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## RESEARCH ARTICLE



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# On informal housing supply restrictions and livelihood in informal settlements: Implications for sustainable development

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**Abstract**

Land use restrictions can curtail housing supply and lead to increased costs of accommodation, which can have adverse effects on livelihood among low-income groups and thereby compromise sustainable development. However, limited studies have investigated housing supply restrictions in informal housing markets. To address this knowledge-gap, this article analyzes a range of indicators of livelihood among residents of informal settlements and informal housing supply restrictions in Maputo, Mozambique and Nairobi, Kenya. The findings underscore that informal urban development is restricted to a far higher extent and livelihood in informal settlements is considerably more compromised in Nairobi compared to Maputo, despite that wages are higher in Nairobi and geographic factors likely curtail urban development to a higher extent in Maputo. The empirical evidence and economic theory reviewed in this article consistently indicate that antagonistic approaches to informal urban development in cities with large segments of the population financially excluded from the formal housing markets have comparable consequences to land use restrictions guiding formal urban development. Namely, that informal land users pay a price premium for basic shelter in such contexts due to the increased pressure on the housing markets and risk of loss of investments through forced evictions. On this basis, the article argues that unless viable legal housing alternatives are available, repressive approaches to informal urban development should be abolished while less restrictive standards for building and planning regulation should be adopted to expand provision of affordable legal accommodation and thereby enhance sustainable development.

**KEYWORDS**

housing markets, housing supply restrictions, informal housing, informal settlements, land markets, land use policy, livelihood, sub-Saharan Africa

## 1 | INTRODUCTION

Today, more than one billion people reside in informal settlements typified by lack of state recognition due to contested rights to the land and construction that does not comply with building and planning

regulation (Satterthwaite et al., 2020). Informal settlement can challenge long-term sustainability as unregulated urban development and lack of state recognition can lead to undesirable living conditions such as unsafe construction, inadequate provision of basic infrastructure, and insecure tenure (Diep et al., 2021; Martins & Saavedra Farias, 2019).

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Because of these conditions, informal settlements are predominantly inhabited by low-income groups and the informal housing sector is linked to several key areas for sustainable development, such as SDG 1: No Poverty, SDG 3: Good Health and Wellbeing, SDG 6: Clean Water and Sanitation, and SDG 11: Sustainable Cities and Communities (Bolarinwa & Simatele, 2022; Özgür et al., 2021; Satterthwaite et al., 2020). However, knowledge gaps on the relation between mainstream public policy approaches to informal urban development and livelihood outcomes of residents of the informal housing sector remain critical barriers of sustainable development in contexts characterized by rapid urbanization and limited public resources to administer the urban development.

Numerous studies have documented links between housing supply and costs of accommodation. Restrictions on land use and construction can lead to decreased housing supply and thereby have adverse effects on affordability of housing (Glaeser & Gyourko, 2020). Conversely, increased housing supply moderates price increases and thus makes housing more affordable to low-income groups (Been et al., 2019). However, limited scholarly works have investigated supply restrictions in informal housing markets. To address this knowledge-gap, this article addresses the following critical questions: Do supply restrictions exist in informal housing markets? What are the key factors restricting supply in informal housing markets? And are informal housing supply restrictions linked to livelihood outcomes among residents of informal settlements?

The concept of 'informality' has origins in economics in reference to income generating activities operating with limited monitoring and regulatory control by the state (De Soto, 1989; Jenkins, 2006; Meagher, 2013). Similar to informal economies, informal settlements are populated areas that operate and develop with limited state control (Dovey, 2019; Hart, 1973). In line with these frameworks, informal housing is accommodation built without state permission typified by contested legality of the land occupation and construction that does not comply with building and planning regulation (Dekel, 2020). Informal housing largely proliferates when large segments of the population are financially excluded from the formal housing market due to unrealistic regulatory standards, poverty, high levels of urban growth, and limited state capacity to administer the urban development (Angel et al., 2016; Goytia & Lanfranchi, 2009; Jenkins & Mottelson, 2020; Kironde, 2006). In Eastern Africa,<sup>1</sup> the majority of the urban population is accommodated in informal housing, reflecting a failure of the formal housing markets to provide affordable accommodation (Angel et al., 2016; UN-Habitat, 2020). However, authorities across different countries in the region have adopted fundamentally different approaches to the informal urban development (Mottelson, 2020).

Maputo, Mozambique and Nairobi, Kenya represent two critical cases of metropolitan areas in Eastern Africa where the majority of the urban population resides in informal housing and the local authorities have adopted radically different approaches to the informal urban development. In Maputo, authorities largely accept the informal urban development (Jenkins, 2013) whereas in Nairobi, authorities have

adopted a hardline approach to the informal settlements involving regular large-scale evictions (Huchzermeyer, 2008; Manji, 2015; Mottelson, 2021b). On this background, the informal settlements are spatially dispersed over vast areas in Maputo whereas the informal settlements in Nairobi are spatially confined into small secluded enclaves (Mottelson, 2020). This has important consequences for the population densities in the informal settlements and the supply and demand of informal housing and informally owned land across the two cities. Accordingly, the two cities constitute relevant cases for analyzing links between informal housing supply restrictions and livelihood outcomes in informal settlements.

This article engages with theoretical literature on informal settlements and housing supply restrictions (see Glaeser & Gyourko, 2020; Satterthwaite et al., 2020). The analysis draws on a range of primary qualitative data collected during field work and secondary quantitative data sourced from other studies and government reports. More specifically, the article (1) reviews the literature on links between housing supply and livelihood; (2) reviews the literature on informal housing markets; (3) provides a context description of the two cities analyzed in the study; (4) presents quantitative and qualitative indicators of housing supply restrictions and livelihood in informal settlements of the two cases; (5) discusses the links between informal housing supply and livelihood based on the theory and empirical data presented in the article.

Although the majority of the population is excluded from the formal housing market in both Maputo and Nairobi, the study found (1) substantially lower proportion of informal urban land use in Nairobi compared to Maputo; (2) substantially higher population densities in the informal settlements of Nairobi compared to Maputo; (3) substantially higher proportion of informal rental housing in Nairobi compared to Maputo; (4) considerably lower levels of access to water and sanitation among residents of informal settlements in Nairobi compared to Maputo; (5) residential development is likely more constrained by geographic factors in Maputo than in Nairobi; (6) construction costs of informal housing are likely higher in Maputo than in Nairobi; (7) wages in informal settlements are higher in Nairobi than in Maputo. The multitude of indicators reviewed of both livelihood and informal housing supply restrictions thus consistently underscore that informal housing supply is more restricted in Nairobi than in Maputo (1–3), that livelihood is more compromised in informal settlements in Nairobi than in Maputo (4), and that costs of construction, wages, and geographic factors likely do not account for the restricted informal housing supply in Nairobi (5–7).

These empirical findings are consistent with mainstream economic theory on housing supply restrictions, suggesting that antagonistic approaches to informal urban development in cities with large segments of the population financially excluded from the formal housing markets have comparable consequences to land use restrictions guiding formal urban development (see Glaeser & Gyourko, 2020). More specifically, the findings suggest that residents of informal settlements in Nairobi pay a price premium for the insecure tenure conditions and that the restricted informal urban development in the city increases the pressure on the informal housing market which

<sup>1</sup>As defined by the United Nations geoscheme.

decreases affordability of informal housing. In addition, the findings suggest that higher costs of informal housing may partially account for the considerably lower levels of access to basic infrastructure in Nairobi compared to Maputo. The novelty of the analysis lies in presenting both theoretical principles and empirical evidence indicating previously undocumented links between common repressive policy approaches to informal urban development and increased poverty and compromised livelihood outcomes. Namely, that insecure tenure can lead to restricted housing supply, which increases costs of accommodation for low-income groups. This likely leads to spillover effects whereby low-income households spend a higher share of their income on securing basic shelter which leaves fewer resources for investments in infrastructure, education, and basic necessities. The relevance of the research thus extends to large parts of the global south where proliferation of informal settlements constitutes a key barrier to sustainable development.

These findings underscore that repressive approaches to informal urban development do not address the failure of the formal markets to provide broad access to legal accommodation, but can have undesirable effects on poverty and thereby sustainable development. On this background, the article argues that unless affordable legal accommodation is accessible for the general population, authorities in rapidly urbanizing contexts with limited administrative capacity should lower the standards for building and planning regulation to increase affordability of housing for low-income groups. Finally, the article discusses the efficacy of specific policy measures to attain this objective, such as introduction of junior land titles in established informal settlements, provision of small plots with leasehold titles on state owned land, and reduction of the requirements and restrictions of building codes and planning regulation on land with junior land titles and leasehold titles.

## 2 | HOUSING SUPPLY AND COSTS OF ACCOMMODATION

Price determination in housing markets generally develops dynamically towards an equilibrium reflective of the housing supply and demand (Watkins, 2001). Interregional differences in housing prices are thus in part induced by differences in housing supply and demand across markets (Gyourko, 2009). Regional increases in productivity can either lead to population growth when housing supply is increased or higher wages and house prices when housing supply is restricted (Gyourko, 2009). Heterogeneity of housing supply across space thus partially accounts for dispersion of housing prices and for regional population growth patterns (Glaeser et al., 2006). On the demand side, factors such as rising incomes and access to cheap credit can contribute to rising housing prices (Alonso, 2013; Glaeser et al., 2005). On the supply side, land use regulation restricting new construction, high costs of construction, and geographic factors limiting residential development can contribute to rising housing prices (Glaeser et al., 2005; Saiz, 2010).

Been et al. (2019) provide an overview of recent studies of the effect of housing supply on affordability and address key arguments of skeptics of such effects. The article concludes that there is substantial empirical evidence supporting that (1) land use regulations that limit construction can restrict housing supply and thereby have adverse effects on affordability of housing; (2) increasing the supply of housing moderates price increases and makes housing more affordable to low-income groups. Nevertheless, the authors argue that expanding the housing supply is important but insufficient, as government-subsidized housing is necessary to provide access to adequate housing for those with the least economic resources (Been et al., 2019).

The scholarly literature has documented how different factors can lead to restricted housing supply, such as geography (Saiz, 2010), high standards of regulation (Glaeser et al., 2005), and construction costs (Gyourko & Saiz, 2006). Saiz (2010) estimates the total developable land in US metropolitan areas based on geographic restrictions such as elevation of the terrain and water bodies. The study found that residential development is curtailed by the presence of water bodies and steep-sloped terrain. In addition, the study suggests that such geographic factors are present in many areas characterized by inelastic housing supply.

Gyourko and Saiz (2006) analyze the determinants of construction costs in the US and find that construction costs in the US today are comparable to those in 1980 in real terms. On this basis, they argue that the rise in housing prices reflects a limited supply of developable land rather than fluctuations in construction costs, while interregional differences in costs of construction are likely linked to differences in wage levels and costs of transportation of construction materials across regions (Gyourko & Saiz, 2006). Glaeser and Gyourko (2020) argue that a housing market is well-functioning if housing prices equal construction costs, as the market thus delivers housing units at their production cost. Conversely, a housing market is not functioning well if housing prices exceed the cost of production of houses. In such cases, consumers pay too high prices for housing. Only in cities with declining populations are housing prices lower than construction costs due to the limited demand (Glaeser & Gyourko, 2005). The gap between price and production cost can be understood as a regulatory tax, accounting for the externalities (Glaeser & Gyourko, 2020).

Bertaud (2018) highlights the trade-off between centrality and transportation costs. Namely, that centrally located urban areas generally are expensive due to the reduced transportation cost associated with the location while peripheral urban areas conversely are inexpensive due to the increased transportation costs associated with the location. Alonso (1964) highlights the influence of amenities on price determination of housing (e.g., clean air, good local public schools, or access to public parks may influence property prices). Accordingly, the influence of housing supply on affordability should be understood in relation to location, housing type, housing size, and amenities. Although these studies highlight important aspects of the fundamental mechanisms of price determination in housing markets, limited

scholarly works have investigated supply restrictions in informal housing markets.

### 3 | INFORMAL HOUSING MARKETS

Approximately one in eight of the global population reside in informal settlements typified by contested property rights and construction that does not comply with building and planning regulation (Satterthwaite et al., 2020; Wekesa et al., 2011). Lack of state recognition can lead to limited public infrastructure and service provision, including sewage, water, and garbage collection, which in turn can lead to compromised public health (Corburn & Sverdluk, 2019). Ultimately, the extra-legal conditions emblematic of informal settlements may lead authorities to evict the residents, resulting in loss of property and homelessness (Galiani & Schargrodsky, 2010; Talukdar, 2018). Accordingly, sustainable urban development is contingent on state recognition of the legality of settlements and informal urban development thus has critical implications for SDG 1: No Poverty, SDG 3: Good Health and Wellbeing, SDG 6: Clean Water and Sanitation, and SDG 11: Sustainable Cities and Communities (Bolarinwa & Simatele, 2022; Özgür et al., 2021; Satterthwaite et al., 2020). This is particularly relevant in the context of sub-Saharan Africa, where high urban population growth rates, limited state capacity to administer the urban growth, and high poverty rates have resulted in the majority urban population residing in informal settlements (Jenkins & Mottelson, 2020).

The informal market is able to produce accommodation at a lower cost than the formal market, as planning regulation such as minimal plot sizes can curtail provision of affordable land (Goytia et al., 2023; Kironde, 2006). In addition, formal construction permits require the involvement of specialized professionals for the provision of drawings and paperwork, while the building code specifies minimum structural dimensions, floor-to-ceiling height, and accessibility requirements which increase costs (Mottelson, 2021b). Empirical findings by Goytia et al. (2023) corroborate the crowding-out hypothesis suggesting that restrictive land use regulation can lead to lack of affordability and excess housing demand absorbed by the informal housing sector. Similarly, findings by Kironde (2006) indicate that unrealistic regulatory standards lead to duplicative costs of plot delivery and exclusionary effects on accessibility of legal accommodation in sub-Saharan Africa. Complying with building and planning regulation thus increases costs and without state-subsidized social housing, formal housing is unattainable for the majority of the urban population in sub-Saharan Africa due to insufficient economic resources (Visagie & Turok, 2020).

The formal-informal price gap reflects an equilibrium, in which the lower land prices in informal settlements are offset by a lack of property rights and consequent lack of secure investments. Formalization of land ownership thus increases the market value as the formal property rights provide protection from eviction. The increased land market values may lead to increased costs of rental housing in areas undergoing land titling, which can exclude low-income tenants from the housing market (Angel et al., 2006). Conversely, tenants of informal housing with insecure tenure pay a price-premium due to the

increased risk of loss of investments for the landlords (Talukdar, 2018). Authorities that evict informal settlements in contexts where large segments of the population lack access to formal housing thus risk raising the costs of accommodation for those with the least economic resources (Bromley, 2009). Accordingly, solitary land titling approaches nor evictions address the inadequacy of the building and planning regulatory framework to enable provision of legal affordable accommodation at a scale consistent with the demand.

Gulyani et al. (2014) study household conditions in so-called 'slums' in Dakar, Senegal, and Nairobi, Kenya and report that location, amenities, and quality and size of housing are primary determinants of costs of rent. The study thus corroborates the Spatial Equilibrium Model (see Samuelson, 1952), as well as previous studies on location and amenities (see Alonso, 1964; Bertaud, 2018), underscoring that informal land markets work similarly to formal land markets. Significant inter-city differences in quality and price of accommodation were found in the study but not accounted for (Gulyani et al., 2014). Similarly, Mottelson (2020) as well as Mottelson and Venerandi (2020) reported significant inter-city differences in terms of indicators of livelihood in the informal housing sector across different major African cities and suggested that variations in supply of informal land induced by different government attitudes towards informal urban development can contribute to unequal livelihood among low-income groups. Although a possible link between housing supply restrictions in informal housing markets and livelihood outcomes among residents of informal settlements has been hypothesized, the underlying mechanisms remain underexplored, theoretically and empirically. The present study addresses this knowledge gap by analyzing a variety of livelihood indicators and informal housing supply restrictions in Maputo, Mozambique, and Nairobi, Kenya.

### 4 | CONTEXT: NAIROBI AND MAPUTO

Maputo and Nairobi are respectively the capitals of Mozambique and Kenya as well as the cultural, economic and political centers of each of the countries. Maputo and Nairobi were chosen as cases for the study as both cities are located in Eastern Africa (see Figure 1) and characterized by large urban populations, high population growth rates, and majorities residing in informal settlements similarly to many other major cities in the region (UN-Habitat, 2018). In addition, informal settlements in Nairobi occupy only around 1% of the total area while informal settlements in Maputo occupy almost 30% of the land (Mottelson, 2020). This has direct consequences for the population densities of the informal settlements and the competition on the informal land market and thus underscores the relevance of a comparative study on informal housing supply restrictions in the two cities. This section provides a short overview of the historical developments of Maputo and Nairobi and discusses the commonalities and differences of the two cities with an emphasis on informal urban development.

Mozambique gained independence from Portugal in 1975, following a 10-year period of militant conflict as the dictatorship that ruled

**FIGURE 1** Overview of the regional location of Nairobi, Kenya (1) and Maputo, Mozambique (2). [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com/doi/10.1002/sd.2611)]



Portugal after the Second World War did not withdraw from its African colonies (Henriksen, 1978; Wantchékon & García-Ponce, 2013). Following independence, the Marxist-Leninist Mozambican Liberation Movement (FRELIMO) took power. However, the country was afflicted by a lengthy civil war (1975–1994), in which FRELIMO supported by the Soviet Union fought against the Mozambican National Resistance (RENAMO) supported by Apartheid South Africa and the United States engaging in a proxy-war (Henriksen, 1978; Wantchékon & García-Ponce, 2013). After the civil war, Mozambique entered a period of relative stability and high economic growth rates under continued FRELIMO single-party governance. However, more recent high-level corruption scandals, as well as ethnic, religious, and political violence have compromised the stability of the country. On this background, Mozambique remains one of the poorest countries in the world and GDP per capita is 1229 USD (Macuane et al., 2018; Morier-Genoud, 2020; Our World in Data, 2022).

Kenya gained independence from the United Kingdom in 1963, following the Mau Mau rebellion in 1952, which compelled the British to give political concessions, allowing the first elections to the Legislative Council in 1957 (Newsinger, 1981). After independence,

the Kenya African National Union (KANU) party took power under President Jomo Kenyatta and consolidated the control of the country in the 1960s and 1970s through autocratic means (Amutabi, 2003). Human rights abuses and single-party rule continued through the 1980s under Daniel Moi, until 1991 when Kenya transitioned to a multiparty political system. Although elections have often been marred by ethnic and political violence since then, Kenyan economy has had a stable growth the past 20 years and GDP per capita is 4220 USD (Mueller, 2011; Our World in Data, 2022).

The urban center of Maputo was established in 1781 by Portuguese colonialists on a peninsular on the southeast African coast facing the Indian Ocean to the west and the estuary of the Mbuluzi River to the south (Jenkins, 2000). In 1898, Maputo (then Lourenço Marques) superseded Ilha de Moçambique as the capital of Mozambique. After independence, informal settlements proliferated in the city as the municipality lacked resources to administer the comprehensive rural to urban migration instigated by the ongoing civil war and the abolishment of restrictions on the movement of people (Jenkins, 2000). All Mozambican land was nationalized subsequent to independence and individuals cannot own or sell land to this day (Sidaway, 1993). Instead, individuals can be granted the right to the land (Carolini,





**FIGURE 2** The continuous informal unplanned urban fabric surrounding the center of Maputo stretches towards the horizon seen from Polana Caniço A, district KaMaxakeni. The lack of distinctive land use boundaries suggests a lack of enforcement of urban regulation. [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

2017). Long-term residents of informal settlements can obtain rights to the land (Silva, 2016). However, the majority of the population lacks the resources to obtain such rights due to the complexity of the law and the requirements of documentation (Carolini, 2017). The total population of the greater Maputo metropolitan area is approximately 3 million and the annual population growth is approximately 5% (Mottelson, 2021a). The continuous urban fabric stretches across Maputo Municipality, Matola Municipality, Marracuene, and Boane districts (Mottelson, 2021a). The authorities generally neglect or de facto accept the extra-legal conditions of the informal settlements as no large-scale evictions have been carried out and limited efforts are made to curb the informal urban development (Mottelson, 2020). Consequently, informal settlements proliferate and develop with limited enforcement of regulation and there is a continuous belt of informal settlements stretching around 30 kilometers to the north and west of the city center (see Figure 2) (Jenkins & Mottelson, 2020).

Nairobi was established as a rail depot along the Kenya–Uganda railway in 1899 by the colonial authorities in British East Africa (Boedecker, 1936). In 1907, Nairobi superseded Mombasa as the capital of the East Africa Protectorate. Independence was followed by rapid developments of urbanization and lack of capacity to administer the urban growth through formal and planned urban development (Mundia, 2017). The urbanization was in part induced by the abolishment of previous legal and administrative restrictions of movement of people. Today, Nairobi has an estimated population of 4.2 million and a high population growth rate of up 7% annually (Mundia, 2017). The government has not addressed the extra-legal status of the informal settlements and there is no legal framework concerning formalizing informal settlements (Ono & Kidokoro, 2020). Notably, the government has periodically forcefully evicted and demolished informal settlements without financial compensation. The antagonistic approach to informal urban development adopted by the authorities has



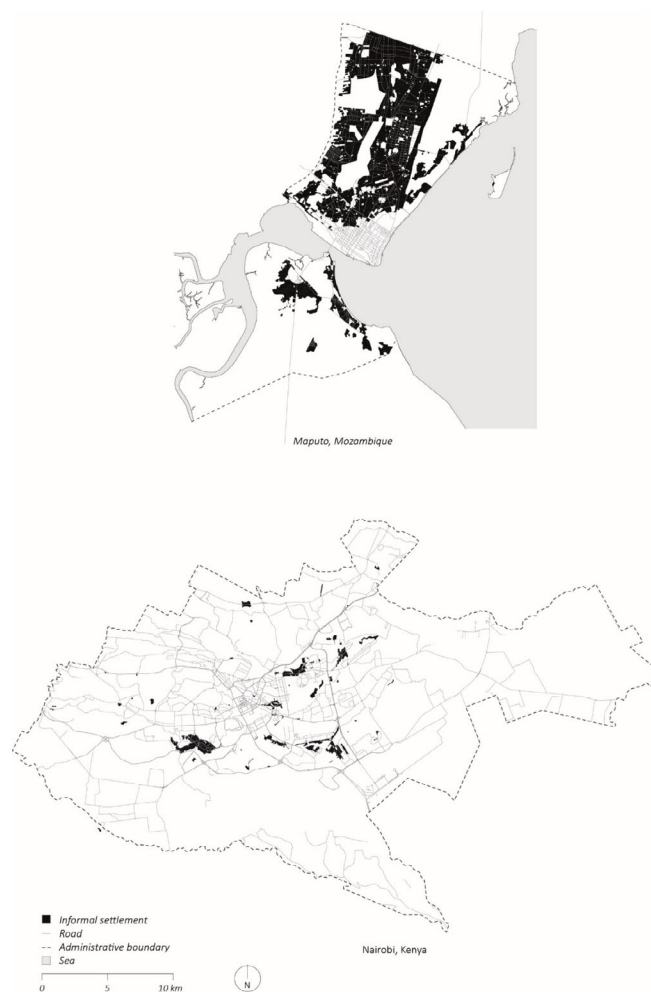
**FIGURE 3** Aerial view of Kibera and the 60-meter-wide void of desolate urban space cleared through forced evictions. The observable land use boundaries suggest that urban development outside of the informal settlement is regulated. [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

contained the informal settlements to secluded enclaves covering little of the Nairobi City County (Mottelson, 2020). One of these includes Kibera, colloquially known as the largest slum in Africa, in which authorities recently evicted 30,000 people to implement a new highway connecting a suburban neighborhood to a primary traffic artery (see Figure 3) (Mottelson, 2021b).

Despite the regional juxtaposition and comparable structural conditions (e.g., high level of rural to urban migration, high population growth rates, and poor majorities), authorities in Nairobi and Maputo have adopted fundamentally different approaches to informal urban development which are likely entrenched in the different historical developments. In Mozambique, the post-independence civil war made land use management difficult. In addition, the government identified with Marxism and may have found the infringement on private property less problematic. Furthermore, as land was nationalized, squatting did not compromise the property of landowners seeking to reclaim the land. Whereas in Kenya, the primordial state power was consolidated around a small elite that used the colonial legacy maintain a lack of formalized land rights for the majority, enabling the state to exercise control of the land (Holden & Otsuka, 2014). In addition, the policy inheritance from the United Kingdom in Kenya may have favored free market thinking (e.g., protection of private property rights) compared to Mozambique which was officially a socialist republic until 1990.

## 5 | LIVELIHOOD AND INFORMAL HOUSING SUPPLY RESTRICTIONS IN MAPUTO AND NAIROBI

This study relies on quantitative and qualitative indicators of housing supply restrictions and livelihood in informal settlements of the two cases. This includes data sourced from other studies and governments



**FIGURE 4** Informal urban land use in Maputo and Nairobi.

reports on informal land use, population densities in informal settlements, tenancy, geographic factors curtailing urban development, construction costs, and indicators of livelihood, supplied with photos from the context of each of the two cases taken by the author during fieldwork.

A wide number of studies underscore the different livelihood conditions in the informal settlements in Maputo and Nairobi. A 2012 study of 772 sampled households in low-income peri-urban informal settlements of Maputo found that almost all (97%) own their home, more than 80% have direct access to sanitation, 96% own a television, 83% own a refrigerator, and 18% own a car, while the median per capita income is 1.50 USD per day (Zuin et al., 2013). By comparison, a 2014 study of 650 households across all 13 villages in the Mathare valley of Nairobi (a major area of informal urban development in the city) found that more than 80% are tenants or renters, 88% lack direct access to clean and reliable drinking water, more than 83% do not have direct access to sanitation (over two-thirds defecate into a plastic bag and throw the bag away as access to toilets is not free), 71% had to walk more than 50 m to access a toilet, while the average income is approximately 3.4 USD per day (Corburn & Cohen, 2012; Corburn & Karanja, 2014). These findings are consistent with other

studies focusing on indicators of livelihood among residents of informal settlements in Maputo and Nairobi regarding access to water (Forjaz et al., 2006; Gulyani et al., 2012), access to sanitation (O'Keefe et al., 2015; Peal et al., 2014), income (Corburn & Cohen, 2012; Corburn & Karanja, 2014; Gulyani et al., 2014; Zuin et al., 2013), home-owner or tenant status (Jenkins, 2013; Gulyani & Talukdar, 2008), and overcrowding (Holcomb et al., 2020; Marx et al., 2013), suggesting that overcrowding, as well as inadequate access to water and sanitation is widespread in informal settlements in Nairobi and limited in Maputo despite that wages in low-income areas of Maputo are considerably lower than those in Nairobi.

A 2019 report by the Mozambican National Institute of Statistics provides information on population densities at district level in Maputo (INE (Instituto Nacional de Estatística), 2019). The highest population density in the city is found in district KaMaxakeni (sometimes spelled KaMaxaquene) with a total of 16,936 inhabitants per km<sup>2</sup>. The district is located adjacent to the formal city center and covers informal settlements exclusively, including the neighborhoods Mafalala, Maxaquene A, Maxaquene B, Maxaquene C, Maxaquene D, Polana Caniço A, Polana Caniço B, and Urbanização. All of the district area is built up aside from smaller vacant urban spaces such as football fields, so the data is not distorted by undeveloped areas. Analogously, a 2019 report by the Kenya National Bureau of Statistics provides information on population densities by neighborhood administrative areas in Nairobi (Kenya National Bureau of Statistics, 2019). Madiwa is the neighborhood with the highest population density in the city with a total of 115,550 inhabitants per km<sup>2</sup>. The neighborhood is an informal settlement surrounded by formal urban areas located in proximity to the city center. Although the neighborhood is considerably smaller than KaMaxakeni, larger and less centrally located informal settlements in Nairobi such as Kibera and Mathare have population densities exceeding 50,000 inhabitants per km<sup>2</sup>, thus confirming that the population densities in the informal settlements in Nairobi are considerably higher than those in Maputo.

A recent study provided detailed information on informal land use in Nairobi and Maputo (Mottelson, 2020). The study sourced data from the Municipal plan for Maputo and an open-source GIS database of land use Nairobi (Williams et al., 2014). The study notably found that the informal settlements in Nairobi City County cover 1.10% while informal settlements in Maputo Municipality cover 29.45% of the total area, excluding the offshore islands (see Figure 4). Since the time of the surveys, a bridge connecting the city center of Maputo and the area south of the bay (Katembe) has been constructed. Accordingly, this area which was largely undeveloped is now a growth zone of informal urban development (Jenkins & Mottelson, 2020). In addition, although Maputo Municipality is considerably smaller than Nairobi City County, had data on informal urban land use been available for the entire Maputo Metropolitan Area been available, it is likely that the proportion of informal urban land use had been higher, as the vast majority of the informal peri-urban development in the city occurs beyond the municipal limits (Jenkins & Mottelson, 2020). As the majorities of both cities reside in informal settlements, the data thus unanimously underscores that informal settlements in Maputo occupy





**FIGURE 5** Street photos of Maxaquene A, Maputo (left) and Kibera, Nairobi (right). [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com/doi/10.1002/sd.2611)]

considerably larger proportions of the administrative area compared to Nairobi, reflecting the respective laissez-faire and restrictive approaches to informal urban development (Jenkins, 2001; Talukdar, 2018).

Nairobi is located at high altitude (1464–1920 m) and the terrain is relatively sloping (Ren et al., 2020). Accordingly, geographic factors likely restrict the urban development to some extent. In addition, a large part of the county is reserved for a national park, in which urban development is prohibited (Rajé et al., 2018). Although the terrain of Maputo is relatively flat, the city is located on a peninsula partly surrounded by water. Accordingly, much of the area in proximity to the city is not developable. There is thus likely much less developable land in proximity to the city center of Maputo compared to Nairobi and geographic factors thus likely restrict the urban development in Maputo to a higher extent than Nairobi.

Although no studies have examined built densities at city level of Maputo and Nairobi, a recent study examined the urban form of sub-areas of KaMaxakeni and Kibera (Mottelson & Venerandi, 2020). The study found that the Floor Area Ratio (FAR) of the case study area in Kibera was approximately 50% higher than in the case study area in KaMaxakeni, despite that Kibera is located farther from the city center than KaMaxakeni. Accordingly, the built densities of the informal settlements in Nairobi are likely considerably higher than those in Maputo.

Although there are limited data on construction costs of informal housing in Maputo and Nairobi, there are a number of indicators suggestive of possible differences between the two cities (see Figure 5). Although, large-scale production of cement exists in both Maputo and Nairobi and both city centers are characterized by almost exclusive concrete structures, the usage of construction materials in the informal settlements differ substantially. In Maputo, almost all housing construction in the informal settlements is based on in situ cast concrete structures, hollow concrete blocks, and corrugated iron roofs cladded on light timber structures (Jenkins, 2013). In Nairobi, most housing construction in the informal settlements is based on wattle and daub (light timber construction plastered with mud) and corrugated iron roofs cladded on light timber structures (Huchzermeyer, 2008). Wattle and daub-based

construction is not seen in Maputo, as the soil is largely composed of sand and can thus not be used to plaster walls. As wattle and daub is only seen in low-income housing while more affluent groups reside in concrete structures in Nairobi (Huchzermeyer, 2008), wattle and daub is thus likely considerably cheaper and considered less desirable. It is thus likely that concrete structures are more expensive than wattle and daub structures, suggesting that construction costs of informal housing in Maputo likely exceed those in Nairobi.

## 6 | DISCUSSION

This section summarizes the findings on indicators of supply restrictions in informal housing markets and livelihood in Nairobi and Maputo presented in the previous section, underscoring that (1) livelihood is considerably more compromised among low-income groups in Nairobi compared to Maputo, despite that wages for these groups are more than twice as high in Nairobi compared to Maputo; (2) informal housing supply is considerably more restricted in Nairobi compared to Maputo. Subsequently, the section assesses potential factors accounting for differences between the two cities in terms of supply and demand of informal housing highlighted in the literature review such as total population size, costs of construction, and geographic factors. The analysis concludes that these factors cannot account for the restricted informal urban development in Nairobi compared to Maputo. Instead, the data consistently indicate that government approaches to the informal urban development account for the restricted urban development. On this background, the analysis underscores that there is both a strong empirical and theoretical basis for concluding that the differences in livelihood outcomes across the two cities are partially explained by diverging government approaches to informal urban development crucial for the informal housing supply restrictions. Finally, the article argues that unless viable legal housing alternatives are accessible for the vast majority of the population, repressive approaches to informal urban development should be abolished in favor of less restrictive regulatory standards for construction and urban development to expand provision of affordable legal accommodation (see Kironde, 2006; Kombe, 2005).

Multiple data sources suggest that informal urban development is largely restricted in Nairobi and de facto accepted in Maputo (see Corburn & Cohen, 2012; Corburn & Karanja, 2014; Mottelson, 2020; Zuin et al., 2013). This is consistently underpinned by the considerable differences between the two cities in terms of informal land use (Mottelson, 2020), population densities (INE (Instituto Nacional de Estadística), 2019; Kenya National Bureau of Statistics, 2019), and proportion of tenants in the informal settlements (Jenkins, 2013; Gulyani & Talukdar, 2008). The proportion of informal urban land use is more than 25 times higher in the administrative area of the Municipality of Maputo compared to that of Nairobi City County and these differences would likely be even higher had more recent data from Maputo and adjacent administrative areas been available (Mottelson, 2020). Similarly, the proportion of tenants in comparable urban areas are more than 26 times higher in Nairobi than in Maputo (Corburn & Cohen, 2012; Corburn & Karanja, 2014; Zuin et al., 2013) whereas the

population densities of comparable areas are more than seven times higher in Nairobi than in Maputo (INE (Instituto Nacional de Estadística), 2019; Kenya National Bureau of Statistics, 2019). High population densities in informal settlements, high proportions of tenants in informal settlements, and limited informal land use are indicative of limited access to land and therefore also of supply restrictions of land for provision of informal housing.

The total urban population size is larger in Nairobi than in Maputo, which may contribute to higher population densities in Nairobi and therefore also higher demand for housing. However, the difference in population size between the two cities is minor considering the order of magnitude of the differences observed in proportion of informal urban land use, proportion of tenants, and population densities in informal settlements. Accordingly, the differences in total urban population size cannot account for the vast heterogeneity in housing supply. Instead, there are numerous reports documenting the large-scale evictions of informal settlements in Nairobi and none in Maputo, suggesting that different government attitudes towards informal urban development likely account for these variations (Jenkins & Mottelson, 2020; Jenkins, 2013; Gulyani & Talukdar, 2010). Accordingly, the data reviewed on informal land use, population densities, and tenants consistently underscore that informal urban development is restricted in Nairobi and the population excluded from the formal housing market is thus confined to small densely populated secluded areas, whereas informal urban development is de facto accepted in Maputo and the population excluded from the formal housing market is dispersed over much greater areas in lower densities. The data thus suggest that informal land supply is vast in Maputo and restricted in Nairobi.

Multiple data sources document that livelihood of residents of informal settlements in Nairobi is considerably more compromised compared to those in Maputo (Corburn & Cohen, 2012; Corburn & Karanja, 2014; Forjaz et al., 2006; Gulyani et al., 2012; Holcomb et al., 2020; Jenkins, 2013; Marx et al., 2013; O'Keefe et al., 2015; Peal et al., 2014; Zuin et al., 2013). These are not superficial variations, considering two studies highlighted in the previous section document that direct access to sanitation is 6.7 times higher in comparable informal settlements in Maputo vis a vis Nairobi (Corburn & Karanja, 2014; Zuin et al., 2013). Similar outcomes are found concerning widespread overcrowding and inadequate household access to water in informal settlements in Nairobi (Corburn & Cohen, 2012; Corburn & Karanja, 2014; Gulyani et al., 2012; Marx et al., 2013; O'Keefe et al., 2015). By contrast, studies of the informal settlements in Maputo suggest that overcrowding and inadequate access to water and sanitation are limited (Forjaz et al., 2006; Holcomb et al., 2020; Jenkins, 2013; Peal et al., 2014; Zuin et al., 2013). The unequal livelihood outcomes across the two cities are notable, considering that GDP per capita in Kenya is more than three times as high as in Mozambique, and that wages in informal settlements of Nairobi are more than twice as high as in Maputo (Corburn & Cohen, 2012; Corburn & Karanja, 2014; Our World in Data, 2022; Zuin et al., 2013). This raises important questions on the

apparent paradox of the inverse relationship between economic resources and livelihood across the two cities.

Geographic factors, such as sloping terrain, lakes, and the sea can restrict residential development in proximity to urban centers and thereby also restrict housing supply (Saiz, 2010). Nairobi is located at a high-altitude region characterized by sloping terrain. In addition, a national park takes up a large part of Nairobi City County, in which all urban development is restricted. By comparison, the center of Maputo is located at the tip of a peninsula partially surrounded by water and more than half of the area in proximity to the city center is essentially non-developable. Although geographic factors likely curb the urban development of Nairobi to some extent, it is thus likely that such factors curb urban development in Maputo to a higher extent. Accordingly, geographic factors do likely not account for the variations in informal urban land use or population densities in informal settlements.

Construction costs can influence the cost of housing (Gyourko & Saiz, 2006). Although limited data are available on construction costs in the informal land markets in Maputo and Nairobi, it is likely that construction costs are lower in the informal settlements in Nairobi compared to Maputo. This is underpinned by the widespread wattle and daub structures in informal settlements of Nairobi and almost universal concrete structures in the informal settlements of Maputo (Huchzermeyer, 2008; Jenkins, 2013). As those with the least resources occupy wattle and daub structures, it is likely that concrete structures are considered more desirable and are more expensive. Accordingly, it is likely that construction costs of housing for low-income groups are higher in Maputo compared to Nairobi.

Supply limitations may lead to price increases in the housing market (Been et al., 2019). As there are multiple indicators suggesting that informal land supply is restricted in Nairobi (Corburn & Cohen, 2012; Corburn & Karanja, 2014; Mottelson, 2020), it is consistent with the theoretical literature on housing supply restrictions previously reviewed that the antagonistic approach to informal urban development adopted by authorities increases competition on the informal housing market and leads to higher costs of accommodation. This is underpinned by the limited informal land use, the high population densities, high proportion of tenants, and numerous reports of forced evictions in Nairobi. In addition, the price premium paid by tenants to landlords risking to lose investments in rental accommodation due to the insecure tenure conditions in the informal settlements in Nairobi may further contribute to higher costs of informal housing in the city (see Talukdar, 2018).

Increased housing supply can moderate price increases and thereby enhance housing affordability (Been et al., 2019). As there are multiple indicators suggesting that informal land supply is widespread in Maputo (Mottelson, 2020; Zuin et al., 2013), it is likely that the agnostic approach to informal urban development adopted by authorities decreases competition on the informal housing market and moderates costs of accommodation. This is underpinned by the vast informal land use, the moderate population densities, and the relatively secure tenure conditions in the informal settlements.

In much of sub-Saharan Africa, the majority of the urban populations are financially excluded from the formal housing market and the

states do not provide subsidized legal alternatives. In such contexts, government repression of informal urban development will thus decrease informal land supply analogous to land use restrictions for residential development. Restrictions of informal urban development in such contexts will thus confine the space attainable for the poor majorities and lead to higher population densities within the informal landmass. Conversely, government acceptance or negligence of the proliferation of informal urban development increases informal land supply and thus provides more space for those excluded from the formal land market, leading to lower population densities of the informal landmass. Government attitudes towards informal urban development, as well as the capacity to control it, will thus decisively influence the population densities of these areas. This will in turn influence the structural framework for the price determination on informal land and housing market based on supply and demand mechanisms. If housing supply is restricted, costs of accommodation increase. Accordingly, it is likely that the variations in livelihood outcomes of residents in informal settlements across Maputo and Nairobi are in part a result of the different government attitudes towards informal settlements in the two cities.

Repressive approaches to informal urban development do not address the failure of the formal housing markets to produce affordable accommodation at a scale corresponding to the demand in Eastern Africa. Accordingly, such approaches will likely not only fail in curbing proliferation of informal housing but also lead to more compromised livelihood for the majority of the population financially excluded from the formal housing market through restricted informal land and housing supply. In line with policy recommendations promoted by other scholars, this article argues that structural barriers for provision of affordable legal housing should be addressed such as lack of property rights, lack of approved urban plans to guide land use and construction, lack of low-cost land supply, and unrealistic regulatory standards for construction and urban development (see Kironde, 2006; Kombe, 2005; Mottelson, 2021b). On this background the following measurements may be considered in order to expand access to affordable legal housing in Eastern Africa (1) introduction of 'junior land titles' with less restrictive regulatory requirements for construction and land title acquisition in order to enable legal urban development in existing informal settlements; (2) guide urban development via standardized guidelines instead of detailed urban plans (e.g., permit construction based on maximum building heights and standardized setbacks from streets/access routes) in areas without approved urban plans in order to enable legal urban development in such areas; (3) initiate large-scale provision of small plots with leasehold titles on government held land in order to expand supply of low cost land; (4) lower regulatory requirements for construction and acquisition of construction permits for land with leasehold titles and junior titles in order to lower costs of construction.

The potential to enhance sustainable development of these recommendations lies in addressing insecure tenure by legalizing informal settlements and enabling legal urban development in existing settlements (1–2), expanding the supply of low-cost land to decrease the pressure on the market and thereby lower costs of land for low-

income groups (3); lowering regulatory requirements of construction to lower costs of legal housing provision (4). The latter could potentially be pioneered through provision of mandate to local authorities to issue construction permits for single-story housing based on standardized documents without ample requirements of further documentation. This would enable legal construction without involvement of high salaried architects or engineers, yet alleviate most negative externalities associated with unregulated urban development, such as compromised access conditions and unsafe construction. As is underscored by the literature review, these policy recommendations hold potential to address supply barriers of provision of affordable legal housing and land in urban areas of the global south where large proportions of the population reside in informal housing, thereby freeing household resources for low-income groups to invest in other purposes and ultimately support sustainable development.

## 7 | CONCLUSIONS

This article presents empirical evidence and economic theory indicating a link between supply restrictions in informal housing markets and livelihood outcomes of residents in informal settlements based on case studies of Maputo, Mozambique and Nairobi, Kenya. The study relies on primary qualitative data collected during fieldwork and secondary quantitative data sourced from other studies and government reports. The article reviews the literature on the links between housing supply and livelihood, reviews the literature on informal housing markets, provides a context description of the two cities analyzed in the study, presents quantitative and qualitative indicators of housing supply restrictions and livelihood in informal settlements of the two cases, and discusses the links between informal housing supply and livelihood based on the theory and empirical data presented in the article. Finally, the study discusses potential policy measures to mitigate the negative effects of housing supply restrictions.

Despite that the formal housing market is inaccessible to the majority of the population in both Maputo and Nairobi, the study revealed notable differences regarding land use, population densities, informal rental housing, and access to water and sanitation across the two cities. The findings consistently indicate that informal housing supply is far more restricted and livelihoods are considerably more compromised in informal settlements in Nairobi than in Maputo. The findings also suggest that the constraints on informal housing supply in Nairobi cannot be attributed to construction costs, wages, or geographic factors. Notably, the empirical evidence and economic theory presented in the article consistently indicate a link between supply restrictions in informal housing markets and livelihood outcomes of residents in informal settlements, underscoring that antagonistic approaches to informal housing without viable alternatives lead to a restricted supply of housing and higher housing costs for households with low incomes.

The article suggests that repressive approaches to informal urban development do not address the failure of the formal markets to provide broad access to legal accommodation, but can have undesirable

effects on poverty and sustainable development. On this background, the article argues that unless affordable legal accommodation is accessible for the general population, authorities in rapidly urbanizing contexts with limited administrative capacity should lower the standards for building and planning regulation to increase affordability of housing for low-income groups. The article discusses specific policy measures to attain this objective, such as the introduction of junior land titles in established informal settlements, provision of small plots with leasehold titles on state-owned land, and reduction of the requirements and restrictions of building codes and zoning laws on land with junior land titles and leasehold titles.

The original contribution of this study lies in its presentation of both theoretical principles and empirical evidence that uncover previously undocumented connections between prevailing repressive policy approaches to informal urban development and negative impacts on poverty and livelihood outcomes. Specifically, the study finds that insecure tenure can result in constrained housing supply and elevated housing costs for low-income households. This outcome can lead to spillover effects wherein a greater share of income is spent on securing basic shelter, thereby limiting resources for investments in infrastructure, education, and basic necessities which in turn can compromise sustainable development. The relevance of these findings thus extends to large parts of the global south and particularly sub-Saharan Africa, where considerable proportions of the urban populations are excluded from the formal housing market and authorities adopt repressive approaches to the informal housing sector.

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## CONFLICT OF INTEREST STATEMENT

The author declares that there is no conflict of interest.

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