3 Assessment of accessibility levels and distribution in Nairobi City County

3.1 Introduction

Measures of accessibility both within and between cities help us understand how well a city connects workers to firms and firms to markets. Intracity accessibility captures how well workers and firms are connected. It consists of two components, transport and land use, both of which can be used to improve accessibility within a city. Intercity and international accessibility captures whether cities have access to the necessary physical infrastructure that allows firms to trade both domestically and internationally.

This chapter analyzes Nairobi's accessibility and spaces. Under accessibility, we will look at intracity, intercity, and international accessibility. We shall examine land use within Nairobi's boundaries and compare it to the city's zoning policy while highlighting land use challenges as part of the intracity subsection. The city's different types of transport infrastructure, their distribution, and routes will also be explored. These will inform proximity and accessibility to jobs, economic opportunities and amenities by residents. The quality of transport and logistic infrastructure, like airports and ports, will also be investigated and compared to that in other countries when looking into intercity and international accessibility. Finally, access to public spaces will be assessed based on distribution and categories. From the sub-sections' findings, we will draw conclusions that will inform policy recommendations.

3.2 Nairobi's accessibility and spaces

3.2.1 Intracity accessibility

3.2.1.1 Land use

Nairobi City County, as the capital city of Kenya and financial and economic hub of East Africa, has competing interests. The county faces competing land uses, necessitating the need for a policy to balance these interests. The highest share of land use in Nairobi is open spaces at 56.75 percent, followed by residential areas at 16.84 percent (Table 3-1). This has left little space for public purposes and public utility usage which is contrary to the zoning policies of the city that seek to ensure a balanced use of land. Agriculture and forests take up large share of open spaces (Figure 3-1). The shortage of public land is a challenge partly caused by illegal acquisitions. Forest cover is the only land use maintained according to the city's zoning policies. The mismatch in zoning and land use and illegal acquisitions of public land have contributed to a shortage of land, especially for public infrastructure. As a result, there have been demolitions of buildings and structures erected on public land and road reserves and delays in infrastructure projects.

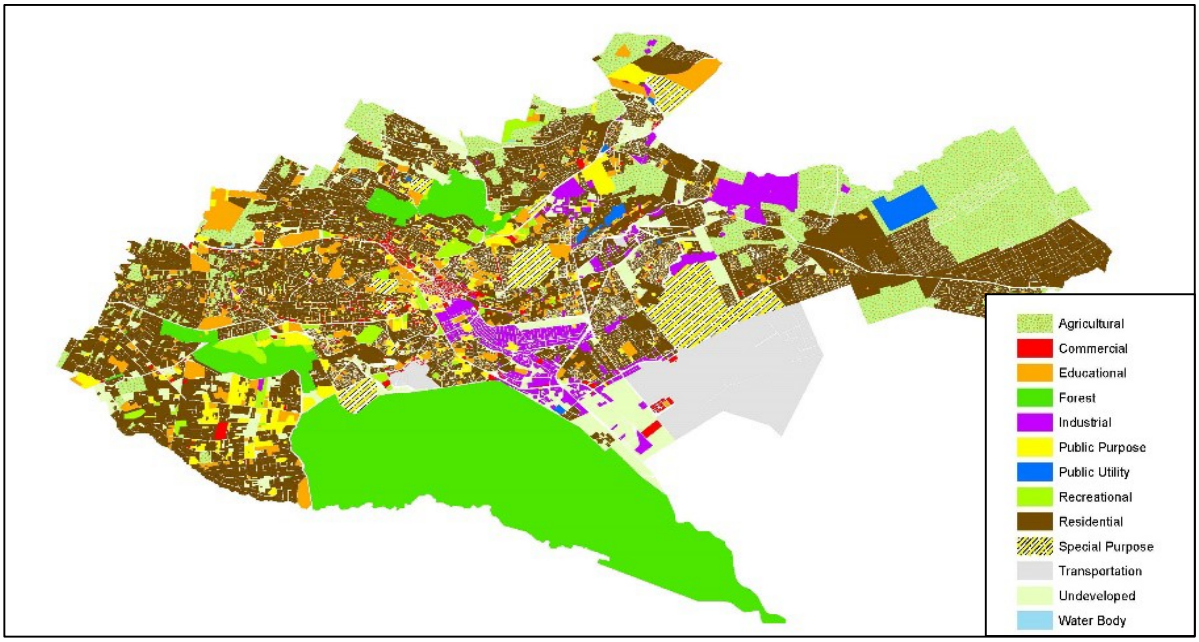
As land use trends in Nairobi have changed over the years with a preference for residential and commercial developments, there is a need for planning that is cognizant of population growth and other emerging issues.

Table 3-1 Land use acreage in Nairobi City County

Land use	Acreage	Share of total space (%)
1. Open space	87,345	56.75
2. Residential	**25,924**	**16.84**
3. Unknown	10,921	7.10
4. Institutional	9,820	6.38
5. Industrial	5,564	3.61
6. Transportation	3,851	2.50
7. Water	2,989	1.94
8. Recreational	2,143	1.39
9. Informal settlement (slum)	**1,915**	**1.24**
10. Commercial	1,466	0.95
11. Mixed residential and commercial	1,102	0.72
12. Mixed commercial and institutional	878	0.57
Total	153,918	100

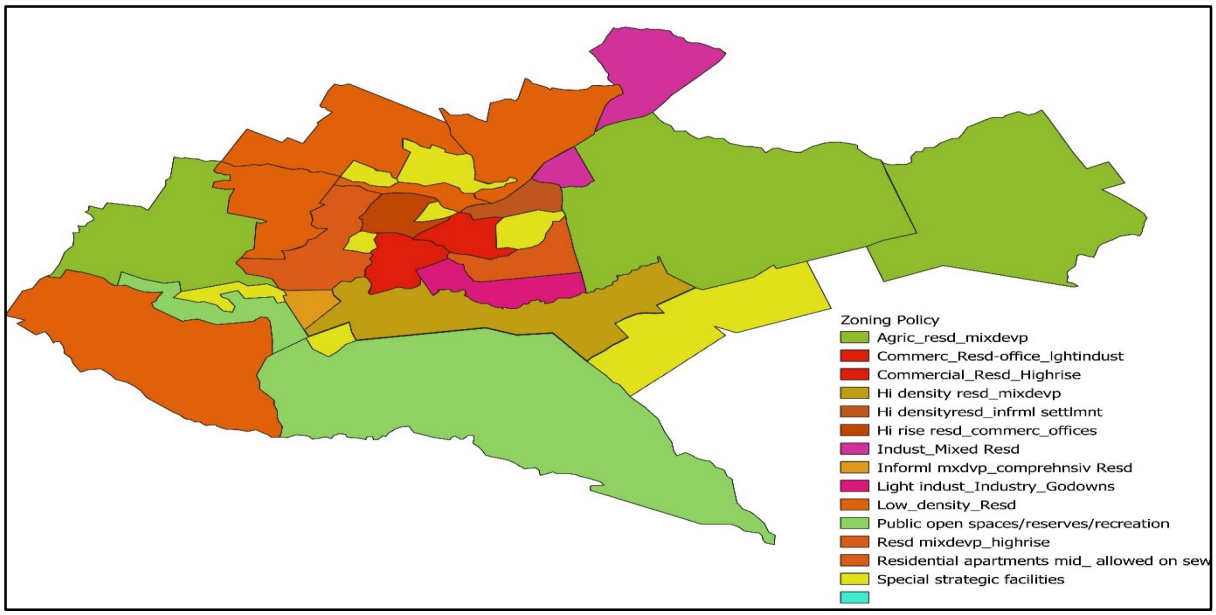
Source: Center for Sustainable Urban Development, Columbia University, 2010

Figure 3-1 Land use share of total space in Nairobi City County



Source: Center for Sustainable Urban Development, Columbia University, 2010

Figure 3-2 Zoning policy for Nairobi City County



Source: Zoning policy, Nairobi City Council, 2022

Other challenges related to land use include fragmented development of neighborhoods especially when land use is disconnected from key infrastructure and services such as transport, sewers, roads, and public amenities. Informal settlements cover 5 percent of the total residential land area of the city, but they are inhabited by about 70 percent of the city's population. There has been a notable expansion of informal settlements occupying prime urban land since 1960 (UN-Habitat, 2006). On a wider scale, 60 percent of those living in Kenya's informal settlements are in Nairobi. The city has among the highest annual population growth rates in Africa and with high urbanization the number of informal settlement residents is estimated to double in the next 15 years. A third of these informal settlement residents are considered poor. They face poor access to services and infrastructure, poor quality of housing, overcrowding, environmental degradation, susceptibility to floods, insecurity, and land ownership disputes. Poor access to infrastructure and the distant locations also limit their chances to get employment opportunities and extends the poverty cycle for some.

Still other challenges include inadequate implementation of land use planning policies and regulations due to insufficient funding, lack of political will, political interference, and corruption. This eventually leads to land grabbing, encroachment, squatter invasion, land use incompatibility, and degradation, particularly of waterfront sanctuaries, wetlands, and parks. In addition, there is poor management of the land register, which was paper based until 2021.

Zoning policy is a critical tool for planning in Nairobi City County as it entails aspects of the development ordinances that every property developer in the city requires to set up any form of development—residential, commercial, industrial, institutional, or religious. With the continued high rate of urbanization, Nairobi City County has a duty to use planning controls to ensure that development is allowed only where it is needed while ensuring that the character and amenity of the area are not adversely affected.

Due to rapid urbanization, low-density residential zones are experiencing a radical shift through a rising demand for high-rise developments as a result of growing demand for housing near various business enclaves and work areas mostly located in Nairobi's Upper Hill neighborhood, Westlands, Ngong Road, Lang'ata Road, and even the Central Business District (CBD). Consequently, the city is in the process of reviewing its development control policies, a process being steered by the Nairobi Metropolitan Services (NMS) to harmonize development with current user needs while still ensuring a sustainable development balance is attained in the short and long term.[2] The instrumental document under review is the "Nairobi City Council: A Guide of Nairobi City Development Ordinances and Zones (City Council of Nairobi, 2004)," which was developed in 2004 by the now defunct City Council of Nairobi.

Other land issues in Nairobi include the high presence of squatters, mostly in informal settlements; absence of an updated valuation toll; land conflicts; uncontrolled development due to a lack of adherence to spatial plans and grabbing of public land; and public insecurity of land tenure, since land used by the majority of the poor is not titled (Nairobi CIDP 2018-2022 and the Nairobi County Annual Development Plan 2021/22).

Table 3-2 Land shortage challenge in Nairobi City County

Issue	Cause(s)/characteristics	Course of action	Responsible persons
Shortage of land	Scarcity of public land Changing land use patterns Illegally acquired public utilities Prevalence of land disputes Delay in development of the developed land as per the land management information system Insecure land tenure	Land reforms Fast-track responsive land management information system. Repossess illegally acquired public utilities and land.	Governor's Office Land subsector Ministry of Lands, Public Works, Housing, and Urban Development National Land Commission Ethic and Anti-Corruption Commission

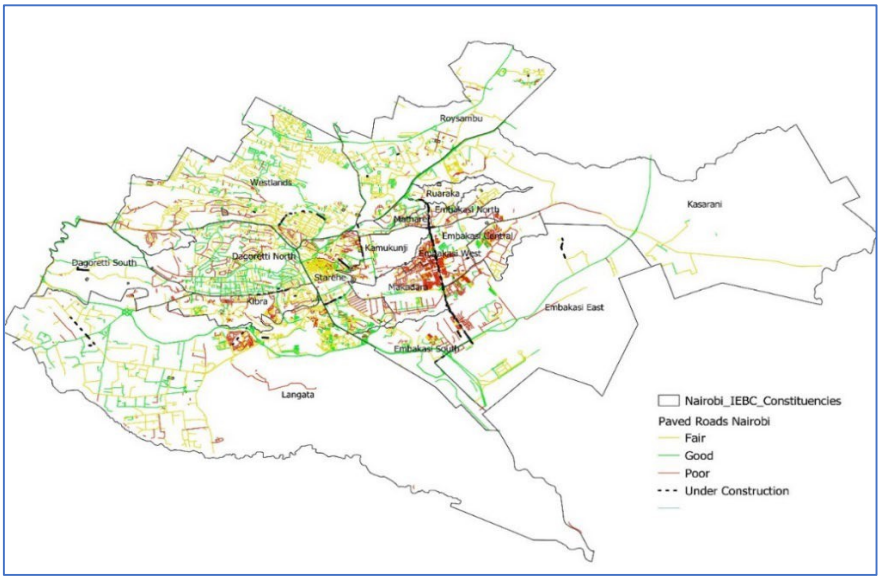
Source: Nairobi County Annual Development Plan 2021/22

[2] This is intended to harmonize some of the provisions of the policy document with what has been provided in the Nairobi Integrated Urban Development Master Plan (NIUPLAN) (2014-2030).

3.2.2 Transport infrastructure in Nairobi

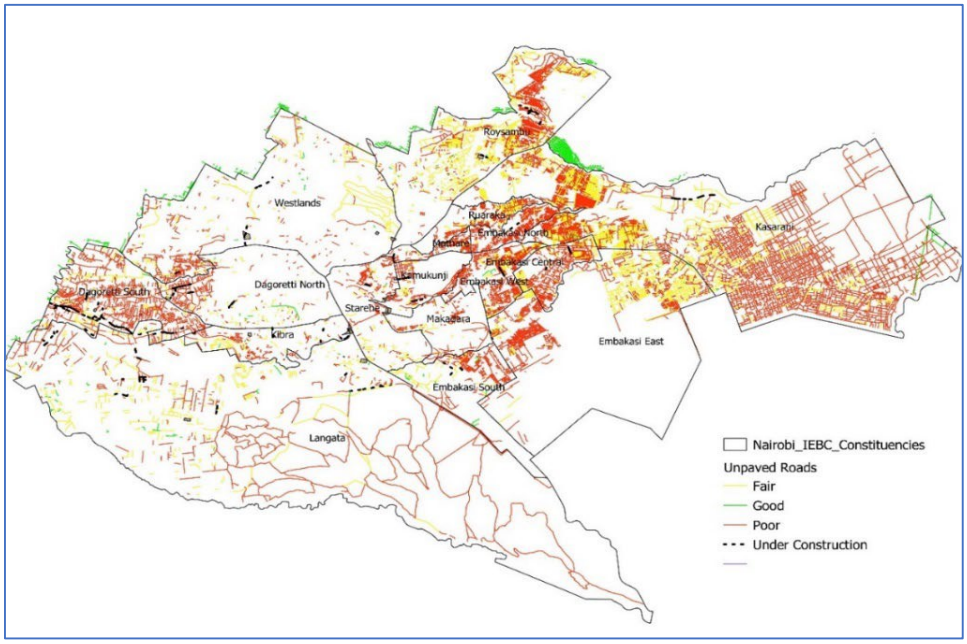
According to the Kenya Roads Board's Road Inventory and Condition Survey 2019, Nairobi City County has a total of 4,731 km of classified road network. Approximately 30.8 percent of the paved road network is in good condition, 43.8 percent is in fair condition, and 22.5 percent is in poor condition. While 0.8 percent of the unpaved road network is in good condition, 26.5 percent is in fair condition and 70.1 percent is in poor condition (Figure 3-3). It is worth noting that most of the county's paved roads are located within the city, especially in the high-end residential and commercial areas, while the informal settlements mainly have roads that are in poor condition. Most paved and unpaved roads in the central part of Nairobi are in good or fair condition. There is a greater concentration of poor unpaved roads as you move east and at the far west of Nairobi, in Dagoretti South, where there are mainly informal settlements. Link roads in the city whose wayleaves were occupied by illegal buildings are among those being constructed.

Figure 3-3 Condition of paved roads in Nairobi City County



Source: Kenya Roads Board -Road Inventory and Condition Survey (2019)

Figure 3-4 Condition of unpaved roads in Nairobi City County)



Source: Kenya Roads Board -Road Inventory and Condition Survey (2019)

Nairobi City County is also served by rail commuter services as depicted in Figure 3-5. The railway network in the city covers 298 km and includes 10 functional railway stations.

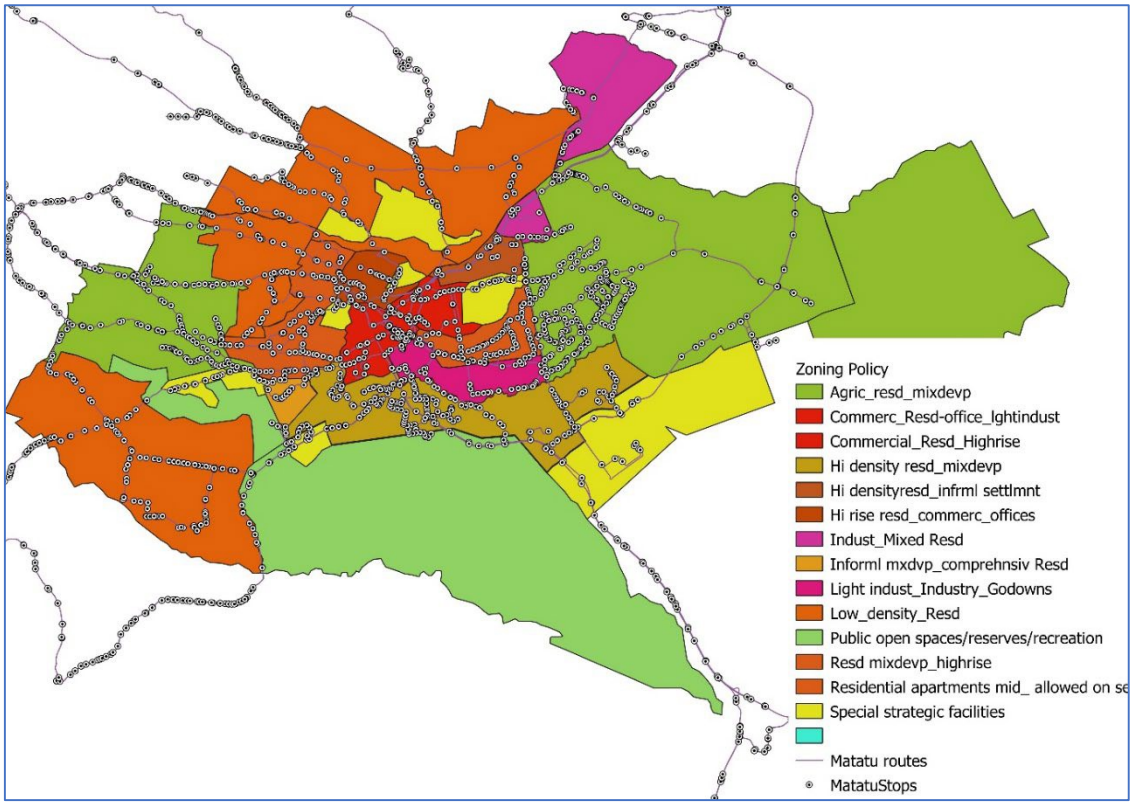
Figure 3-5 Rail network in Nairobi City County

Source: Japan International Cooperation Agency (JICA) 2013

The rail network in Nairobi City County is unevenly distributed and covers only a few sub-counties and wards when compared to the other modes of transport like road. Therefore, the low volume of commuter rail passengers registered in the past years is attributable to low connectivity and accessibility of the rail network.

The main means of transport in Nairobi City County are mini-bus public service vehicles (PSVs), popularly known as *matatus,* at 58.7 percent, followed by walking at 17.1 percent, private cars at 9.7 percent, motorbikes at 3.9 percent, and buses at 3.7 percent. There is varying locational access to jobs for people living in various areas that has led to spatial inequality as discussed by Babijes (2016). It is observed that while nonmotorized modes of transport and PSVs are the predominant modes of transport, private car users have better access to employment opportunities. Using the overall average travel time per trip in Nairobi of 47 minutes, car users could access 58 percent of employment opportunities.

Figure 3-6 Public service routes and stops by zone in Nairobi City County



Source: Japan International Cooperation Agency (JICA) 2013

The matatu stops and routes are multiple, more far reaching, and accessible compared to rail. This makes matatus the more convenient mode of transport for most Nairobi

residents. More stops are concentrated in the central part of Nairobi, a sign of the fact that travel destinations are concentrated here as well. These destinations may include schools, work, home, social, shopping, businesses, or others (JICA 2013).

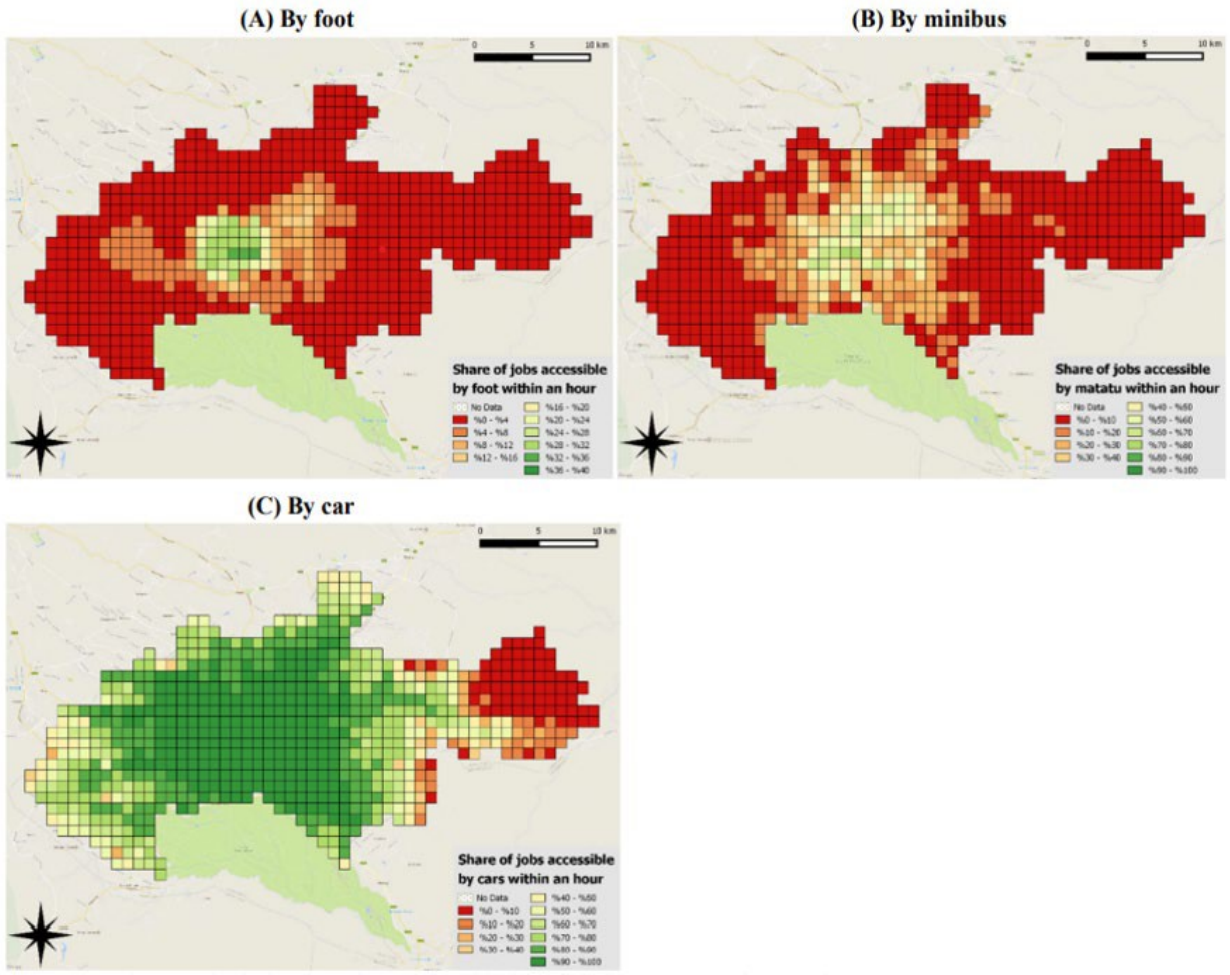
Table 3-3 Commuter train passenger volumes

Routes (000)	2017	2018	2019*
Nairobi-Kahawa	657	690	724
Nairobi-Syokimau	833	874	918
Nairoib-Ruiru	1,136	1,192	1,252
Nairobi-Kikuyu	393	413	433
Nairobi-Embakasi	1,061	1,115	1,170
Nairobi-Dandora	236	247	260
Total passengers (000)	**4,315**	**4,531**	**4,758**

**Data collected is not for the full year*
Source: Kenya Railways annual reports (2017-2019)

Most jobs cannot be accessed by foot or minibus within an hour. Between 36 percent to 40 percent of the jobs accessible by foot are centrally located. Majority of jobs that can be accessed by minibus within an hour are located in the central part of Nairobi. However, the trend is different for job accessibility by car—70 percent to 100 percent of jobs are accessible by car in most parts of Nairobi, with lower shares in the east. This coincides with the distribution of paved and unpaved roads in Nairobi. In the far western part of Nairobi, where there are mostly poor unpaved roads, a lower number of jobs can be accessed by car, foot, or minibus.

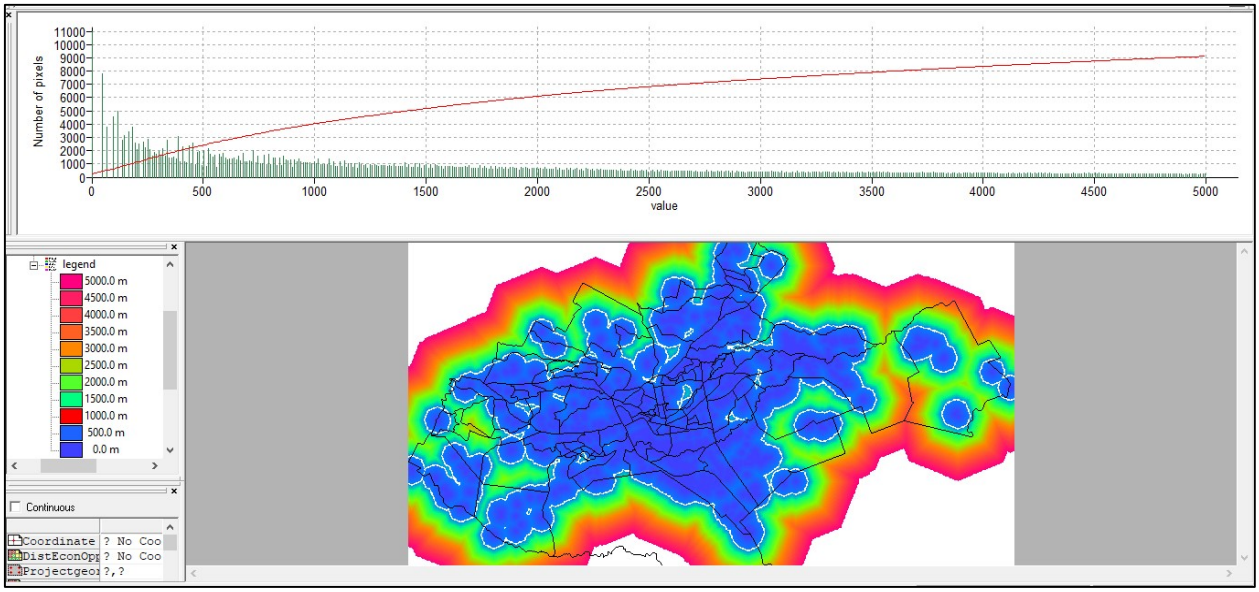
Figure 3-7 Share of accessible jobs within 60 minutes by mobility mode in Nairobi City County



Source: World Bank 2018

Areas with closer proximity to jobs and economic opportunities were captured in Figure 3-8 as areas within the city near commercial and industrial land uses. The proximity map shows that there are more pixels (spatial area covered) within 2 km of jobs/economic opportunity zones. There is spatial differentiation in locational access to jobs indicating spatial inequality. However, the map does not consider road network routes or residents' mode of transport choice or options due to data limitations.

Figure 3-8 Proximity to jobs and economic opportunities in Nairobi City County

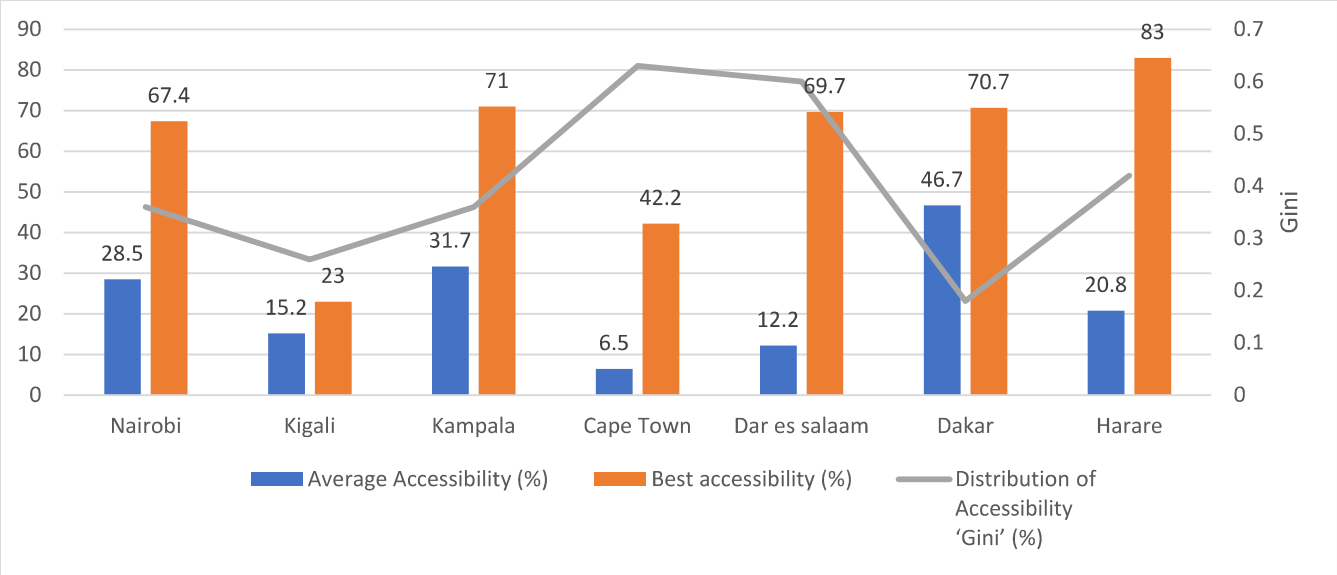


Source: Authors' calculation using GIS software.

According to a World Bank study by Tatiana, Tamara and Pablo (2019) on accessibility to employment opportunities in some African countries, the average accessibility in Nairobi is lower (28.5 percent) compared to other cities like Kampala (31.7 percent) and in Dakar that had the highest in the srudy (46.7 percent). Harare had best access level at 83 percent followed by Kampala at 71 percent. For Nairobi, this number was 67.4 percent. Average accessibility refers to the percentage of estimated employment opportunities accessible to an average person within an hour, while best access level (accessibility) is the highest percentage of jobs accessible from the single best-positioned location. The percentage of jobs accessible to each population percentage group is the distribution of accessibility, also called the Gini coefficient.

The Gini coefficients ranging from 0.36 to 0.42 are marked by relative linearity in terms of access distribution amongst the population and show substantial differentiation only at the higher levels of access, affecting relatively small proportions of the population.

Figure 3-9 Accessibility metrics for Nairobi and comparators



Source: World Bank -Tatiana, Tamara and Pablo (2019)

Table 3-4 Accessibility metrics for Nairobi based on World Bank 2019 study

City	Average accessibility	Best access level	Distribution of accessibility Gini
Nairobi	28.5%	67.4%	0.36

Source: World Bank- Tatiana, Tamara and Pablo (2019)

The distribution of access shows the percentage of jobs accessible by each percentage of the population (Table 3-5). The results show cumulative accessibility, which is the percentage of jobs accessible by each percentage of the population, at 5 percent intervals. In Nairobi, 51 percent of the population has access to at least 30 percent of the job opportunities and 0 percent of the population has access to more than 65 percent of the job opportunities.

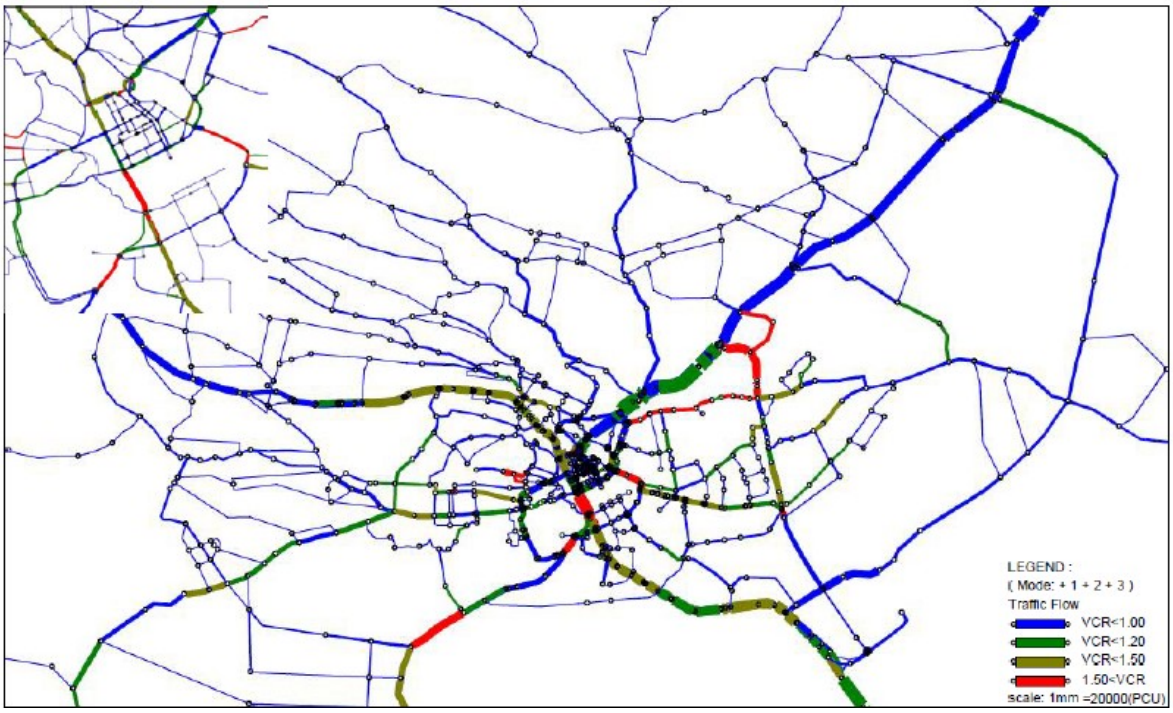
Table 3-5 Percentage of the population with access to x% of opportunities in Nairobi

Percentage of jobs accessible by each percentage of the population, at 5% intervals	Percentage of the population (cells) with access to x% of jobs (rows) in each urban area
	Nairobi
>0%	100%
>5%	85%
>10%	78%
>15%	71%
>20%	64%
>25%	58%
>30%	51%
>35%	43%
>40%	35%
>45%	22%
>50%	11%
>55%	4%
>60%	1%
>65%	0%
>70%	0%
>75%	0%
>80%	0%
>85%	0%
>90%	0%
>95%	0%
100%	0%

Source: World Bank 2019

Traffic congestion affects accessibility by causing variability in travel speed and times. According JICA (2013), the average travel speed in Nairobi was 40 km/hr. Figure 3-10 shows traffic congestion on the road network and measures the volume of traffic to capacity of the road network ratio (volume-to-capacity ratio; VCR). The average VCR for the road network in Nairobi was 0.69.

Figure 3-10 Traffic volume-to-capacity ratio for Nairobi (2013)

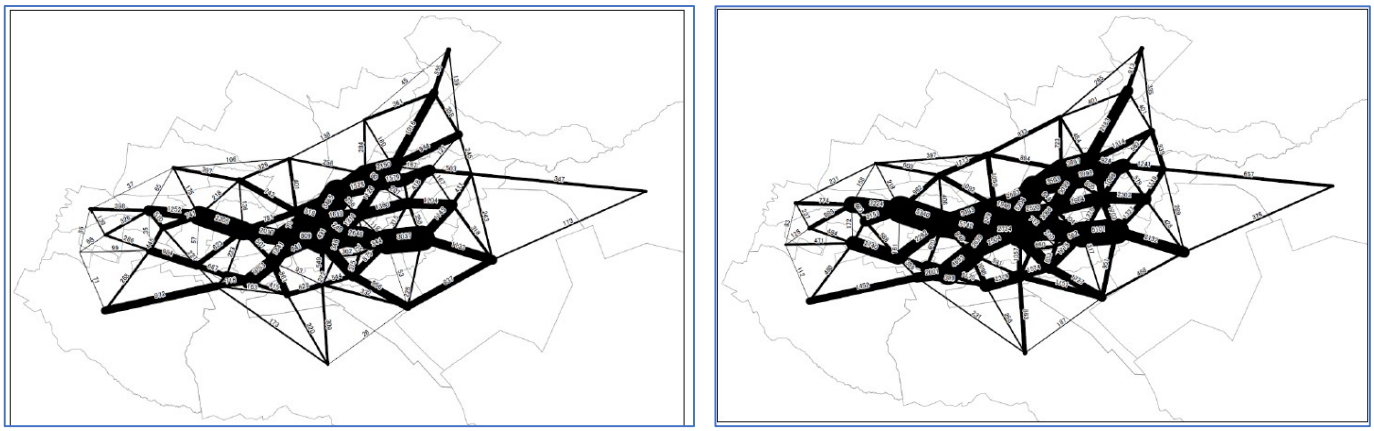


Source: JICA 2013

As exhibited by the darker lines in Figure 3-11, a majority of the flows (spatial interaction) in 2013 were toward the central and northwestern areas of Nairobi. The lines represent trip direction and distribution with the trips into the city center being more in 2013 and forecasted to increase by 2030. These lines also show the city transport network and its compact nature, especially at the city center as seen in figure 3-6. Metropolitan areas outside Nairobi's core depicted low levels of flows with lesser concentrations of trips in 2013 and 2030. This can be explained by the monocentric nature of development in Nairobi where most activities are concentrated in the central areas of the city. The number of lines and concentration outside the city center have been forecasted to increase by 2030. This can be interpreted to symbolize potential growth and spread of economic activities, employment opportunities, and development in these areas.

Figure 3-11 Trip distribution and total trips (desire lines) in Nairobi

a) 2013 b) 2030 forecast



Source: JICA 2013

Table 3-6 Travel demand framework (2013 base, 2030 forecast)

		2013	2018	2023	2030	Remark
a	GRDP per Capita (Nairobi) (at 2011 constant Price: KSh)	240,005 (1.000)	294,637 (1.228)	365,247 (1.522)	500,200 (2.084)	
b	GRDP per Household (Nairobi) (at 2011 constant Price: KSh)	748,816 (1.000)	901,589 (1.204)	1,092,089 (1.458)	1,445,578 (1.930)	
c	Household Size: (Person per Household)	3.12	3.06	2.99	2.89	
d	Population: (Person)	3,601,351	4,174,952	4,677,671	5,212,500	
e	Number of Household	1,154,279	1,364,364	1,564,439	1,803,633	
f	Average Household Income: (KSh)	36,540	44,000	53,300	70,500	
g	Car Ownership Rate per Household	29.9%	32.8%	41.3%	58.6%	$y = 3.286E\text{-}11x^2 + 5.998E\text{-}06x$
h	Number of Private Car	345,685	447,500	646,100	1,056,900	
i	Population Age 5 & Above: (Person)	3,141,928	3,642,920	4,082,148	4,549,696	
j	Student at Residence Base: (Person)	953,813	1,190,009	1,427,494	1,737,357	
k	Worker at Residence Base: (Person)	1,647,869	1,950,933	2,230,666	2,554,768	
l	Student at Enrolment Base: (Person)	953,813	1,190,009	1,427,494	1,737,357	= j
m	Worker at Work Place Base: (Person)	1,812,869	2,146,279	2,454,021	2,810,575	
n	Un-employee: (Person)	540,245	501,978	423,987	257,571	= i - j - k

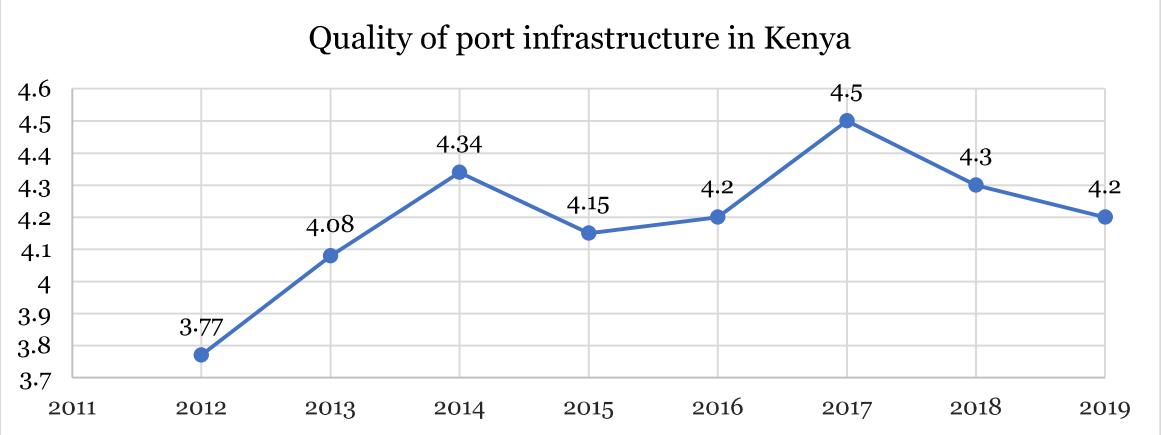
Source: JICA 2013

3.2.3 Intercity and international accessibility

According to the Global Competitiveness Index, Kenya has shown an improving trend in the quality of infrastructure from 3.77 points in 2012 and 4.2 points in 2019; a maximum of 4.5 points was recorded in 2017. For comparison, the world average in 2019 based on 139 countries stood at 4.03 points. The quality of Kenya's port infrastructure is above the world average and contributes to the transport pillar of the overall global competitive

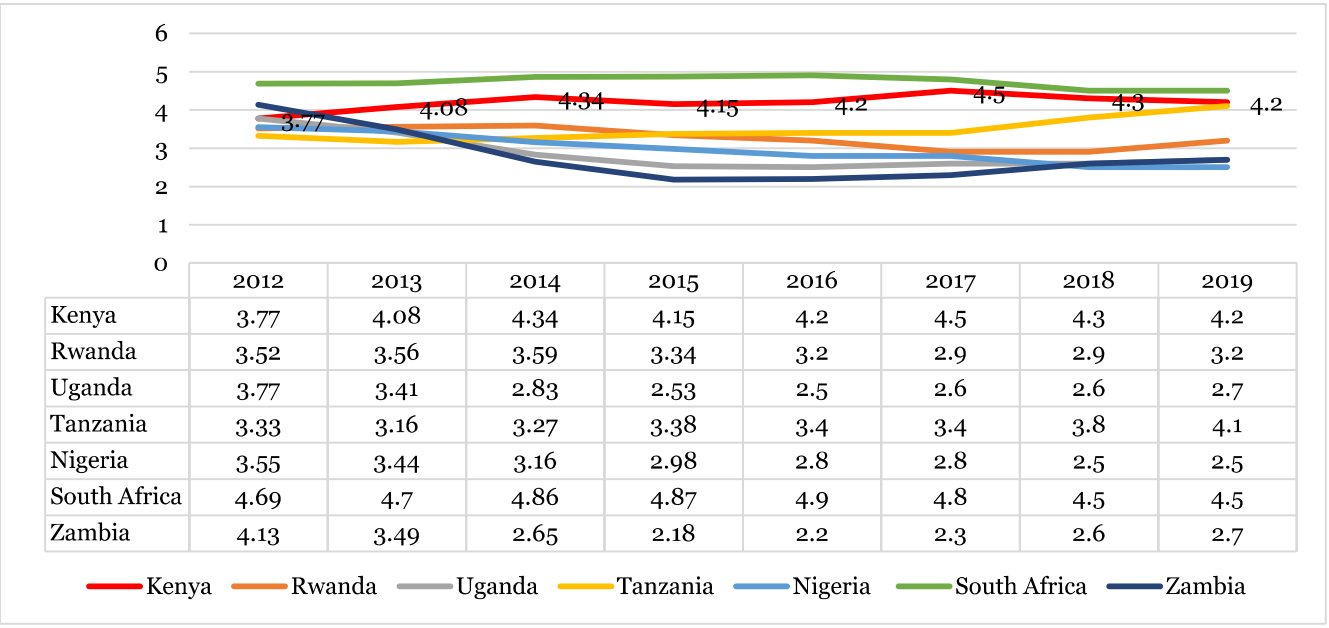
index. The value score ranges from one to seven, with one being extremely poor quality, among the worst in the world, to seven, which is extremely good and among the best in the world. This score is based of respondents' answers to the question of rating the country's port facilities from one (underdeveloped) to seven (extensive and efficient by international standards). For landlocked countries, the respondents are asked to rate access to port facilities and inland waterways on a scale from one (impossible) to seven (easy). Nairobi City County does not host any port but plays a key role as a transit point and dry port for goods transported from the Port of Mombasa. The dry port is linked by rail with the Port of Mombasa and brings port services closer to customers in the hinterland through a special rail terminal service. Some of the benefits of the dry port include reduced inland transport costs for shippers, enhanced dispatch of import and off take of exports, improved security of cargo, and decongestion of the Port of Mombasa.

Figure 3-12 Quality of port infrastructure in Kenya



Source: World Economic Forum 2019

Figure 3-13 Quality of port infrastructure with comparators

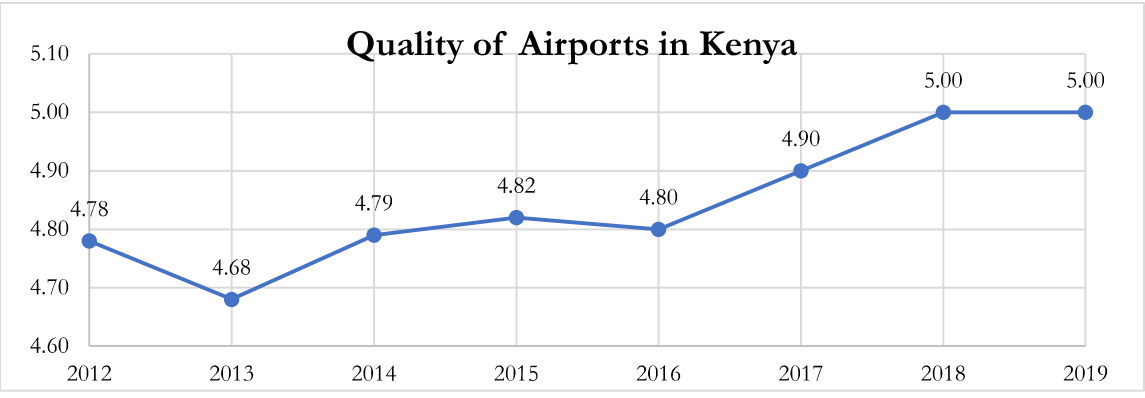


	2012	2013	2014	2015	2016	2017	2018	2019
Kenya	3.77	4.08	4.34	4.15	4.2	4.5	4.3	4.2
Rwanda	3.52	3.56	3.59	3.34	3.2	2.9	2.9	3.2
Uganda	3.77	3.41	2.83	2.53	2.5	2.6	2.6	2.7
Tanzania	3.33	3.16	3.27	3.38	3.4	3.4	3.8	4.1
Nigeria	3.55	3.44	3.16	2.98	2.8	2.8	2.5	2.5
South Africa	4.69	4.7	4.86	4.87	4.9	4.8	4.5	4.5
Zambia	4.13	3.49	2.65	2.18	2.2	2.3	2.6	2.7

Source: World Economic Forum 2019

Nairobi City County hosts the Jomo Kenyatta International Airport, which is the largest international airport in Kenya, and Wilson Airport. According to the Global Competitiveness Index, the quality of airport average value for Kenya registered an improving trend from 4.78 points in 2012 to 5.00 in 2019 with a minimum of 5.00 points in both 2018 and 2019. For comparison, the world average stood at 4.55 points in 2019 based on 141 countries. These scores range between one and seven, with one being extremely poor quality and seven being extremely good quality.

Figure 3-14 Quality of air transport infrastructure in Kenya

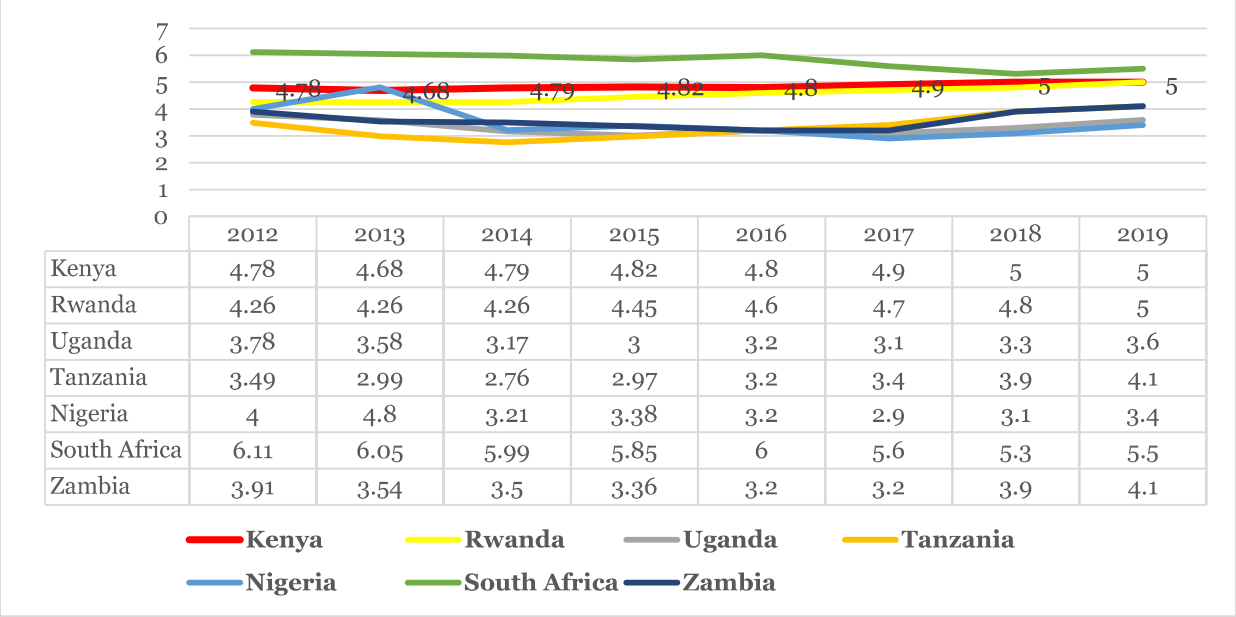


Source: World Economic Forum 2019

Note: The quality of air transport infrastructure represents an assessment of the quality of airports in a given country based on data from the World Economic Forum's Executive Opinion Survey, a long-running and extensive survey tapping the opinions of more than 14,000 business leaders in 144 countries. The

score for the quality of air transport infrastructure is based on only one question. The respondents are asked to rate the passenger air transport in their country of operation on a scale from one (underdeveloped) to seven (extensive and efficient by international standards). The individual responses are aggregated to produce a country score.

Figure 3-15 Quality of transport logistics and infrastructure with comparators

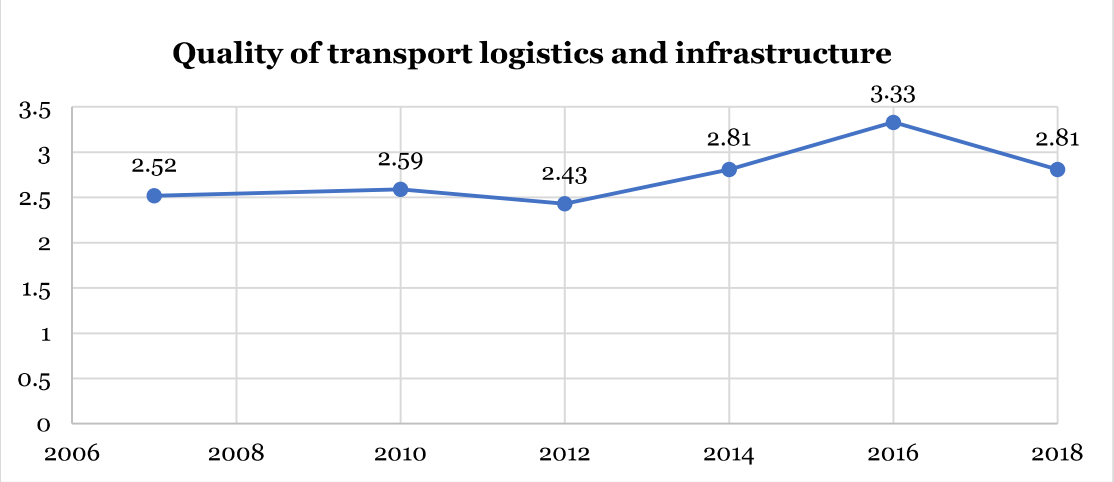


	2012	2013	2014	2015	2016	2017	2018	2019
Kenya	4.78	4.68	4.79	4.82	4.8	4.9	5	5
Rwanda	4.26	4.26	4.26	4.45	4.6	4.7	4.8	5
Uganda	3.78	3.58	3.17	3	3.2	3.1	3.3	3.6
Tanzania	3.49	2.99	2.76	2.97	3.2	3.4	3.9	4.1
Nigeria	4	4.8	3.21	3.38	3.2	2.9	3.1	3.4
South Africa	6.11	6.05	5.99	5.85	6	5.6	5.3	5.5
Zambia	3.91	3.54	3.5	3.36	3.2	3.2	3.9	4.1

Source: World Economic Forum 2019

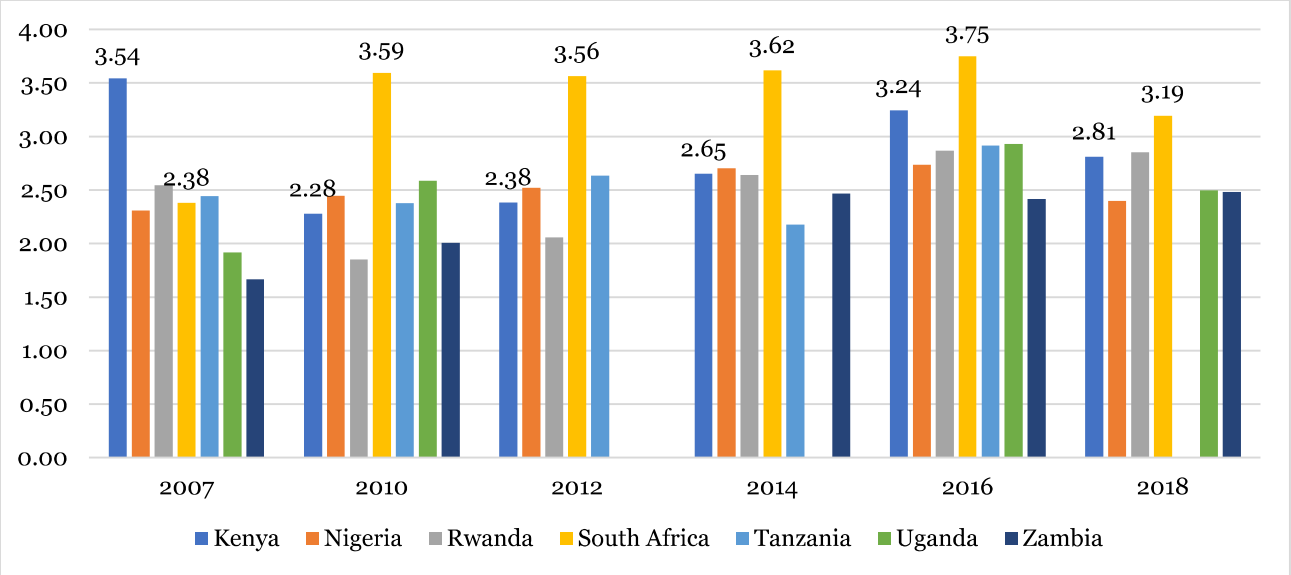
According to the World Bank's Logistics Performance Index,(2018), Kenya's quality of transport logistics and infrastructure registered an increasing trend from 2.52 points in 2006 to 2.81 points in 2019. However, a slight drop of 0.52 was recorded in 2018.

Figure 3-16 Quality of transport logistics and infrastructure in Kenya



Source: Logistics Performance Index- World Bank (2018)

Figure 3-17 Quality of Kenya's transport logistics and infrastructure with comparators



Source: Logistics Performance Index- World Bank(2018)

3.2.4 Access to open spaces

Public space has emerged as a critical lifeline for cities and their residents. It has proven to be a timeless risk-reducing infrastructure, an essential urban service, and an infrastructure of opportunity especially in times of crisis, including during the COVID-19 pandemic. Nairobi has experienced major developments in public spaces in the recent past. For instance, the Nairobi River Life project is a joint flagship initiative of the Kenyan government and UN-Habitat aimed at reclaiming the Nairobi River as a shared public good that supports better urban and environmental performance for a better quality of life in the city. This section highlights the gaps in the distribution, accessibility, and quality of public open spaces in Nairobi, and provides a starting point for developing an evidence-based strategy and policy for the protection, revitalization, creation, management, and enjoyment of public spaces, and restoration of the city.

3.2.4.1 Public open spaces per typology

The typologies of public open space include urban forests, cemeteries, parks and gardens, squares and courtyards, and road reserves among others. However, Nairobi's Public Open Space ecosystem is dominated by potential public open spaces, such as derelict land; infrastructure rights of way, such as electricity wayleaves; railway reserves; and riparian reserves. Other typologies of public spaces in the city include amenity green spaces, public parking lots, street corners, and other non-defined spaces which include disused quarries.

Table 3-7 Public open spaces per typology in Nairobi

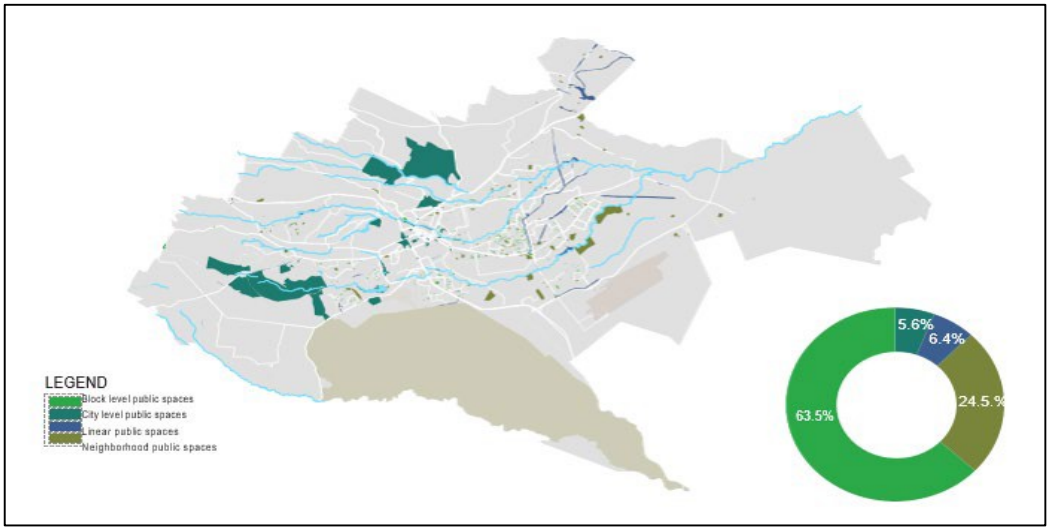
#	Typology	Number	Area (ha)
1.	Urban forests	2	***1,930.3***
2.	Nature reserves	2	*94.1*
3.	Parks and gardens	34	*129.6*
4.	Playgrounds	99	*90*
5.	Cemeteries	6	*10.2*
6.	Squares	14	*11.6*
7.	Sports fields	51	*65.5*
8.	Courtyards	413	*56.6*
9.	Infrastructure ROW	5	***319.6***
10.	Others	206	*398.9*
#	***Total***		***3,106.6***

Source: UN-Habitat 2021

Classification of public spaces by scale indicates Nairobi has 526 block-level public spaces. The majority of these are courtyards, playgrounds, and gardens. There are 203 neighborhood-level public spaces in the city like include neighbourhood squares gardens, neighbourhood parks and sports fields. These include neighborhood squares, gardens, parks, and sports fields.

Nairobi also has 46 city-level public spaces. These include the large and strategic public spaces around the city. On the other hand, the city has 53 linear spaces like infrastructure rights-of-way, electricity wayleave, railway reserve, and road reserves that can be potential public spaces.

Figure 3-18 Classification of public spaces in Nairobi by scale



Source: UN-Habitat 2020

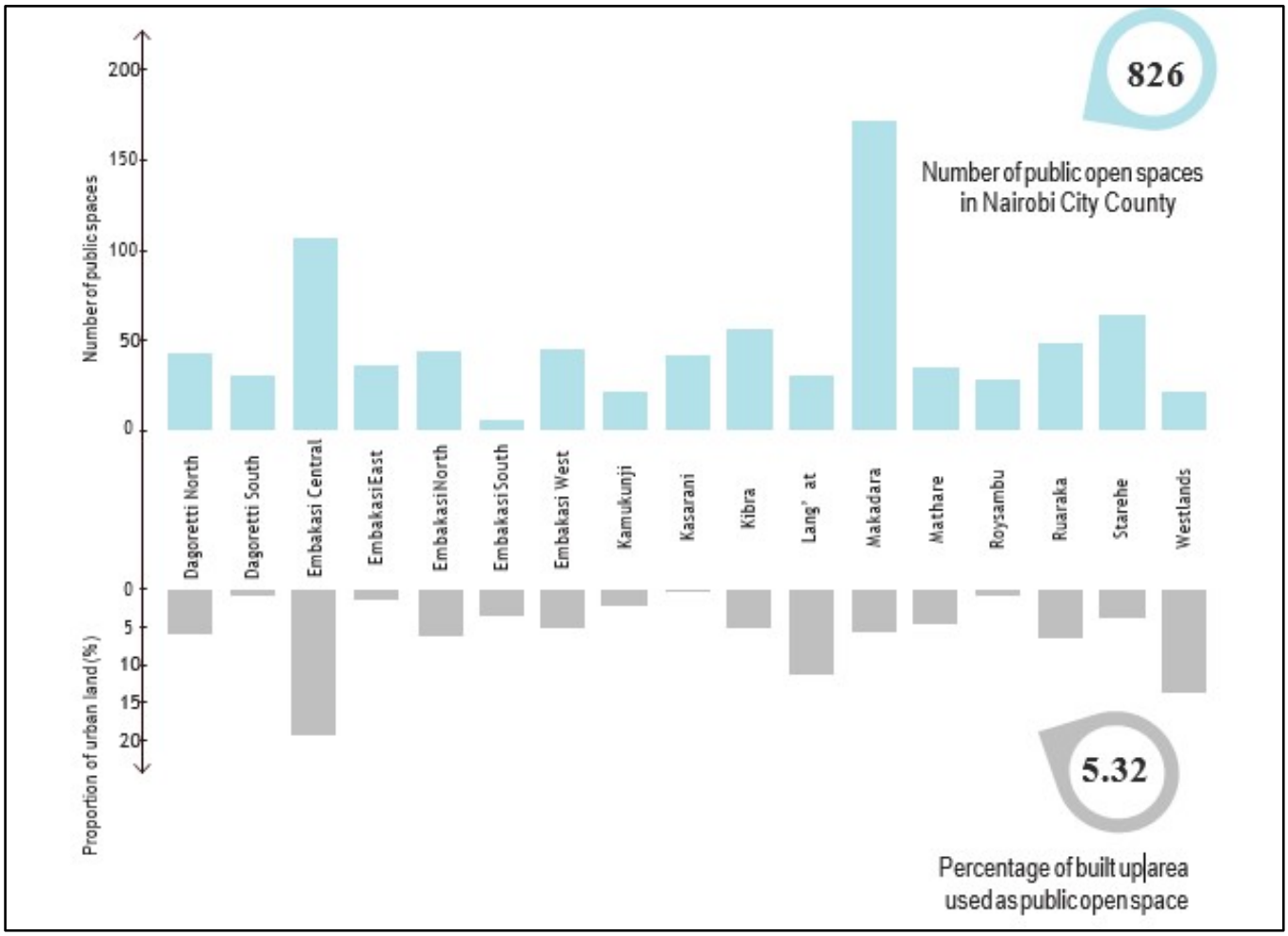
3.2.4.2 Distribution of public spaces in Nairobi City County

The distribution of public open spaces in Nairobi City reinforces the social and economic inequalities regarding access. Equitable distribution of public spaces across the city is an important element for creating a cohesive city, balancing growth, and revitalizing impoverished communities and inner-city neighborhoods.

Overall, the public spaces in Nairobi City County occupy a combined area of 3,106.4 ha. This is equivalent to 5.32 percent of the built-up area and translates to 6.56 square meters per capita public open space.

Evidence shows that successful cities have at minimum 15 percent to 20 percent of urban land allocated to public open spaces. There is a clear need for Nairobi to work toward improving the amount of its urban land that is designated, used, and experienced as public space. This is particularly important to future-proof the city from stress and such shocks as climate and health disaster risks.

Figure 3-19 Disparities in the distribution of public spaces in Nairobi City County



Source: UN-Habitat 2020

3.3 Conclusion

The mismatch between zoning and land use in Nairobi City County has contributed to a shortage of land, especially for public infrastructure, resulting in a delay in projects and demolition of buildings and structures erected on wayleaves.

Land use trends in Nairobi have changed over the years with a growing preference for residential and commercial developments. Therefore, planning that is cognizant of population growth and other emerging issues is essential to ensure balanced development.

Nairobi CBD is connected with road networks that are in good condition compared to the periphery, which is characterized by fair to poor roads, indicative of the existing constraints in connecting the city to the suburbs.

A lack of planning, inappropriate land use regulations, unclear land rights, conflicts between informal and formal markets, and legacy issues all can contribute to informal fragmentation of land which is disconnected from trunk infrastructure and basic services.

The rail network in Nairobi City County is unevenly distributed and covers only a few sub-counties and wards when compared to the other modes of transport like roads. In addition, the low volume of commuter rail passengers registered in the past 4 years is attributable to the lack of uniform connectivity and accessibility of the rail network.

Most jobs are not accessible within an hour by foot or minibus. Most of those that are accessible by minibus within an hour are in the central part of Nairobi. Seventy percent to 100 percent of jobs in most parts of Nairobi are accessible by car, with lower shares in the eastern side of Nairobi.

There is a higher concentration of trips in the city center compared to other parts of the city. This can be attributed to the high concentration of jobs and the transport network in the city center.

There is varying accessibility to jobs in different locations across the city, bringing about spatial inequality. However, the coverage map does not consider road network routes or residents' transport modal choice or options.

The average accessibility across other cities in sub-Saharan Africa is higher in Dakar (46.7 percent) and Kampala at (31.7 percent), ahead of Nairobi (28.5 percent). For best accessibility, Harare stood at 83 percent followed by Kampala at 71 percent. For Nairobi, this number was 67.4 percent.

In Nairobi, 51 percent of the population has access to at least 30 percent of the job opportunities and 0 percent of the population has access to more than 65 percent of the job opportunities.

Traffic congestion affects accessibility by causing variability in travel speed and times. The average travel speed was 40 km/hr. The average VCR, a measure of traffic congestion, for the road network in Nairobi was 0.69.

The majority of the flows (spatial interaction) are toward the central and northwestern areas of Nairobi's core. Metropolitan areas outside the core have low levels of flows. This can be explained by the monocentric nature of development in Nairobi where most activities are concentrated in the central areas of the city.

Nairobi City County is connected internationally via air, road, and rail transport and logistics networks and have shown a trend of improving competitiveness over the past years.

3.4 Policy recommendations

In the face of the increasing scarcity of land for infrastructure development caused by the lack of compliance with physical and land development, the Nairobi City County and national governments should expedite the updating of the land register land appraisal system and resolve pending land conflicts.

A high concentration of poor unpaved roads in high-density informal settlements makes it hard for residents to access jobs and services. The high concentration of trips in the city center caused by the concertation of transport networks and job opportunities there contributes to creating traffic jams that have negative economic impacts. The county and national governments should, therefore, step in and improve the quality of roads in the informal areas and expand the road network in the outer parts of Nairobi to improve access.

The county needs to embed public space in Nairobi's urban planning and further allocate resources for the creation of new public spaces as well as protection, management, and maintenance of existing spaces. In addition, urban planning tools, such as land regeneration and urban renewal, must be used to create more public spaces.

There is a need to harmonize development with current user needs while still ensuring a sustainable development balance is attained in the short and long run. There is also a need to fast-track the review of "Nairobi City Council: A Guide of Nairobi City Development Ordinances and Zones" to harmonize development control with the prevailing city needs and priorities.

A land value index should also be developed to compensate the county for mandatory acquisition of land for government projects and investments and land value tax.

The county and national governments need to develop programs to improve connections between intermediate cities and their hinterlands, improve exchanges around economic blocs, improve connections with urban hinterlands, and strengthen the agglomeration of economies.