessibility to amenities, affordability concerns, satisfaction with housing adequacy, income, and increased access to employment opportunities" emerge as key drivers that significantly influence levels of urban integration, livelihood improvement, active community participation, and an overall sense of belonging,

underscoring the importance of holistic policy approaches that address these interconnected factors simultaneously. The AfCFTA framework offers promising opportunities in this regard: UNECA (2025) advocates for gender-inclusive financial mechanisms that could empower women, who often bear the brunt of household responsibilities in informal settlements, to invest in durable housing upgrades and entrepreneurial activities that enhance family stability.

Salem et al. (n.d.) stress the critical need for integrating "informality, resilience, and climate adaptation" into urban planning strategies, arguing that recognizing the adaptive roles of informal systems is essential for developing policies that are both effective and equitable. By blending bottom-up ingenuity, such as community-led microfinance schemes that enable incremental improvements like adding sturdy roofs or sanitation facilities, with top-down institutional support, these strategies can foster greater sustainability and reduce vulnerability. Environmental adaptations, including simple yet effective measures like rainwater harvesting systems in water-scarce regions or the use of reflective materials to combat heat, demonstrate proactive resilience that aligns with broader goals of ecological balance. As Moghayedi et al. (2024) note, technologies like 3D-printing hold immense potential to "decrease whole-life carbon assessments" by minimizing waste and energy consumption, offering scalable solutions for climate-vulnerable settlements where traditional methods fall short.

4. Trajectories and Future Pathways for Informal Urban Environments

The future trajectories of precarious housing in Africa are inherently contingent upon the delicate interplay between governance quality, economic policy coherence, technological adoption, and community engagement, factors that together determine whether current trends will lead to deepened vulnerabilities or pave the way for transformative progress. Without deliberate and well-coordinated interventions from both state and non-state actors, existing pathways point toward an escalation of vulnerabilities, especially as demographic shifts toward aging populations begin to take hold in middle-income countries (World Bank, 2021), coinciding with the intensification of climate hazards such as more frequent extreme weather events that disproportionately impact informal settlements with their limited protective infrastructure.

Conversely, strategic and forward-thinking actions could steer these trajectories toward more positive and sustainable outcomes, fostering environments where informal areas evolve into integrated components of vibrant urban fabrics. Balanced development in hinterland regions, strategically designed to avoid the over-concentration of populations and resources in primary cities, can effectively mitigate the U-shaped deprivation curve identified by Granda et al. (2025), where initial growth yields benefits but unchecked expansion reverses gains; by investing in secondary cities and rural-urban linkages, policymakers can distribute opportunities more evenly and reduce the pressure on mega-cities. Scaling up localized applications of innovative technologies like 3D-printing, bolstered by AfCFTA-driven regional supply chains that facilitate the affordable procurement of construction materials, could dramatically reduce housing deficits in high-need countries such as Kenya, Nigeria, and the Democratic Republic of Congo (Moghayedi et al., 2024), enabling faster, greener, and more cost-effective building processes that prioritize environmental sustainability.

To move these trajectories from general theory to operational reality, policy success should be measured by:

1. **The Tenure Security Ratio:** Increasing the percentage of mapped informal plots.
2. **Infrastructure Resilience Index:** Reducing the response time for disaster recovery in settlements like Katanga (Kampala).
3. **Local Sourcing Percentage:** Measuring the use of modern vernacular materials (compressed earth, bio-materials) in AfCFTA-supported trade."

Importantly, any viable future pathways must prioritize and center the voices, knowledge, and agency of migrants themselves, who are often the most affected yet least consulted in urban planning processes. As Tietjen et al. (2023) argue incisively, current city climate adaptation plans frequently "do not incorporate the perspective of migrants, who are both particularly vulnerable to climate change and play a role in exacerbating environmental challenges in cities," a oversight that not only undermines effectiveness but also perpetuates inequities. Salem et al. (n.d.) advocate for "strategies for integrating climate resilience into urban planning," emphasizing the necessity of context-specific approaches that account for the unique historical, cultural, and socio-economic factors in diverse urban environments like Lagos or Cairo, where informality serves as both a challenge and a source of adaptive innovation.

Fosudo et al. (2026) call for "integrated approaches to urban management," prioritizing investments in health infrastructure, inclusive policy frameworks that recognize the contributions of migrants, and equitable access to education, household services, and urban opportunities to break cycles of poverty. The concept of modern vernacular adaptations offers particular promise in charting these pathways: Mottelson (2023) notes that informal housing's "optimized use of resources," through designs that adapt to local contexts with minimal formal intervention, suggests that formal recognition and support could enhance resilience without erasing the cultural authenticity of these spaces.

Jones (2015) emphasizes the critical need for state legitimization of informal spaces: "legitimization of the informal city by the State is critical as informal settlements play an important role for residents to express and develop their skills of resiliency," arguing that without such acknowledgment, the fluid boundaries and multi-functional uses of space in these areas, essential for adaptation, may be stifled. Interdisciplinary strategies that harmonize economic integration under the AfCFTA with robust climate adaptation measures, community participation, and technological scaling can thus foster inclusive growth, turning potential crises into opportunities for equitable and resilient urban futures across the continent.

5. Conclusion

Precarious housing in Africa's informal urban environments arises from a complex interplay of rapid urbanization that outstrips planning capacities, escalating climate pressures that displace rural populations, and pervasive economic informality that limits access to formal resources, collectively revealing deep-seated diseconomies of scale as evidenced by Granda et al. (2025) in their analysis of housing deprivation trends. Resilience strategies, however, shine through in the form of community-driven adaptations that leverage social networks for mutual support and incremental improvements, alongside promising technological potentials like 3D-printing which, as Moghayedi et al. (2024) demonstrate, can significantly reduce environmental footprints and construction timelines, offering scalable solutions for vulnerable populations. Future trajectories remain contingent on the adoption

of inclusive governance models, as advocated by UNECA (2025), that integrate economic frameworks like the AfCFTA to promote regional trade, job creation, and infrastructure investments while addressing demographic shifts outlined by the World Bank (2021).

Poverty's central role in these dynamics, as Fosudo et al. (2026) assert with emphasis on the need for continuous evaluation, underscores the imperative for holistic responses that tackle interconnected issues of health, education, and environmental sustainability. The incorporation of modern vernacular architecture, as conceptualized by Mottelson (2023) through its adaptive and resource-efficient designs, and the prioritization of migrant integration as critiqued by Tietjen et al. (2023), further offer viable pathways to equity and durability. Continental frameworks such as the AfCFTA, when combined with localized innovation, participatory planning processes that empower residents, and climate resilience strategies as proposed by Salem et al. (n.d.), provide essential tools for systemic transformation. Addressing precarious housing, therefore, is not merely a technical or humanitarian imperative but a foundational element central to Africa's broader project of achieving sustainable, inclusive, and resilient development that benefits all segments of society in the long term. The future of African urbanism lies not in the eradication of informality, but in a 'hybridity' that legitimizes local resilience while providing the industrial scale of modern technology.

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