

## **TITLE PAGE**

### **Title:**

Sustainable Housing through Sustainable Planning Practices: Challenges and Opportunities for formal housing provision in Nairobi, Kenya.

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## **ABSTRACT**

Rapid population growth and urbanization is a phenomenon that is characteristic of numerous cities in the global South. Nairobi, a rapidly urbanizing city in Kenya, and also the regional hub of East Africa, is no exception. This growth has resulted in enormous pressure on the city's urban infrastructure in tandem with a high demand for formal housing for the increasingly affluent residents. Historically, the trend has typically been the growth in informal settlements to meet the growing housing demand of poor and low income residents who constitute the majority of the city dwellers. However, in recent years, while the historical trend has continued unabated, the new phenomenon of a rising middle class has increased pressure on the existing limited formal housing stock. This has resulted in the rapid transformation of the extant low-rise single family housing units, mostly bungalows, to high-rise multi-family housing units, in the form of high-rise apartment blocks. This paper evaluates this transformation in housing and highlights the unsustainable way in which it is occurring as evidenced by negative externalities. It concludes with a discussion of possible strategies that could be employed to ensure more sustainable urban planning to address the need for sustainable housing. And in fostering the understanding of lifelong learning and education in healthy and sustainable cities, this chapter hopes to achieve a clearer understanding and appreciation of the fundamental issues that need to be considered, contemplated and addressed in ensuring sustainable outcomes despite the fluidity and dynamicity that accompanies change, which is inevitable in a complex system such as a city.

**Key words:** urbanization, Nairobi, housing transformation, sustainable housing, sustainable planning.

## **1. Introduction**

Rapid population growth and urbanization is a phenomenon that is characteristic of numerous cities in the global South. Nairobi, a rapidly urbanizing city in Kenya, the capital city of the country, and also the regional hub of East Africa, is no exception. In tandem with the country's rapid population growth, the city of Nairobi has experienced accelerated population growth since Kenya gained independence more than half a century ago. By the time of the 1969 census, five years after Kenya's independence, the city's population was 509,286 persons (Kenya National Bureau of Statistics [KNBS], 1969). In the 1999 census the city's population was 2,143,254 persons (KNBS, 2001), which had risen to 3,138,369 persons by the 2009 census (KNBS, 2010) – an increase of approximately 100,000 per year over the decade. The United Nations (2015) estimated the city's population to be 3.9 million in 2015 (United Nations, 2015). This growth has resulted in enormous pressure on the city's urban infrastructure as well as a high demand for formal housing for the increasingly affluent residents. Historically, the trend has typically been the growth in informal settlements to meet the growing housing demand of poor and low income residents who constitute the majority of the city dwellers. Estimates put the figure of those who live in informal settlements at 60 percent of the city's population (United Nations Human Settlements Programme [UN-HABITAT], 2003).

However, in recent years, while the historical trend has continued unabated, the new phenomenon of a rising middle class has increased pressure on the existing limited formal housing stock. Shah and Ruparel (2016) have documented the progressive increase in the middle-income population in Kenya. Their research indicates that their numbers have grown from less than three million to more than five million over a span of six years, between 2006 and 2012, and projected to increase further (Shah and Ruparel, 2016). At the same time, the

World Bank (2017) notes that Kenya's Gross Domestic Product (GDP) has maintained a steady rate above 5 per cent growth for the last four consecutive years (World Bank, 2017) indicating a thriving economy and the potential for the middle class to expand further.

Additionally, other markers of a growing middle class such as an increase in car ownership and the growth of mega Malls has been characteristic of trends in the city. And with Nairobi as both the capital and primate city of the country, it is no surprise that most of the middle class have clustered in the city and especially in areas easily accessible from the city's central business district (CBD).

This growth in the middle class has resulted in a high demand for formal housing leading to the rapid transformation of the extant low-rise single family single unit housing units, mostly bungalows, in historically well-planned and serviced neighbourhoods, to high-rise multi-family multi-unit housing units, in the form of high-rise apartment blocks up to thirteen floors in height.

The unsustainable way in which the housing is currently being produced to address the market need and demand for housing is thus the primary concern of this chapter, which seeks to not only highlight the challenges of the prevailing situation but also suggest some of the opportunities and strategies available through sustainable planning practices for pursuing the transformation of housing to meet the formal housing need in a more sustainable way that ultimately enhances the quality of life of the neighbourhood and city residents.

This chapter was informed by research undertaken to better understand the effects of rapid transformation of housing in fast growing cities in the global South. While extensive research has been undertaken on informal housing in these cities, limited scholarly work has been

undertaken to understand the dynamics of formal housing provision in this context thus limiting the scope of understanding of the complete picture of the housing situation in countries that are experiencing rapid population growth and high rates of urbanization.

And in fostering the understanding of lifelong learning and education in healthy and sustainable cities, this chapter hopes to achieve a clearer understanding and appreciation of the fundamental issues that need to be considered, contemplated and addressed in ensuring sustainable outcomes despite the fluidity and dynamicity that accompanies change, which is inevitable in a complex system such as a city and especially one fraught with contradictions and a preponderance of challenges as those in the global South.

## **2. Conceptual Approach**

Thirty years ago, the World Commission on Environment and Development (1987), chaired by Norway's former Prime Minister, Gro Harlem Brundtland presented a report titled, *Our Common Future*, or the *Brundtland report* that defined sustainable development as one, "that meets the needs of the present without compromising the ability of future generations to meet their own needs." (World Commission on Environment and Development [WCED], 1987). The report is commonly understood to have proposed a balance between the economic, the social and the environmental components of development. However, over the three decades since the release of the report, it is arguable that the economic dimension has been privileged over the social and the environmental dimensions in prevalent approaches to sustainable development. Commonly used econometric measures such as GDP, used as indicators of sustainable growth, fail to take into account the negative social and environmental consequences of many economic activities. Consequently, the positive economic measures of development, encouraged in discourses on and targeted in strategies for development, are

inadvertently leading to unsustainable development. As will be demonstrated in the subsequent discussion, the reality is no different in the case of formal housing provision in the city of Nairobi, where market-driven housing provision is seen in a positive light as helping to address the formal housing need but nevertheless has promoted the economic dimension of development to the detriment of the social and the environmental components with its inevitable unsustainable outcomes.

### **3. Methods**

To illustrate the challenges and opportunities associated with the provision of sustainable formal housing in Nairobi, this investigation made use of a case study approach that allowed for an in-depth study of a particular case in a specific area of the city. The case selected was a residential neighbourhood located in the western suburbs of the city of Nairobi. This neighbourhood, *Kileleshwa*, is part of the inner ring suburbs of the city of Nairobi and is situated only 4 kilometres from the city's central business district (CBD) making it an ideal location in which to live given its proximity to places of work both in the city centre and in the surrounding suburbs. It is an area that has experienced rapid transformation from single-family single-story dwelling units to high rise multi-family multi-story apartment blocks over the past decade. The various emergent building typologies were documented through photography and notes made from observations done during several field site visits. The data thus derived was augmented by archival review of pertinent documents on housing and urban planning issues as well as with interviews done with the various key actors involved in the process of production and consumption of the housing units such as developers, architects, contractors, various government agencies playing a regulatory role, investors, and residents occupying the apartment units either as tenants or homeowners.

#### **4. Results and Discussion**

The understanding of sustainable development, which requires a balance of the economic, the social, and the environmental dimensions (WCED, 1987), formed the basis of the analytical approach of this chapter that considered how housing is being produced and consumed in the case study context and the outcomes of these processes in relation to what would be deemed as sustainable outcomes thus forming the basis of a critique of the physical manifestation of the transformation of existing low-rise housing to high-rise housing. And since the research was largely qualitative, the perspectives of the key actors involved in the process and outcomes of transformation – the regulatory authorities, the developers and architects, and the investors and residents – also shaped the understanding of the findings.

Thus, in evaluating the processes and outcomes of housing production in the city of Nairobi, to meet a growing housing need, casting them in terms of challenges and opportunities for sustainable housing provision, illuminates more clearly some of the salient issues involved. In the discussion that follows that is the approach that is taken. The key issues concern the qualities of the infrastructure in place and the formal housing being developed.

##### **4.1 Infrastructure**

As regards infrastructure provision associated with the development of housing in the city, as illustrated in the case study area, a number of issues are apparent. This is particularly so in the case of the road network, sewage reticulation, storm water drainage, water provision, and electricity supply.

The road network in the case study area is woefully inadequate to cater for the emergent apartment blocks which rise to a height of up to thirteen floors in an area that was zoned for

single family dwelling units with an allowance for, at most, four-story apartment blocks or town houses. The challenge arises from the fact that the established road network was never designed for the increased volume associated with more families residing on three quarters of an acre where only a single family used to reside. A case in point is an amalgamated site in *Kileleshwa* where three plots that previously accommodated three families in three bungalows now hold a thirteen-story apartment block in three towers designed to accommodate 110 families each with access to at least one parking space. Thus, in a very small area, less than one hectare, the number of cars have increased almost 20-fold from a possible six to more than 100, which would in effect spill onto a road network that has maintained its original structure from the inception of the neighbourhood. The exhaust from the increased cars also contributes to air pollution thus worsening the air quality of the residential neighbourhood that is part of the western suburbs of the city historically referred to as the leafy green suburb. However, given the increasing density of the area, an opportunity exists to contemplate the development of multi-modal transit including provision for a network of bike paths, pedestrian footpaths and mass transit particularly providing buses that would transit through the area and connect it to the city centre.

Similar to the issue of an overburdened road network, is the issue of the sewerage system and water provision to the neighbourhood, as well as storm water drainage.

The current sewerage system is inappropriate for apartment development. It was built with the capacity to cater for single family dwellings some of which were connected to septic tanks. However, with the emergence of apartments, connections are being made from the apartment developments to the sewer line which is now in danger of exceeding its capacity as well as adversely impacting adjacent neighbourhoods. In some instances, some developers are



illegally connecting effluent from the apartments to a nearby stream thus adding to the pollution of Nairobi River into which the tributary eventually flows. The sewerage system ought to be expanded to meet the growing demand wrought by the development of apartments, and water harvesting features ought to be required by the regulatory authorities as part of the approval process for apartment development.

The challenges are no different regarding water supply to the apartments. To meet the shortfall from the reticulated supply by the county government, some developers have sunk boreholes, without approval from the relevant authorities who have noted that two-thirds of the boreholes sunk in the city have not been approved. This trend is bound to have an adverse impact on the city's aquifers as well as its plans for future water supply to the city. The boreholes, if required, should be regulated and planned to avoid excessive withdrawal of the aquifers, beyond the rate of replacement, as well as to alleviate the risk of building subsidence due to potential eventual draining of the aquifers.

The storm water drainage also suffers the challenge of being below capacity. The increased hard surface ground coverage, which is a direct result of the large building footprint of the apartments in addition to the paved driveways and parking lots has resulted in increased water run off during rainfall resulting in flooding in the lower area of the neighbourhood especially at the confluence of the two streams that drain the area. Consequently, property damage is experienced every time it rains, a situation that can be alleviated with an adequate drainage network. The storm water drainage needs to be expanded in order to cope with the increased water runoff and porous surface finishes ought to be encouraged to allow more water to naturally percolate into the ground and eventually into the water table.

With the advent of apartments in the neighbourhood, energy needs have also increased, especially in the form of electricity consumption. While the neighbourhood has a dedicated electrical power sub-station, it was not built with the capacity to handle the energy demands associated with high-rise apartment living with their increased energy needs per family. Consequently, frequent blackouts and power rationing are the norm in the apartment complexes in the neighbourhood. However, an opportunity does exist to require the adoption of alternative energy sources, such as the installation of solar panels for water heating, as part of the apartment development approval process. This would not only reduce the demand of electrical energy from the national grid but would also encourage a more sustainable approach to apartment housing development.

## **4.2 Housing**

The demand for housing in the city is very high. Current estimates put Kenya's housing need at between 200,000 (Habitat for Humanity, 2017) and 244,000 units per year with less than a quarter of these being produced annually (Thomson Reuters Foundation, 2017). Formal housing provision has always lagged behind the demand for housing in Nairobi. However, a growing middle class has encouraged developers and investors alike to come up with ways in which to profitably tap into the market demand. The emergent trend has seen the densification of low rise neighbourhoods close to or easily accessible to the CBD which is dominated by government and professional jobs. Consequently, the cost of land in the inner ring suburbs especially in the more affluent suburbs to the west of the city has increased exponentially over the past decade. For example, the cost of land in the case study area has increased seven-fold over a span of a decade, 2007 to 2017 (Hass Consult, 2017). Developers have thus argued for the need to build higher, even beyond the stipulated height limit in order to recoup their

returns on investment. This is the argument that they have adopted, and the city seems to have acquiesced to, to circumvent the stipulated height limit of four floors with an allowed ground coverage of 25 to 35 percent, and a plot ratio of 75 percent for the case study residential area as well as for other adjacent neighbourhoods with similar height restrictions (City Council of Nairobi, 2014).

This has driven up the cost of apartments in the western suburbs to prices that are comparable to similarly sized suburbs in the global North: The average mortgage in Kenya, which is approximately US\$ 80,000 (Central Bank of Kenya [CBK], 2015, p. 18), barely covers half the cost of the average three-bedroom apartment in the case study area. However, this has not been without consequences. Apart from affordability issues, which limits those who can afford to own apartments to those in the higher income brackets, issues of the quality of the housing units are emerging as a singular multi-faceted challenge: From the cost per square foot hence the size of the apartment, to the construction standards hence quality of the finishes, and building design hence access to daylight and open spaces, significant challenges prevail.

The size of the apartment units on offer is significantly smaller than its equivalent single family unit. This presents a significant challenge where the average family size in Kenya is 4.4 persons (KNBS, 2012) – a figure which nonetheless obscures the presence of a significant number of large households in the country. Developers use their own matrix (maximization of profit) in determining the size of the units that they engage architects to develop. The spatial requirements of the targeted residents are hardly factored in. Thus, residents are having to adapt to cramped living conditions at high cost in neighbourhoods that were historically valued for their spaciousness. The number of bedrooms such as a three-bedroom apartment,

when advertised, gives the false promise of adequate space when the reality is that the three-bedroom apartment is really in actuality the equivalent of a two-bedroom house and only just. The reduced space has a direct impact on the quality of life of the residents who have to cope with reduced personal space and less privacy. Here, though, exists an opportunity for the regulatory authorities to insist on minimum standards for the various sized apartments – studio, one-bedroom, two-bedroom, three-bedroom, or four-bedroom. This would at least ensure, at the very minimum, some value for the high investment that goes into home purchase.

In a related vein, the construction standards of the emergent apartments are wanting. It is not uncommon to encounter chipping staircases in apartments under construction – bringing to question the quality of the cement used in the concrete mixture or even the professionalism of the mixing of the concrete itself – nor is it uncommon to find poor plaster work, leaking roofs and less than satisfactory plumbing in finished apartments. The government agency mandated with assuring the quality of construction is still in its nascent years and seems to lack the capacity to inspect and enforce construction standards. Further aggravating the situation is the prevalence of untrained contractors supervising unskilled labourers on construction sites. Thus, there is a real concern for the structural integrity of the apartment units being developed in the upmarket western suburbs. Unlike the suburbs in the east of the city, the western suburbs have not experienced building collapses perhaps because the absolute minimum standards are at least being adhered to given the high cost of the apartments per square meter. However, there still exists an opportunity for higher standards of construction to be enforced to assure the sustainability of the apartment structures in the long run.

Related to the quality of construction is the issue of apartment design both in terms of form and orientation. The emergent designs do not reflect the local context. They are replicas of designs from the global North that have simply been transplanted into a context for which they were not designed nor suited. The spacing and orientation of the apartment blocks also leaves a lot to be desired. The inadequate spacing and building orientation has resulted in a majority of apartments lacking access to adequate air circulation and natural light with the result that electric lighting has to be used during the day thus adding to the energy load. Further exacerbating the situation is the prevalent use of small as well as tinted windows that contribute to inhibiting the amount of natural light admitted into the apartment interiors. The interior layouts of most apartments are also not logical in terms of the segregation of the private and more public spaces, and the external layout of apartment blocks fails to consider the need for open spaces that are necessary for communal activities and children's playing requirements. Moreover, trees that were a characteristic accompaniment of the previous bungalows that were replaced by apartments, were felled to make room for the large apartment building footprint hence resulting in the gradual development of a concrete jungle with its associated higher heat gain especially in a tropical country like Kenya. The foregoing, notwithstanding, an opportunity does exist to explore the possibility of enshrining minimum design standards especially as regards access to light, air and open space, as well as material finishes, greenery, building footprint shape, plot ratio, ground coverage, and offsets relative to property line and size.

## **5. Recommendations**

It is inevitable that rapid population growth and urbanization in the global South, which has historically had low levels of urbanization, would generate numerous challenges. But planning as a profession is well suited to grapple with emerging and future trends, and

especially as currently construed as strategic planning rather than master planning. Hence, what is perceived as a challenge in the present age could be re-considered from the point of view of an opportunity.

It is already apparent that the primarily market-driven development trends in housing production and consumption in Nairobi are resulting in numerous negative externalities. It is also not surprising that the County Government of Nairobi, the country's National Environmental Management Authority (NEMA), and the National Construction Authority (NCA) – the statutory bodies charged with the responsibility of regulating and managing the city's urban development, are struggling to stamp their authority on the emergent phenomenon. This is arguably due to the scale and rapidity of the transformation that the urban environment is undergoing as a result of the pressure wrought by the market dynamics that are funnelling enormous amounts of funds into the real estate sector. The regulatory authorities' coping with the situation by adopting the easier option of simply charging regulatory fees as part of the approval process without providing or enforcing guidelines on how the developments should occur, is a sign of lack of preparedness for the changing economic climate. However, this is no excuse for their abdicating their role. There's an opportunity to set the agenda for a more sustainable urban future by ensuring that each facet of development aligns with this goal.

From a sustainable urban planning perspective, a plethora of tools are at the disposal of the planners charged with the responsibility of shepherding a more sustainable future. Some of these include: planning for compact development; encouraging mixed use development, favouring transit oriented development over vehicle oriented structuring of the urban environment; developing multi-modal transit that encourages non-motorized mobility through

bike paths and pedestrian walkways and foot bridges; ensuring residential neighbourhoods develop as viable, cohesive, and sustainable communities with the requisite amenities in close proximity such as schools, shopping areas, markets, public parks, entertainment facilities, health facilities, recreational facilities, places of worship, and easily accessible places of work thus encouraging development towards a people-oriented live-work-play ideal, and one that caters to the much neglected social and the environmental aspects of development as well.

Sustainable housing development could be encouraged through tried and tested strategies to overcoming the emergent externalities of housing development as currently enacted. Water catchment, the use of solar panels for water heating, sewage treatment through the use of bio-digesters, use of locally available construction materials rather than the imported ones shipped in by foreign contractors and developers, use of porous and soft surface finishes to minimize the extent of hard surfaces and encourage water percolation, should all be enshrined and enforced in the building regulations. And to assure standards are adhered to, it should be required that only trained professionals are involved in all facets of the apartment construction process – from its design to its implementation. The quality of the apartment interior and exterior design layouts and form should be subject to minimum design standards for functional spatial use. The greening of the residential neighbourhoods especially through the planting of trees and other plantings should also be a requirement of the apartment development approval process. And while the development of apartment housing goes a long way in helping meet the housing need, it is important that the diversity of housing stock be preserved. There are those who can and would prefer to live in non-apartment housing if these were made available at a level of affordability. It should thus be part of the planning strategy to preserve part of the single-family neighbourhoods not only for their historical significance but also for the variety in housing options that they would then be contributing towards.

In as much as most of the above recommendations seem normative in approach, it is a necessary direction that needs to be taken considering that developers are more likely to see all the requirements required for sustainable housing, neighbourhood and urban development as an additional cost to development rather than a value addition to their investment, given their profit motive in a highly market-driven and competitive real estate environment. Regulatory authorities are best placed to ensure that sustainable development goals are achieved as a benefit of market derived investments otherwise potentially irreversible negative consequences would become characteristic features of previously well-planned residential neighbourhoods.

## **6. Conclusion**

This chapter has discussed some of the challenges and opportunities related to rapid transformation of housing in a fast-growing city in the global South. While it is limited in scope in focussing on a case study drawn from one country, it has nonetheless highlighted pertinent issues that would be relevant in an analysis of other cities in the global South that are experiencing a similar phenomenon of rapid formal housing transformation. The study is also limited to formal housing provision and does not address informal housing provision where even similar issues are of a different magnitude, scale, and dynamic. However, it contributes to research into formal housing, which has largely been overlooked in discourses on housing in the global South yet needs scholarly attention to provide a more balanced understanding of the reality of the dual housing situation in this context – the formal and the informal and the unique challenges and opportunities that this presents in addressing issues related to sustainability in an urban habitat.



An apartment is an expensive real estate investment both from the supply and consumption side of the market hence, ensuring its sustainability has to be front and centre on the list of priorities that the city sets for itself in ensuring that its residents are adequately housed. And when done sustainably, the quality of life of the residents is thus assured and so is the city's contribution to a sustainable and viable planet for human habitat.

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