Review

Urbanization and urban environmental challenges in Sub-Saharan Africa

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Although Sub-Saharan Africa is the least urbanized continent, its rate of urbanization is among the highest in the world. While urbanization can be a welcome engine for socio-economic development, innovation, and employment creation, it can also bring about a number of challenges, most of which are manifest within the sphere of urban environment. The objective of this study, therefore, was to identify the urban environmental problems facing Sub-Saharan Africa, their types, causes and effects at varying urban spatial scales. The geographical scope of the study was confined to that part of Africa south of the Saharan Desert. The major environmental challenges identified by the study included: crowded living conditions; poor disposal of wastes; inadequate basic infrastructure; pollution of water and air; and the decline of the urban green frame. The study established that urban environmental problems in Sub-Saharan Africa occurred at various levels, namely, at household, neighborhood, community and city levels. The study went on to identify the dominant causes or factors contributing to the above urban environmental problems. The study concluded that the major urban environmental causes in Sub-Saharan Africa included massive rural-urban migration; poor urban development control; weak urban institutions; and inadequate financial resources. To improve this situation, the paper recommends that there be improvement of conditions in rural areas; capacity building in urban planning and management; implementation of policies and regulations to improve controls; encouragement of public participation in urban environmental issues that affect them; and forging of partnerships with the private sector, NGOs and other relevant stakeholders.

Key words: Urbanization, rural-urban migration, environmental challenges, solid waste management.

INTRODUCTION

Cities are home to nearly half of the world's population. Today, almost 400 cities contain a million people or more, and about seventy percent of them are found in the developing world (Cohen, 2006). Although cities often attracted young men who were in search of jobs, the trend has dramatically changed, with women migrants as well as the older married men on the increase. Some studies have found that women migrants were in fact in the majority (Gwebu, 2002). Many women are wives, daughters, and fiancees arriving to join their male relatives in town, but they also come to seek employment. The increase in the numbers of females partly explains one trend of rural-urban migration - the tendency for long term or even permanent migration, thus reflecting a shift from individual to family migration. The trend for long-term migration has been explained by the increasing difficulty of finding jobs in the formal sector (van Western and Klute, 2006). This has implications for urban planning and management. Increasingly, urban managers and planners have to plan and provide services, not for circulating, but for permanent and stable urban populations.

URBANIZATION AND URBAN GROWTH IN SUB-SAHARAN AFRICA

According to van Western and Klute (2006), the main engine of urban growth in Sub-Saharan Africa is rural-urban migration. The urban population in a number of countries in this sub-region has at least doubled since 1980, with changes in proportions and growth rates as shown in Table 1.

The main motivation for migration is economic. Cities have always been a focal points for economic growth, innovation, and employment. Indeed, many cities grew...
Table 1. Urbanization in selected countries of Sub-Saharan Africa (1980-2010)

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Historically out of some natural advantage in location, transport or raw material supply. Cities are also centers of modern living, where indicators of general health and wellbeing, literacy, women’s status, and social mobility are typically highest. In these modern times, cities are also important social and cultural centers that house museums, art galleries, film industries, theaters, fashion houses, and other important cultural centers.

Other reasons for migrating to towns include personal security in countries where there is political strife and warfare and the desire for better services which are found in urban areas. As a result of urban-biased development, the quantity and quality of health and education services are higher in urban than in rural areas (Sparks, 2000).

In Sub-Saharan Africa, the phenomenon of rural-urban migration lies in the structure of the economies of the sub-region. Since independence, there has been a general economic decline, so much that some poor countries have become poorer now than they were during the colonial era. In the process of impoverishment, Sub-Saharan Africa has lost the ability to feed itself, thereby increasing both food imports and food aid (Sparks, 2000). The major explanation for this malaise lies in the neglect of agriculture, Sub-Sahara Africa’s most important activity.

**Urban environmental challenges**

As a consequence of the fast rate of urbanization, Sub-Saharan Africa is now characterized by a number of emerging environmental challenges. Of particular concern in the urban areas are the risks to the immediate and surrounding natural environments and their resources, as well as the health conditions of the urban citizens. Rapid urban growth has seriously outstripped
the capacity of most cities to provide adequate housing and other basic services for their citizens. Yet each year, new migrants continue to flock to the cities, thereby exacerbating the problems of urban congestion, leading to the expansion of squatter settlements and shanty towns, and hampering the capacities of local authorities to improve basic infrastructure and deliver essential services (United Nations, 2001). Thus, as cities grow, managing them has become increasingly complex in Sub-Saharan Africa. The speed and sheer scale of the urban transformation and the increased concentration of population, production and consumption has presented formidable urban environmental challenges (Sililshena, 1989). In turn, the dysfunctional urban environments have brought with them high costs that have undermined the benefits of economic growth and development needed to improve the living standards of urban populations.

The concept of urban environmental problems typically refers to damage to the physical environment, mostly caused by anthropogenic activities, and usually with harmful consequences for human health, either now or in the future. The common urban environmental problems include:

i. Urban ecosystem degradation, ecological disruption, resource depletion, and urban sprawl into the city hinterlands;
ii. Localized environmental health problems such as inadequate safe potable water, sanitation and drainage facilities; and,
iii. Inadequate waste management, pollution of water sources such as rivers, lakes and coastal areas, and ambient and indoor air pollution.

### Urban sprawl and ecosystem degradation

As human populations increase in Sub-Saharan Africa, they often lead to the decline in the amount of open spaces available. As a consequence, the urban poor often find themselves with no choice but to take up illegal residence on any open spaces, including in the periphery of the cities (Gilbert et al., 1996). These settlements become slums of the most appalling nature and adversely affect the environment. When slum areas increase, they exacerbate the rapid deterioration of physical environments and provide breeding ground for prostitutes, criminals and social miscreants (Marshall, 2003). They also constitute an affront for human dignity with associated adverse health implications on residents, thereby negating the goal of environmental sustainability.

Thus, urbanization and urban development trends do pose serious problems to ecosystems in Sub-Saharan Africa. Natural ecosystems such as open spaces tend to be neglected as a result of the continued lack of understanding and appreciation of the complex processes involved. These ecosystems provide many services to urban residents, including recycling polluted air. In most cases, the degradation of ecosystems is due to the difficulties that public agencies encounter in managing and regulating them as they tend to cross administrative boundaries (Mpofu, 2013). More importantly, the degradation is a result of the fact that the people most adversely affected by the loss of ecosystems tend to be the least influential economically and politically, such as the urban poor.

Due to these severe environmental health problems within urban settlements, the end results are often inadequate access to ecosystem services (such as clean water) and the degradation of ecosystems adjoining urban areas, due to continuous urban expansion and increased demands on resources (UN-Habitat, 2001). Sometimes there are also increased pressures on distant ecosystems due to increased urban production, consumption, and trade. Interrelated problems involving local water, sanitation, waste, and pests contribute a large share of the urban burden of disease in low-income countries of Sub-Saharan Africa (Tsourou and Barton, 2000). This typically reflects a combination of degraded or increasingly scarce ecological services generated within the urban area, minimal infrastructure such as water pipes to tap more-distant ecosystem services, and differential access to the ecological and derived services available within the urban area.

### Lack of access to safe potable water, sanitation and drainage facilities

Because of low per capita Gross Domestic Product (GDP) of most Sub-Sahara African countries and their limited governance capacity at local levels, urban water, sanitation and drainage facilities have been unable to keep pace with rapid urban growth (Pelling, 2003). Infrastructure installation has been inadequate and inequitable; utilities and social services have not been provided in advance of new settlements or in many newly developed areas; and service delivery continues to be unreliable due to poor maintenance, low charges in comparison with operating costs, and often, limited technical and administrative expertise (Kebbede, 2004). As a result, many urban residents in Sub-Saharan Africa are subjected to increased health hazards and adverse environmental impacts, including pollution of rivers, coastal areas and groundwater.

### Improper management solid and hazardous waste

The problem of waste management in Sub-Saharan Africa is a function of inefficient collection, transportation and reduced availability of safe, suitable, and accessible disposal sites around urban areas. The involvement of
and participation by private waste management companies is very minimal. This has led to a call for more efficient, environmentally friendly options such as locally developed collection and disposal equipment, recycling and adoption of less polluting incineration technologies where feasible.

**Water pollution**

Water pollution is more widespread and very critical among the urban areas of the Sub-Saharan African countries. The major source of water pollution in urban environments of this sub-region is the large quantity of household, industrial, institutional and hospital wastes and effluents that are discharged indiscriminately (Henry and Heinke, 2004). Another major contributor to water pollution is sewage from the cities. This is because only a small percentage of the urban areas is covered by an efficient drainage systems. In addition, only an insignificant amount of sewage is treated. In 2010, the World Health Organization (WHO) estimated that nearly 1.5 billion people in Sub-Saharan Africa lacked safe drinking water and that at least 5 million deaths per year could be attributed to waterborne diseases (WHO, 2010).

**Air pollution**

Urban areas are intended to be healthy and livable places. However, the fast rate of urbanization in Sub-Saharan Africa, devoid of environmental safeguards, is a major factor in high air pollution levels. About 70 to 80 per cent of local air pollution in cities of Sub-Saharan Africa is caused by emissions from the transport sector (WHO, 2010). As air pollutant levels begin to exceed WHO standards in many Sub-Saharan African cities, they are now responsible for a plethora of adverse health effects, ranging from cardiovascular and respiratory disorders, cancers to reduced IQ of children. Women in the sub-region also suffer most from indoor air pollution due to extensive dependence on biomass cooking.

**Climate changes and its effects**

Because of the afore level of air pollution in Sub-Saharan Africa, the sub-region cannot remain an observer when issues of acid rain, greenhouse gas emissions and global warming are being discussed at global levels. This is because climate change will negatively affect access to water in urban areas and that millions of people will be vulnerable to coastal flooding and related natural disasters as global warming increases (Pelling, 2003). Moreover, it will be the poorest countries and people who will be most vulnerable to this threat and who will suffer the earliest and the most.

High urban land and housing costs are currently pushing the lowest-income people into locations that are prone to natural hazards, such that four out of every ten non-permanent houses in Sub-Saharan Africa are now located in areas threatened by floods, landslides and other natural disasters, especially in slums and informal settlements (Kanie and Haas, 2007).

**The city’s ecological footprint**

The ecological footprint of a city refers to adjacent forest or agricultural lands that have been converted for urban use (United Nations Environment Program (UNEP), 2004). It may also include open pit mines for quarrying sand, gravel and other building materials; forests that have been cut to meet lumber and fuel demands; and waterways, lakes and coastal waters that have been polluted with untreated urban effluent (Leggesse, 2004). Also included among city ecological footprints are problems such as air pollution, which will have effects on residents’ health as well as vegetation and soils in the surrounding areas.

In Sub-Saharan Africa, cities are often located on prime agricultural land, thereby putting pressure on food production. A case in point is the City of Harare which, since Independence in 1980, has been expanding into some of the most productive agricultural lands. Also, urbanization along coastal areas of Maputo, Lagos and Mombasa is known to have destroyed sensitive ecosystems, altered coastal hydrology and negated the protection of mangroves, coral reefs and beaches (FAO, 2007). Other less quantifiable but nonetheless important aspects incorporated in the ecological footprint include noise pollution, loss of green space, odors and loss of aesthetics.

**Levels of urban environmental problems**

Urban environmental problems in Sub-Saharan Africa occur at different but interconnected scales. They originate from homes, neighborhoods, cities themselves as well as from the city hinterlands (UN-Habitat, 2009).

**Environmental problems of the home**

The majority of urban populations in Sub-Saharan Africa live in squatter settlements. These settlements are characterized, among other things, by:

i. Poor sanitary conditions;
ii. Lack of running water;
iii. Irregular garbage collection;
iv. Poorly constructed houses; and,
v. Lack of legal status as residential dwellings (UN-
Many houses in Sub-Saharan Africa suffer from the prevalence of pathogens because of the lack of basic infrastructure and services such as sewers, drains, or services to collect solid and liquid wastes and safely dispose of them (UN-Habitat, 2009). These pathogens are a cause of many debilitating and endemic diseases that afflict poor households. The common diseases include diarrhoea, dysentery, typhoid, food poisoning, and intestinal parasites.

As earlier discussed, one of the basic problems in Sub-Saharan Africa is lack of running water as the majority of residents have no access to potable (clean) water. In Nigeria, for example, only a limited number of houses have running water. Some towns are characterized by open drains, which are never cleaned and often clogged with all types of debris and garbage (Nwaka, 2000). Even where sewers are provided, they are often blocked and overflow into the streets and attract harmful insects and bacteria (Mosha, 2000).

Describing a squatter settlement in Port Harcourt in Nigeria, Izeogu (2009) said that:

i. There was no provision for sanitation and drainage facilities, separate kitchens or children's play areas;
ii. There was a total lack of infrastructure such as piped water and residential access roads;
iii. Most houses were below acceptable standard and their condition was also deteriorating;
iv. The level of household facilities such as flush toilets, and piped water to the house was very low; and,
v. Most residents depended upon a bucket toilet (Izeogu, 2009: 62).

In some parts of Sub-Saharan Africa, the majority of households depend upon various, and often unsafe, sources of water such as streams, wells, itinerant vendors, stagnant pools, and springs (Mwafongo, 2001). Such water is often contaminated by untreated effluents from industry and by sewage and is a source of many children's diseases. Where standpipes are provided, they are so few as to make a meaningful impact.

The health problems are exacerbated by often crowded and cramped housing conditions. The numbers of persons per room are high (Izeogu, 2009), which contributes to the spread of diseases such as tuberculosis, influenza, and meningitis. The spread of diseases is facilitated by limited resistance because people also suffer from malnutrition. Among the children, diseases such as mumps and measles take a heavy toll. Accidents, particularly among children, are also common from fires, stoves, and kerosene heaters (UN-Habitat, 2009).

In Addis Ababa, Ethiopia, solid waste is one of the major environmental issues facing the city administration. The sources of solid wastes include: 76 % (Household), 18 % (Institutions, Commercial, factories, and hotels) and 6% (street sweepings) (Environment Protection Agency, 2003).

At one point in Zimbabwe, the Government used to be hostile to squatting and did not allow the process to take root. Recently, however, with Government inability to provide accommodation, there has been a considerable level of softening on that policy as squatting is grudgingly being accepted (Africa South, 2002). Currently, for example, Harare suffers from a scarcity of serviced land, insufficient funds, rapid population growth, and a shortage of building materials (Southern African Economist, 2009).

Problems of the neighborhood

In Sub-Saharan Africa, urban environmental problems that originate from homes are often part of the wider problems afflicting the city neighborhoods. The neighborhood problems often relate to the physical location of human settlements and the poor collection of household garbage. This is because squatters often select land that is likely not to be demanded for any other use, thus minimizing the possibility of eviction. These types of land are also selected because of their additional advantage of being cheap or close to jobs (UN-Habitat, 2009). The locations selected for squatter settlements include hillsides, flood plains, as well as polluted sites such as near solid waste dumps. For example, squatter settlements in the Cameroon towns of Douala and Yaounde occupy quarry and/or marshy sites in valley bottoms. However, such sites tend to be dangerous and environmentally unhealthy.

The second urban neighborhood-related environmental problem is waste disposal. In 2009, Izeogu found six factors that affected solid waste generation in Nigeria. They included urbanization, population growth, social development, income class composition, and diffusion of technical competence. He found that, with improvements in incomes of the urban employed, consumption patterns changed so that the emphasis shifted to packaged products, which tend to produce large amounts of litter such as plastics, tins, and bottles (Izeogu, 2009).

Most cities in Sub-Saharan Africa do not have sufficient capacity to deal with the garbage that is generated. For example, in 2000, Dar es Salaam generated an estimated 2,000 tonnes of refuse a day but its removal capacity was only 100 tonnes a day (Mosha, 2000). In Nigeria, Nwaka (2000) estimated that only 30 per cent of waste was satisfactorily disposed of; the rest was dumped by the roadside or into nearby drainage channels, rivers and streams. In Harare, refuse collection is restricted to high-income areas.

Thus, in squatter settlements in Sub-Saharan African cities, there are no regular collections, if any, and the uncollected refuse soon attracts rodents, flies, and other vermin. Where refuse is collected, it is often dumped at
the edge of the city. The situation is very serious because it has a direct effect on the quality of the environment, such as pollution of the soil and ground water. Izeogu observed that the large volumes of solid waste generated in Port Harcourt had changed the aesthetics of the urban environment. Garbage completely blocked some streets in Diobu and various parts of the city were dirty, unhealthy and visually unpleasant” (Izeogu, 2009: 64).

Problems of the city-wide environments

Just as homes merge into the neighborhoods, so do neighborhoods into the city region. The main environmental problems at the city level in Sub-Saharan Africa are related to various aspects of water, air and noise pollution (Lovelock, 2000). Although air pollution may be considered unimportant because of the low scale of industrialization in Sub-Saharan Africa, it is as serious as in developed countries in certain localized areas. These are the major centres, particularly capital and industrial cities like Johannesburg, Nairobi, Harare and Addis Ababa, where industries are concentrated UN-Habita, 2009).

The first city level environmental problem concerns the disposal of toxic or hazardous wastes. The main sources of hazardous wastes include heavy metals, oxides of nitrogen and sulphur, and petroleum hydro-carbons (UN-Habitat, 2009; Christiansson, 2003). Most of the toxic wastes come from the chemical industries, although other industries such as primary and fabricated metal and petroleum industries and leather tanning industries also produce significant quantities of hazardous substances (UN-Habitat, 2009). Effluents are discharged into rivers, lakes, and/or estuaries, some of which are sources of drinking water (Izeogu, 2009). Alternatively, they may be dumped with ordinary domestic garbages, thus causing soil and groundwater contamination (Segosebe and Van der Post, 2010). The situation is exacerbated by the fact that most cities of Sub-Saharan Africa have no effective regulations and institutions to manage the handling and disposal of such materials (UN-Habitat, 2009).

In cities like Johannesburg, South Africa, air pollution is becoming a serious problem. The general sources of air pollution are industry, fuels for heating and electricity generation, the burning of garbage, some mining operations such as quarrying, and motor vehicles (UN-Habitat, 2009, Mosha, 2000). Motor cars, which are often poorly maintained and congested in narrow streets, also contribute substantially to air pollution through emissions of carbon monoxide, oxides of nitrogen, and hydro-carbons. In addition, there is lead pollution as a result of less stringent regulations on the lead content of petrol.

Noise pollution is a common problem in large cities of Sub-Saharan Africa. The sources of noise pollution include highway traffic, industrial operations, and aircraft (UN-Habitat, 2009). In some cases, desirable maximum levels of outside noise (65 decibels) are exceeded. For example, in Port Harcourt, Nigeria, measurements in excess of 80 decibels were recorded (Izeogu, 2009).

Environmental problems affecting the city hinterland

Around major cities of Sub-Saharan Africa, few areas now remain in a relatively undisturbed state. Some natural woodlands, grasslands and wetlands are disappearing, if they have not done so already. Several urban-related causes are responsible for this change of the natural environment. They include urban sprawl, industrialization, housing and physical infrastructure (UN-Habitat, 2009).

The expansion of urban and industrial areas as well as the increase in the amount of houses built in urban peripheries is the chief cause of damage to the landscape around cities of Sub-Saharan Africa. For example, in Johannesburg, Lagos, and Addis Ababa, many new industries now prefer to locate in attractive peri-urban zones or hinterlands (Andreasen, 2010). As a result, many agricultural lands and wetlands have thus been removed or drained, leading to some negative impacts on the natural landscapes.

Transport systems, telephone lines, pylons and overhead power lines have also created some changes upon the natural environment as they criss-cross the countryside. These and other developments have had negative environmental impacts because in most countries of Sub-Saharan Africa, environmental impact assessments are hardly carried out. In Ethiopia, for example, Adil (2006) observed that the Environmental Impact Assessment Policy existed only on paper. Other causes of natural landscape deterioration include large-scale development facilities that do not blend with the natural environment, thereby creating negative visual impacts. This is particularly so where housing, industrialization and other developments are poorly planned. While much of the change on the landscapes has benefited humanity in economic terms, it has often been achieved at a cost to the environment. The range of plant life found over large areas has been greatly reduced. In Addis Ababa, many attractive landscape features and natural habitats for fish, birds and animals have been lost or are threatened due to the eastern expansion of the city. This has further caused great changes to the rural natural ecosystems and disturbed the agricultural practices of surrounding farmers.

Breeding and feeding grounds for birdlife have particularly been affected through the drainage of wetlands and the removal of tree cover in Harare (Silithshena, 1989). The decline in plant variety has meant a loss in the habitat for wildlife, thereby forcing some wildlife to retreat into other areas of the countryside (Kanie and Haas, 2007). As if to add salt to injury, some natural trees and bushes have not been replaced after tree felling while some wild flowers have declined as open lands are converted to housing and urban-industrial areas.
Another urban environmental effect that goes beyond the city boundaries is water pollution. The effluents dumped in rivers and streams have polluted water beyond the city limits, thereby negatively affecting rural communities (Izeogu, 2009). Thus, as cities grow in Sub-Saharan Africa, the demand for water increases and sources further afield may be tapped. In Zimbabwe, for example, the City of Harare draws its water from Kunzwi Dam which is more than 50 km away. Also, Bulawayo, Zimbabwe’s second largest city, obtains its supplementary water from boreholes 65 km away, thereby competing with rural communities for water, let alone contributing to the fall in the levels of aquifers (Cities Alliance (2007).

Energy is another area of natural resource stress beyond city boundaries. The main source of energy in most urban areas of Sub-Saharan Africa is charcoal, followed by wood fuel (White, 2009). Because charcoal is lighter, it is easier and cheaper to transport from areas outside city limits. Consequently, urban dwellers cause greater deforestation per capita than do rural dwellers. In Malawi, for example, it is feared that the shift from commercial fuels to wood may increase severe deforestation (Mwafongo, 2001).

CONCLUSION

Urbanization in Sub-Saharan Africa is increasing at a very fast rate, thereby putting enormous pressure on the limited resources and services in the urban areas. Many cities also cause serious environmental degradation to their surroundings and increasingly contribute to global warming. While resources are limited and also unevenly distributed among different urban centers, they are used at an accelerated pace, thereby producing vast amounts of wastes. The wastes are, in turn, responsible for urban environment deterioration in Sub-Saharan Africa. Environment-related diseases and injuries cause millions of preventable deaths each year. As observed by Hardoy, Mitlin and Satterthwaite (2001), in many squatter settlements, children are 40 to 50 times more likely to die before the age of five than they would be in Europe or North America and most such deaths are environment-related. In the majority of cases, there are political causes that underpin many of these problems, including unplanned and poorly managed urbanization, as well as ineffective and unaccountable governments.

RECOMMENDATIONS

i. To deal with the urban challenges identified, Sub-Saharan Africa should have accurate projections of future urban growth. This should be based on a solid foundation of high-quality statistics and a good understanding of the likely future patterns and trends of changes in their own urban areas.

ii. To overcome the problem of waste management, Sub-Saharan Africa should consider a judicious combination of public, private and community involvement, in particular, the informal sector. However, a more sustainable long term solution should put emphasis on waste minimization at the various levels, that is, household, industry, institution and, indeed, at city levels. Solid waste collection should also be seen as an income generation and employment creation for the urban poor through small-scale waste recycling and composting initiatives.

iii. To mitigate urban environmental problems, urban authorities ensure the production and enforcement of urban plans before cities can grow out of control. Urban planning provides more detailed guidance in sorting out possibilities for different land uses in the city. Urban planning should also be used to provide long-term development strategies of land resources. However, because urban planning is intended to provide benefits to the city and its citizens, it should be done with the full participation of all stakeholders in the city.

Finally, a more sustainable mitigation of urban environmental problems in Sub-Saharan Africa will depend on innovative urban environmental governance approaches that are not top-down. Governments should recognize the role of civil society in the governance process as they badly need their advice, support and action (Hardoy, Mitlin and Satterthwaite, 2001). Through education and public awareness, citizens should have an understanding and appreciation of efforts to reduce, minimize and manage urban environmental problems. Thus, environmental governance should be understood and embraced as a sum of organizations, policy instruments, procedures, financing mechanisms and norms that regulate environmental protection for the common good of all those who live in urban areas.

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