

THE NAIROBI SPRAWL; MISERY OR FELICITY?

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ABSTRACT

The Nairobi Sprawl; Misery or Felicity

The city of Nairobi was founded in 1899 as a railway town of the Uganda Railway. The Nairobi site was situated about midway between the port of Mombasa and Kisumu on Lake Victoria, which were to be the two termini of the railway line.

The Plan for a Railway Town (1898), the Plan for a Settler Capital (1927) and the Plan for a Colonial City (1948), guided the urban development of Nairobi during the colonial period. Over the years, the city has grown to become a metropolis of more than four (4) million people. However, unlike the colonial period the city has grown informally without clear guidelines for its development.

At independence in 1963, there was a relaxation on the movement of Africans leading to a massive population growth of Nairobi. The colonial development control mechanisms that were inherited by the new African regime were unable to provide the requisite urban goods and services. This led to the production of these goods and services through informal processes. The Metropolitan Growth Strategy of 1973 was never fully implemented, and the city continued to grow informally.

Nairobi became an enormous urban sprawl, making travel time quite long between residences and places of work. This has not been made any better by the collapse of the public transport system and the dependence on the chaotic privately run *matatu* transport system.

In 2014 a proposal for the Integrated Urban Development Master Plan for the city of Nairobi (NIUPLAN) was launched. This plan is meant to address the challenges facing the city. However, not much has happened as a result of this launch and most Nairobians continue to live in misery on a day to day basis. Surprisingly Nairobi has at the same time become the choice destination for local and international real estate developers.

This paper argues that unless a sustainable urban infrastructure is realized, the city of Nairobi may one day grind to a halt. This is the fate that befell Old Delhi give rise to the establishment of New Delhi.

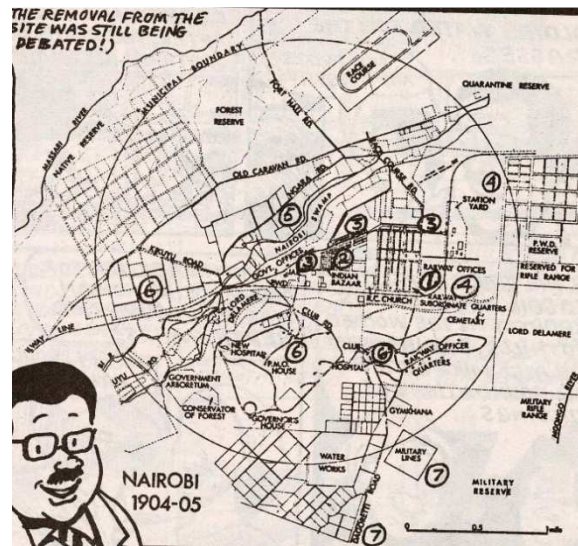
KEYWORDS: Sprawl, Colonial, Railway, Informal, Sustainable

INTRODUCTION

The city of Nairobi was established in 1898 as a railway town for the Uganda Railway. The interest of the British Government was to layout a town in the interior from where the “Kings Rifles” could control this part of East Africa. The Plan for the Railway Town, only considered the European employees of the Railway, and the European and Asian traders. The plan completely ignored the Asian labourers or coolies and Africans (Emig&Ismail, 1980, Thornton White et al. 1948, Hake, 1977).

Although the site the town of Nairobi was suitable for railway functions and had a favourable climate for Europeans, it was basically a wetland (Enkare Nyaribe)¹, which in later years created acute sanitation and drainage problems. During this founding period, there was talk of moving the location of the settlement on health grounds, but no decision was made, and the settlement remained. Writing in 1906, Winston Churchill said that; “it is now too late to change, and thus lack of foresight and of a comprehensive view leaves its permanent imprint upon the countenance of a new country” (Anyamba, 2008).

From the beginning, Nairobi was designed for settlement containment rather than growth. In fact by 1905, a municipal boundary had been demarcated arbitrarily to enclose an area of 18km² (Figure.1). The centre of this circular boundary was the Government Offices at the head of Station Road (now Moi Avenue) (Halliman&Morgan, 1967, Hirst, 1994). During this early period, the dominant mode of transporting goods was by ox-drawn carts as can be seen in Figure. 2.



Source: Adopted from Hirst, 1994:37

Figure 1: Layout of Nairobi c 1905



Source: Adopted from Nevanlinna, 1996: 102

Figure 2: Bazaar Street c 1904

The town rapidly grew to become a settler capital by 1927. At this time the colonial regime had restricted the movement of Africans, where only authorized Africans could live within the town's boundary. This gave rise to the development of African villages on the periphery of the municipal boundary. The construction of these villages intensified after the First World War (WWI), when several settlements consolidated. These villages included; Kangemi, Kawangware,

¹ Enkare Nyaribe- Maasai word for a place of cold water

Kileleshwa, Kibera, Masikini, Pumwani, Pangani and Mombasa. By 1921, 12,088 Africans were living in these eight villages (Hirst, 1994, Anyamba, 2008).

Nairobi's European citizenry had however long viewed the town's unregulated African villages as havens of disease and criminality, and advocated for their demolition as a sign of better social control and improved public health (Anderson in Burton, 2002:142).

At the same time, consciously or unconsciously, the European settlers designed their city around a personalized transport; first were the horses, bikes and rickshaws, and then the motor car ruled. The first car appeared in Nairobi in 1902, and by 1928 with 5,000 cars, Nairobi was the most per capita motor-ridden city in the world for Europeans (Hirst, 1994:65)². This privatized approach to transportation was later to haunt the city and propagated urban sprawl. In fact the reliance on personalized transport still persists today after the collapse of the public bus transport of the 1960s, 70s and 80s.

After the Second World War (WW II), the position of settlers in the management of Nairobi weakened. The municipal authorities also for the first time accepted to accommodate African families within the municipality (Hirst, 1994, Anderson in Burton 2002). These post-war circumstances led to the further expansion of Nairobi, which necessitated the 1948 Master Plan for a colonial capital. The Master Plan was conceived as a key plan for the general physical, economic and social development of Nairobi over a period of 25 years.

The 1948 Master Plan, aimed to confine further growth within existing boundaries of the municipality as determined by the 1926 Feetham Commission, at 32.4MI²(84Km²). However, despite all the planning, Nairobi was on a decline and was quickly becoming a "self-help-city" for the vast majority who operated a subsistence economy (Hirst, 1994). By the eve of independence in 1963, the Nairobi cityscape was characterized not by "model" housing estates, but by the burgeoning shanties, whose poverty and squalor stood as testament to historic inadequacies of colonial municipal government (Anderson in Burton, 2002:140)

At the independence in 1963, the new African regime opted for a policy of continuity rather than change. Thus the colonial urban development instruments continued to be used with little success. The municipal boundary was increased from the previous 91Km² to 684Km² (Figure 3). After independence, the informal sector which had always been there, started to make itself felt in the economy. It became the main provider of urban goods and services.

The 1973 Metropolitan Growth Strategy that was supposed to mitigate the urban development of the city was never fully implemented. With regard to public transport, the Kenya Bus Service and the Nyayo Bus collapsed in the 1990s. Currently the privately controlled "Matatu" transport is the dominant mode of public transport.

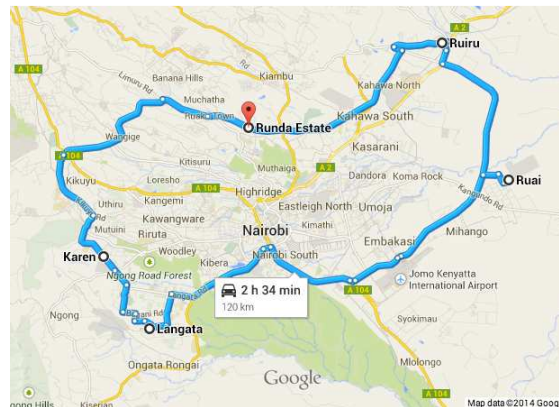
² Harvey, 1986:2, argues that space and time are forms of social power, therefore in order to control time and space, a car and home ownership make an attractive combination.



Source: Adopted from Hirst, 1994:138/9

Figure 3: Nairobi City Area

The provision of urban housing is also dominated by private sector. Since there is a dearth of affordable serviced land near the city centre, more and more developers are developing housing further away from the city centre. Thus generating an urban sprawl that will be discussed later in this paper. The Nairobi Integrated Urban Plan (NIUPLAN) was launched last year. This plan is supposed to address the challenges facing the city of Nairobi including; transportation, housing provision and other urban goods and services. The Plan proposes polycentric intermediate centres at forming a ring around the CBD (Figure 4). Time will tell whether this plan will be implemented.



Source: JICA Maps

Figure 4: NIUPLAN 2014

We now discuss urban sprawl in general before focusing of sprawl in Nairobi.

URBAN SPRAWL

There is ambiguity in defining exactly what urban sprawl is and how it should be measured. Like sprawl itself, writing about sprawl is scattered in a vast multidisciplinary literature. The way urban sprawl is measured is determined by how it is defined. Similarly the methods used to measure urban sprawl are determined by spatial data (Banai & De Priest, 2014).

Sprawl means different things to different people. While some see sprawl as an unintended consequence of a lifestyle in a suburban house and auto commute to work, others consider it as a waste of resources-land, water, air and energy-and, above all else, inimical to civic life if not the economy and society (Banai & De Priest, 2014). Although urban sprawl has generally been viewed as a negative phenomenon, it also has advantages as will be discussed later in this paper. Urban sprawl has different impacts on the urban environment that require different mitigating instruments in order to

generate sustainable urban environments.

Definition of Urban Sprawl

In general, urban sprawl or suburban sprawl describes the expansion of human settlements away from central urban areas into low density mono-functional and usually car-dependent communities. The above notwithstanding many scholars have defined or conceptualized urban sprawl differently.

Brueckner, 2000 argues that urban spatial expansion results mainly from three forces; a growing population, rising incomes and falling commuting costs. Thus urban sprawl is the excessive spatial growth of cities. Amarawickrama, et al. 2015, posit that many scholars agree that there is no clear consensus regarding what “urban sprawl” is or what causes it. They argue that urban sprawl can be defined on the basis of different parameters such as; density, concentration, proximity to services, automobile dependency and extend of vegetation cover. Further they see urban sprawl as a multidimensional phenomenon which is conceptualized in different ways by different scholars.

This multifaceted phenomenon is observed as a pattern, process, cause and consequence. It is a pattern of residential and non-residential land use, a process of extending urbanized areas, a cause of particular land use practices and a consequence of those land use practices. Finally Amarawichrama et al. define urban sprawl as a pattern and process that expands the spatial boundaries of urban areas over a period of time.

Banai and De Priest, 2014 also argue that there is ambiguity in defining exactly what urban sprawl is and how it should be measured. In addition they state that each specialization has its own “language” of sprawl. The differences in language and perspectives (e.g. architects, planners, real estate agents, bankers, land-use regulators), contributes to the lack of a cohesive definition. Hayden, 2000:8, defines sprawl as “a process of large-scale real estate development resulting in low-density, scattered, discontinuous car-dependent construction, usually on the periphery of declining older suburbs and shrinking city areas.

Bourne, 2001:26 recounts observations about sprawl as:-

- Any extension of the suburb margin
- The spread of development into sensitive green fields and agricultural soils.
- Increases in highway congestion
- The proliferation of new subdivisions of homogenous and low-density, single family housing.
- A “suburban development” that is haphazard, disorganized, poorly serviced and largely unplanned.

This fifth observation is the most applicable to Nairobi’s urban sprawl.

Causes of Urban Sprawl

There are many causes of urban sprawl. However, theoretically some scholars interpret urban sprawl as an outcome of market failure, where “the invisible hand fails to allocate resources in a socially desirable manner” (Banai and De Priest, 2014). Similarly, Brueckner, 2000 has argued that three market failures may lead to excessive spatial growth of cities (sprawl). These failures are:-

- Failure to take into account the social value of open space when land is converted to urban use.
- Failure on the part of individual commuters to recognize the social costs of congestion created by their use of the road network, which leads to excessive commuting and cities that are too large.
- Failure of real estate developers to take into account all the public infrastructure costs generated by their projects.

In America for example, the consumption of large amounts of living space at affordable prices is one of causes of urban sprawl. While in Nairobi, the conversion of riparian zones into informal settlements is a major cause of urban sprawl. Similarly in Colombo, the cultural obsession for “my own home” in Sri Lankan society, which is always craving the freehold ownership of properties, make people buy land and build their own houses. This trend reduces the vegetation cover beyond the Colombo Municipal Area and further propagating urban sprawl (Amarawickrama, et al. 2015).

Measurement of Urban Sprawl

Measurement of urban sprawl has become a difficult task because of the “conceptual ambiguity and lack of consensus” among researchers on what sprawl is (Amarawickrama, et al. 2015). The way urban sprawl is measured is determined by how it is defined. Similarly, the methods used to measure urban sprawl are determined by spatial data (Banai and De Priest, 2014).

Notwithstanding the contentions with regard to sprawl, the definitions suggest the sprawl indicators among which are the density of population and dwelling units (persons per hectare and dwellings per hectare). Other indicators of sprawl are consumption versus conservation of land. Per capita consumption of land is used as an indicator of efficient growth. For example, Washington D.C. consumed 480m²/person compared to Portland’s 120m²/person. The lower per capita consumption of land indicates a more compact development and less sprawl (Banai and De Priest, 2014).

The progression and the phased spread of urbanism are best grasped when mapped and visualized at the metropolitan level-regional scale, which provides the “big picture”. Remote sensing and GIS are commonly used technologies in urban-sprawl research with land-use/land cover change (LULCC) maps. Satellite imagery has proven useful in depicting the bigger picture of sprawl.

Besides remotely sensed data and images, studies of urban sprawl have used readily available census data that are retrieved and visualized with thematic maps and are compatible with widely used GIS. The location and density of jobs data are useful in determining whether the urban structure resembles the polycentric pattern of linked centres or sprawl. Just as sprawl is defined in varied ways, so too are the multiple ways to measure sprawl. Galster, et al. 2000 identify eight measurable dimensions of sprawl; density, continuity, concentration, compactness, centrality, nuclearity, diversity and proximity.

Advantages and Disadvantages of Sprawl

Urban sprawl like most urban phenomena has advantages and disadvantages.

Advantages:-

- Less expensive land in outlying areas around cities
- People are able to afford larger houses on larger lots

- Homes closer to most urban areas are usually more expensive than those farther out in the suburbs.
- Crime Rates Tend to be Lower in Suburbs than in Urban Areas

Disadvantages:-

- Loss of farmland
- Environmental devastation, including loss of tree cover, wildlife habitats as well as polluted drinking water
- Increased levels of smog and air pollution as a result of increased automobile usage. This results in more cases of asthma and other respiratory ailments.
- Increased green house gas emissions impacting on global climate change.
- Longer commutes result in high levels of automobile crashes.
- Car-based living is also credited in part with obesity.

Impacts of Urban Sprawl

Although the conceptual understanding of urban sprawl is blurred, immense negative impacts generated by urban sprawl are obvious. Sprawl creates many challenges for sustainable urban development given inefficient utilization of resources such as land, water and energy. Sprawl also causes pollution, traffic congestion and has aesthetic impacts to the city and its peripheral areas as well (Amarawickrama, et al. 2015).

Commuters incur substantial costs, which include the out-of-pocket expenses of vehicle operation as well as the “time cost” of commuting (Bruecker, 2000). The impact of sprawl on the natural environment includes; low density, dispersion, challenging access to basic services where private vehicle consumption is acute. Many sprawled cities of the south have limited or no open spaces. In this regard Brueckner, 2000 has argued that “ready access to open space provides city dwellers with easy escape from the frenetic urban scene and a chance to enjoy nature”. Such open space benefits however, are not taken into account when land is converted to urban use.

Similarly, a study carried out by the University of Utah in 2014, found out that as the sprawl index improved-that is as areas became less sprawling-several quality of life factors improved along with them:-

- People have greater economic opportunity in compact and connected metro areas.
- People spend less of their household income on the combined costs of housing and transportation in these areas.
- People have a greater number of transportation options available to them
- People in compact, connected metro areas tend to be safer, healthier and live longer than their peers in more sprawling metro areas.

There are other environmental impacts of sprawl including; storm water runoff, water and air pollution, soil degradation and urban heat islands. Banai and De Priest, 2014 argue that literature gives greater attention to the concept of 3Es (Ecology, Economy and Equity) compared to the discussions of the consequences of urban sprawl in ecologic, economic and equity terms for environmental sustainability.

Calthorpe and Fulton, 2001 identify economic and social inequity as both cause and effect of urban sprawl. Alternatively, making the land-use-transportation-air quality (LUTRAQ) connection is an exemplary holistic (epistemic) system that links environmental consequences of urban form with alternative land use and transportation options, increasing density or intensity of land use that supports “walking, biking and transit use” contrasting auto-dependent sprawl (Banai and De Priest, 2014).

Mitigating Urban Sprawl

Brueckner, 2000 posits that there are three remedies for urban sprawl; development taxes, congestion tolls and impact fees. When new housing development is built, roads and sewers must be constructed, and facilities such as schools, parks, and recreational areas are needed. Homeowners through the property tax system, pay for this infrastructure. However, this is not the case in Nairobi, as no roads or sewers are constructed including other social amenities.

Similarly, a congestion toll can be imposed to mitigate the congestion caused by commuters. With regard to impact fees, rather than the traditional property tax catering for development of infrastructure, an impact fees can be paid to offset the infrastructure costs of the new development.

Alternatively, an Urban Growth Boundary (UGB) can be used to mitigate sprawl. A UGB is a zoning tool that slows urban growth by banning development in designated areas on the urban fringe. It is however not possible to gauge the exact extent of urban expansion. As a result, a UGB may be much too stringent needlessly restricting the size of a city and leading to an inappropriate escalation of housing costs and unwarranted increases in density.

The way to avoid errors regarding sprawl is to attack urban sprawl at its source by imposing the specific remedies outlined earlier. Proper congestion tolls and impact fees can be computed with a high degree of reliability. A development tax designed to preserve open space works well also, provided that a proper measure of open-space benefits can be computed.

THE NAIROBI SPRAWL

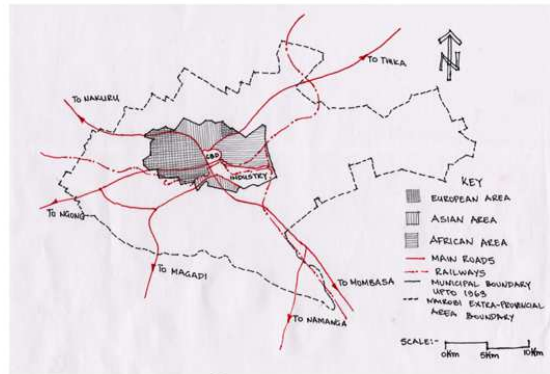
The dearth of affordable serviced land in the proximity of Nairobi’s Central Business District (CBD), has led many developers and individual homeowners to gravitate to the city’s periphery. This gravitation has been highly pronounced in the Thika, Namanga, Magadi and Ruai corridors (Figure.5). In addition to the green field peripheral sprawl, there is also inner city sprawl occurring along the river valleys in both low and high income neighbourhoods.

Nairobi’s Peripheral Sprawl

Although land on the periphery of Nairobi is not serviced, it is attractive to potential homeowners and real estate developers. This is because the land is affordable and is in close proximity to the CBD and industrial area, which are the two major employment destinations.

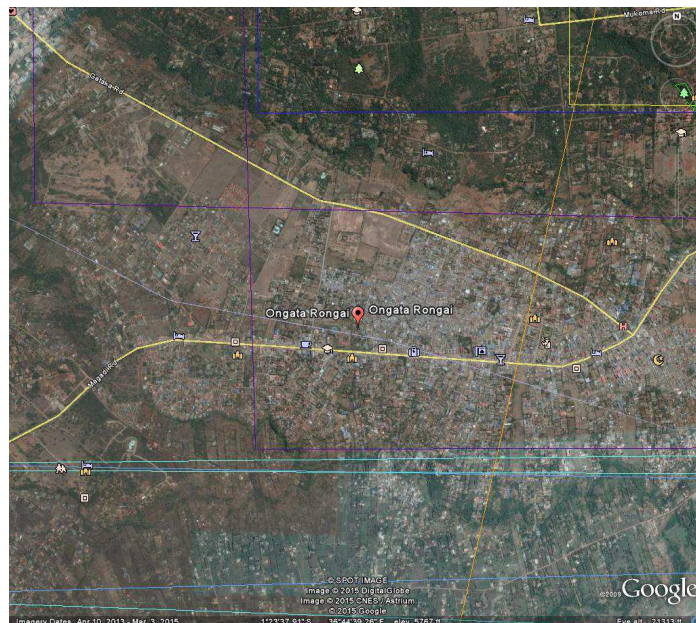
These green field developments are haphazard, disorganized, poorly serviced and largely unplanned. They lack social amenities and open spaces, as a result, the residents in these neighbourhoods criss-cross the city in search for these amenities, particulars schools. On weekends and public holidays many residents from the periphery who have no access to open spaces, crowd Uhuru Park for recreation and the enjoyment of nature.

These peripheral neighbourhoods which are approximately 20km from the CBD condemn the residents to time consuming commutes that last almost three (3) hours each morning and evening. The auto-dependency of the commuters has a negative impact on the environment through tail-pipe pollution. The cost to the economy through time wasted in traffic jams and consumption of fuel has not been scientifically computed, but could be quite substantive. In addition, high value agricultural land is converted to real estate and thus negatively impacting on food security. Figure.6 is an example of Nairobi’s peripheral sprawl of the Ongata Rongai area in the Magadi corridor.



Source: Anyamba, 2008

Figure 5: Main Corridors of Sprawl

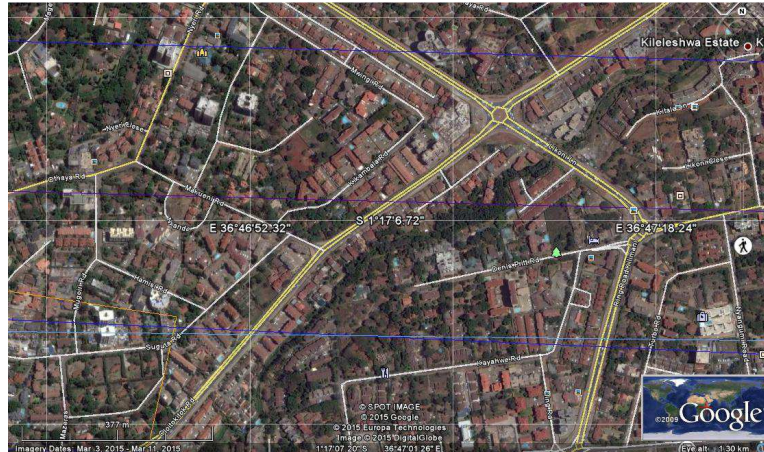


Source: Google Images

Figure 6: Ongata Rongai Sprawl

Nairobi’s Inner City Sprawl

In addition to Nairobi’s peripheral sprawl, there is an occurrence of inner city sprawl, particularly in the riparian zones of the rivers. Unscrupulous government operatives were able to subdivide riparian zones in high end neighbourhoods of Kileleshwa and Lavington Green. This conversion of riparian zones into real estate has reduced the vegetation cover and constrained the river channels, creating inner city sprawl and causing flooding downstream even when there is minimal precipitation. Figure 7 shows inner city sprawl along the Kirichwa Kubwa River in the Lavington-Kileleshwa basin.



Source: Google Images

Figure 7: Sprawl in the Lavington-Kileleshwa Basin

The downstream riparian zones on Nairobi and Ngong rivers have been converted into informal settlements, causing inner city sprawl. The vegetation in these downstream areas has been compromised significantly, and as a result, most dwellings get flooded with water whenever it rains. Figure. 8 shows the Mukuru Kwa Njenga sprawl along the Ngong River. Although the settlements in river valleys do not significantly impact on traffic, they portend a health hazard. The frequent outbreaks of cholera and other waterborne diseases impact negatively on the city's health budget. Although informal settlement such as; Kibera, Kawangware, Kangemi, Korogocho, Kambio house a majority of the Nairobi residents, they are a major cause of reduced vegetation cover in the river valleys resulting in inner city sprawl.



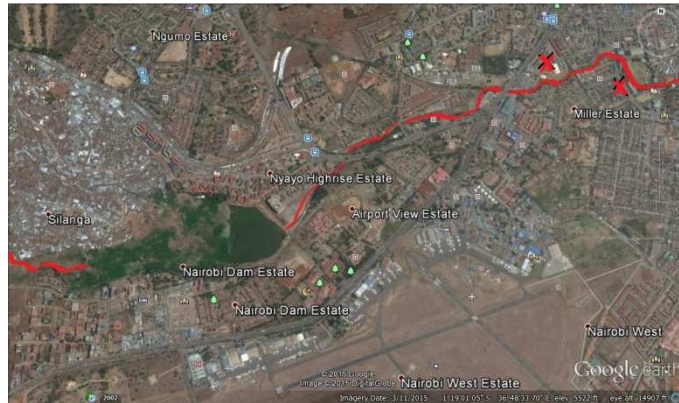
Source; Google Images

Figure 8: Mukuru Kwa Njenga Sprawl

Nairobi Floods

It floods whenever Nairobi receives moderate or heavy rainfall. This is due to the city's geographical location and its poor drainage system. On 12th May 2015, the city received unusually heavy precipitation and the results were disastrous. More than 10 people were reported dead in different parts of the city and losses worth millions of shillings were incurred. Areas along the Ngong River were arguably the most hit. This is because nearly all the riparian zone along this river has been converted into real estate. As a result, the vegetation cover and river flood plain have been reduced resulting in sprawl. When such flooding occurs, which happens quite often, many residents are condemned to a life of misery.

Figure 9 shows the Ngong River flood plain. As can be seen to the left, the Nairobi dam which was once a hub of sailing activities is now heavily polluted and dysfunctional. Similarly the low lying Gikomba area gets heavy flooding as can be seen on New Pumwani road Figure 10.



Source: Reconstructed from Google images

Figure 9: Ngong River Flood Plain



Source: Daily Nation

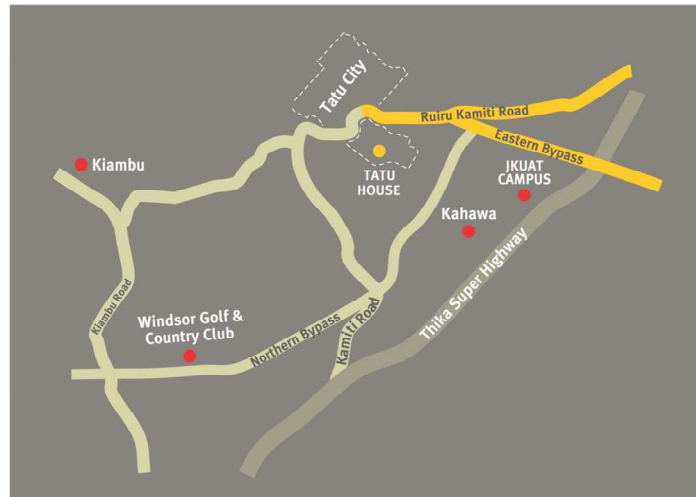
Figure 10: New Pumwani Road Floods

Emerging Trends

The challenges facing the city of Nairobi have created a new opportunity for both the private and public sector, to initiate the development of speculative cities. This has enabled the development of cities like; Tatu, Konza and Tilisi which are now in various stages of implementation. Although these cities are imaged as autonomous cities on the periphery of Nairobi, they will still impact heavily on the infrastructure of Nairobi.

Tatu City

The Renaissance group and Kenyan investors are in a 50:50 joint venture, to develop Tatu City in ten (10) phases on a site of more than 1,000 hectares to the north of Nairobi Figure 11



Source: Tatucity.com

Figure 11: Tatu City Location

Tatu City will provide housing for 62,000 people, as well as offices and shops which are expected to attract a further 23,000 visitors a day. The project is expected to cost Kenya shillings 240 billion (USD \$ 2.4b). Figure 12 shows the developers imagery of the Tatu City.



Source: Tatucity.com

Figure 12: Tatu City Imagery

Konza Techno-City

Konza Techno-City is a government of Kenya initiative and is one of the vision 2030 flagship projects that are supposed to make Kenya a middle income country by the year 2030. It is a Business Process Outsourcing (BPO) project that is being marketed through the Kenya Government Information and Communication Technology (ICT) Board.

The Technology Park is set to host Business Process Outsourcing ventures, a Science Park, a Convention Centre, Shopping malls, Hotels, International school and a Health Facility. It will be built on 5,000 acres of land in Makeni County 64km south of Nairobi. It is estimated to cost Kenya Shillings 1.2 trillion (approximately USD \$ 14.5 billion). Konza Techno-City can be compared to Kuala Lumpur's Cyber Jaya City. Figure 13 shows the Master Plan of Konza Techno-city.

CONCLUSIONS

Nairobi's urban sprawl causes fundamental challenges for the city's infrastructure and livelihoods. Long commutes are necessitated by people looking for jobs, recreation and educational institutions. The urban sprawl of Nairobi has not been entirely negative since it has created the coping mechanism of a rapidly urbanizing city.

The polycentric intermediate centres proposed by the NIUPLAN may ease the pressure on the city centre and thus reduce sprawl. However, only time will tell whether the NIUPLAN will be implemented, as history shows that no previous plans have been implanted as envisaged.

The private sector has been the main player in Nairobi's urban growth. However, due to the weak regulatory regime in operation, the place of public open space has been compromised. The state will have to play a key role in the future development of the city taking cognisance of the social value of open space.

The emerging satellite cities should complement the city of Nairobi by investing in major trunk infrastructure rather than focusing on speculative generation of lifestyle environments. A multi-modal mobility with public transit, bike and walk options that reduce auto-dependency will have to be invested in for Nairobi's future sustainability.

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