

## Understanding the Grassroots Dynamics of Slums in Nairobi: The Dilemma of Kibera Informal Settlements

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### ABSTRACT

A lot of literature on urban development in developing countries has entirely focused on the nexus between rapid urbanization, Gross Geographic Product (GGP) and poverty growth with little research that demonstrates what this impacts on urban sustainability especially with increasing slums in rapidly urbanizing African countries. Available research has focused entirely on increasing poverty level in urban Africa and its mitigation without a clear direction on what this means to slums improvement and urban sustainability. This papers aims to give a conceptual analysis that will help to understand the dynamics of urban sustainability and slums development. The historical perspectives and current realities of Kibera slums in Nairobi are reviewed.

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## 1. Introduction

Kenya is facing an increasing growth of informal settlements in her urban centers. As rapid urbanization takes its toll, so has the development and growth of slums. More than 34% of Kenya's total population lives in urban areas and of this, more than 71% is confined in informal settlements (UN-Habitat, 2009). This number will continue to increase unless a serious and concerted action by all relevant stakeholders is undertaken.

Kenya's annual informal settlements growth rate of 5%, is the highest in the world and it is likely to double in the next 30 years if positive intervention measures are not put in place (UNDP, 2007). According to UN-Habitat (2003), the experience in these slums shows a strong link that people living in poverty are trapped in their present (World Economic and Social Survey, 2008) situation because they are excluded from the rest of the society. Unfortunately, they are not empowered to allow them to make any significant contribution to community building (United Nations Population Division, 1998; Mutisya, 2010), pushing Nairobi city to the verge of sinking into abyss as the weight of mushrooming slums takes its toll.

These unprecedented rates of urbanization can be linked to massive migratory movements as well as to natural growth, challenging urban planning and thereby causing environmental problems with far reaching effects. While the low quality of housing and the general lack of basic infrastructure especially sanitation, drainage, access to energy and clean water supply result in poor social and environmental conditions, high levels of unemployment and low income give rise to conflicts (Beatley, 2000; Smith & Hanson, 2003; Pamoja Trust, 2009). The situation is not helped by lack of supporting policies for effective urban planning and improvement.

Slums in Nairobi have existed since the cities inception, the government has failed to respond to the flight of slums dwellers accordingly (Mitullah, 2003), even after being classified as illegal. Life is very difficult to approximately 1.5 million people in Nairobi informal settlements. The residents in these areas live under deplorable conditions with lack of the most basic needs and social amenities and face multi-dimensional challenges which require multi-dimensional interventions such as clean water supply and improved sanitation, energy, solid waste management, housing, schools, and hospitals (United Nations, 2006; Centre on Housing Rights and Evictions, 2008). Since illegal, informal settlements were previously abolished by the government through forced evictions often leading to conflicts. Fortunately, the government has recently drafted strategic plan papers and policies recognizing the existence of slums and the need to improve them though this does not address the lack of security of tenure and fails to help with access to the most essential social services.

## **2. Nairobi's Informal Settlements**

Informal settlements have a long history in Nairobi dating from colonial period, where most Africans were barred from the city's designated residential areas since they were reserved

for Europeans and Asians. Kenyans who came to the city in search of work had to create informal residential settlements outside the central business district and the planned residential areas which were largely ignored by the colonial government [Amnesty International, 2009]. Mitullah (2003) argues out that the city’s first development plans did not include early settlements; hence essential services to the settlements and road construction to link them to other areas of the city were not provided by the local authorities. As a result, Nairobi developed along segregated lines. The city’s 1948 Master Plan and other major urban development plans continued to neglect informal settlements (Anyamba, T.J.C., no date).

*“The people who live in the slums around Nairobi and other towns of our country require special attention.” (The President of the Republic of Kenya, His Excellency Hon. Mwai Kibaki)*

Nairobi, the capital city of Kenya and one of the largest in Africa, is the hub of trade and business in Eastern Africa. The city’s population has grown over the years from 11,500 inhabitants in 1906 to 3.1 million people in 2009 [KNBS, 2010] with more than half the city’s population living in informal settlements and slums occupying less than 1% of Nairobi’s area and less than 5% in residential area [Mitullah, 2003] as shown in Figure 1.

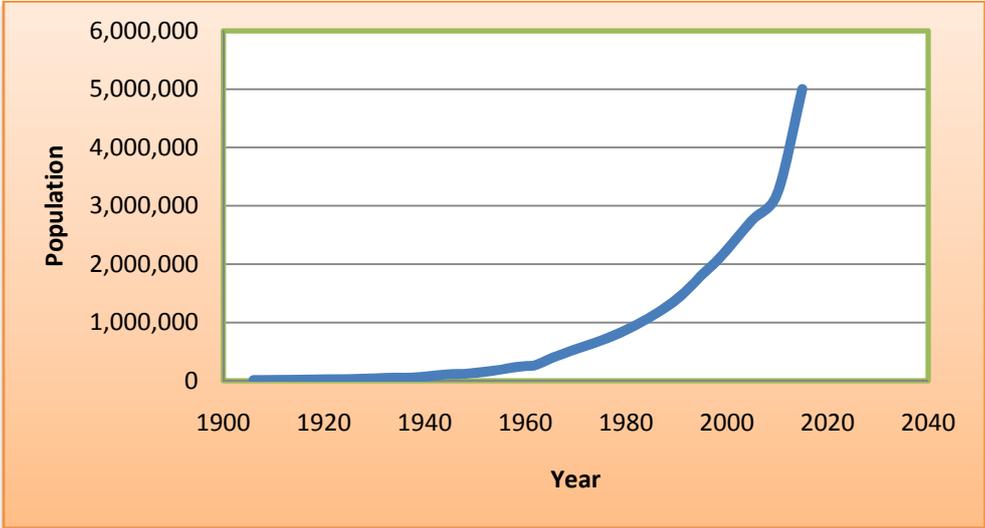


Figure 1: Nairobi Population Growth (Data Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects).

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With a rapid urbanization growth rate of about 4%, current population is projected to grow to 5 million by 2015 and to more than 8 million by 2025 [UN, 2001]. And unlike cities in developed countries, Nairobi’s growth is not accompanied with equal socio-economic and environmental development.

The informal settlements are scattered within Nairobi’s nine administrative divisions (Figure 2). Residents in these marginalized areas live in very inhumane and disturbing conditions with severe lack of clean water supply, improved sanitation, housing, health services, and lack of solid waste management facilities [Umande Trust, 2007]. In addition to this, slums dwellers face inadequate schooling facilities, unemployment, lack of energy, lack of drainage systems, high crime rates, and lack of proper governance including security services. This has resulted to life threatening outcomes which lead to mass poverty, contagious diseases, conflicts, and other social, ecological and economic hazards.

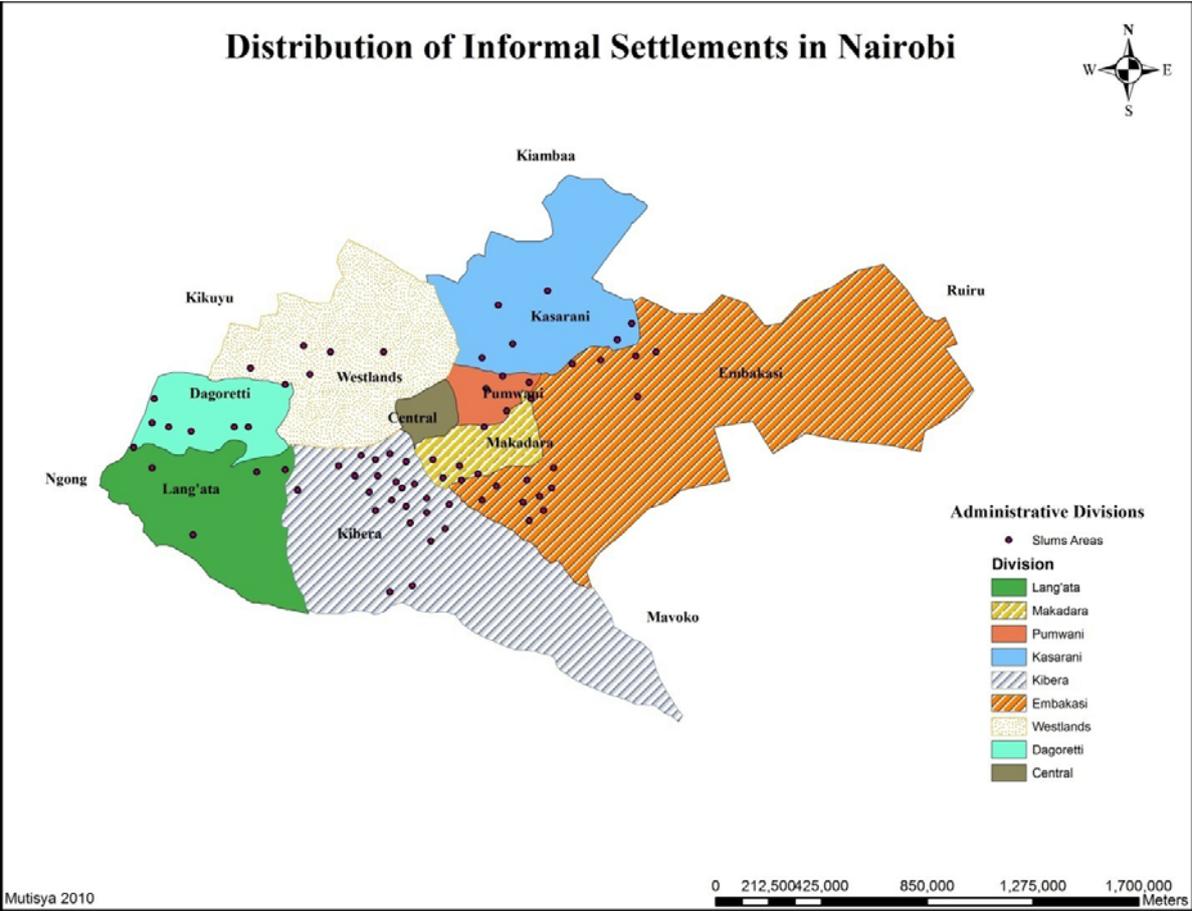


Figure 2: Distribution of informal settlements in Nairobi Administrative Divisions.

Informal settlements in Nairobi are the consequence of both explicit government policy and decades of official indifference. In particular, informal settlements were excluded from city authority planning and budgeting processes. The governments in power have ignored their existence until recently when national authorities and international bodies outlined the dangers of slums to humanity. Complexities surrounding slums in the city have made it difficult for the government to pass workable policies which if enacted and applied in the right way could help Kenya improve slums life. In Nairobi therefore, the lack of recognition of slums and settlements as residential areas denies residents a range of essential services provided by the government to other residents of the city. These essential services include improved water supply, improved sanitation, electricity, garbage collection, improved health services, education, access roads and transport.

Lack of good governance and proper leadership in these settlements has worsened the situation. The experience of slum-dwellers starkly illustrates that people living in poverty not only face deprivation but are also trapped in poverty because they are excluded from the rest of the society, denied a say, and threatened with violence and insecurity [Amnesty International, 2009]. There is indeed a clean lack of empowerment and social capital and corrupt authorities have taken advantage of this.

Kibera informal settlements (began in 1912) have an estimated population of 950,000 people, while Mathare slums (started in 1963) houses more than 500,000 people, Korogocho slums (started in 1980s) has an estimated population of 150,000 people and Mukuru Kwa Njenga (began in 1958) has an estimated population of 100,000 people (Umande Trust, 2007).

### **3. Kibera Informal Settlements**

Kibera is one of the largest slums in Africa with an average population of approximately more than nine hundred thousand people (Umande Trust, 2010). The slum stands on a 2.5 square kilometers and is roughly five kilometers away from the city center. In 1912, Kibera was a settlement in a forest outside Nairobi; as a result of World War I, it became a resettlement area for Nubian soldiers returning from service. The colonial government then, allowed settlements to grow and opened gates to other tribes from across the country.

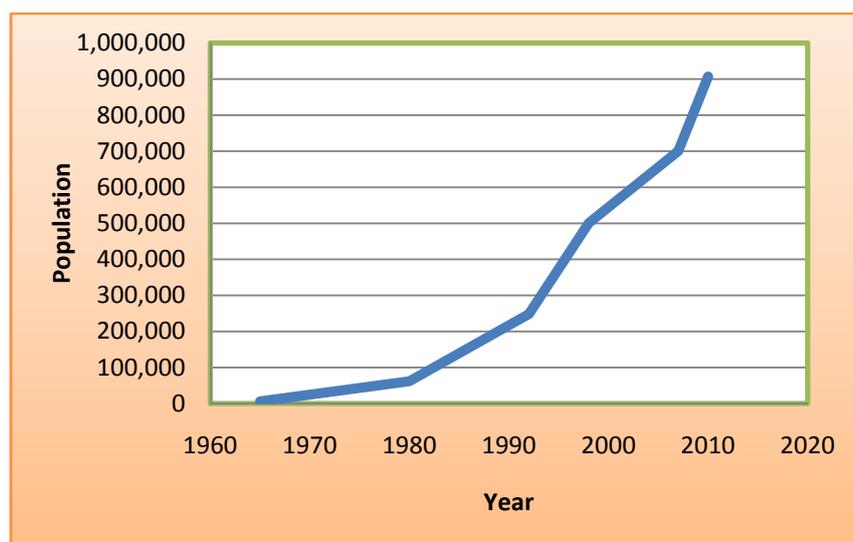


Figure 3: Kibera's population growth (Data source: An average of Kenya Bureau of Statistics Approximations, UN-Habitat, Local government, NGOs in Kibera).

In 1963, the first government of the Republic of Kenya declared Kibera settlements illegal. However, Kibera slums continued to grow from as low as 6,000 people in 1965 to around one million today. Proximity to the city center, provided a cheaper ground for people from rural areas who move in search of employment opportunities. Lack of reliable data on population and growth parameters on Kibera slums has led to disagreements on the size of the slums as one of the largest in the continent. UN-Habitat puts the total population at between 350,000 to one million. International Housing Coalition estimates the population to more than half a million people, while experts on urban slums give an estimate of more than 800,000 people. Government statistics on the total population of Kibera slums to around 200,000 people [KNBS, 2010] as shown in Figure 3.

Many new residents come from rural areas with chronic underdevelopment and overpopulation issues. The multi-ethnic nature of Kibera's populism combined with the tribalism that pervades Kenyan politics has led Kibera hosting a number of small ethnic conflicts throughout its century-long history. Initially, the Kikuyu tribe dominated Kibera slums population. However over the years, the Luo tribe has grown dominant (Figure 4). Today, Kibera's residents represent all the major Kenyan ethnic backgrounds, with some areas being specifically dominated by peoples of one ethno-linguistic group.

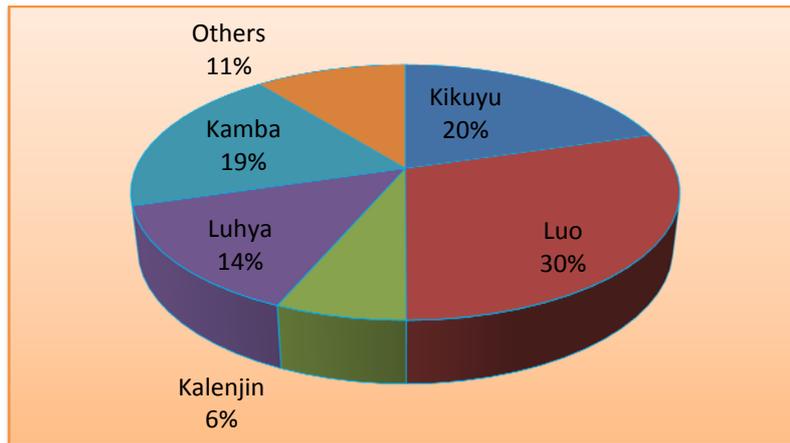


Figure 4: Population by tribe (Date Source: Umande Trust, 2007; CBO's in Kibera).

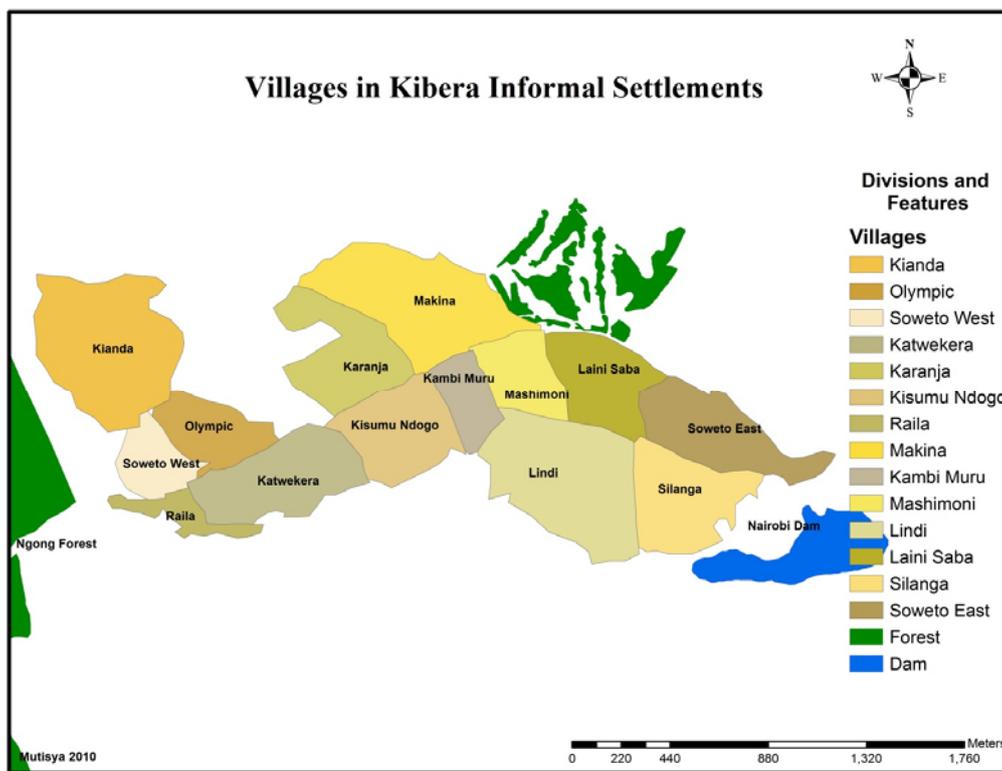


Figure 5: A map of villages in Kibera informal settlements.

The Kenyan government owns all the land upon which Kibera stands, though it continues to not officially acknowledge the settlement; no basic services, schools, clinics, running water or lavatories are publicly provided, and the services that do exist are privately owned.

Kibera settlement is located on two Nairobi divisional administrative areas; Dagorett and Lang'ata divisions. The slums is divided into 14 villages with varying populations - Kianda,

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Olympic, Soweto West, Gatwekera, Raila, Karanja, Kisumu Ndogo, Makina, Kambi Muru, Mashimoni, Lindi, Laini Saba, Silanga and Soweto East.

Figure 6 shows Kibera’s population by village. Makina, with a population of 130,000 people is the largest village by population. Mashimoni, Katwekera, Kianda and Laini Saba villages equally accommodate large populations of more than 80,000 people per village.

Since these government policies have not focused on making low-cost housing available or providing slum-dwellers with viable long-term alternatives, the state has contributed to the proliferation of informal settlements. In the absence of other affordable housing, many people who migrate to Nairobi have no realistic alternative to life in the slums.

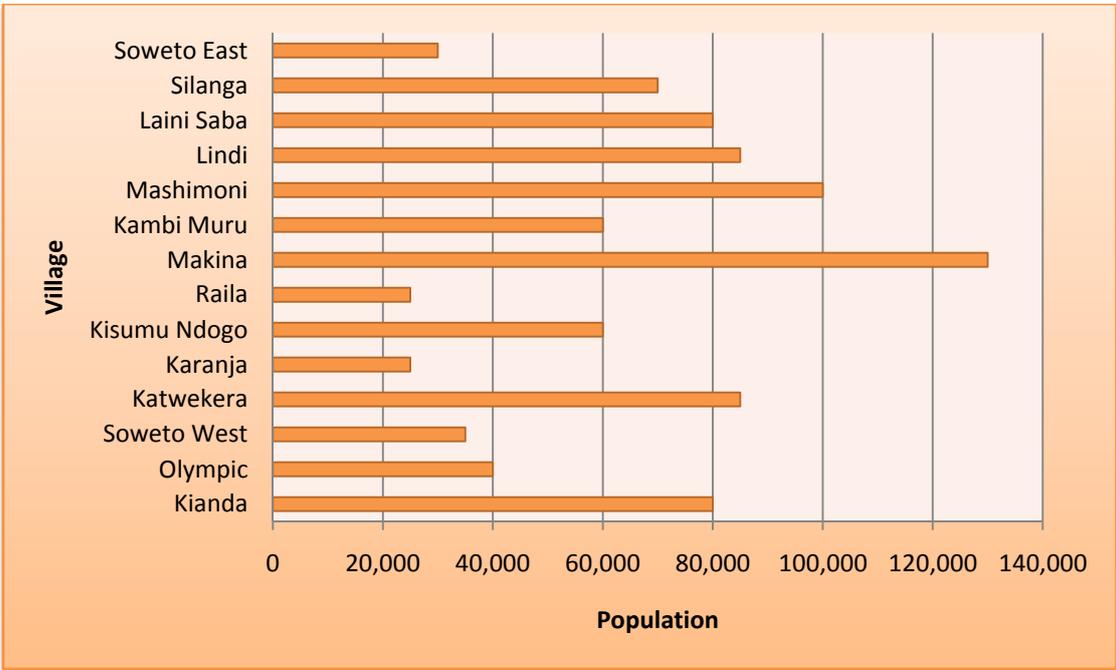


Figure 6: Kibera slums population; Kenya National Bureau of Statistics, 2010; Umande Trust

#### 4. Sustainability Challenges in Kibera Informal Settlements

*“The incidence of crime, robbery and gang violence, as well as gender based domestic violence in informal settlements; undermine both macro and micro economic growth and productivity of a country’s development, as well as social and individual well-being” (Dr. Anna K. Tibaijuka, The Executive Director, UN Habitat 2007)*

Kibera informal settlements suffer from a host of challenges. The residents live under mass poverty leading to a collection of sustainability challenges. Access to clean water, improved

sanitation, good housing, solid waste management, proper health care, security and energy are some of the most fundamental challenges faced by slums dwellers. Together with this is the lack of enough schools and educational centers and a huge deficiency of other urban infrastructure (Guy, Marvin & Moss, 2001). In addition, Kibera is heavily polluted by human refuse, garbage, soot, dust, and other wastes. The slum is contaminated with human and animal feces and all sorts of wastes which are worsened by open sewages and lack of drainage systems (Hardoy, Mitlin & Satterthwaite, 2003; Hodson & Marvin, 2009). Poverty, lack of improved sanitation combined with poor nutrition among residents' accounts for many illnesses and diseases in slums (Heynen, Kaika & Swyngedouw, 2006; Kumar, Shigeo & Harada, 2003). It is estimated that 20% of the 2.2 million Kenyans living with HIV live in Kibera.

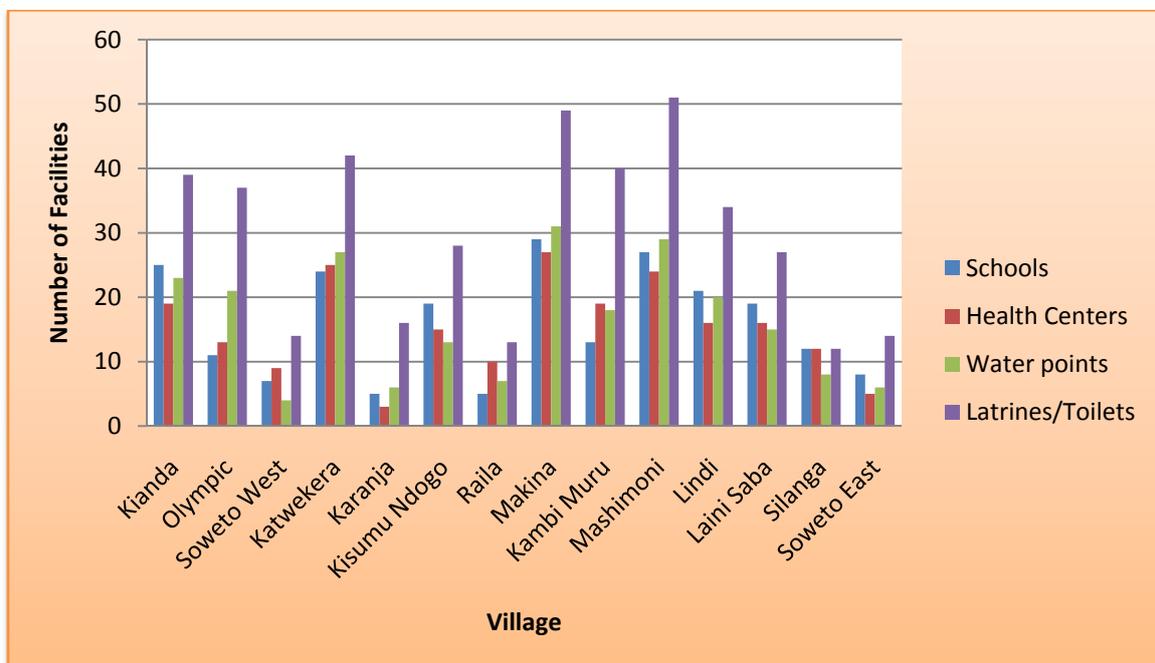


Figure 7: Social facilities in Kibera slums (Data Source: Authors' fieldwork findings).

There is however a continued intervention by international organizations, NGOs/CBOs/FBOs, financial institutions, and even the government to improve the situation in this slum. These organizations have erected schools, water kiosks, health centers, and toilets in different villages in Kibera slums but these facilities are inadequate given the high number of people living in Kibera (Figure 7). These immediate challenges attract more evils such as crimes, accidents, and diseases.

## 4.1 Improved Water Supply

Most slums dwellers have three main concerns with water: access, cost and quality. They complain about the limited access to water points, which are often located far from their houses, some landlords ration water such that it is only available on specific days of the week and at specific times (Water Sanitation Program, 2007). This is a limitation especially for people who have children and would require high amounts of water. However, for those who have access they decry the high cost of buying water in the informal settlements. This is costly especially relative to the slum residents' income levels.

Some Kibera slums dwellers use sewerage water for bathing and washing. They also use borehole, rainwater, and sometimes draw water from broken pipes. This water is highly contaminated and filthy especially when plastic pipes burst and can potentially cause contagious diseases.

For many years, Kibera slums has not had clean water points as most collected water comes from Nairobi dam. The Kenyan government in 2007 admitted that sustainable access to water dropped to as low as 20 per cent in the settlements of the urban poor where half of the urban population lives. This is a tragic situation given that Kenya falls far below the estimated defined minimum water per capita requirement (Water Sanitation Program, 2008)

However, many organizations including the World Bank have funded some water projects in the slums but still more than 75% of the residents lack access to sufficient clean water. Many NGOs and CBOs have also supported clean water provision and campaigns across the slums. K-Rep, a microfinance institution has funded water projects through group loans since 2007.

A lot has been done by the Kenyan government in the past to improve water provision to urban poor. In 2003, the Water Act 2000 was implemented to pave way to water reforms including privatization of water services. However, this has not improved the situation in Kibera slums, it only made water services more expensive than neighboring areas. In Kibera slums, the cost of water is seven times higher than that paid by people in high-income settlements served by the Nairobi Water and Sewage Company [UNDP, 2007; National Water Strategy, 2007].

## 4.2 Improved Sanitation

The lack of improved sanitation facilities, including toilets, showers, and sewage disposal has been well documented in Kibera. Ninety four percent of the population in informal settlements does not have access to adequate sanitation. Up to sixty per cent of the population in Kibera must share pit latrines with approximately fifty others. Even when toilet facilities are available, people complain that they are not conveniently located, that they are unclean, or that using them at night poses a security risk. Children are especially vulnerable to inadequate toilets because they may lack access to household keys which unlock the community toilets. The toilets are mostly built by the support of NGOs and managed by CBOs.

With few toilets and pit latrines, there has also been a continued growth of “flying toilets”. The reality behind these flying toilets is the inaccessibility of toilet facilities especially during late hours due to uneven distribution and lack of convenience resulting to insecurity. Most toilets and pit latrines are owned and managed by community groups and also individual businessmen who charge Ksh. 5 per person per every visit.

Several organizations and stakeholders are investing heavily on improved sanitation. Umande Trust, a well-established NGO is working in different parts of Kibera settlements to improve sanitation through erection of biogas toilets which are also sources of energy through production of biogas and methane. This development of the biogas latrines has come in handy and now helps the community because of the low cost charged per visit. The bio- latrine uses the technology of airless digestion to transform human waste into fertilizer and gas suitable for uses like cooking, heating, lighting etc this therefore generates a sizeable amount of energy. Consequently, the community is able to properly dispose human waste and at the same time reduce pollution and environmental degradation.

## 4.3 Energy Availability

Kibera residents have to rely almost exclusively on firewood and charcoal. Mostly women and girls have to walk for distances to look for firewood. Charcoal is often prepared for commercial purposes. Entire trees are being carbonized and sold in sacks to the poor in urban areas.

More than 70% of the slums lack electricity. Provision of energy is controlled by government owned firms and since Kibera settlements are classified as illegal, these energy firms have not been able to set power transmission points in many parts of Kibera. In addition, the cost of electricity is quite high not only to slums residents but also to the rest of Kenyans living in the city.

Energy development must precede economic development because no area can succeed in shaking loose from a subsistence economy without widespread access to energy services. Adopt-A-Light was set in 2002 to assist light the city of Nairobi in collaboration with the Nairobi's city council and has erected lighting masts in Kibera slums. In 2005, the UN-Habitat's Slum Lighting Project was commissioned to assist with lighting the city. These two initiatives have helped in providing light in Kibera slums among other slums in the city.

#### **4.4 Solid Waste Management**

While poor management of solid waste is a general problem in Kenya, it is probably worst in Nairobi. Solid wastes in Nairobi are a by-product of a broad spectrum of industrial, service and manufacturing processes. Primary high-volume generators of industrial solid wastes include chemicals, petroleum, metals, wood, paper, leather, textile and transportation industries. Secondary smaller generators include auto and equipment repair shops, electroplaters, construction firms, dry cleaners and pesticide applicators. Mismanagement of these wastes typically results in pollution of the natural environment and may pose substantial danger to public health and welfare.

Over the years, Kibera slums has been isolated by the Nairobi City Council. There are no garbage collection systems in the slums. Due to this neglect, solid wastes have grown into mountains of heaps over the years with most of it being washed into water channels during the rainy season further contaminating underground water. Tons of solid wastes are generated every month in Kibera slums. There are no solid waste dumping sites and no recycling plants. Uncollected solid waste is one of Kibera's most visible environmental problems: The municipal services seem to fail most strikingly in garbage collection and disposal because it causes littering and untidiness which has an immediate adverse psychological impact. The lack of adequate garbage disposal in an area often results in negative attitudes that contribute to a general deterioration of community development and cohesion.

One half of the solid waste generated in Kibera consists of organic matter. Toxic materials are estimated to be 0.2 percent of the total. For households alone, it is estimated that three-quarters of the waste is organic material. Estimates for the daily generation of solid waste in Kibera range from 150 tonnes to 200 tonnes (Umande Trust, 2007). Waste collection services are provided only sporadically to low-income areas because of poor accessibility and very high waste generation which cannot be handled with available vehicles and equipment.

The recycling equipment used by some NGOs like Carolina for Kibera is small and can only take in a very minute percentage of Kibera's waste. Other problems include inadequate financing, a lack of recognition of the importance of satisfactory and effective waste management by the policy makers, and inadequate training of managers to handle the increasingly large amounts of solid waste.

#### **4.5 Provision of Housing**

There are more than 30,000 structures in Kibera slums which are mud walled and thatched with corrugated iron sheets [Amnesty International, 2009]. A household in the slums comprises of seven members on average and usually stands on a 12ft by 12ft structure costing almost US\$15 per month. The local authorities usually issue temporary occupation licenses to the owners. Around 10% of Kibera residents own the structures and sub-let them to the remaining 90% (UN-Habitat, 2003). The structures are owned by informal owners who are recognized by the tenants, but they have no legal ownership. The tenants pay a monthly micro-lease to the owners.

Acumen Fund, through Jamii Bora is supporting the construction of affordable houses with the aim of moving slums dwellers from their deplorable living conditions to these better houses. This project is aimed at those residents who earn less than 350 US dollars per month. Also, the government of Kenya in conjunction with UN-Habitat started an upgrading programme aimed at building affordable housing units in Kibera slums. The first batch of people was allocated houses with a monthly rent cost of 10 US dollars late 2009.

## 5. Conclusion

The outcome of this research shows the mega problems city dwellers in Nairobi face. Results show a serious shortage of social amenities in Kibera slums with especially an acute deficit in clean water supply, improved sanitation, and solid waste management. For slum dwellers, water is more expensive since Nairobi City Council has not yet provided piped water, leaving water vendors as the sole suppliers of clean water. Lack of enough toilets poses other serious challenges like contagious diseases. Research results indicate that up to 150 people share one toilet facility. In addition, very little solid waste is collected by NGOs leaving thousands of tons of garbage scattered everywhere. These shortages of public services remain a serious challenge to especially social and environmental urban development.

This research clearly points out that the problem of unsustainable urban growth in Kenya is not just about poverty but the poverty of ideas. The government and organizations operating in informal settlements in Nairobi and other stakeholders have not been able to come up with new and applicable ideas to combat the rising growth of slums. Nairobi, just like any other African city is not only faced by sustainable development challenges but also sustainability of developmental efforts.

Negligence by the Kenyan government to improve informal settlements and at least to provide the minimum support on basic requirements and services has led to unimaginable suffering to slums residents. This is coupled by the fact that the government fails to recognize the growth and proliferation of informal settlements and thus excludes them from the rest of the city's development plan. The government and UN-Habitat development plan for Kibera settlements upgrading is a good gesture but falls short of a comprehensive plan to recognize the settlements and to invest in improving the living conditions.

The increasing level of population without equivalent development of these settlements is worrying. With so many sustainability challenges, increase in population in Nairobi slums has aggravated the situation. Together with this, the lack of allocation of resources by the central government to these settlements has ensured that the residents continue to wallow in sustainability challenges. It is hoped that the passing of a new constitution which advocates for devolution of governance and resources would help change the course of events in informal settlements in Nairobi if pertinent laws are implemented to cater for this.

The article further shows that Kibera slums has evolved over the years. It helps in defining, understanding and uncovering multidimensional historical perspectives and the current realities. Historically, the government and other organizations have claimed that they have done a lot but the situation currently remains deplorable. This clearly points out that in slums in Kenya; the more things change the more they remain the same. Data provided in this article is useful to policymakers and other stakeholders to formulate workable policies that will be used to tackle the ever increasing social and environmental challenges in slums and help end the routinized processes of exclusion, exploitation and discrimination of slums residents.

This paper proposes that the government and other organizations should therefore:

- i) Recognize informal settlements as legal parts of the city and support comprehensive development programmes and projects in slums.
- ii) Support and foresee that implementation of the slum upgrading programme complies with the government's obligations in relation to the right to adequate housing.
- iii) Ensure that the slum upgrading programme and policies address immediate needs in relation to water, sanitation, health, energy, housing, in addition to medium- and long-term goals.
- iv) Encourage collaborative programmes and projects.

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## 7. References

Amnesty International, (2009). *The Unseen Majority: Nairobi's Two million Slum-Dwellers*. Amnesty International Publications

Anyamba, T.J.C., *Nairobi's Informal Modernism*," available at <http://www.kutokanet.com/issues/culture/nbinformalmodern.pdf> (last accessed 13

Dec 2010).

Beatley T. (2000). *Green Urbanism*. Island: Washington, DC.

Centre on Housing Rights and Evictions (COHRE), May (2008), *Women, Slums and Urbanisation: Examining the Causes and Consequences*, p.108.

Guy S, Marvin S, Moss T. (2001). *Urban Infrastructure in Transition*. Earthscan: London.

Hardoy J, Mitlin D, Satterthwaite D, (2003). *Environmental Problems in Third World Cities*. Earthscan: London

Heynen N, Kaika M, Swyngedouw E. (2006). *In the Nature of Cities: Urban Political Ecology and the Politics of Urban Metabolism*. Routledge:London.

Hodson M, Marvin S. (2009). Urban ecological security: a new urban paradigm? *International Journal of Urban and Regional Research* 33(1): 193–215.

Human Development Report (2006), UN Development Programme, p.14.

Kenya National Bureau of Statistics (KNBS, 2010). *Kenya 2009 Population and Housing Census*.

Kumar S., Shigeo K, Harada, H. (2003) *Living Environment and Health of Urban Poor: A Study in Mumbai*. *Economic and Political Weekly*, August 23.

Mitullah, W. (2003), “Understanding Slums: Case Studies for the Global Report on Human Settlements, 2003 – The Case of Nairobi, Kenya,”

Mutisya, E.M. (2010), *The Sustainability of Downscaling of Microfinance in Africa: Empirical Evidence from Kenya*, VDM Verlag, Germany

Pamoja Trust, (2009), *An Inventory of the Slums in Nairobi*, Matrix Consultants, 1998.

Satterthwaite D. (2001). *Sustainable Cities*. Earthscan: London.

Smith, L., Hanson, S. (2003). Access to water for the urban poor in Cape Town: where equity meets cost recovery. *Urban Studies* 40(8): 1517–1548.

Umande Trust Kibera, (2007). *The Right to Water and Sanitation in Kibera in Nairobi, Kenya*

UN-Habitat (2003): *The Challenge of Slums - Global Report on Human Settlements*

United Nations Development Programme. (2007). *Human Development Report 2007/2008 Fighting Climate Change: Human Security in a Divided World*. United Nations Development Programme: New York.

United Nations Population Division. (1998). *World Population Monitoring, 1997*. New York: United Nations.

United Nations, (2006). *The Millenium Development Goals Report*. United Nations: New York.

Water Sanitation Program (2007): <http://www.wsp.org>. Last Accessed Jan 2010

Water Sanitation Program (2008). Improving water utility services through delegated management. Water and Sanitation Program Field Note, World Bank Water and Sanitation Program.

World Economic and Social Survey (2008): Overcoming Economic Insecurity. United Nations, Department of Economic and Social Affairs



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