

The Impact of population growth on the Ecosystems and Biodiversity of Kampala: Lessons for Sustainable Urban Development

Aloysius Byaruhanga¹ and Leonard Ssozi²

¹Faculty of Education, Uganda Martyrs University

²Department of Dean of Students, Uganda Martyrs University

ABSTRACT: From the time it attained city status, Kampala's population has been increasing. This has led to the rapid expansion of the city from the originally known seven hills to wetlands and valleys in a bid to accommodate the population. There is massive encroachment on wetlands and green belts for establishment of settlements and factories. Further more, Kampala's position as the commercial and political seat of Uganda has influenced people to migrate from rural areas to the city in search of employment and 'better standards of living'. There is thus need to extend social services and sustainable development initiatives in the rural areas to curb rural to urban migration. This paper explores the impact of population growth on the health of ecosystems and biodiversity. The paper also emphasises wise use of ecosystems while maintaining their ecological character.

Conference Theme: Design for Sustainability

Key words: population growth, ecosystems, biodiversity

INTRODUCTION AND BACKGROUND

Omolo-Okalebo et al (2010) observe that Kampala became a city by the Royal Charter of September 28, 1962, with an estimated population of 50,000. By 1980, the population had increased to 458,503, and 774,241 in 1991, and 1,208,544 in 2002 (most recent census) at average annual growth rates of between 3.14 percent and 5.61 percent.

In 1968 when the then municipalities of Kampala city, Kibuga (Mengo), Kawempe and Nakawa were merged into one administrative unit, there were differences in the pace of development (Ssebaana 2000). Generally, planning was confined to the original city boundaries. The city originally comprised of seven hills and most of the development concentrated in this area. As citizens migrated to the city to participate in trade and commerce, the population increased greatly encroaching on the city's ecosystem. Today, many settlements have sprung up in wetland areas. Also, the city's green belts are continually being allocated to investors for establishment of supermarkets, leisure parks and factories.

The city of Kampala is made of 172 square kilometres a big fraction of which are swamps, with an annual population growth rate of 5.61% (Nyakaana 2004). According to the Uganda Bureau of Statistics-UBOS (2002), 31 out of 172 square kilometres of the city are covered with wetlands. In addition, Kampala absorbs 40% of the national urban population and 4.9% of the national population (UBOS, 2002). Expansion of Kampala city and reduction in the green belt has increased the land surface (built up area) leading to constant flooding, increased runoff and silting of Lake Victoria through Nakivubo channel and its tributaries.

The central focus of this paper is on the wetland ecosystem of Kampala, tree coverage, birds and animals and how these are affected by population increase. As a result of a high human population growth rate accompanied by increased demand for commercial and settlement land, encroachment on protected areas is still a major problem in the city. All these challenges are aggravated by man-made activities and it is mainly the poverty associated with rural to urban migration as well as government development policies which are the major cause of environmental degradation. This paper therefore attempts to find out whether preservation of ecosystems and biodiversity provide a basis for sustainable urban development as well as the impact of population growth on Kampala's Ecosystems and Biodiversity.

METHODOLOGY AND APPROACH USED

Document review, observation techniques and interview guides were used to collect the relevant data. Documents reviewed included policy briefs from Kampala Capital City Authority (KCCA), National Environment Management Authority (NEMA) as well as documents from Uganda Bureau of Statistics (UBOS). A critical observation of the human activities taking place in wetland areas and the city's green belts was undertaken. The observation technique was very important in finding out the current state of Kampala's ecosystems.

CONCEPTUAL ORIENTATION

Ecosystems

Ecosystems provide a large array of services to cities. According to the TEEB manual for cities (2010, p1), functioning ecosystems are the foundation of human well being and most economic activity. In this paper, the term ecosystem has been used to describe nature's functioning in relation to other components such as plants, animals, water, micro organisms and air. Kampala's trees and wetland vegetation act as carbon sinks. Wetlands are a source of food, water, papyrus (for making crafts) and herbs from the vegetation. These are also known as provisioning services. As observed in the Millennium Ecosystem Assessment Report of 2005, wetlands also offer regulating services (*Water purification and waste treatment; Retention, recovery, and removal of excess nutrients and other pollutants*), *Cultural services* (Source of inspiration; many religions attach spiritual and religious values to aspects of wetland ecosystems) and supporting services (Soil formation: Sediment retention and accumulation of organic matter). Against this background, Ecosystems are a life support system for the Kampala residents.

Biodiversity

"Biodiversity" is often defined as the variety of all forms of life, from genes to species, through to the broad scale of ecosystems (Gatson, 1996). It is observed in the TEEBS manual for Cities (2011) that "biodiversity of ecosystems and within ecosystems is integral to their functioning and provision of ecosystem services. In this paper, biodiversity will encompass all living things (plants, animals, and microbes) and all the places where they are found. This is also the argument of the National Environment Research Council (NERC, 2012) with regard to Biodiversity in Cities and Ecosystem Services.

Population growth

Population growth will be understood as an increase in the number of people residing in a square kilometer. In the context of Kampala, increase in population could be attributed to rural to urban migration as well as an increase in the number of people born. In fact the Kampala District State of Environment Report (1997) contends that migration is the 'principal fact fueling population growth of the city with internal birth rates accounting for only 3%'.

STATE OF KAMPALA'S ECOSYSTEMS AND BIODIVERSITY

Kampala's ecosystems are as diverse as the range of services they provide. The Uganda National Environment Authority (NEMA 2006, p.11) report on ecosystems, ecosystem services and their linkages to poverty reduction in Uganda recognises that 'biodiversity, food production, water supply and quality and, energy resources are the four critical ecosystem services' deteriorating in Uganda. In the context of Kampala city, deterioration of these services is mainly as a result of population growth, which is not commensurate to the available social services. Wetlands are the only remaining free or inexpensive areas for infrastructural development. Urban planners, decision makers and developers do not seem to appreciate the economic value of the undeveloped wetland.

Uganda has very good legislation for environmental protection with a fully facilitated parastatal/agency responsible for environmental governance. The Ministry of Environment is in place to ensure the wise use of nature. However, these agencies have always succumbed to pressure from politicians leading to the 'give away' of large chunks of wetlands to private individuals. Also, wetlands have been converted to industrial use or taken over by slum/semi-slum residential housing and cultivation (urban agriculture), waste disposal and small scale business (welding and metal fabrication, carpentry). Kampala's wetland cover is gradually reducing due to encroachment. For instance, Nakivubo wetland, which is one of the largest wetland systems in the city, has been greatly affected. At least 2.9 square kilometres of this wetland has been reclaimed out of the original 5.29 sq km (Emerton *et al* 1998). The Nsooba-Lubigi and the Kinawataka wetland systems have equally been affected. If well maintained, wetlands play a very important role in maintaining the quality of the city's water supply. Kampala's wetlands are instrumental in physically, chemically and biologically removing pollutants and sediments from the waste water disposed in them.

As hinted upon in the earlier discussions of this study, much of the wetland degradation in Kampala seems to stem from challenges associated with rural to urban migration. Lwasa (2005) acknowledges that 'although there are some similar expansion processes of Kampala to those of developed countries, the processes in Kampala are largely dissimilar due to the nature of and the product of the expansion.' In this regard, urban expansion of Kampala as observed by Wegener (2001) is driven by demographic shifts in the form of rural-urban migration that has led to creation of unplanned settlements within the city and at its periphery. The 2002 Uganda Statistical abstract (UBOS, 2002) revealed that Kampala's annual growth rate was 5.61% absorbing 40% of the total national urban population. However, this population increase is taking place at the expense of ecological sustainability.

In respect of the above, Lwasa brings out yet another key concept associated with rural to urban migration, namely: the concept of urbanized rural life. The urbanized rural life is mainly as a result of unemployment in the city forcing unemployed migrants to utilize wetland resources as a source of employment. At present, there is a variety of threats to wetlands arising from human activities. These include drainage for urban and industrial development, excessive harvesting of vegetation such as papyrus for making crafts, palms and wetland woods for fuel; clay mining for brick and tile-making; and overuse for effluent treatment.

In the 1960s, Kampala's vegetation was classified as forest-savanna mosaic and the used to be one of the 'greenest' in East Africa (Langdale-Brown 1964) with well conserved urban flora and fauna. There were several bird species and green hedges. Most of the ground flora has rapidly changed. Hedges have been replaced with brick walls and iron perimeter walls; grass compounds have been turned into concrete and the bird species have migrated (Pomeroy 2012, p.1).

UGANDA GOVERNMENT POLICIES GUIDING SUSTAINABLE URBAN DEVELOPMENT

Echookit Akello (2007) points out that the Government of Uganda put in place a National Environment Action Plan (NEAP) 'which provided a framework for addressing gaps in environment management as well as a strategy for integrating environment into the national socio-economic development.' This action plan was followed by the formulation of the National Environment Management Policy (NEMP) of 1994. The main goal of the NEMP is to ensure sustainable social and economic development, which preserves environmental quality and maintains resource productivity to meet the needs of the present generations while putting into consideration the needs of future generations.

The National Environment Statute of 1995 provides for the establishment of the National Environment Authority (NEMA). The Statute also provides that NEMA shall prepare and adopt guidelines for Environmental Impact Assessment (EIA) on proposed actions, which may have an impact on the country's natural and social environment. The Government (Republic of Uganda, 1997) put in place Guidelines for Environmental Impact Assessment in Uganda. According to Kakuru *et al* (2001), Environment Impact Assessment entails analyzing the positive and negative effects of a proposed project, plan, or activity on the environment. This may include studies on the weather, flora and fauna, soil, human health including physical, social, biological, economic and cultural impacts. It is one of those measures taken to ensure that development is sustainable.

The Uganda Environment Impact Assessment guidelines state that,

'The use of EIA ensures that environmental impacts are considered during conception, planning, design, as well as during the implementation of development policies, projects and activities, at the same time that their financial, technical and institutional aspects are considered. EIA is a systematic and interdisciplinary evaluation of the potential positive and negative environmental effects of a proposed action and its practical alternatives on the physical, biological, cultural and socio-economic attributes of a particular geographical area. The developer is responsible for the EIA in accordance with the general guidelines on the conduct of the assessment, and in compliance with provisions of national law (1997, p.1).'

In order to ensure that the preservation of the ecosystems and biodiversity of Kampala Capital City, the provisions of the EIA Guidelines must be respected and enforced. There is thus need to harmonise the developments by particularly conserving the wetland and the green space because of their ecosystem services and usefulness in preserving biodiversity. It is gratifying to note that in the newly enacted Kampala Capital City Act of 2011, Article 22 the Metropolitan Planning Authority is responsible for planning major transportation, infrastructure and other utilities as well as planning recreation parks, tree planting, green corridors and other environment areas.

EFFECT OF POPULATION GROWTH ON KAMPALA'S ECOSYSTEMS AND BIODIVERSITY

The rapid and unprecedented population increase in Kampala city is responsible for the increased demand for employment, land for housing, social services and infrastructure that have stimulated spatial urban development and industrialisation. Though this current population increase can be seen as a positive development since it could potentially cause an increase in employment opportunities, housing, social services and infrastructure expansion, such development has however, been occurring in a haphazard manner largely dominated by urban informality in most of the sectors. As a result, there is growth of unplanned informal housing and challenges related to solid waste accumulation, wetland encroachment and destruction, water pollution and land use that are reducing the ecological services from the natural environment to the metropolitan area.

Environmental protection is essential in promoting healthy livelihoods of communities. The current increase in the spread of disease in most parts of Kampala is partly due to environmental degradation. The environment provides other services that enable economic activity, such as sequestering carbon, filtering air and water pollution, protecting against flood risk, and soil formation. It is also vital for human wellbeing, provision of recreational opportunities, health improvement, and much more. According to the National Development Plan (2010/11-2014/15), the rapid increase in urban population is not matched with growth and development in basic infrastructure, housing and social amenities which has ultimately led to overcrowding, traffic congestion, growth of slums and informal settlements, dilapidated housing and poor sanitation. Consequently, challenges of air and water pollution have increased most of which have had adverse effects on the well-being of the city's ecosystems and biodiversity. The Kampala District State of the Environment Report (1997) observed that the streams of the city are heavily polluted with domestic and industrial effluent. Contamination by faecal waste is the leading contributor for the transmission of water borne diseases such as typhoid, cholera, bacillary dysentery and the viral diseases of polio and hepatitis. Therefore, when untreated sewage from urban dwellers is discharged in wetlands, faeces transport a variety of bacteria and viruses that threaten the health of humans, animals and aquatic life.

Population growth in Kampala has resulted into an increase in the industrial/ manufacturing sector to offer employment and essential products to urban dwellers. Manufacturing firms are among the leading air and water polluters of the city. Air pollutants emitted by factories include sulphur dioxide and suspended particulate, which have severe effects on humans and the natural environment; they have also been linked to lung damage and other respiratory infections (Kormandy 1989). Chlorofluorocarbons (CFC's) -carbon dioxide, methane and nitrous oxide are another type of pollutant emitted by industries, which contribute to ozone depletion and the greenhouse effect (Grossman and Krueger 1994). The District State of the Environment Report (1997) identifies the abattoir, oil and soap industries, meat and fish processing factories and the tannery as the major air polluters in Kampala.

SUMMARY AND CONCLUSIONS

Urban population growth is bound to have adverse effects on the environment if it is not accompanied by proper planning. In Kampala, the flora and fauna are diminishing at an increasing rate mainly due to rural to urban migration in search of employment opportunities and 'better standards of living'. However, this influx of immigrants is not commensurate to the available accommodation and employment opportunities, a situation that has contributed to the emergence of unplanned settlements in wetland areas. There has also been substantial encroachment on the city's green belts and wetlands by investors and government officials to set up supermarkets and factories. Where as commercial development (eg. supermarkets) is good for the economic growth of the city and the country as a whole, it ought to be balanced with environmental protection.

It is possible to have a trade off between environmental protection and urban development if the available policies and legal instruments governing natural resource use are enforced. Due to selective law enforcement, politicians and powerful businessmen and women have constructed buildings and parks in wetlands and green spaces. We therefore contend that environmental laws, policies and provisions should be adhered to when undertaking any development endeavour in the city.

From the foregoing discussion, it is noted that the increasing population in Kampala and the subsequent demand for food and energy have led to a change in land use pattern. It is for this reason that the city's ecosystems and biodiversity are gradually diminishing in the quest of meeting human needs (cutting down trees for wood fuel, encroachment to practice agriculture, encroachment to set up industries, encroachment for settlement). This change in land use patterns has exacerbated incidences of water borne diseases as well as flooding and damage to infrastructure. Kampala city is heavily congested mainly because most of Uganda's development initiatives centred there. Therefore, government needs to work out a strategy of providing social services in the neighbouring towns with intent to decongest Kampala. Also, investment in low cost housing for the urban poor, aimed at relocating wetland dwellers, should be undertaken.

REFERENCES

- Ecosystem Services in Urban Management. <http://www.teebweb.org> accessed 25th March 2012
- Gaston, K.J. (ed). 1996, *Biodiversity: a biology of numbers and difference*, Oxford: Blackwell.
- Grossman, M. and Krueger, A.B. (1994) 'Economic Growth and Development'. in *National Bureau of Economic Research Working Paper Series*, Working Paper No. 4634. Cambridge.
- Kakuru, K. et al. (2001) A Guide To The Environment Impact Assessment Process In Uganda.
- Kampala City Council (1997) District State Of The Environment Report
- Kormandy, E. (1989) *Internal Handbook of Pollution Control*, New York and Westport, CT: Greenwood Press.
- Langdale-Brown, I., Osmaston, H. & J.Wilson (1964) *The Vegetation of Uganda*. Entebbe: Government Printer
- LWASA, S (2005) *Adapting Urban Areas in Africa to Climate Change: the case of Kampala*. Current Opinion in Environmental Sustainability 2:166-171. Elsevier, Science Direct
- Millennium Ecosystem Assessment (2005). *Ecosystems and Human-Well-being: Wetlands and Water Synthesis*. World Resources Institute, Washington, DC
- National Environment Authority Report (2006)
- NEMA (2006) *Ecosystems, Ecosystem services and their linkages to poverty reduction in Uganda*, Centre for Resource Analysis Limited. Kampala
- NERC (2011a) *Biodiversity* <http://www.nerc.ac.uk/research/issues/biodiversity/> accessed 9th April 2012
- Nyakaana, J.B et al (2004) *Population, Urban Development and the Environment in Uganda: The Case of Kampala City and its Environs*. Faculty of Arts, Makerere University
- Omolo-Okalebo, F. et al (2010) Planning of Kampala City 1903–1962: The Planning Ideas, Values, and Their Physical Expression, *Journal of Planning History* 9(3) 151-169
- Omolo-Okalebo, F. Evolution of Town Planning Ideas, Plans and their Implementation in Kampala City 1903-2004. Doctoral Thesis in Infrastructure, Planning and Implementation .Stockholm 2011

- Pomeroy, D. (2004) *The Birds of Makerere Hill, Kampala-A Story of Biodiversity Loss*. AJOL. <http://www.ajol.info/index.php/uj/article/viewfile/23000/19823> Accessed: 12th January 2012
- Republic Of Uganda (1997). Guidelines for Environmental Impact Assessment in Uganda
- Ssebaana Kizito J. Kampala's Future As Model City, The Uganda Journal Vol. 46 December,2000. AJOL. Available at: <http://www.ajol.info/index.php/uj/article/viewFile/23032/19796>
- TEEB (2011) *The Economics of Ecosystems and Biodiversity: TEEB Manual for Cities*: Accessed on 12/01/2012
- Uganda Bureau Of Statistics (2002) *Uganda Population and Housing Census*. Kampala.
- Uganda Bureau Of Statistics (2002) *Uganda Statistical Abstract*
- Wegener, M. (2001). *New Spatial Planning Models*. JAG 3(3): 224 / 237.