

CLIMATE CHANGE ASSESSMENT FOR KAMPALA, UGANDA: A SUMMARY



CITIES AND CLIMATE CHANGE INITIATIVE

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HS Number: HS/150/10E
ISBN Number:(Volume) 978-92-1-132264-4

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ACKNOWLEDGEMENTS

This report is based on the report 'Assessment of Cities and Climate Change in Kampala and Uganda' (2009), prepared within the Framework of UN-HABITAT's Cities and Climate Change Initiative

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1.0

INTRODUCTION

1.1. CITIES AND CLIMATE CHANGE

Millions of people around the world are already, or will be, affected by climate change. Urban areas, which typically feature high concentrations of populations and buildings, are particularly vulnerable. Climate change is expected to compound the overall vulnerability of urban areas through rising sea levels, more frequent and stronger weather events, and inland flooding, among other challenges. At the same time, cities are major sources of greenhouse gases, and therefore must stand at the forefront of mitigation efforts. Mitigation and adaptation to the effects of climate change must take into account the vulnerable natural and human systems existing in our urban areas and their surroundings.

In many countries, cities are located in coastal areas, beside rivers, on steep slopes or other risk-prone areas. Infrastructure such as roads, water networks, transmission lines, schools and hospitals providing basic services for urban populations, are vulnerable to extreme climatic events such as floods, storms or landslides. Cities located in tropical coastal areas are particularly vulnerable to cyclones or rising sea levels, the frequency and intensity of which have been on the increase over the past three decades. In addition, salt water intrusion restricts the availability of fresh water in coastal areas, jeopardizing food security as once-fertile land becomes barren due to high salt content. Cities located in the hinterland or along rivers may be vulnerable to flooding. Conversely, areas where climate change is expected to reduce rainfall may be affected by drought, shrinking water tables and food scarcity. In urban areas, the poor are the most vulnerable to the effects of climate change, and particularly slum dwellers in developing countries.

1.2 UN-HABITAT'S CITIES AND CLIMATE CHANGE INITIATIVE

Cities and local authorities have the potential to influence the causes of climate change and to find how to protect themselves from its effects. The Cities and Climate Change Initiative, a key component of UN-HABITAT's Sustainable Urban Development Network (SUD-Net), promotes enhanced climate change mitigation and adaptation in developing-country cities. More specifically, the Initiative supports the development of pro-poor innovative approaches to climate change policies and strategies. This Initiative builds on UN-HABITAT's rich experience in sustainable urban development (through the Environmental Planning and Management approach of the Sustainable Cities Programme and the Localizing Agenda 21 Programme) as well as on well-recognized capacity-building tools. The Initiative develops, adapts and disseminates the methodologies that put city managers and practitioners in a better position to cope with climate change.

The Cities and Climate Change Initiative also promotes collaboration by local authorities and their associations in global, regional and national networks; the triple rationale is (1) to enhance policy dialogue so that climate change is firmly established on the agenda; (2) to support local authorities' efforts to bring about these changes; and (3) to enhance awareness, education and capacity-building in support of climate change strategies. A major outcome of the initiative will be the development of a set of tools for mitigation and adaptation.

This report comes under the Cities and Climate Change Initiative. Four pilot cities were selected in 2009, and one of their first assignments was for each to assess its vulnerability to climate change. In addition to Kampala, the other three cities are Esmeraldas in Ecuador, Maputo in Mozambique; and Sorsogon in

Philippines. The aim is to provide insights on climate change adaptation and mitigation capacity in cities in developing and least developed countries. The rationale behind this report is to disseminate the early lessons of the Cities and Climate Change Initiative.

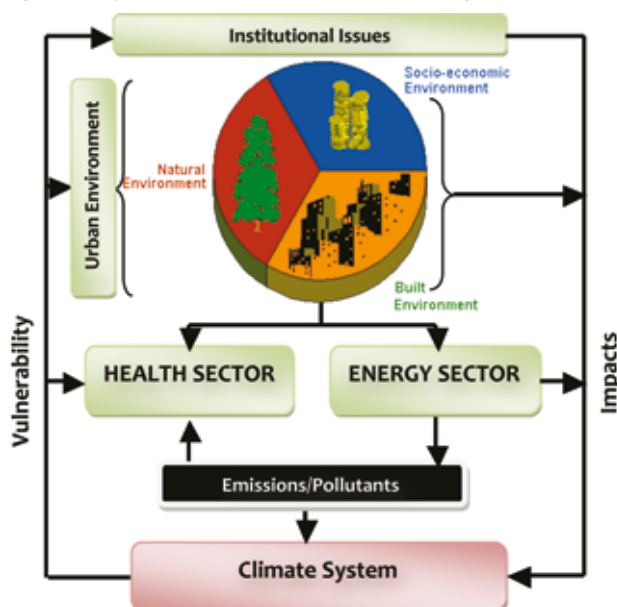
1.3 ASSESSMENT METHODOLOGY

The Uganda assessment was carried out at two levels; the national and the city level. Demographic data was analyzed to elicit information on urban development dynamics. Geospatial analysis of population using the gridding approach was applied on the 'city region' of Kampala and also at national level and was utilized to integrate demographic, health, environmental and socio-economic data. This enabled the assessment of urban vulnerabilities at both levels. Through documentary review and field interviews, institutional issues were also analyzed to identify functional mechanisms, gaps and potentials. Institutional mapping was applied to elicit information on how the Ministry of Lands, Housing and Urban Development as well as Kampala City Council are structured to respond to climate change.

For institutional, human capacity and tools assessment, a SWOT analysis was carried out to analyze existing frameworks, tools and human resource capacities in the context of adaptation to and mitigation of climate change effects. The institutional assessment encompassed policy, strategy, planning, human resource, management and monitoring & evaluation frameworks for climate change management and sustainable urban development at all levels. Meta-evaluation for cases of climate change related projects was conducted based on the evaluation reports. This method provided information on demonstration projects which can be up-scaled or out-scaled based on the actual or envisaged outcomes of existing interventions. A list of potential projects that can be used to mainstream responses to climate change is included in this report.

To structure the report analysis and also provide a basis for coherence in the relationships between the various components of the study, the team developed an analytical framework as indicated in Figure 1 below. This analytical framework recognizes that cities relate to climate change in a bi-directional manner. This means that cities contribute to climate change through emissions that come from high consumption but are affected and vulnerable to the effects of climate change including extreme events. Various sectors are responsible for the emissions and are affected in particular ways. Around these biophysical relationships are the institutional and governance systems which shape and determine the development pathways of cities as well as the consumption patterns. The urban system is exposed and vulnerable to the climate stressors while impacts are recorded to occur. Adaptation and mitigation are requisite in order to reduce the vulnerability but also the emissions which are directly linked to climate change.

Fig. 1 Analytical Framework of Climate Change in Kampala



2.0

BACKGROUND

2.1 GEOGRAPHIC BACKGROUND

Uganda is a landlocked country situated in East Africa. It is bordered by Kenya in the east, Sudan in the north, the Democratic Republic of the Congo in the west, by Rwanda in the southwest, and by Tanzania and Lake Victoria in the south. Uganda has an estimated population of 31 million (2008)¹, 13% of who live in designated urban areas. Kampala, the capital city is located on the northern shores of Lake Victoria and covers an area of 195 sq. km. Situated at an average altitude of 3,910 ft (1,120 m) above sea level it sits on 24 low flat topped hills that are surrounded by wetland valleys. The city 'region' of Kampala covers an estimated land area of 1895 sq km engulfing the satellite towns of Entebbe, Wakiso, Mukono, Lugazi and Gayaza.

2.2 URBANIZATION IN UGANDA

Urbanization in Uganda is characterized by the primacy of Kampala as the major urban center. Typified by urban sprawl, Kampala's annual growth rate is 3.7%, faster than that of any other urban area in Uganda. There are a number of reasons for this urbanization trend including population dynamics, industrialization, rural urban migration and economic growth leading to labour shifts. Although urbanization should not be viewed as a problem, the challenges that come with the high growth rate are overwhelming, especially in the context of climate change. There is thus urgent need to re-engineer the urban governance system, infrastructure and social fabric to respond to inherent problems and the emerging impacts of climate change.

In Uganda, designated urban areas follow a five tier level, that is, trading centers, town boards, town council, municipality and city. The population

MAP 1: Uganda showing Kampala



living in these areas has increased from 635,000 in 1969, 938,000 in 1980, 1.9 million in 1991 to 3.7 million in 2007 (UBOS, 2002, 39). Although the level of urbanization in Uganda is low - below 20% - urbanization growth rates are relatively high posing a challenging task of ensuring environmental sustainability especially in the metropolitan area of Kampala. The urban challenge in Uganda is more visible in designated urban areas, but the growth in population and density of small rural hamlets and trading centers should not be ignored because it influences sustainable urban development in the country. In the context of climate change, these secondary cities face serious challenges due to lack of institutional readiness to confront the impacts.

¹ World Bank <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/UGANDAEXTN>



Kampala City ©UN-HABITAT

The nature of urbanization in Uganda has two dimensions: first an increasing growth path that continuously presents urban management problems and sustainability challenges; second the creation of districts, resulting in more urban centers with inadequate administrative, financial, social and economic managerial capacity. The mushrooming of new urban centers through districting poses challenges of creating and nurturing functional institutions for urban governance. Given the growth trajectory, sustainable urban development and management should be of high priority in the urban agenda in Uganda. Because urban development is crucial to national development, and urban areas are engines of growth, urban centers need to be managed properly not only to enhance and promote national development but also be at the cutting edge of adaptation and mitigation of climate change.

The lack or slow process of initiating an urbanization policy, the failure of current urban planning and guidance systems and laws, and the continued organic development of urban areas in Uganda have far reaching implications on realizing the Millennium Development Goals, national development and responding to climate change. Therefore institutional changes are needed for sustainable urban development. Without expedited institutional adaptation, urban vulnerabilities in Uganda will increase putting an estimated 7.7 million or 25% (adjusted 2009 population based on gridding) of the urban population at greater risk, causing destruction to urban infrastructure investments and destroying livelihoods. The cost of increasing urban vulnerabilities in Uganda will continue rising and urban adaptation is a necessary action now.

3.0

OVERVIEW OF CLIMATE CHANGE IMPACTS AND VULNERABILITY

3.1 CLIMATE PROJECTIONS

According to the Fourth Intergovernmental Panel on Climate Change Assessment Report, the global climate change models project an increase in average temperatures in Uganda by up to 1.5°C in the next 20 years and by up to 4.3°C by the 2080's. Changes in rainfall patterns and total annual rainfall amounts are also expected. Based on the models, predictions indicate an increase in rainfall of 10 – 20% over most of the country with a decrease expected over the semi-arid cattle corridor. From the precipitation predictions, it is estimated that there will be 10 to 20% increase in runoff under future climate change scenarios for most of Uganda. Recent recorded rainfall data indicate some significant variations and changes in various parts of the country.

3.2 THE IMPACTS OF CLIMATE CHANGE IN UGANDA

In Uganda, as for the rest of the world, there are likely to be changes in the frequency or severity of extreme climate events, such as droughts, floods and storms². Such rates of increase are unprecedented and will be felt in fast growing urban areas including Kampala. Each year there are climatic events that represent risks to city residents and the urban sectors. These risks arise from 'normal' day-to-day, seasonal, and year-to-year variability in climate as well as regional climate differences.

The most critical climate changes in Uganda are increased/reduced precipitation and increasing temperature. The two scenarios have implications on urban vulnerabilities. In the first scenario, increased precipitation implies that there will be more water to harness for urban use but a lot of it turns into runoff.

Increased runoff has an implication on flooding and requires more robust drainage systems for managing storm water to prevent disruption to urban sectors such as public transportation. Besides making urban infrastructure susceptible to destruction, heavy storms also affect housing, social services and livelihoods of urban dwellers. Vulnerability of urban infrastructure to climate induced exposure such as flooding is on the increase. For example, the extended rains and floods of December 2006 to February 2007 caused serious damage to housing, schools and disrupted livelihoods in addition to cutting off neighborhoods from towns in eastern Uganda. A spatial analysis of the areas vulnerable to flooding reveals that an estimated 1,600km of urban road segments are highly vulnerable to flooding and extreme weather events. The climate change extremes have also affected health either directly or in transient. Malaria, dysentery and cholera epidemics are increasing. Cholera cases and frequency has increased in the last 8-10 years due to erratic rainfall contributing to slow onset floods in many towns. On the other hand, reduced rainfall and water availability will result in water 'stress' in the urban areas where there is evidence of reduced precipitation. The vulnerability of these urban areas is in relation to water provision given that most of them rely on wetland areas from which water is drawn for treatment and storage before distribution.



Recent flooding in Kampala ©UN-HABITAT

² Hepworth and Goulden, 2008



Poor neighbourhoods with inadequate infrastructure, such as this slum in Kampala, are particularly vulnerable to the impacts of climate change such as flooding ©UN-HABITAT

In the second scenario, changes in temperature are likely to have significant implications for water resources, food security, natural resource management, human health, settlements and infrastructure. For example, cases of meningitis have increased recently in north and eastern parts of the country where temperatures have changed over time.

3.3. IMPACTS OF CLIMATE CHANGE IN KAMPALA

In Kampala the impacts of climate change are manifested in the following forms:

Floods: As many of the poor of Kampala live in flood plains and reclaimed wetlands, they are exposed to frequent flooding during the rainy season resulting in loss of lives and property. The impacts of the floods are exacerbated by poor city planning as these neighbourhoods have no drainage systems. The frequency and intensity of floods are expected to increase with climate change.

Decreased Water Availability: Most of the slum dwellers in Kampala do not have access to running water; their main source of water is natural springs. During flooding, most of these water sources get contaminated due to the poor sanitary conditions, thus putting the lives of these poor communities in danger.

Health: Floods cause frequent outbreaks of water

borne diseases like cholera. The urban poor are affected most by these water borne diseases and the frequency of the outbreaks is expected to increase with climate change.

Sanitation: Most of the slum dwellers use pit latrines which are shallow due to the height of the water table in the flood plains where they live. These sanitary facilities get flooded and become inaccessible during the rainy season, leading to contamination of water sources.

It should therefore be noted that if urban poverty is reduced, the disasters brought on by climate change will be greatly offset.

3.4 VULNERABILITY TO CLIMATE CHANGE

The vulnerability of a society/community to climate change is measured by its lack of capacity to recover from an impact. It is determined by social and economic factors and depends on the magnitude of the climate change/variability event and the impact of economic and social development on the natural systems. Social and economic vulnerability is determined by:

- Poverty levels;
- Weakness of institutions;
- Inappropriate political and technological framework;

- Insufficient monitoring and observation systems;
- Lack of basic information and appropriate decisions;
- Limited institutional management;
- Settlements in vulnerable areas;
- Lack of early warning systems;
- Lack of capacity building and
- Lack of funds to invest;

3.4.1 VULNERABILITY OF KAMPALA'S URBAN SECTORS

Different urban sectors have differing levels of vulnerability. In the Kampala city region, the following key urban sectors are particularly vulnerable to climate change: industrial establishments, businesses, settlements, roads and ancillary infrastructure, communication infrastructure, public transportation systems, urban livelihoods, ecosystems and the entire population. Housing is one of the most vulnerable sectors in Kampala. Within the city boundaries, an estimated 45% of the residential buildings are in flood prone areas. Although data for the city region is not available, it is likely that a similar proportion of houses are located in flood prone areas. Housing utilities and services such as latrines and access roads are also vulnerable to the effects of climate change. Further, industry has historically been located in wetlands. Between 1920 when spatial planning was first implemented in Kampala and 1994, industrial location policy involved gazettement of wetlands for industrial activity. This explains the existence of many industries in wetlands within the city region. Existing land use patterns thus make much of Kampala vulnerable to climate change.

The ecosystem of the city region is under threat from climate change and urbanization. Wetland destruction, biodiversity loss and soil erosion augmented by clearance of vegetation on hill slopes indicate ecosystem decline. In 1993, only 13% of the wetland area was severely degraded. However, by 1999, 46% of the wetland was severely degraded and by 2002 only 3.3% of the total wetland area remained. This implies that flood attenuation from extreme storms will be hampered exposing the population within the city region to even more stressful burdens. The degradation of wetlands through conversion to built up environment has led to consequences including flooding, housing destruction, production disruptions

and loss of products leading to human suffering. Ecosystem conservation and management therefore remains an important component for climate change adaptation and mitigation.

The health system is also vulnerable to climate variability, particularly health infrastructure which provides the basis for responses to epidemics and emergency situations. Spatial analysis shows that an estimated 45% of the health units are located in flood prone areas. The same is true of social services such as schools, with the implication of reduced access to education if increased rainfall and floods continue.

Another important urban sector that is vulnerable to climate change is the livelihood system of the urban population. Many people in the peri-urban areas and within the boundaries of Kampala rely on natural resources for some or all of their household livelihood strategies. Climate change is likely to impact large proportions of the urban populations in Uganda resulting in increased social polarization of communities as a result of urban poverty, environmental degradation and increasing burdens (sanitation, flooding, waste accumulation, public health, and disasters) leading to regional imbalances in urban development and the challenge of urban sustainability.

3.5 ANALYSIS OF KAMPALA'S URBAN SECTORS IN RELATION TO CLIMATE CHANGE

The assessment carried out an analysis of various urban sectors in Kampala to determine their contribution to climate change, and how climate change impacts each respective sector.

3.5.1 ENERGY

In Kampala, the greatest demand for energy is for residential use, with a combination of electricity, wood fuel, charcoal and petroleum products used for various domestic activities. Residential demand is followed by commercial and industrial demand. Energy demand forecasts³ for the period 1994-2010 show petroleum demand to rise at an average annual rate of 6 to 8 percent in relation to importation of vehicles.

³ ESMAP (1996)



A charcoal seller in a Kampala slum. 75% of all households rely on wood & charcoal to meet their energy needs ©UN-HABITAT

In addition there has been a surge in energy demand to generate power following the decreasing water levels of Lake Victoria. This has led to a sudden increase in demand for diesel run generators as a backup system in the wake of failure of the national hydropower generating system to provide reliable energy in 2006. In response, the Government waived tax on diesel products and generators which triggered a surge in usage of diesel for power generation across the country. The implication is an increase in CO₂ emissions.

A significant aspect of energy use in Kampala and urban areas in Uganda is the heavy reliance on wood energy in the form of wood and charcoal. Wood fuel use is dominant with 75% of households, 10% of commercial, and 5% of industry relying on wood for energy while charcoal production meets 10% of energy needs in the city⁴. The high dependency on wood fuel and charcoal has implications on carbon production through deforestation and carbon dioxide emission through combustion. Kampala is thus both a contributor to climate change processes and vulnerable to the effects of CO₂ accumulation in the atmosphere. Therefore adaptation is necessary and mitigation measures are important to support continued economic growth by going greener in energy use. Yet there has not been a serious effort on making urban areas green with more energy efficient systems. Despite the continued investment in urban infrastructure such as water, drainage, roads, communication,

waste management, sewerage systems, lighting and housing, governance systems to ensure sustainability and functionality of the infrastructure is almost non-existent. This is reflected in non-maintenance, repairs and non-replacement even though extension and expansion are limited.

The increased intensity and frequency of severe weather events impacts on energy infrastructure, by causing destruction of, for instance, power plants, transmission lines and power lines in and around the city. These weather-related supply disruptions result in higher energy prices. Severe storms and rains lead to flooding of lower areas making rail and road transportation inaccessible and result in deterioration of critical bridges used for fuel transport or distribution.

Adaptation of the key energy consumption sectors including buildings, residences, industry and the urban transport system to climate change should be seriously undertaken by Kampala City Council and the envisaged Kampala Metropolitan Authority.

3.5.2 URBAN TRANSPORT AND ENERGY

Vehicle emissions are the major source of pollution in Uganda as 80% of diesel fuel is used in the transport sector, and 100% of petrol is used in this sector. There is growing evidence that higher densities lead to greater energy efficiency. Ideally, urban centers should have high population densities with a mix of residential and commercial buildings connected through high speed transport systems. The city of Kampala has been allowed to spread without adequate controls and the danger is that public transport to the extended areas is inadequate, necessitating almost exclusive reliance on motor vehicles. Due to the increase in motor vehicles, the consumption of petroleum products is responsible for 75% of greenhouse gas emissions. Although Uganda's contribution to CO₂ emissions is low, adapting urban transportation calls for action, and smarter ways of urban transport and energy efficient systems is a key area for climate change adaptation.

3.5.3 ENERGY AND THE BUILT ENVIRONMENT

The role of buildings in the context of climate change is twofold: on one hand, energy efficient buildings protect their inhabitants against the effects of climate change, and on the other hand, residential buildings themselves contribute to the emissions of greenhouse

⁴ (MoNR, 1996:19)

gases⁵. No significant quantitative assessment on energy use in the built environment and its implications to climate change in the city has been made. However, the energy used by the building sector continues to increase, primarily because new buildings are added to the national building stock faster than old buildings are retired. The construction industry and buildings contribute to emissions in three phases; during manufacture of materials such as cement, during construction and at operation when buildings are in use. Data from selected buildings in Kampala shows that energy consumption in the building sector is mainly for air conditioning and mechanical ventilation, lighting, domestic hot water supply, catering, laundry, lifts and health clubs⁶. As regards, the growing industrial sector more energy, mostly electricity and oil is needed. The growth in the industrial sector, while promising a healthy gross domestic product (GDP), has severely affected the ability of the country to maintain adequate fuel supply or reserves. Often, dependence on fossil fuels to power industry has cost the environment. Industries use oil furnaces for heating and there is need for viable alternatives such as solar thermal technology to reduce oil consumption and the consequent CO₂ emission.

3.5.4 URBAN WATER AND SANITATION

Currently, only 67% of the population in Kampala is served with safe water. One key issue related to climate change in respect to water provision in Kampala is the receding Lake Victoria levels which dropped by 1.5 m during the period 2004-2006. The result has been that the only available and functional treatment plant is operating below capacity. Analysts have argued that this has increased the costs of treatment of water for the region, further exposing the urban population to risks. Besides the risk to the population, the treatment plant is also at risk due to the falling lake levels that are partly related to climate change effects in the region.

Water provision is complementary to sanitation and only about 15% of the urban population in Kampala is served with sewerage network connections. Sanitation in Kampala is dominated by latrines which serve 74% of the population. Climate change effects are accentuating the problem of sanitation in Kampala because most settlements are in flood prone areas

which also have high water tables. During heavy rainfall and floods, the resultant overflow of human waste will increase the population's vulnerability to poor health. In the case of urban areas in water stress areas, less water implies increased health risks such as cholera, dysentery and other diseases related to dry conditions.

3.5.5 CLIMATE CHANGE AND URBAN WASTE MANAGEMENT

With an average household size of 5.7 the waste generation rate per capita per day is 0.89 kg for households and 0.213 kg for commercial units. Waste generation becomes a problem if the means for storage, transportation and disposal are insufficient and therefore overwhelmed. This presents serious environmental and health implications to the urban population.

The urban sprawl in Kampala has resulted in increased costs of waste disposal since settlements have developed expanding towards the current landfill with negative impacts on health and the aesthetics of the neighbourhoods. The city has only one land fill managed by the council which serves the population, yet the city regional municipalities operate garbage dumps around and within the region that are of environmental concern. With only about 40% of the waste in Kampala administrative area collected and disposed off at the landfill, there is a double challenge of waste management in the context of climate change: first, the current landfill is a source of GHG's especially Methane and leachates as it is inadequately managed, second, the uncollected garbage in the city remains scattered around in heaps and much of it ends up in the surface drainage system. This interaction calls for mitigation and adaptive measures that would enable the city region to remain green and sustainable. Like energy, this area calls for innovative ways of managing garbage, for example, the Clean Development Mechanism (CDM) of carbon credits can be realized by managing garbage better. Additionally, local level innovative ways of utilizing waste as energy would further reduce the effects of a landfill and have greater implications on terrestrial carbon stocks.

3.5.6 CLIMATE CHANGE AND HEALTH

The relationship between urban environmental conditions and health is well established and the health of people is an indicator of the environment in

⁵ Richerzhagen, et al., 2008

⁶ Wanyama, 2002



Taxi park, Kampala ©UN-HABITAT

which they live. Infectious diseases especially water-related and air-borne are prevalent in many of the neighborhoods of Kampala, while outbreaks of cholera were recorded in 1997 and reoccurred in 1999, 2004, 2006 and 2008 due to the increased floods in the city. Flooding in Kampala especially in settlements of the urban poor has become a normal phenomenon even when slight downpours occur in the city. This is attributed to the nature and pattern of urban development that has altered the wetland systems and cleared the hill tops of natural vegetation. Flooding affects the economic livelihood of the people, health, housing and accessibility of the neighborhoods. Heavy rains can be followed by an upsurge of malaria, while flooding is followed by diarrhoeal diseases and during drought the population is predisposed to meningitis epidemics and other diseases caused by lack of water for adequate sanitation, such as eye and skin infections. Both floods and drought lead to crop failure, also leading to food insecurity and even malnutrition. Climate change exacerbates all the above scenarios, further worsening the environmental health of the city region's population.

3.5.7 CLIMATE CHANGE AND GENDER

Gender is important in understanding the vulnerability and effects of climate change in Uganda and

Kampala, but it is also important when trying to devise adaptation measures because women and girls comprise 51.19% of the national population. Women play an important role not only in the national and urban economies but also in the social and environmental arena. Women's triple gender roles of reproduction, economic and social roles, and their responsibilities including providing for their households and engagement in livelihood strategies make them the cornerstone of household welfare. These roles make it critical to analyze gender and climate change. In housing, emerging economic activities, transportation, energy, agriculture, water, sanitation and health, women are central to exposures and risks associated with climate change accentuated vulnerability. Adaptation measures and mitigation should therefore ensure the mainstreaming of gender into these strategies. Further, household adaptation measures are likely to take root if women are included in adaptation projects. Therefore climate change adaptation and mitigation needs to be gender responsive in the sense that the effects need to be analyzed in terms of how they affect the different social groups including special needs for women and children.

4.0

EXISTING INSTITUTIONAL FRAMEWORK

4.1 NATIONAL POLICIES AND STRATEGIES

Nationally, the existing relevant climate change legislature draws its strength and legitimacy from the Constitution of the Republic of Uganda (1995) coupled with particular international conventions and treaties such as the United Nations Framework Convention on Climate Change (ratified 1994) and the Kyoto Protocol. By addressing local level governance, urban development and management, environmental and natural resource management, the constitution essentially guides and supports national and local level interventions and actions related to climate change.

Although there is no specific urban development policy, urban development is guided by the following national legislative framework;

1. The Town and Country Planning Act (1964); which, inter alia, prescribes the procedure for declaring a locality as a planning area and the process for formulating spatial planning schemes as a framework for urban service provision.
2. The Public Health Act (1964) which, inter alia, details building standards and requirements.
3. The Local Governments Act (1997), plus its amendment of 2001, which in part, focuses on urban-wide provision of services, including street lighting, solid waste management, environment management, infrastructure development and governance.
4. The National Environmental Act, CAP 153, under which a number of vital environment management guidelines and regulations have been formulated and put into effect.

Although most of the current policies, laws and regulation are a result of reviews and new formulations after Rio de Janeiro, climate change issues have not been sufficiently integrated. But newer revisions are

now taking into account environmental concerns especially Environmental Impact Assessments (EIAs) for planning of urban activities, pollution management and other environmental standards. In respect to socio-economic development, aspects of conservation and sustainable management of resources like water, soil, minerals, air and the ecology are specifically addressed although there are often no direct linkages with the climate change.

At the country level, climate change issues are coordinated and monitored by the recently created Climate Change Unit located in the Meteorology Department of the Ministry of Water and Environment. Although there is no policy on climate change, recent direct and specific interventions by Government to conduct climate change vulnerability analysis provide an entry point for the development of such policy. Initial steps to establish an institutional framework for management of climate change (adaptation and mitigation) are further guided and supported by the Poverty Eradication Action Plan (PEAP) and the National Development Plan (NDP) which is under formulation.

As part of this assessment, a SWOT Analysis was carried out to assess the internal capacity of twelve national level institutions involved in sustainable urban development. The objective was to establish the capacity needs of these institutions and their readiness to respond to climate change. The major capacity needs that were assessed were management, human resource, logistical and financial resource. Although 50% of assessed institutions had good or relatively good managerial, human technical resource and logistical capacity, one of the key gaps identified was the need for training both the managerial and technical staff, and the need to improve capacity in terms of office space and equipment. The majority of institutions had low financial capacity, indicating the need for support to mainstream climate change issues on their agendas.

At the national level, there is need for legislation that specifically guides and supports interventions or initiatives in the climate change areas of awareness-raising, in-depth analysis of dynamics and impacts, monitoring, as well as prioritizing and mainstreaming climate change adaptation and mitigation into national and local level plans. Such legislature would enable the country respond to climate change in a holistic, systemic and sustainable manner.

To counter the obvious disconnects between climate change issues and policy, the following proposals are made:

1. Increase capacity building through awareness campaigns on climate change at all levels.
2. Ensure adequate consultations are made during policy, law and regulation reviews and formulations.
3. Climate issues, like gender and HIV/AIDS, should be taken as cross-cutting and mainstreaming guidelines should be developed.
4. United Nations Framework Convention on Climate Change concerns should be made requirements for Environment Impact Assessments.
5. Measures to promote mitigation and adaptation vis-à-vis the convention requirements should be supported.
6. There is need to support networking in research, especially on adaptation and mitigation technologies.

4.2 KAMPALA CITY POLICIES AND STRATEGIES

At Kampala city region level, tools on climate change are yet to be developed, and the Kampala City Council is yet to adopt climate change in its agenda. There are, however, assessments that relate to but do not target climate change, for example, the on-going Kampala Integrated Environmental Management Project has

carried out situational assessments of environment, health, infrastructure and social conditions in its pilot areas but it has not factored in the impacts of climate change.

Kampala City Council has been involved in several on-going projects that address some aspects of climate change. These projects provide an opportunity to mainstream climate change adaptation and mitigation in their activities and also provide a platform for knowledge generation that can enhance the understanding of climate change. By firmly placing climate change on its agenda, the council can maximize on these opportunities to start addressing climate change.

During this assessment, a SWOT analysis was carried out to assess the internal capacity of 6 city level institutions/ projects involved in sustainable urban development. The managerial skills of the assessed projects was found to be good, although the need for more technical human resource capacity and for training at managerial and technical staff levels was identified. Institutions in the city region and particularly Kampala City Council require capacity in advocacy, vulnerability assessment, climate change adaptation, and climate change mitigation including climate proofing of existing and planned infrastructure. Key departments of the council such as planning, public health, environment, public transport and energy did not have climate change on their agendas and capacity will have to be built to address adaptation and mitigation to climate change. As many of the projects assessed were dependant on donor funding, their financial capacities were sufficient for their intended activities. However, most projects did not have sufficient office space and equipment, indicating a need for support.

5.0

CLIMATE CHANGE ADAPTATION AND MITIGATION MEASURES

Climate change can basically be addressed in two ways, by mitigation and or by adaptation. Mitigation involves decreasing the rate of emission of carbon dioxide and other greenhouse gases into the atmosphere so as to reduce the rate at which climate is changing. Adaptation is a process by which individuals, communities and countries seek to cope with the consequences of climate change, including climate variability. It can also be defined as “any action that seeks to reduce the negative effects or to capitalize on the positive effects, of climate change”. Adaptive actions may be either anticipatory or reactive in nature.

Adaptation Principles: For any adaptation process to be effective, the following should be noted:

- Adaptation to present climate variability and extreme events forms the basis for reducing vulnerability to future climate change ;
- An adaptation strategy has to be developed within the development context of the city or country and should lead to harmonization with the country's priorities such as poverty alleviation, food security and disaster management;
- Adaptation happens at various levels within the society – national, regional, local, community and individual;
- The adaptation process is as important as the adaptation strategy;

An effective adaptation process should have the following steps:

1. Assess current vulnerability
2. Assess future climate risks
3. Formulate an adaptation strategy
4. Monitor, evaluate and review
5. Engage stakeholders in the adaptation process
6. Assess and enhance adaptive capacity



Lake Victoria ©UN-HABITAT

5.1 NATIONAL ADAPTATION AND MITIGATION MEASURES

At national level, there is growing awareness of climate change and efforts to address it. An important and initial measure to address climate change was the preparation of a vulnerability assessment report that provided the scope of vulnerability in Uganda. A Climate Change Unit, serviced by climate change scientists has been created in the Meteorology Department of the Ministry of Water and Environment. Dialogue on climate change is growing, and in early 2009 there were two important meetings on climate change: one organized by the Uganda Association of Impact Assessment and the other by a business forum. Institutions are also beginning to take the lead in various climate change issues, for example, the Carbon Credit Bureau is carrying out analysis of information and implementation of climate change related projects, particularly of the Clean Development Mechanism (CDM) projects in Uganda.

A key challenge is the need for tools for climate change analysis, including impact assessment. Currently, the newly created Climate Change Unit is reliant on global scale models of climate change which only allow for generalized assessments. Tools that would enable downscaling of the Global Circulation Models of climate change are necessary to enable national and regional level assessments.

From the literature examined so far, there are two tools at national level: the National Adaptation Program of Action (NAPA) and the Initial Climate Communication tool. The National Adaptation Program of Action is a short-term intervention that outlines what kinds of adaptations are needed at national level and how these will be mainstreamed. A key information gap exists in the linkage between National Adaptation Programs of Action and Local Adaptation Programs of Action. Consequently, the current Local Adaptation Programs of Action is silent about urban areas despite their importance in climate change adaptation and mitigation. The Initial Climate Communication Tool is meant to support the flow of climate change information between stakeholders for awareness creation.

5.2 CITY LEVEL ADAPTATION AND MITIGATION MEASURES

At Kampala city region level, various assessments have been conducted that relate to - although they do not target - climate change, such as, the Kampala Integrated Environmental Management Project, a situational assessment of environment, health, infrastructure and social conditions in the projects pilot areas⁷, the Kampala Urban Sanitation Project, and the Kampala Institutional and Infrastructure Development Project. Although the routine budget frameworks of the city are participatory they have not explicitly integrated climate change issues.

The development of appropriate tools is thus paramount. In this report, a tool in general terms is taken to refer to a set of guides, steps and practical means that enable different stakeholders reach a desired goal of improving understanding and delivery of services. Thus a tool can be anything from a systemically organized book, manual, toolkit and or practical step-by-step guide around issues important

to cities and climate change. Tools provide a basis for enabling urban governance that would respond to the challenges of climate change. A key issue in tools development will be the cross cutting requirement for institutional reorganization and reform to deal with the challenges of climate change, more specifically institutional adaptation to climate change.

In Kampala City Council the concern of how to mainstream climate change tools application can be addressed through two key institutional set-ups that are underway:

The first is the Kampala Institutional and Infrastructure Development Project which was recently approved. Under this project, a metropolitan strategic plan is to be formulated. The project process provides good opportunity for climate change to be mainstreamed into the plan and also for climate proofing the infrastructure.

The second opportunity - though not yet approved - is the Kampala Metropolitan Authority. Among several institutional reorganization proposals is the creation of a metropolitan planning committee that will have mandate over the city region. There is a promising opportunity for adaptation and mitigation through this authority as it addresses urban regional transport planning and implementation, creation of industrial parks and orderly settlement development. These different urban sectors are the premises of climate change mitigation at the metropolitan level.



Kampala City Highway ©UN-HABITAT

⁷ (KCC, 2008 15)

TABLE 1: Kampala City Council Projects with potential for mainstreaming Climate Change Adaptation and Mitigation

Project Name	Objective and focus	Duration	Timeframe	Lead Agency	Value	CC Adaptation and mitigation opportunities
Kampala Infrastructure and Institutional Development Project KIIDP	Improve infrastructure, spatial planning and knowledge management	10 years	2009 - 2019	KCC	\$ 10 m	Vulnerability assessment, strategic measures for adaptation, climate proofing infrastructure, inclusion of mitigation in various sectors
Lake Victoria cleaning week	Held annually in July as mobilization event to rally stakeholders in reducing pollution of the lake	Continuous	Started in 2007	KCC	Varied	Platform for CC awareness raising, knowledge base on community adaptation, wastes mitigation measures
Kampala Integrated Environment Management Project KIEMP	To improve the quality of life of poor communities in Kampala suburbs by enhancing integrated environmental planning and management	5 years	2005 - 2011	KCC	€6.5	Urban planning, urban greening, water supply, improved sanitation, roads construction, solid waste disposal all of which involve adaptive measures but require climate proofing

5.2.1 MAINSTREAMING CLIMATE CHANGE IN KAMPALA

There are several on-going and complete projects which have addressed aspects of climate change adaptation in Kampala and Uganda. These projects not only offer opportunities for mainstreaming climate change adaptation and mitigation but also a platform for knowledge generation for better understanding of climate change. Kampala City Council has been involved in various projects which are community-based city-wide projects that address some of the vulnerable sectors analyzed earlier. Details of some of the current projects are summarized in the following table.

5.3 PROPOSED TOOLS

This report recommends the development of various tools to support climate change mitigation and adaptation at both national and city level as follows:

Profiling and Assessment Tools - the current national vulnerability assessment report mentions urban areas but there is no specific analysis of urban vulnerabilities. There is need for an urban-specific climate change vulnerability assessment. There is also need for the development of a tool for impact assessment at national level.

Awareness Raising Tools - like all other types of tools, the advocacy and awareness creation tools are critical because it is necessary to bring climate change on the agenda of policy actors and all other stakeholders in city development and management. The on-going Advocacy tool development by UN-HABITAT should be broad, but specific as to how policy actors can respond to climate change.

Capacity Building Tools – these should be designed to target key institutions at national and local level. With regard to training needs, preliminary consultations indicate limited capacity to analyze and implement climate change activities including adaptation and mitigation.

Policy Response Tools - a policy response tool needs to be developed at national level.

Planning Tools - the Local Climate Change Plans tool needs to identify a series of relevant cases that would be adaptable by Kampala City Council in developing and implementing the plans.

The toolkits under development as well as those to be developed need to clearly and specifically target the key institutions for capacity building.

6.0

CONCLUSIONS

6.1 CHALLENGES

Based on the findings it is clear that urban adaptation and mitigation are necessary for immediate action. A couple of challenges are worth noting.

There is limited knowledge and debate about climate change in Kampala, its impacts and green house gas emissions

The institutional set up of local governments and how they relate with ministries needs to be addressed. For example, Kampala City Council is directly answerable to Ministry of Local Government but less to other ministries such as the Ministry of Water and Environment. When advice on climate change from the Ministry of Water and Environment is received by the council, it may not feel obligated to respond as it would if the advice was from Ministry of Local Government.

There is also low institutional readiness and capacity to respond to the effects of climate change

With regard to information networks, tools and advocacy, there are insufficient systems to provide the necessary information and to stimulate action at neighborhood as well as city level. Information sharing is a big challenge and yet a key for adaptation and mitigation.

6.2 RECOMMENDATIONS

Following the assessment of climate change in Kampala and Uganda, the following recommendations are made:

1. Improve urban governance and preparedness to respond to climate change.
2. Consider social and cultural dimensions, especially in awareness creation.
3. Climate proof social services and public infrastructure to promote good health.
4. Adapt urban land use planning and housing for energy efficiency.
5. Improve urban transport through compact city development for energy efficiency and reduction of emissions.
6. Conserve and manage urban natural resources for biodiversity and undertake urban greening and preservation of the hill tops.
7. Integrate the informal sector into the urban economy as a way of coupling poverty and climate change effects through innovative solutions to local problems such as waste recycling.
8. Develop tools for awareness raising and capacity building in the city and at national level for secondary towns.
9. Initiate and stimulate Local Urban Knowledge ArenaS (LUKAS) through the development of a toolkit.
10. Invest in community projects that help build community resilience to climate change risks and impacts such as tree planting and alternative energy sources.
11. Support climate change responsive planning and development approval as well as planning policy.
12. Plan for an equitable change to a low-carbon economy including spatial planning that takes into account 'green' technology and buildings.
13. Promote urban and peri-urban local production and distribution networks for food and fuel.
14. Re-use resources where possible.
15. Improve the existing housing stock towards low-carbon designs and urban development.

In conclusion, it can be stated that the potential impact of climate change on the sectors of energy, housing, urban infrastructure, livelihoods, ecosystems and health is important in Kampala. There is thus need for action on adaptation and adaptive capacity enhancement especially in respect to gender. In addition to climate proofing buildings and infrastructure, there is need to develop tools to help adaption to climate change at national and city level. There is also a clear need for mitigating climate change in the city towards a low carbon future. This can be achieved by developing an energy efficient and socially acceptable transport system in Kampala, developing energy efficient and affordable residential neighborhoods, and better management of energy consumption in the construction/building sector.



Kampala slumroad ©UN-HABITAT

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UN-HABITAT's Cities and Climate Change Initiative promotes enhanced climate change mitigation and adaptation in developing country cities. Kampala is a pilot city of the Initiative, and this document is an initial output of the Kampala's Cities and Climate Change Initiative activities. This summary on climate change assessment for Kampala is based on the report titled "Assessment of Cities and Climate Change in Kampala and Uganda", an initial output of the city's activities under the Cities and Climate Change Initiative.

The Kampala City Assessment examines the climate change impacts, vulnerability and adaptation capacity of Kampala City in Uganda. The assessment examines urban development dynamics and urban vulnerabilities to climate change. Through documentary review and field interviews, institutional issues are analyzed to identify functional mechanisms, gaps and potentials, and to elicit information on how the Ministry of Lands, Housing and Urban Development as well as Kampala City Council are structured to respond to climate change. The report concludes by summarizing the challenges the city faces in adapting to and mitigating against climate change and recommends action to enhance the adaptation capacity of the city.

HS Number: HS/150/10E

ISBN Number:(Volume) 978-92-1-132264-4

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