

Morphological Transformation of Kileleshwa, Nairobi

Collins Sasakah Makunda* and Tom J. C. Anyamba

Received on 2nd October, 2020; Received in revised form 5th November, 2020; Accepted on 16th November, 2020.

Abstract

In this paper, we investigate the physical manifestation of ongoing urban habitat transformation in the context of a residential neighbourhood, Kileleshwa, which is located in the western suburbs of Nairobi. This is done through an analysis of the emergent morphology of the urban habitat by delving into various levels of urban resolution: the street network, the plots, and the buildings, while tracing the roots of the neighbourhood in the colonial era and its rapid change in the current millennium. In so doing, the aim was to understand the degree to which these dimensions had undergone change as a consequence of the urban transformation. The findings of the paper are that at the different levels – the street, plot, and building – a variation in transformation has occurred, with a resultant increase in the density of the urban habitat. This variation is explored in detail at these different levels of the neighbourhood's urban tissue. In shedding light on this ongoing transformation, the paper contributes to a deeper understanding of how an urban habitat has actually transformed, as manifested in its physical outcomes, which have in turn set the stage for the social transformation of the urban context.

Keywords: Apartment block, Building typology, Density, Kileleshwa, Morphology, Nairobi, Plot, Street layout, Transformation, Urban habitat.

INTRODUCTION

Morphological transformation is a feature of urban areas all over the world. However, in cities in the global South, the nature of morphological transformation is profoundly influenced by the rapid population growth and high urbanization rates currently being experienced (United Nations Department of Economic and Social Affairs (UN DESA), 2014; UN DESA, 2015).

A case in point is a city such as Nairobi, which is at the epicentre of a demographic boom. While Kenya's population in 2019 was 47.56 million persons, Nairobi's share of this population was about 10% with a population of 4.4 million persons (Kenya National Bureau of Statistics (KNBS), 2019). This represents a 40% increase or a growth by 1.26 million persons in a decade. The city also makes up one-third of Kenya's urban population (KNBS, 2019). In addition, in 2019, it accounted for 12% of the country's households with a total of 1.5 million households (KNBS, 2019).

In recent years, neighbourhoods in the capital city have manifested signs of pressure from the expanding population. One such neighbourhood is Kileleshwa, located 4 km from the Central Business District (CBD) (Hass Consult, 2016a). Historically, this was a low-density residential neighbourhood. It is part of Nairobi's suburban upmarket neighbourhoods referred to as the 'leafy green' suburbs with roots in colonial era Kenya (White, Silberman & Anderson, 1948). These are the old suburbs in the upper, western area of the city (Halliman & Morgan, 1967). They are typically known for their single-family detached dwelling units set in plots that are a quarter of an acre or more with a preponderance of mature trees. Their planning, in the colonial era, was inspired by garden city principles and the concept of the neighbourhood unit (Freund, 2007; White, Silberman & Anderson, 1948; Huchzermeyer, 2011).

From its establishment and over the intervening years up until the turn of the millennium, Kileleshwa remained fairly stable as a low-density

*Corresponding author:

Collins Sasakah Makunda, The Oslo School of Architecture and Design, Oslo, Norway.

Email: collins.makunda@aho.no

residential neighbourhood. However, the onset of the twenty-first century ushered in significant change in the urban habitat. The neighbourhood has experienced noticeable morphological transformation. In the current millennium, Kileleshwa's housing stock has been undergoing rapid transformation from single-story detached dwellings to multi-story apartment blocks. This is a process occurring conterminously with a growing middle-class (Shah & Ruparel, 2016) who are viewed by developers as the source of the demand for the apartment form of housing (Makunda & Ellefsen, forthcoming).

This study traced the historical evolution of Kileleshwa in the context of the city. While Kileleshwa is presented historically from its provenance, the primary focus was on the rapid transformation that has occurred in the neighbourhood in the opening decades of the current millennium. This transformation from a low-density neighbourhood to an emerging high-density urban habitat was tracked. This is something that has been occurring rapidly in a little over a decade. In this, the study was concerned with the morphological and typological aspects of the phenomenon. Consequently, the urban tissue of the neighbourhood was investigated. This was done by probing the key elements of its urban form: the street network, the plot pattern and density, and the building form.

THEORY

According to the International Seminar on Urban Form (ISUF), urban morphology is the study of the physical (or built) fabric of urban form, and the people and processes shaping it (ISUF, 1990). This is affirmed in a recent definition by Karl Kropf who defines it as the study of human settlements, their structure and the process of their formation and transformation (Kropf, 2017). In addition, Kropf (2017), suggests that urban tissue consists of the combination of streets, plots and buildings seen as a composite, multi-level form. Kropf (2017), proposes the foregoing elements as levels in a multi-level diagram forming a generic structure (Table 1) noting that the level of complexity of the elements increases with successive movement up a level.

TABLE 1: Levels in a multi-level diagram of a generic structure with an upward increasing level of complexity

Urban Tissue		
Streets		
Plot Series (Blocks)		Street spaces
Plots		
Buildings	Open areas	
Rooms		
Structures		
Materials		

Source: Kropf 2017

Meanwhile, Vitor Oliveira, combining urban morphology and urban form, suggests the following basic definition:

'Urban morphology means the study of urban forms, and of the agents and processes responsible for their transformation, and that urban form refers to the main physical elements that structure and shape the city – urban tissues, streets (and squares), urban plots, buildings, to name the most important,' (Oliveira, 2016).

The foregoing perspectives on urban morphology and urban form informed our investigation of Kileleshwa neighbourhood. Focus was on the built fabric of the urban form without neglecting the people and processes shaping it. Further, the approach adopted for the morphological understanding of Kileleshwa neighbourhood was inspired by approaches developed by Conzen (1969) and Rossi (1982). M.R.G. Conzen developed an approach known as a town-plan analysis (Conzen, 1969). This approach consists of three key aspects: the town plan, pattern of building forms, and pattern of land use. The town plan in turn entails the study of three key components; streets, plots, and buildings (Conzen, 1969). These components run as a common thread in the understandings of urban morphology and urban form that influenced the study. These were adopted as defining the urban tissue of Kileleshwa neighbourhood. However, while the three were germane to our study and therefore deliberately attended to, greater emphasis was placed on the latter two about which were argued the more significant degree of morphological

transformation has occurred due to market dynamics. As Zhang & Ding (2017) suggest:

‘Of these levels, the street (and street-block) is strongly interrelated with the urban structure of the entire city. This means that it is affected by urban top-down decision making and not exclusively reliant on the market, whereas the plot and the building are strongly influenced by individual developments closely related to the market’.

Furthermore, Aldo Rossi in ‘The Architecture of the City’, established architecture as a valid means of reading the city (Rossi, 1982). Hence, the relevance of the residential buildings that constitute Kileleshwa, for this study.

RESEARCH METHODS

A mixed methods approach was employed for this study. This entailed the use of a combination of both quantitative and qualitative methods that involved the collection and integration of both quantitative and qualitative data (Creswell & Creswell, 2018). A case study of a residential neighbourhood in Nairobi was undertaken, which enabled an in-depth investigation of the dynamic phenomenon of rapid urban habitat transformation.

On one hand, quantitative methods were used for obtaining empirical data on the built fabric of the case study neighbourhood. These entailed the use of photography, aerial imagery, maps and plans. They informed the spatial analysis of the physical site. A review of historical plans, land use plans and maps of the city was undertaken to detect the spatial changes in the neighbourhood over the course of the century of its existence. In addition, Google Maps, Google Earth, and other available plans of the area were studied for changes in the neighbourhood in the current millennium. The various maps and plans made it possible to analyse the degrees of transformation of the neighbourhood’s streets, plots and building footprints. During multiple site visits, the site was documented with the aid of photography. The photographs taken of the buildings in the area were then used to analyse the vertical transformation of the neighbourhood in the current millennium.

On the other hand, qualitative methods were used for obtaining data on the people and processes shaping the built fabric of the emergent urban form. These primarily involved in-depth interviews with direct and indirect agents of change (Oliveira, 2016) or key actors involved in the process of neighbourhood transformation. These were central to gaining insights into the logic of the morphology of the transforming urban habitat. The interviewees included county government officials, developers, real estate agents, planners, architects and Environmental Impact Assessment (EIA) experts. The key actors were interviewed to understand their role and perspectives in the process of neighbourhood transformation. In addition, reports by various government entities involved in the process of transformation were reviewed. The key entities in this regard were the development control department of the county government, the National Environmental Management Authority (NEMA), and the National Construction Authority (NCA). Urban commentators were also interviewed to gain insights into the ongoing process of morphological transformation.

The focus of the study was Kileleshwa neighbourhood. It was selected because it was viewed to be a paradigmatic case of rapid urban habitat transformation. It is historically a low-density residential zone in the western suburbs of the city in which the most extensive transformation of housing units from low-rise dwellings to high-rise apartment blocks has occurred in recent years. Moreover, unlike other neighbourhoods in the western and northern suburbs of Nairobi in which office developments are also emerging, Kileleshwa’s transformation has largely remained centred on the development of residential units.

Kileleshwa neighbourhood is located 4 km from Nairobi’s central business district (CBD) (**Figure 1**). It is part of the upper side of Nairobi in the western suburbs of the city. The neighbourhood’s boundaries are defined by two rivers, Nairobi River and Kirichwa Kubwa. These two rivers define the neighbourhood’s northern and south-eastern boundaries respectively. Nairobi Arboretum flanks its north-eastern border while its south, southwestern, western and northwestern border

is defined by several connecting roads: Gitanga Road, Othaya Road, Nyeri Road, Olenguruone Road and Mzinga Springs Road.

The neighbourhood is nestled between three upmarket suburban residential neighbourhoods that share its northern, western, and eastern boundaries. These are Westlands, Lavington and Kilimani neighbourhoods respectively (**Figure 2**).

According to the Nairobi City County, the map shown in **Figure 3** indicates what the local government considers to be the administrative boundaries of Kileleshwa. This demarcates an area that the county government refers to as Kileleshwa Ward. It stretches the north-western portion of the area much farther to the west. However, a note on the map suggests that the County is not an authority on the boundaries of the area.

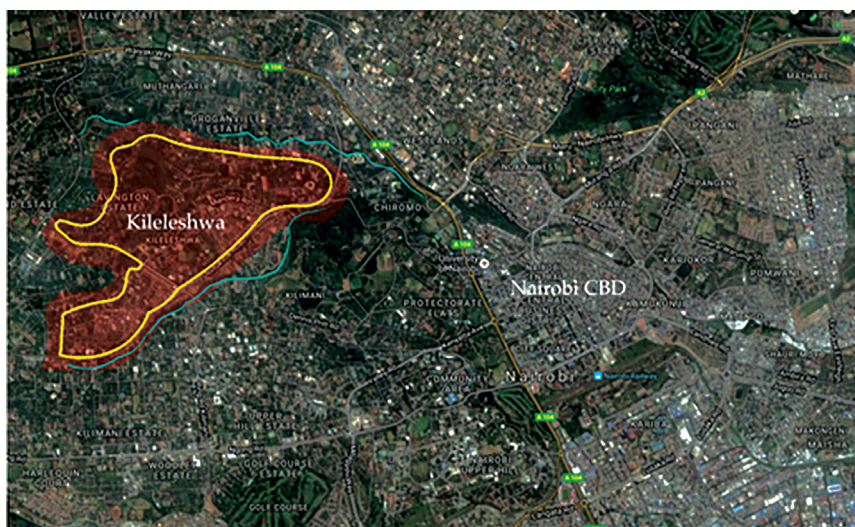


FIGURE 1

Aerial image of Kileleshwa neighbourhood showing its broadest boundary delimitation and location relative to Nairobi CBD

Source: Adapted by Authors from Google Maps 2016

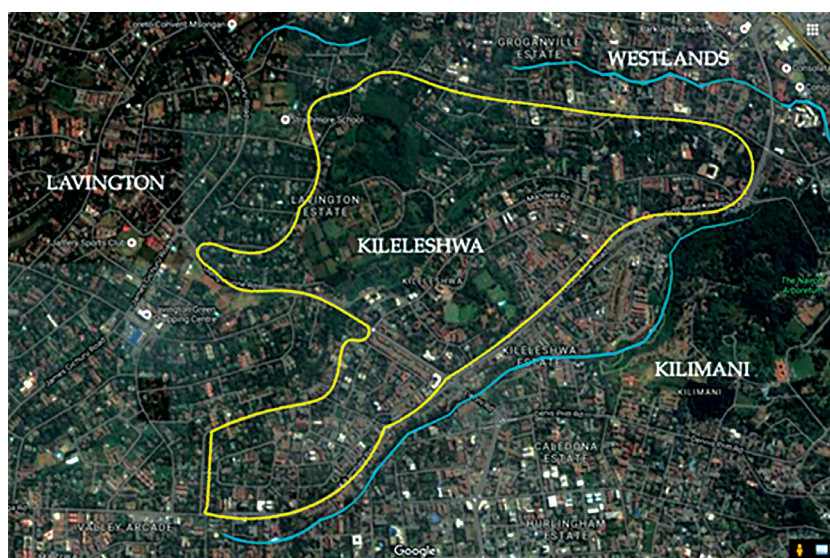


FIGURE 2

Boundary of Kileleshwa with surrounding upmarket suburban residential neighbourhoods and the two rivers along its northern and south-eastern edges

Source: Adapted by Authors from Google Maps 2016

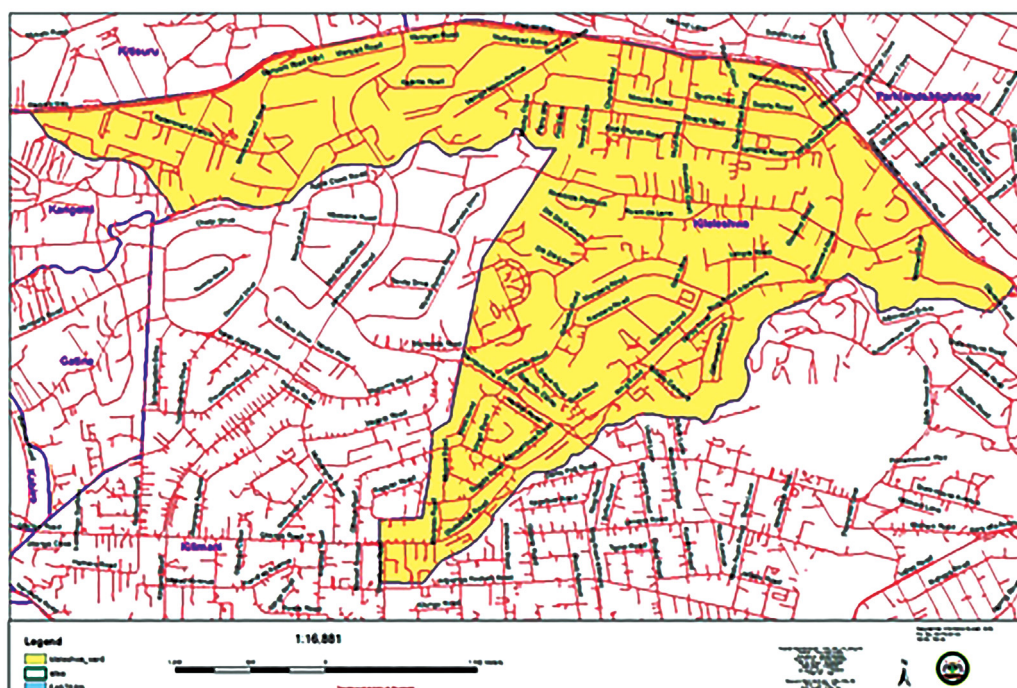


FIGURE 3

NCC boundary of Kileleshwa, Nairobi

Source: Nairobi City County Government 2016

Figure 3 differs significantly from the preceding boundary map presented earlier especially in its northern half. However, it aligns with the boundary delineation provided by Kenya's Independent Electoral and Boundaries Commission (IEBC) (Figure 4). Nevertheless, in the IEBC version, Kileleshwa is further subdivided into two sections, an upper section, referred to as Muthangari, and a lower section, referred to as Kileleshwa (Figure 4).

Since IEBC is the constitutionally mandated body with the authority to delimit the boundaries of various jurisdictions in the country (IEBC, 2020), its prescribed boundaries were adopted as the official boundary of Kileleshwa. This is an area that covers 9.1 square kilometres (KNBS, 2010a; KNBS, 2019; KNBS, 2020a).

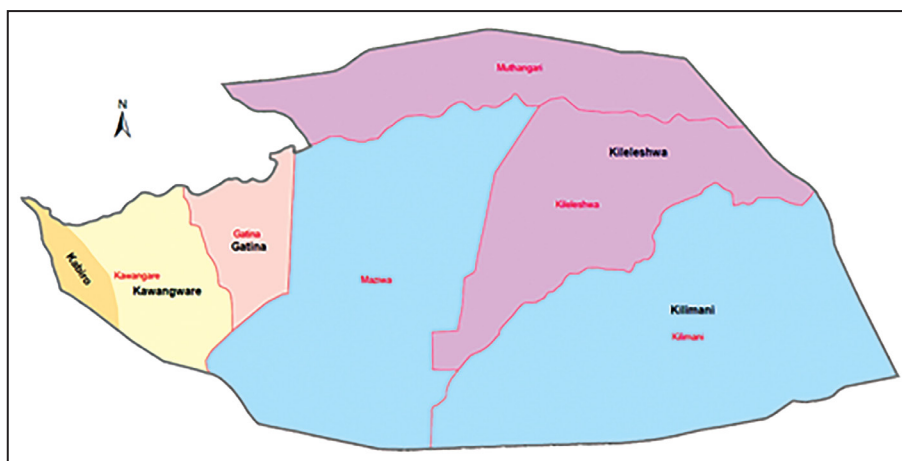
However, the study area was limited to the sub-area of Kileleshwa as depicted in the IEBC map (See area indicated as Kileleshwa in a smaller typeface in Figure 4). This sub-area covers 5.2 square kilometres (Table 9). This choice was made because the sub-area of Kileleshwa is the residential area commonly understood, by real estate stakeholders active in Nairobi, to be Kileleshwa. Real estate

reports on the state of the real estate sector make this distinction; separating it from the upper part of Kileleshwa, which is classified by the sector as Riverside (Hass Consult Ltd, 2020). Within this sub-area of Kileleshwa, the study area boundaries were delimited by two rivers – Kirichwa Dogo River (south west, west, north west and north boundary) and Kirichwa Kubwa Rivers (north east, east, and south east boundary) – in addition to two roads – Othaya Road (west boundary) and Gitanga Road (south boundary) (Figure 5).

RESULTS AND DISCUSSION

Transformation of Kileleshwa in the context of Nairobi's urban transformation

Nairobi's origins can be traced to the late 19th Century when it was established as a railway depot by British colonialists in 1899 (Halliman & Morgan, 1967). During its more than a century of existence, Nairobi has undergone significant transformation. From a railway depot at the close of the 19th Century, it is now a bustling cosmopolitan metropolis in the 21st Century. In that time period the city has been subject to no less than five formal plans (Table 2).

**FIGURE 4**

Dagoretti North Constituency showing Kileleshwa as both a ward and a sub-area (the latter adopted as the study area)

Source: Kihui 2013 based on IEBC 2012

**FIGURE 5**

Kileleshwa study area

Source: Adapted from Google Maps 2020

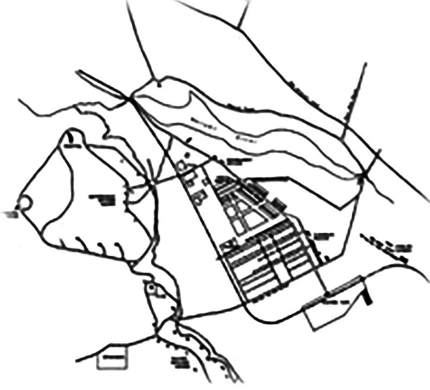




The plans were all attempts at structuring the city's land uses. While largely unsuccessful, they nonetheless succeeded in establishing the general disposition of the CBD, industrial area and the city's residential areas, especially formally designated ones such as those situated in Upper Nairobi, in which Kileleshwa is located. The city's land use indicates that less than one fifth of its area is devoted to residential use (Table 3).

The following land use map by Columbia University shows land use in Nairobi in 2008

(Figure 6) (Columbia University Earth Institute, Center for Sustainable Urban Development, 2008). Residential areas are spread throughout the city. The western suburbs are predominantly residential in use.

Figure 7 shows a map by Columbia University on building density in Nairobi in 2008 (Columbia University Earth Institute, Center for Sustainable Urban Development, 2008). High rise structures are clustered around the city's central core,

TABLE 2: Formal plans prepared for Nairobi 1898-2014

	
 <p>Master plan of 1948</p> <ul style="list-style-type: none"> Residential Neat Road Regional Road Railway Regional Path Urban Core Business & Commerce Light Industry Heavy Industry Urban Center Business & Commerce Light Industry Heavy Industry 	
 <p>LEGENDS</p> <ul style="list-style-type: none"> Urban Core Sub-Center (Old) Sub-Center (New) National Highway New Express Road Main Road Railway 	<p>A: Plan for a Railway Depot (1898) by Arthur F. Church B: Plan for a Settler Capital (1927) by F. Walton Jameson & Eric Dutton C: Master plan for a Colonial Capital (1948) by White, Silberman & Anderson D: Metropolitan Growth Strategy (1973) by Gupta & Monson E: Proposed Structure Plan for Nairobi (2014) by JICA Study Team</p>

Source: Compiled by Authors from Mills 2012; Rahbaran & Hertz 2014; NCC & JICA 2014

TABLE 3: Land use distribution in Nairobi

Land Use	Area (sq. km)	Area (%)
Residential	105.2	15.1
Commercial	5.9	0.8
Industrial	22.2	3.2
Mixed Commercial & Industry	3.6	0.5
Mixed Residential & Commercial	4.2	0.6
Institutional	39.8	5.7

No structures*	0.3	0.0
Open space**	332.0	47.8
Recreational	8.7	1.3
Res slum***	7.8	1.1
Transportation	15.5	2.2
Unknown****	42.3	6.1
Water	10.9	1.6
Total	598.2	86.1
National Park	96.9	13.9
Grand Total	695.1	100.0

* This appears to refer to land without any man-made forms but not designated as open space or recreational

** This is land not designated to have any buildings but also not classified as recreational

*** This refers to the areas in which slums are located

**** This is unclassified land whose use does not seem to have determined

Source: Adapted from NCC & JICA 2014

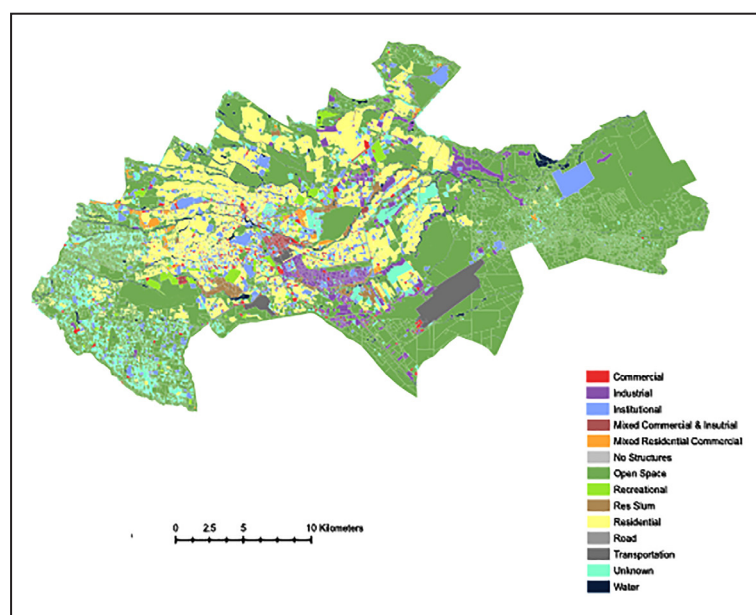


FIGURE 6

Nairobi land use map

Source: Columbia University Earth Institute, Center for Sustainable Urban Development 2008

commercial zones in the inner peripheral areas, and the eastern residential suburbs of the city.

The city's road network (**Figure 8**) defines the structural disposition of the city. Major roads radiate from the heart of the city- its CBD- to various parts of the city.

Over the course of the century, the city's population has exploded from 11,000 in 1906 to a population of 4.4 million in 2019 (**Table 4**) (KNBS, 2019).

However, despite the tremendous growth that the city has experienced and the formal plans that have been made to guide the city's development, the urban transformation of Nairobi has been largely

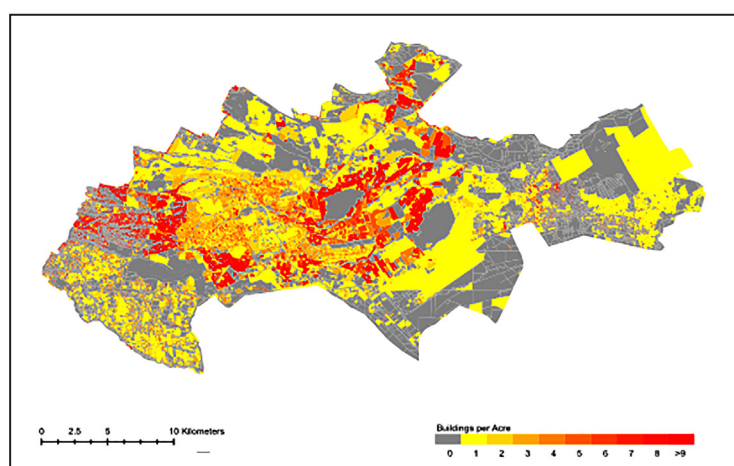


FIGURE 7

Nairobi building density map

Source: Columbia University Earth Institute, Center for Sustainable Urban Development 2008

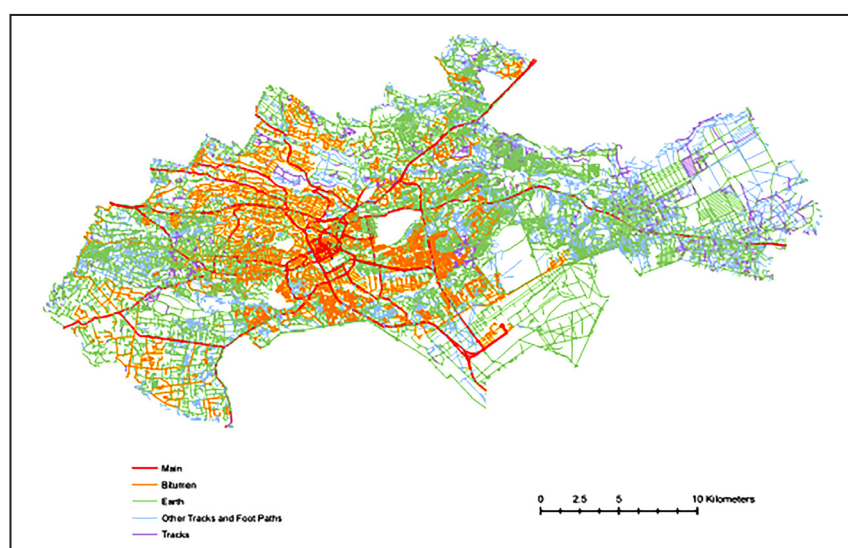


FIGURE 8

Nairobi's road network

Source: Columbia University Earth Institute, Center for Sustainable Urban Development 2008

TABLE 4: Nairobi population growth from 1906 – 2019

Year	Population (1,000)	Growth Rate (%)	Comment
1906	11		Plan 1 & 2-1898, 1927
1948	119	6.84	Master Plan 3 - 1948
1963	342	7.29	Independence 1963
1969	509	6.85	National Census 1
1979	828	4.99	Plan 4 - 1973; Census 2
1989	1 325	4.81	National Census 3
1999	2 143	4.93	National Census 4

2009	3 138	3.89	National Census 5
2019	4 398		National Census 6

Source: Compiled by Authors from KNBS 2019; KNBS 2020b; NCC & JICA 2014

haphazard and predominantly ad hoc (Obudho, 1997). A key factor in this has been the failure of the city's governance to implement its formal plans and planning policies due to reasons ranging from poor governance, poor leadership, lack of capacity, inadequate resources, lack of proper prioritization of resources, a culture of corruption, and lack of a shared vision for the future of the city (Huchzermeyer, 2011).

At the same time, global paradigms have had a significant impact on the urban transformation of the city (**Table 5**). The neo-liberal paradigm is arguably still a dominant underlying orthodoxy in the current millennium with the private sector driving the nature of the urbanization process. This is despite emergent concerns with sustainability in 21st Century global discourse on development.

Significantly, as the city's population exploded, growing exponentially over the five decades since independence, a housing crisis emerged in the city as slums proliferated. Initiatives from international agencies such as the World Bank and the United Nations to help alleviate the problem metamorphosed over the years. Site and services schemes were initiated in the 1970s which have now evolved to slum upgrading initiatives as the latest approach to providing better housing for informal settlement dwellers. In the early years after independence, the government had programs to provide public housing particularly for civil servants. However, this promising strategy fell afoul of the much-criticised structural adjustment programmes introduced in the 1980s (to make governments in the developing countries more efficient) that pared down the role of government in public service provision, and led to the privatization of state assets (Weaver, 1995), and also, generally, ushered in the neo-liberal era that prioritizes market processes (Fainstein, 2010) and business interests (Harvey, 2006 as cited in Fainstein, 2010) – that now defines the

paradigm within which the city's current urban transformation occurs.

Arguably, in the current millennium, the city is in the grips of market-driven urban transformation. This has ushered in developer-led property development, which is leading to the transformation of neighbourhoods such as Kileleshwa into higher density urban habitats. This is evident in the ongoing construction of high-rise apartment blocks which are replacing the extant single-dwelling detached housing units. Furthermore, the rapid densification of Kileleshwa has been accompanied by the growing presence of a middle-class, which has been associated with the purchase and rental market of apartment units in the residential area.

Kileleshwa's Regulatory Environment

Administratively, Kileleshwa is one of five wards in one of the 17 sub-counties (constituencies) into which Nairobi city county is sub-divided (Nairobi City County, 2020a). Each constituency is represented by an elected member of the National Parliament and each ward has an elected representative in the Nairobi County Assembly. Kileleshwa is in Dagoretti North constituency. The other wards in this constituency are Kilimani, Kawangware, Gatina and Kabiro. In total, there are 85 wards in Nairobi City County (Nairobi City County, 2020a). The Nairobi County Assembly has jurisdiction in formulating laws that have a direct impact on the city.

According to the Nairobi City County (NCC) zoning guidelines (NCC, n.d.; NCC & Japan International Cooperation Agency (JICA), 2014), Kileleshwa is classified as a Zone 4 (**Table 6** and **Figure 9**) residential area, which stipulates low-density housing on a minimum plot size of 0.05 hectares; with a plot ratio of 25% if the property is not connected to a sewer line and 75% if the property is connected to a sewer line. The zoning

TABLE 5: Global development paradigms and their characteristics

Time Period	Dominant Orthodoxy	Geopolitical Trends	Strategy for Urbanisation
1960s	Modernization Theory with a strong Western bias	Emergence of newly independent countries and the cold war	Import substitution strategy for industrialisation plus slum eradication
1970s	Growth and Redistribution Theory plus Basic Needs Theory	Cold War, Oil Shock and the emergence of the Debt Crisis	Focus on Site and Service Schemes, Self-help Projects, Core Housing etc. Projects to satisfy: Affordability-Cost Recovery – Replicability formula
1980s	Emergence of the Neo-liberal Theory	Debt Crisis full blown, and severe economic decline in developing countries	Problems of affordability come to fore. Tacit acceptance of informal settlements. Relaxation of laws
1990s	Neo-liberal Theory the driving orthodoxy. Emphasis on enablement and Good governance	End of Cold War. Increased emphasis on democratisation based on Western models	Cities increasingly seen as engines of economic growth. Restrictive building and land use standards increasingly being phased out
2000s	Sustainable Livelihoods Theory, Focus on Poverty eradication	USA as the dominant super power. Increasing urban poverty	Privatization. Focus on private/public sector partnerships

Source: Reconstruction by Anyamba 2006 based on Syagga 2002

TABLE 6: Section of Nairobi zoning guidelines indicating classification of Kileleshwa in zone 4

ZONE	AREAS COVERED	GC %	FR %	Dept Ref. Map	TYPE (S) OF DEVELOPMENT ALLOWED	MIN. AREA (Ha.)	REMARKS/POLICY ISSUES
3	Parklands			CPTNXXX	Commercial/Residential (High-rise Flats)	0.05	
	• Commercial	50	100				
	• Residential	35	75				
	City Park Estate /Upper Parklands	35	75				
	Westlands			CPTNXXX	Commercial/Offices/Residential (High Rise Flats) – Four Storeys Max.	0.05	
	• Westlands CBD	80	240				
	• Westlands/Museum Hill						
	o Block 1 Commercial	80	200				
	o Block 2&3 Offices & Highrise Residential	35	80				
	o Block 4 Offices	80	200				
4	o Block 5 Commercial/Residential Hotels						
	Spring Valley			CPTNXXX	Residential (Apartments allowed on sewer only) – Four Storeys Max.	0.05	• Policy Under Review
	Riverside Drive						
	Kileleshwa	35(u)	75(u)				
	Kilimani	25(u)	25(u)				
	Thompson						
5	Woodley						
	Upper Spring Valley			CPTNXXX	Low-Density Residential One-Family House	0.2(u) 0.1(S)	• Maisonettes Allowed On Sewered Areas Of Lavington
	Kyuna	25	25				
	Lorecho						
	Lavington /Bernard Estate						
	o On sewer	35	75				
6	o Unsewered	25	25				
	Muthaiga	25	25	CPTNXXX	Low-Density Residential	0.2	Single Family Dwelling
	New Muthaiga			X			

Source: NCC and JICA 2014

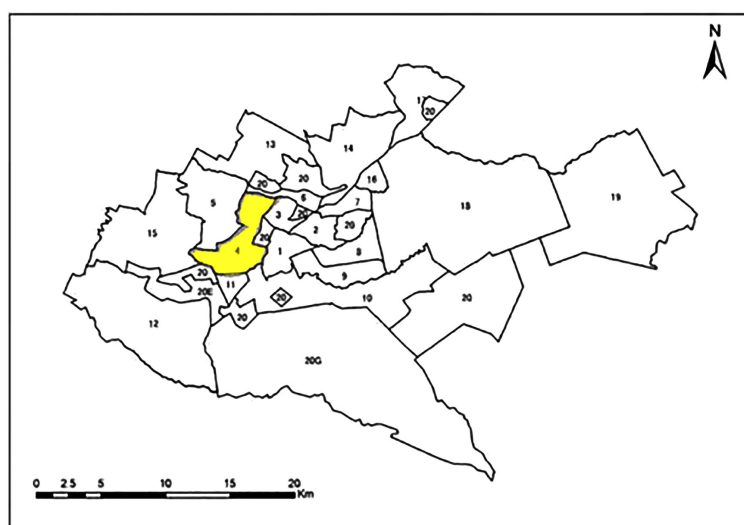


FIGURE 9

Nairobi zoning guidelines indicating the geographical distribution of the various zones within the city of Nairobi

Source: NCC and JICA 2014

guidelines also mandate a maximum ground coverage of 25% if the property lacks a sewer line and 35% if the property is connected to a sewer line. While the guidelines allow a maximum building height limit of four storeys in the zone (NCC, 2020b), apartment blocks, while still restricted by the height limit, are only allowed if connected to a sewer line (NCC, n.d.; NCC & JICA, 2014).

However, despite the existence of these regulations, as will be demonstrated in a later subsection, Kileleshwa's recent and ongoing housing transformations are occurring in contravention of the development controls.

Kileleshwa's Recent Demographic Changes

As of the 2009 decennial census, Kileleshwa, as a ward was part of a constituency referred to as Dagoretti North (**Figure 10**) with a population of 151,000 persons, which was then 5% of the city's total population of 3.1 million (KNBS, 2010a).

However, the recent demographic situation in Kileleshwa is illustrative of significant change in the current millennium. While Kileleshwa ward's share of the sub-county population has declined by 4% from 18% to 14% between 2009 and 2019, its population has increased by 20% from 27,202 in 2009 to a total population of 32,513 persons in

2019 (KNBS, 2020a). This was half the city's average population increase rate of 40%, over the same time span, from 3,138,369 to 4,397,073 (KNBS, 2020a). The number of households have increased by one-third over the same time period from 7,743 households in 2009 to 10,392 households in 2019. Population density has grown by 18% to 3,570 persons per sq. km. in 2019 (KNBS, 2020a) from 3,022 persons per sq. km. in 2009 (KNBS, 2010a) (**Tables 7 and 8**). This was half the rate of the city's increase of 38% from 4,515 persons per sq. km. to 6,247 persons per sq. km. It is also about two-thirds the city's population density per sq. km. The average household size of the sub-county into which Kileleshwa is clustered is 2.8 (KNBS, 2010a). This is marginally different from the city's 2.9, but lower than the country's average household size of 3.9 (KNBS, 2010a).

In the sub-area of Kileleshwa ward (**Figure 4**), which most closely corresponds with the study area (**Figure 5**), and accounts for more than two-thirds of the ward's population in 2019, even more rapid population growth has occurred over the past decade. The residential area's population increased by more than 30% between 2009 and 2019 from 16,802 persons (KNBS, 2010b) to 22,216 persons (KNBS, 2020a), which was a much higher rate of growth than the ward's. While its number of households increased by 50% (or 2,272 households) from 4,592 to 6,864 households

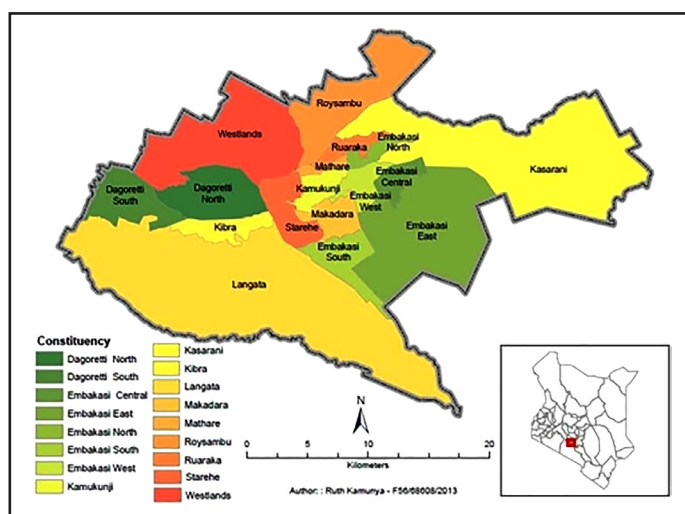


FIGURE 10

Nairobi City County Constituencies

Source: Kamunya 2013 as cited in Tuko 2020

TABLE 7: Dagoretti North Constituency: Wards, population, area, households and density, 2019

Ward	Population	Households	Area Sq. Km.	Population Density Pers./ Sq. Km.
Kilimani	50,457	15,331	16.0	3,149
Kileleshwa	32,513	10,392	9.1	3,570
Gatina	63,560	24,005	1.5	42,772
Kawangware	91,487	33,008	2.4	37,533
Kawangware*	30,587	10,893	0.9	33,605
Kabiro**	36,228	13,328	0.8	46,767
Total	238,017	82,736	29.0	8,207

* This is a sub-area of the original Kawangware ward that was sub-divided into three to accommodate Kabiro and Muslim sub-areas hence figures are already included in the preceding Kawangware Ward

** Though listed as a ward, according to the 2019 census data, it is a sub-area of Kawangware hence figures are already included in Kawangware Ward

Source: Compiled from KNBS 2020a

between 2009 and 2019 (KNBS, 2010b; KNBS, 2020a) – which was more than 10% higher than the city's average rate of increase in the inter-censal period – its population density (persons per square kilometre) increased by one-third over the inter-censal period. It grew to a density of 4,229 persons per sq. km in 2019 from a 2009 population density of 3,210 persons per square kilometre (KNBS, 2010b; KNBS, 2020a). This was 18% higher than the ward's and more than two-thirds of the city's population density (Tables 9 & 10).

Degrees of Urban Habitat Transformation

Kileleshwa has undergone morphological and typological transformation to various degrees as a result of market-oriented developer-led habitat transformation. In this analysis, the focus is on the street pattern, plot pattern, and building pattern, which are important components of urban form. An analysis of the neighbourhood's street network, plots and buildings (footprints and units) makes this apparent. The foregoing aspects can usefully

TABLE 8: Dagoretti North Constituency*: Wards, population, households, area and density 2009

Ward	Population	Households	Area Sq. Km.	Population Density Pers./ Sq. Km.
Kilimani	43,122	11,350	16.1	2,685
Kileleshwa	27,202	7,743	9.0	3,009
Gatina	45,872	15,987	1.5	30,411
Kawangware	34,683	22,262	2.4	28,258
Kabiro**	-	-	-	-
Total	150,879	57,342	29.0	5,202

* The constituency was created after 2010 bringing together the listed wards

** Area not delineated in the 2009 census

Source: Compiled from KNBS 2010a

TABLE 9: Kileleshwa: Distribution of population by sex, number of households, land area, population density, and sub locations, 2019

Sub Location	Sex			Households			Area Sq. Km.	Density Persons/ Sq. Km.
	Total	Male	Female	Total	Conventional	Group Quarters		
Kileleshwa	32,513	14,608	17,903	10,392	10,250	142	9.1	3,570
<i>Kileleshwa</i>	<i>22,216</i>	<i>9,761</i>	<i>12,453</i>	<i>6,864</i>	<i>6,864</i>	-	<i>5.3</i>	<i>4,229</i>
Muthangari	10,297	4,847	5,450	3,528	3,386	142	3.9	2,672

Source: Compiled from KNBS 2020a [Italics by authors to indicate figures in the study area]

TABLE 10: Kileleshwa: Population distribution by sex, number of households, area, density, and administrative units, 2009

Administrative Unit	Sex			Households	Area Sq. Km.	Density
	Total	Male	Female			
Kileleshwa	27,202	12,207	14,995	7,743	9.0	3,009
<i>Kileleshwa</i>	<i>16,802</i>	<i>7,389</i>	<i>9,413</i>	<i>4,592</i>	<i>5.2</i>	<i>3,210</i>
Muthangari	10,400	4,81	5,582	3,151	3.8	2,734

Source: Compiled from KNBS 2010b [Italics by authors to indicate figures in the study area]

be viewed as nested within each other [Table 1]. Through the analysis, issues of spatial morphology and building typology are interrogated. These are analysed and discussed in turn, below, in terms of degrees of transformation.

Minimal transformation: Street

While Nairobi CBD's grid-iron street layout (Figure 11) was deliberately planned due to ease of setting out as happened to many cities planned in the colonial era (Halliman & Morgan, 1967), the street layout in Kileleshwa developed

much more organically, constrained as it was by the neighbourhood's topography of ridges and valleys (Halliman & Morgan, 1967), and in keeping with ideas of a garden city suburb and the neighbourhood unit (Figure 12) (Huchzermeyer, 2011).

The two main longitudinal streets that structure the spatial layout of the neighbourhood are inclined at nearly a right angle to the CBD's main highway, Uhuru Highway (Figure 13). One of these streets,

Othaya Road, which parallels the upper boundary of the neighbourhood, starts in the south-western corner of the neighbourhood and winds due north eastwards on a 45-degree axis. As it does so, its name changes to Nyeri Road, then to Gatundu Road, and finally to Mandera Road before connecting with Ring Road Kileleshwa. The path traced by the foregoing roads was historically the main street of Kileleshwa. The second of the long streets through the neighbourhood is Oloitotokitok Road or Ring Road Kileleshwa. It begins in the south-eastern corner of the neighbourhood, traversing past two

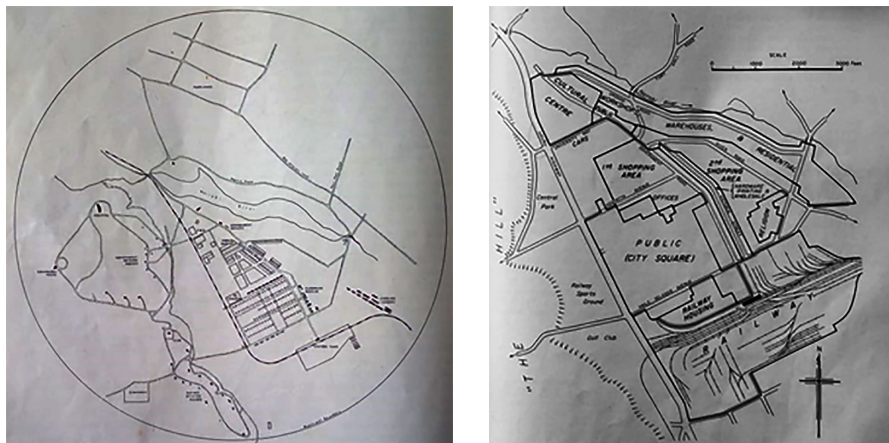


FIGURE 11

Nairobi: CBD in 1905 (left) and structure (right) laid out on a grid (geometrically constrained by the railway alignment in the south, Nairobi River in the North East, and the Nairobi trachyte bluff (the Hill), in the west)

Source: Halliman & Morgan 1967

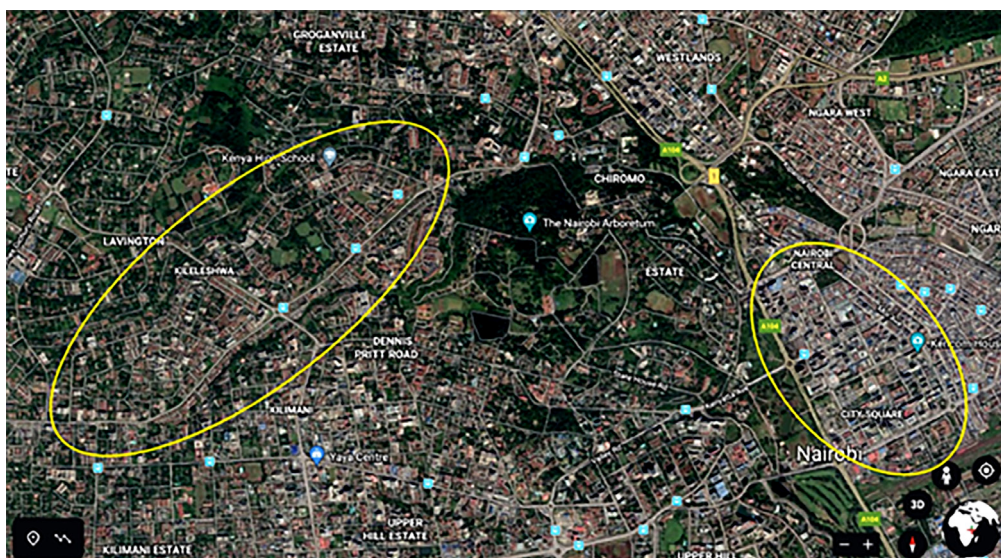


FIGURE 12

Kileleshwa's irregular street plan (left) compared to the CBD's regular gridiron street plan (right)

Source: Adapted from Google Earth 2020

roundabouts, connecting at a 90-degree angle with Likoni Road at the first roundabout, then Mander Road at the second roundabout before exiting the neighbourhood at its north-eastern corner. This road, as a link road, provides a convenient connection between the western suburbs and a major commercial and business centre – Westlands – located north west of Nairobi's CBD (Figure 13). It does this via a connection with the major highway that cuts through the city. A major latitudinal street, aligned at a 45-degree angle to the CBD's main highway, cuts through Kileleshwa at its midpoint, connecting it to its adjacent neighbourhoods in the western suburbs (Figure 14).

Thus, at present, Kileleshwa's street plan remains largely unchanged from its pattern that was established in colonial era Nairobi. The most recent improvement that has occurred has been the construction of the Ring Road (Oloitokitok Road) that connects the residential area to adjacent residential neighbourhoods and nearby commercial areas, particularly the significant commercial and business area of the city, Westlands, located north west from Nairobi's CBD (Figure 14).

Hence, while the improvement has made Kileleshwa more accessible to adjacent neighbourhoods, the

ring road was the implementation of a road that had been planned for hence reserved for and not necessarily the creation of an entirely new road on a greenfield site. Thus, the ring road has better defined Kileleshwa's street structure, and arguably made the neighbourhood more desirable for property development, without necessarily altering the original street structure. However, it can be argued that the ring road has altered the street hierarchy of the neighbourhood since it is now the new main street through Kileleshwa. Moreover, the construction of the Ring Road created a better connection with the bisecting road that runs on a north-west/south-east axis, connecting adjacent neighbourhoods in Nairobi's western suburbs (Figure 14).

Thus, at the level of the street network, which defines the circulatory structure of Kileleshwa neighbourhood, minimal transformation has occurred. The street network, which bounds the original blocks/zones that constitute the neighbourhood has remained the same throughout the period of the ongoing rapid transformation of the urban residential area in the current millennium. Even in the few instances where plot size and shape is becoming increasingly inconsistent due to plot amalgamation, this is occurring without the alteration of the street network.

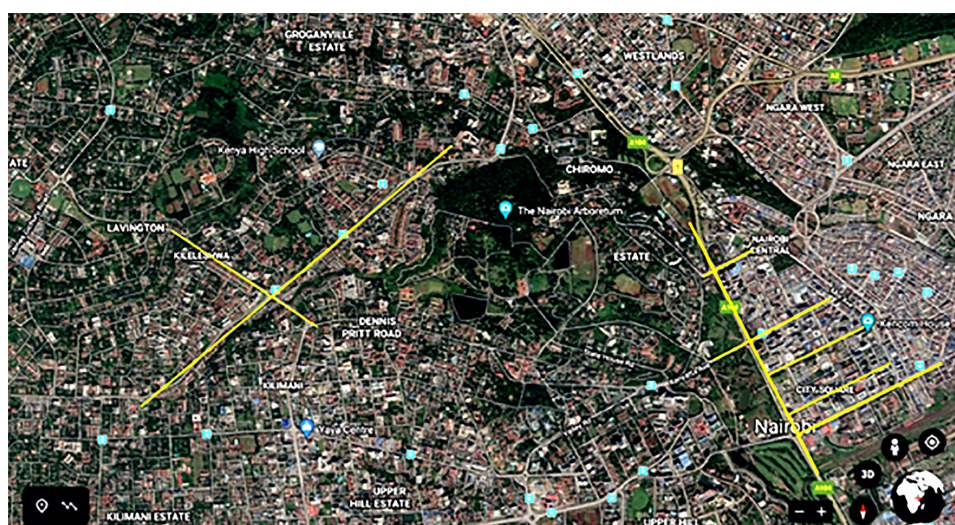


FIGURE 13
 Diametrically opposed alignment of streets through Kileleshwa, with those through Nairobi's CBD
 Source: Adapted from Google Earth 2020

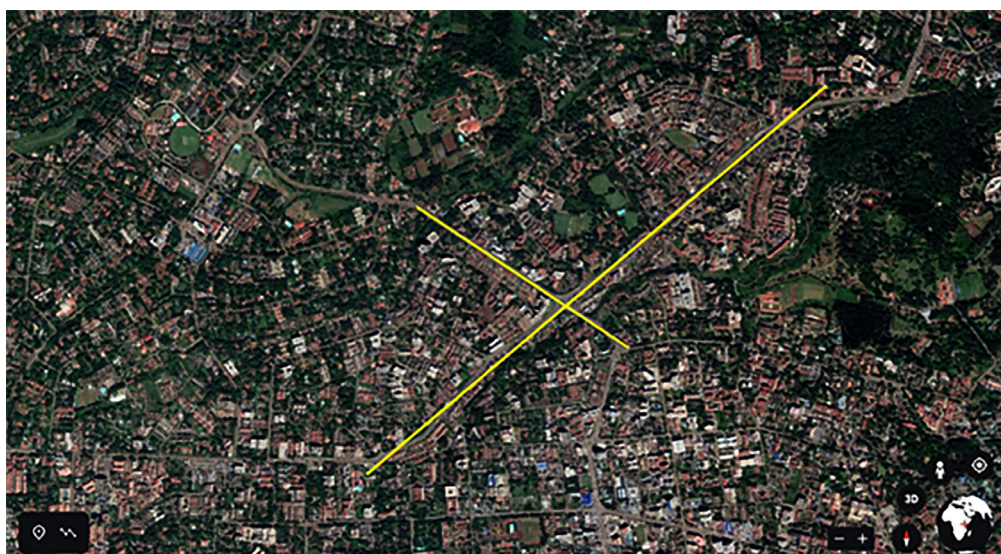


FIGURE 14

Kileleshwa's Connecting Streets: The Ring Road (NE/SW axis) connects the area to commercial zones and neighbourhoods to the North and South. The bisecting road (NW/SE axis) connects Kileleshwa to adjacent residential areas

Source: Adapted from Google Earth 2020

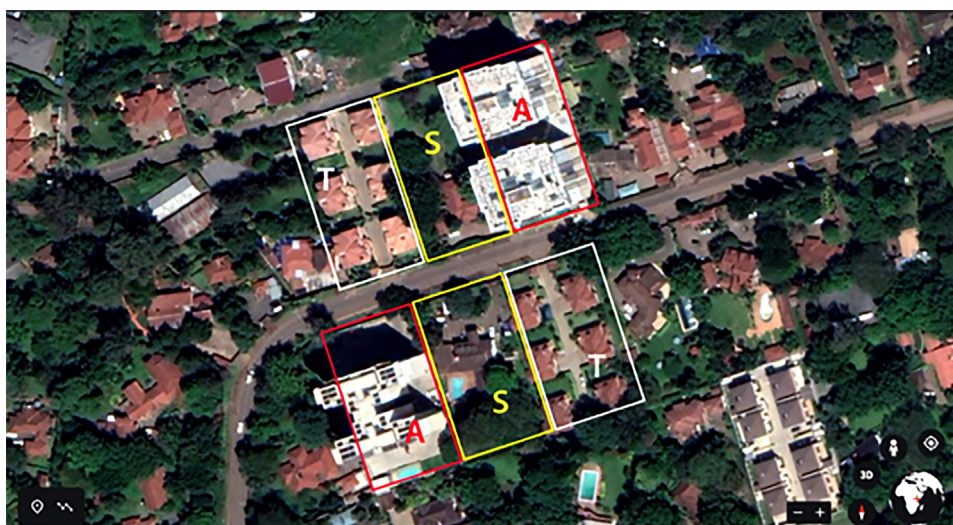
Moderate transformation: Plot

In the wake of the ongoing intensive urban transformation since the turn of the millennium, Kileleshwa's plot patterns have remained remarkably resilient. The original plot configurations of a quarter of an acre or more have been retained, with high-rise apartment blocks being developed on the same plots that historically housed single-family detached dwelling units. **Figure 15** shows a section of Kileleshwa depicting similar three-quarter acre plots with different formal categories of the residential functional building type. "S" are the original single family detached dwelling units; "T" are townhouses developed in the first-generation transformations that adhered to the residential area's height limit; whereas "A" are the recent high-rise apartment blocks built beyond Kileleshwa's height limit. On very few occasions has plot amalgamation preceded the development of the high-rise apartment blocks.

In the cases where the original single-family houses have been replaced by high-rise apartment blocks, the most noticeable change has been the intensification of the use of the plot and the increase in plot coverage. With apartment blocks, plot coverage has increased extensively and more massive building structures have

become widespread. In some cases, especially where the apartment block has been designed as an undifferentiated mass, the plinth area of the apartment block covers almost the entirety of the plot. Thus, there is hardly any offset from the plot boundary. The result is that apartment blocks on adjacent blocks barely have any space between them apart from the boundary wall. This is in sharp contrast to the original sites with single-family detached dwelling units in which the plot ratio was much lower. With single-family housing, the offset from the property line was much greater hence there was ample room between the dwelling unit and the property boundary. Thus, the hard surface coverage of the plot was much lower and plenty of room was available for soft coverage in the form of greenery such as grass, shrubs, and trees (**Figure 15**).

Thus, at the level of the plot, moderate transformation has occurred. The form of redevelopment of the plot into apartment blocks can be seen as a case of adaptive development since it is occurring within the existing street system as defined in the ISUF glossary (ISUF, 1990). In the current millennium, the plot has undergone moderate transformation within the context of housing transformation in Kileleshwa.

**FIGURE 15**

A section of Kileleshwa depicting similar three-quarter acre plots with different formal categories of the residential functional building type

Source: Adapted from Google Earth 2020

The original plot sizes have been retained to a large extent despite the ongoing transformation from single-family dwellings to high-rise apartment blocks. While the plot boundaries have been retained in many of the developments, their built-up area has increased, exceeding the stipulated plot ratios, as the density of the housing has risen. Building footprints vary on the developed sites as regulations on plot coverage are flouted.

Substantial transformation: Building

Historically, the typical buildings in Kileleshwa were single-family detached dwellings (Halliman & Morgan, 1967). These houses were built of stone, had a tiled roof and included a separate servant's quarters (DSQ) (**Figures 16 & 17**) (Halliman & Morgan, 1967).

However, at the turn of the millennium, this stable nature of the low-density character of the residential area began to change. Although the neighbourhood was zoned for low-density housing, the zoning provisions for the area had an allowance for the development of mid-rise flats or buildings provided that they were connected to a sewer line (City Council of Nairobi [CCN], n.d.). In the first decade of the millennium, this was the direction that densification took. The

**FIGURE 16**

Typical upper income housing in Nairobi: built of lava tuff under tiles, fireplace, well developed garden on sloping red soil

Source: Halliman & Morgan 1967

**FIGURE 17**

Kileleshwa: a poorly maintained single family dwelling unit

Source: Author 2018

initial densified buildings were either town houses or mid-rise flats or apartment blocks that did not exceed the maximum zoning limit of not more than four floors and an attic or, in effect, five floors (**Figure 18**). Moreover, these mid-rise apartment blocks require only a walk-up vertical circulation system.



FIGURE 18

Kileleshwa: First Generation Transformation: Mid-rise apartment Blocks with walk-up vertical circulation system

Source: Author 2016

However, the second decade of the millennium has been characterized by a second generation of apartment block developments. From a single-family detached dwelling unit on a given plot of land in Kileleshwa, the emergent characteristic is that of a high-rise apartment block on the same plot of land. These apartment blocks exceed five floors and range in size from six to 14 floors (**Figures 19, 20 & 22**). Consequently, they require a lift or elevator vertical circulation system.

This evolution in building typology, which is densifying the land use of the neighbourhood, has been accompanied by an escalating cost of land in the area. Land prices have increased seven-fold over the course of a decade (**Figure 21**). This, in turn, is further accelerating the conversion of single-dwelling detached housing units to multi-dwelling apartment blocks.

Thus, in Kileleshwa, from a single-family detached dwelling unit, the emergent building typology is that of a multi-dwelling high-rise apartment block with multiple towers. In some cases, the towers are structurally connected; in others, a courtyard



FIGURE 19

Kileleshwa: Second Generation Transformation: High-rise apartment blocks with elevator vertical circulation system

Source: Author 2018



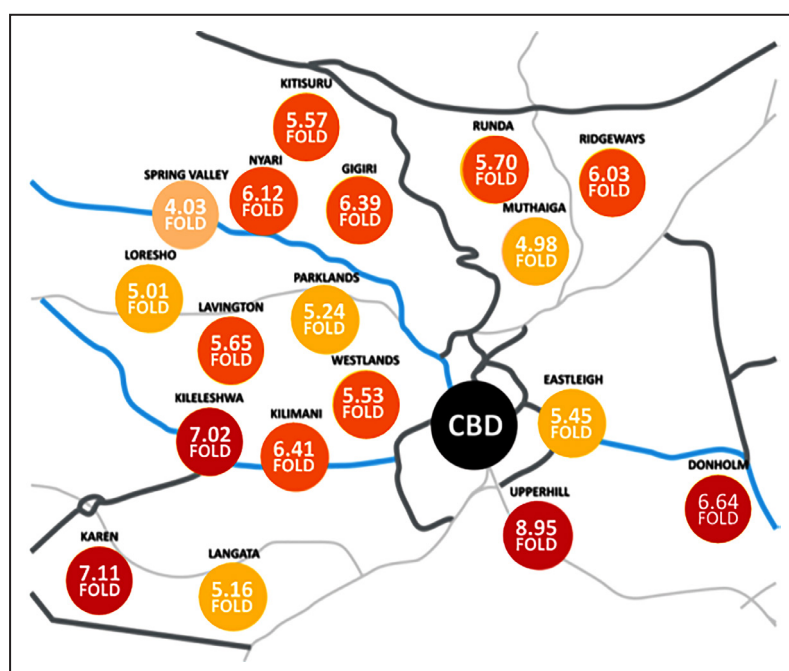
FIGURE 20

Kileleshwa: A high-rise apartment block under construction

Source: Author 2018

separates them. Some apartments have provision for underground or basement parking while others offer surface parking or a combination of both surface and underground parking. Some buildings are raised on *piloti*, allowing for parking space and access underneath, while others are built from the foundation up without openings beneath.

Hence, the most extensive transformation that has occurred in Kileleshwa in the current millennium has been in terms of building

**FIGURE 21**

Nairobi: 18 suburbs change in price since 2007

Source: Hass Consult 2016b

typology. At present, apartment blocks proliferate in the neighbourhood. They are at various stages of development, all exceeding the residential area's *de jure* height limit.

The apartment blocks perpetuate the enclaving of the neighbourhood by maintaining the historical gated nature of the residential area in which the single-family housing was enclosed within a gated compound (Figure 17). The apartment blocks are built as an enclave, are mostly inward oriented and make minimal reference to adjacent buildings. The result is a series of apartment blocks, at various heights and in various forms; some neighbouring each other, and some surrounded by low-density housing units. The overall result is that of an incoherent picture of residential housing. Thus, present day Kileleshwa is characterized by a diversity of apartment blocks with significant variation on the high-rise tower typology (Figure 22). With the emergence of apartment blocks, a substantial increase has occurred in the neighbourhood's building density.

Thus, at the level of the building, substantial transformation has occurred. The building typology (height and exterior footprint) has transformed substantially. Building heights have increased substantially as low-rise housing units make way for high-rise ones. The building coverage (or plot ratio) – the amount of plot area covered by buildings, expressed as a percentage of the total plot area (Conzen, 1969) – has increased in size from 35% of plot coverage to at least twice as much.

**FIGURE 22**

Kileleshwa: Completed high-rise apartment blocks

Source: Author 2018

Some Positives and Negatives of the Morphological Transformation

The positives

Apartment blocks make it possible to accommodate more people, within a limited area, in a rapidly expanding city. This is an important consideration because Nairobi's boundaries are now firmly established. The promulgation of Kenya's new constitution in 2010 resulted in Nairobi becoming a county with its boundaries clearly defined in relation to neighbouring counties, which together with Nairobi constitute the Nairobi metro region. Consequently, Nairobi city's outward growth is constitutionally and politically constrained. Hence, the emerging viable option is for the city to expand upwards and to densify existing residential areas. A significant feature of apartment block developments is that they make possible the opportunity to structure the urban habitat into a more compact urban form, which has the desirable quality of reducing urban sprawl and enhancing urban sustainability.

Apartment blocks, in accommodating more people in comparison to single-dwelling units, can potentially lead to a more economically diverse neighbourhood. In the case of Kileleshwa, a previously exclusive neighbourhood for the elite is now becoming accessible to a growing middle-class. Arguably, this is contributing to the increased democratization of space as more people access a previously exclusive locale. This in turn can be viewed as contributing to spatial justice (Soja, 2008), and a more just city (Fainstein, 2010), which are key to social sustainability as more diverse income groups co-exist close to each other compared to the current state of residential income segregation.

The negatives

The ongoing densification of Kileleshwa is occurring without the availability of commensurate infrastructure. Inadequate physical infrastructure (water supply, electricity, sewage reticulation, storm water drainage) and insufficient social infrastructure (public open space, and amenities such as schools, shopping areas, health centres), if left unaddressed, will compromise the neighbourhood's viability as an urban habitat, and lead to the deterioration of its urban qualities.

The reduction in greenery (and micro-climate) as trees are cut down to make room for apartment block developments is resulting in the previously leafy green streets becoming barren avenues. And, in combination with the loss of public open space and decrease in water permeability due to the expanding building footprints, the residential area is becoming a concrete jungle.

There is a big discrepancy between the regulations on paper and the reality on the ground. The lack of adherence to regulations and disregard of planning practices, hence unpredictability of future outcomes, has the potential to entrench practices resulting in negative externalities such as poor urban quality and unsustainable outcomes.

With the ongoing morphological and typological transformation, Kileleshwa is becoming an intensive machine for living. This in turn raises issues of its long-term viability in the face of rapidly increasing building density. The residential area was not deliberately designed for high-density living, rather the opposite, hence the current densification is tending towards undesirable outcomes for the urban habitat. The question of how to accommodate rising density in a dynamic urban context is yet to be addressed.

Furthermore, as the apartment blocks become the norm for housing in the residential area, an emergent trend is the increasingly smaller apartment units on offer based on the open plan apartment unit layout concept. This raises the issue of liveable space since set standards for the minimum size of the apartment unit interior spaces are yet to be articulated in relation to the building permit approval process.

CONCLUSION AND RECOMMENDATIONS

A new normal for the pattern of urban habitat transformation for Nairobi is emerging in historically low-density neighbourhoods such as Kileleshwa. However, in the interest of securing a viable future for the urban habitat, the piecemeal nature of the residential property developments needs to be supplanted by a planned approach to urban development.

Vertical living and emergent middle-class lifestyle is arguably a pointer to improving quality of life. Thus, their emergence as a factor in the formal residential property market is a significant occurrence. With greater disposable income, the middle-class are likely to invest in their neighbourhood and contribute to the thriving of not only the city's economy, but the national economy as well.

A vision-led approach to a desired future ought to be the driver of the trajectory of transformation rather than the neo-liberal profit-oriented market-led approach with the developer at the apex of decision making on the future form of the city. Market-led development will not deliver a desirable outcome without a strong role for the government to direct the course that it takes. Developers and investors are motivated by maximizing profits in the shortest time possible for the least amount of investment. High returns on investment are a great motivator. However, this may not necessarily deliver desirable outcomes for the greater good of the society.

There is need for proper planning for higher density living. It is a present reality that the population of the city is increasing rapidly along with rapid urbanisation. Hence, more housing is needed to accommodate the expanding population. Given the constraints of the city's set boundaries, densification of the city's existing neighbourhoods is fast becoming the leading viable approach to meeting the growing housing need. But this has to be done properly by deliberate planning for densification rather than its current ad hoc evolution.

As part of proper planning, the City authority should compulsorily acquire appropriate land within the Kileleshwa area for the construction of social amenities/social infrastructure. Similarly, some guidelines should be set for maximum and minimum heights and spaces between blocks, as well as for minimum spaces of dwelling interiors to ensure the development of a liveable residential dwelling.

Overall, the nature of the current morphological and typological transformation of Kileleshwa is leading to more negative than positive outcomes. There is therefore a strong need to redress this imbalance – by addressing infrastructural challenges, both physical and social, and ensuring that the transformation is deliberately planned for and guided – to increase the possibility of the urban habitat remaining viable for the foreseeable future.

CITED REFERENCES

Anyamba, T.J.C. (2006). *Diverse informalities: Spatial transformations in Nairobi. A study of Nairobi's urban process* (doctoral thesis). The Oslo School of Architecture and Design.

City Council of Nairobi. (n.d.). *A guide of Nairobi city development ordinances and zones*. Retrieved from http://www.ccn-ecp.or.ke/asset_uplds/files/zoneguide.pdf.

Columbia University Earth Institute, Center for Sustainable Urban Development. (2008). *Nairobi regional project: GIS maps*. Retrieved January 25, 2017 from <http://csud.ei.columbia.edu/projects/nairobi-regional-project/nairobi-gis-maps/>

Conzen, M.R.G. (1969). *Alnwick, Northumberland: A study in town-plan analysis*. London: Institute of British Geographers.

Creswell, J.W. & Creswell, J.D. (2018). *Research Design: Qualitative, quantitative and mixed methods approaches*. Thousand Oaks, CA: Sage Publications, Inc.

Fainstein, S. (2010). *The Just City*. Ithaca, NY: Cornell University Press.

Freund, B. (2007). *The African city: A history*. Cambridge: Cambridge University Press.

Halliman, D. M. & Morgan, W.T.W. (1967). The city of Nairobi. In W.T.W. Morgan (Ed.), *Nairobi: City and region* (pp. 98-120). Nairobi: Oxford University Press.

Hass Consult Ltd. (2020). *The Hass land index: Land prices ease as Covid-19 lowers market liquidity.* Retrieved May 18, 2020 from <https://hassconsult.co.ke/real-estate/hass-index/13-the-hass-land-index?typ=2&layout=2>.

Hass Consult. (2016a). *Suburb profile Kileleshwa.* Retrieved June 5, 2016 from http://www.hassconsult.co.ke/index.php?option=com_content&view=article&id=167:kileleshwa&catid=51:area-profile&Itemid=155.

Hass Consult. (2016b). *Land price index 2016: Land index heat maps.* Retrieved May 15, 2020 from <https://hassconsult.co.ke/images/pdf/landindexQ1.2016.pdf>.

Huchzermeyer, M. (2011). *Tenement cities: From 19th Century Berlin to 21st Century Nairobi.* Trenton, NJ: Africa World Press.

Independent Electoral and Boundaries Commission (IEBC). (2020). *About IEBC.* Retrieved August 17, 2019 from <https://www.iebc.or.ke/iebc/?mandate> [Accessed August 17th, 2019].

ISUF. (1990). *Glossary.* Retrieved July 27, 2019 from <http://www.urbanform.org/glossary.html>.

Kenya National Bureau of Statistics (2010a). *The 2009 Kenya population and housing census: Population distribution by administrative units (Vol. 1A).* Retrieved from <https://www.knbs.or.ke/publications/>

Kenya National Bureau of Statistics (2010b). *The 2009 Kenya population and housing census: Population and household distribution by socio-economic characteristics (Vol. 2).* Retrieved from <https://www.knbs.or.ke/publications/>

Kenya National Bureau of Statistics. (2019). *2019 Kenya population and housing census volume I: Population by county and sub-county.* Retrieved April 8, 2020 from <https://www.knbs.or.ke/>

[wpdmpro=2019-kenya-population-and-housing-census-volume-i-population-by-county-and-sub-county](https://www.knbs.or.ke/?wpdmpro=2019-kenya-population-and-housing-census-volume-i-population-by-county-and-sub-county).

Kenya National Bureau of Statistics. (2020a). *2019 Kenya population and housing census volume II: Distribution of population by administrative units.* Retrieved April 29, 2020 from <https://www.knbs.or.ke/?wpdmpro=2019-kenya-population-and-housing-census-volume-ii-distribution-of-population-by-administrative-units>.

Kenya National Bureau of Statistics. (2020b). *Population and housing census (1962-2009).* Retrieved from https://www.knbs.or.ke/?page_id=3142.

Kihiu. (2013). *Dagoretti North constituency [tiff].* Retrieved May 9, 2020 from https://commons.wikimedia.org/wiki/File:Dagoretti_North_Constituency.tif.

Kropf, K. (2017). *The Handbook of Urban Morphology.* Chichester: John Wiley & Sons.

Mills, S. (2012). *A railway to nowhere: The building of the lunatic line.* Nairobi: Mills Publishing.

Nairobi City County [NCC] (n.d.). *Urban planning: Requirements (check-list) for development approvals.* Retrieved July 30, 2019 from <https://nairobi.go.ke/downloads/>

NCC & JICA. (2014). *Integrated urban development masterplan for the city of Nairobi (NIUPLAN).* Retrieved September 26, 2017 from <http://citymasterplan.nairobi.go.ke/>

NCC. (2020a). *Nairobi county assembly: Who we are.* Retrieved October 27, 2020 from <http://nairobiassembly.go.ke/who-we-are/>

NCC. (2020b). *Developments approvals requirements.* Retrieved May 18, 2020 from <https://nairobi.go.ke/downloads/>

Obudho, R.A. (1997). Nairobi: National capital and regional hub. In C. Rakodi (Ed.), *The urban challenge in Africa: Growth and management of its large cities*. Tokyo: United Nations University Press.

Oliveira, V. (2016). *Urban morphology: An introduction to the study of the physical form of the cities*. Cham: Springer International Publishing AG.

Rahbaran, S. & Herz, M. (2014). *Nairobi, Kenya: Migration shaping the city*. Zurich: Lars Muller Publishers and ETH Studio Basel.

Rossi, A. (1982). *The architecture of the city*. Cambridge, MA: MIT Press.

Shah, S. & Ruparel, R. (2016). *The transformation of the Housing Finance Company of Kenya*. Johannesburg: Centre for Affordable Housing Finance in Africa [CAHF]. Retrieved from <http://housingfinanceafrica.org/documents/case-study-7-the-transformations-of-the-housing-finance-company-of-kenya/>

Soja, E.W. (2008, March). *The city and spatial justice* [Paper presentation]. Spatial Justice Conference, Nanterre, Paris, France. Retrieved from <http://www.jssj.org/>

Tuko. (2020). *List of Nairobi County Wards*. Retrieved May 9, 2020 from <https://www.tuko.co.ke/285791-list-nairobi-county-wards.html>.

United Nations, Department of Economic and Social Affairs, Population Division. (2014). *World urbanization prospects: The 2014 revision, highlights*. New York, NY: United Nations (ST/ESA/SER.A/352). Retrieved from <https://esa.un.org/undp/wup/Publications/Files/WUP2014-Highlights.pdf>.

United Nations, Department of Economic and Social Affairs, Population Division. (2015). *World population prospects: The 2015 revision, key*

findings and advance tables. New York, NY: United Nations (Working Paper No. ESA/P/WP.241). Retrieved from https://esa.un.org/undp/wpp/Publications/Files/Key_Findings_WPP_2015.pdf.

Weaver, J.H. (1995). What is structural adjustment? In D.M. Schydrowsky (Ed.), *Structural Adjustment: Retrospect and prospect*. Westport, CT: Praeger Publishers.

White, L., Silberman, L. & Anderson, P. (1948). *Nairobi master plan for a colonial capital: A report prepared for the municipal council of Nairobi*. London: His Majesty's Stationery Office.

Zhang, L. & Ding, W. (2017). Changing urban form in a planned economy: The case of Nanjing. *Urban Morphology*. 22(1), 15-34.