

CHALLENGES OF URBANIZATION AND DEVELOPMENT IN AFRICA: THE CONTEXT OF CLIMATE CHANGE

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Abstract:

Across Africa, urbanisation presents new and multiple development opportunities and challenges at the local level. Globally more than half of the world's population resides in cities and urban areas, severely increasing pressure on essential services, infrastructure and natural systems which underpins economies and social well-being. Security and access issues pertaining to water, energy and food are projected to be exacerbated through climate change, most affecting the vulnerable within society. Climate change poses a major threat to sustainable urban development in Africa. Changes in the frequency, intensity and duration of climate extremes (droughts, floods, heat waves, among others) will affect the livelihoods of the urban population, particularly the poor and other vulnerable communities who live in slums and marginalized settlements. Extreme changes in weather patterns will increase incidences of natural disasters and impact on all key sectors of the economy, including the urban economy, agriculture and forestry, water resources, coastal areas and settlements and health. Using secondary sources, this paper examines the relations between climate change and urban development in Africa and looks at the role and effect of climate change on urban development. It also assesses the available policy options for adaptation and mitigating climate change effects in urban Africa. The findings show that indeed climate change has had major challenges that adversely impact on sustainable urban development. These challenges call for innovative solutions – A transition in Africa towards embracing urbanization, responding to change and harnessing opportunities. Emphasis should be put on (a) local leadership, financing and accelerated integrated action and (b) greater emphasis on Africa's future cities through building resilience to climate change using various known options and best practices.

Keywords: Climate change, Development, Urbanisation, Africa

BACKGROUND

Climate change is one of today's emerging threats and challenges to humanity. The signs are visible, while the adverse effects of climate change are felt across the globe. The high incidences of flooding and intense rainfall (Trapp *et al.*, 2007) drought and heat waves, cyclones, hurricanes, and the frequent erratic weather patterns, which have exacerbated poverty, displacement and hunger among millions of people, are partly attributable to climate change (Pall *et al.*, 2011). The term climate change has been defined as a statistically significant variation in either the mean state of climate or in its variability, persisting for an extended period (WMO, 2012). The major causes of climate change include natural variations in sunlight intensity and human activities, which have led to an increase in greenhouse gases and a steady

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rise of the earth's temperatures (Hope, 2011). Global warming, which entails a rise in the earth's temperature, is caused by the use of fossil fuels such as wood, coal, oil, petrol among other industrial processes that have led to a build-up of greenhouse gases such as carbon dioxide, methane, nitrous oxide, and chlorofluorocarbons (IPCC, 2007). Human activities that are related to biomass burning during shifting cultivation and domestic fuel are responsible for increasing greenhouse gases in Africa.

Besides rendering traditional agriculture across African countries less profitable, climate change has driven an unprecedented number of people into cities as they search for alternative livelihoods (Barios *et al.*, 2006). The resultant urban population increase has exerted pressure on urban services and resources such as urban space, urban water supply, and sanitation systems. Apart from posing a daunting challenge to urban planners and policymakers (Thynell, 2007; Choguill, 1999), climate change has become a major national, regional and international problem among developed and developing countries. It has limited human capabilities and undermined the international communities' efforts to attain the Millennium Development Goals (MDGs). Consequently, UNDP has declared climate change "the defining human development issue of our generation" (UNDP, 2007: 1).

This paper looks at the relationship between climate change and urban development in Africa, where urbanization rates are high but with governments having limited resources to cope with it. It examines the role and effect of climate change on urban development. It also assesses available policy options for adaptation and mitigating climate change effects in urban Africa.

CLIMATE CHANGE AND ITS IMPACTS

The Intergovernmental Panel on Climate Change (IPCC) has declared that "warming of the climate system is unequivocal, as is now evident from observations of increase in global average air and ocean temperatures; widespread melting of snow and ice and rising global average sea level" (IPCC, 2007: 30). Consequently, warming of the climate will not only hinder the achievements of MDGs and sustainable development, but it will also increase the risk of violent conflicts and therefore adversely affect human security (Barnet and Adger, 2007). Therefore, concerted efforts to tackle climate change are required, and failure to address this challenge will result in diminished future prospects for humanity.

UNDP (2007) reports that average annual global temperatures have been rising by 0.7⁰ C since the Industrial Revolution. The report also notes the rapid rate at which CO₂ concentrations are increasing, leading to rising air temperatures. It is expected that with the rise in temperatures, droughts will be frequent as rainfall patterns change. In the next 100 years, climate-induced temperatures in Africa could increase by between 2⁰C and 6⁰C (Hulme *et al.*, 2001). This will have adverse effects on agricultural productivity and food security. It will also mean less water for poor people, increased floods and a rise in sea level, thereby posing a great threat to coastal regions and small island nations (Tacoli, 2009). The rise in temperatures will also increase incidences of diseases such as malaria and other communicable diseases.

Unfortunately, climate change disproportionately affects the poor and poor countries since it impacts on the very resources that the poor depend on, e.g. agriculture, forests, rivers and lakes. Most importantly, poor countries are extremely vulnerable to the adverse effects of climate change due to their low physical and financial capacity to withstand the physical and economic shocks triggered by climate change (Ward and Shively, 2012). Some experts argue that although Africa contributes the least to greenhouse gas emissions, it is the most adversely affected by climate change (Hope, 2009). It is estimated that African farmers are losing as much as US\$28

per hectare per year for each 1⁰C rise in global temperatures (The Economist, 2008), mainly due to the erratic rainfall patterns, increased average daily temperatures, reduced productivity, increased pests and frequent droughts.

Another major impact of climate change is desertification. In this regard, drought affected areas in sub-Saharan Africa could expand by 60 – 90 million hectares, while dry lands could lose about US\$26 billion by the year 2060 (UNDP, 2007). Desert conditions are induced by gradual and prolonged loss of vegetation cover over extensive land areas in a country, and/or across two or more countries. Permanent loss of vegetation cover leads to a reduction in soil moisture, hence curtailing productivity. Poor land utilization practices such as subsistence farming and clearing-and-burning agricultural practices in the majority of African countries have accelerated the loss of natural vegetation, exacerbating the problem of climate change. With time, desertification has transformed extensive land areas in and across countries into arid- and semi-arid lands. The capacity of the original vegetation land cover to regenerate has been severely impaired by the near total damage of the ecosystem, and the absence of rainfall in many parts of Africa (UNDP, 2007).

Worsening climatic conditions, coupled with other factors such as political and ethnic conflicts, erosion of traditional safety nets and the deteriorating physical infrastructure, besides the absence of general security in rural areas, have forced some people to migrate to urban areas, exerting further pressure on cities, and compounding their socioeconomic problems (Choguill, 1999). As centres of innovation, cities have the capacity and the technical know-how of dealing with climate change. Unfortunately, they are also the major contributors to greenhouse gases. City-based commercial, industrial and domestic refrigeration facilities, for instance, discharge large amounts of gaseous emissions (Mosha, 2011). There is therefore a need to critically examine the role of cities vis-à-vis the process of climate change and its impacts.

URBANISATION AND URBAN DEVELOPMENT IN AFRICA

The process of urbanisation in Africa is usually highly influenced by the movement of people displaced by drought, famine, ethnic conflicts, civil strife and war. These have resulted into acute levels of urban poverty and haphazard urban settlements. The poor live in slums where they face dire economic and social hardships. Most are uneducated and unskilled workers who have migrated to urban areas, encouraged by the push-and-pull factors associated with rural–urban migration.

As people migrate from the rural areas to urban regions, global settlement patterns are gradually changing. For instance, in 2008, 3.3 billion people lived in urban areas, a number that is expected to reach 4.9 billion by 2030. Despite being the least urbanized continent in the world, Africa has the highest urbanisation rate of 3 per cent per annum. In 2007, the African urban population was 373.4 million, a figure that is projected to reach 759.4 million by the year 2030. It is further projected that more than 1.2 billion Africans will be living in urban areas by the year 2050 (UN-HABITAT, 2008). Table 1 profile the past, current and projected urban population by sub-region between 1980 and 2030. From the data, northern and southern Africa is the most urbanized regions in Africa, while East Africa is the least urbanised (but nevertheless the most rapidly urbanizing region on the continent). This rapid urbanisation can be explained by both the natural growth of the urban population (the net excess of births over deaths in urban areas) and the rural–urban migration. Some attribute other factors such re-classification of small rural settlements as urban to the rapid urbanization process in Africa (Potts, 2012). Other scholars (Zachariah and Conde, 1981; Kelley, 1991) argue that rural–urban migration is the main contributor to urbanisation in Africa.

Table 1: Percentage of African population residing in urban areas by sub-region, 1980-2030

Region	1980	1990	2000	2010	2020	2030
Africa	27.9	32.0	35.9	39.9	44.6	50.0
Eastern Africa	14.4	17.7	21.1	24.6	29.0	34.8
Northern Africa	44.4	48.5	51.1	53.5	56.8	61.3
Southern Africa	31.5	36.7	42.1	47.1	52.3	57.9
Western Africa	29.2	33.0	38.4	44.1	50.1	56.1

Source: UN-HABITAT (2008)

Rural–urban migration has been triggered mainly by both the pull-and-push factors (Barrios *et al.*, 2006) as well as past development strategies adopted by African countries, including socialist-leaning development policies and structural adjustment programmes, which are biased against rural and agricultural development (Hope, 2009). A dismal consequence of these policies is that the non-agricultural population now exceeds the available non-agricultural employment, leading to *over-urbanisation* (Hope, 1998). Urbanization pull factors include, inter alia, the following:

Economic Factors: economic opportunities are one of the biggest pull factors attracting people to cities from rural areas. From blue-collar manufacturing to white-collar professionals, urban areas offer a broader range of employment opportunities than rural areas, where most residents earn their living from agriculture and other sectors dependent on natural resource extraction.

Government Policies: Public policy sometimes acts as a pull factor, favouring urban over rural areas. This is especially true of developing nations in Africa and Asia. The governments of many developing countries often channel a larger share of their budgets toward improvements in cities, even though a majority of their citizens resides in rural areas.

Cultural Factors: Many people believe that city life offers a glamour and excitement that rural life does not. For many people, cities mean diversity, cultural attractions, hip restaurants and exciting nightlife. These act as pull factors, attracting many people -- especially young professionals -- to major urban centres.

Urban economies (weakened by institutional problems such as extreme centralization, rampant corruption and external factors, and unfair global trade practices) have failed to absorb the growing urban populations. As a result, in most cities of Africa, shanty towns and squatter settlements have developed along the periphery of the major cities (Mosha, 2011). The poor who live in these areas face tremendous economic and social hardships since they do not have access to basic human services such as shelter, land, water, safe cooking fuel and electricity, heating, sanitation, garbage collection, drainage, paved roads, footpaths, street lighting, etc. (Tacoli, 2009; World Bank, 2009).

Urban areas in Africa host major government agencies and the private sector. These sectors contribute significantly to economic growth and create much-needed employment. According to the UN-Habitat (2008), urban areas account for about 55 per cent of Africa’s GDP. They therefore play a pivotal role in the production of goods and services, besides generating employment for the growing urban populations. Unfortunately urbanisation in Africa is not accompanied with an increase in economic growth or improved living standards. This is a unique phenomenon, which the World Bank has called “urbanisation without growth” (Fay and Opal, 2000; Barrios *et al.*, 2006). This pattern of “urbanisation without growth” is the result of

inappropriate policies that could not cater for properly managed and planned urban development. In developed countries urbanisation took root during the industrial revolution. At a time when there was “redundant” labour in the rural areas, there was an increase in demand for labour in urban areas (Potter, 1995). The same cannot be said about the process of urbanisation in Africa. Another interesting phenomenon associated with urbanisation in Africa is that the majority of the growing urban population is not absorbed by larger cities but by intermediate and smaller cities. It is contended that intermediate urban centres do improve both the economic growth and equity in many countries in the continent. These centres have a considerable potential role in regional and rural development and in poverty reduction. They can provide local markets for agricultural produce, which are essential for small-scale farmers. They also provide information and credit for farmers.

The impact of climate change on cities and on urban development in Africa

Due to climate change, urban settlements in Africa have are facing daunting challenges. Some coastlines and river deltas are densely populated low lying areas, which could easily be affected by a rise in sea level. Other costal settlements will be subjected to increased coastal erosion. African coastal cities that could be severely affected by rising sea levels include Abidjan (Cote d’Ivoire), Accra (Ghana), Alexandria (Egypt), Algiers (Algeria), Cape Town (South Africa), Dar es Salaam (Tanzania), Lagos (Nigeria), Mombasa(Kenya), Maputo (Mozambique) and many more others (Mosha 2011).

Infrastructure in urban areas is already showing evidence of destruction due to climate change impacts due to the above mentioned problems of erosion and sea level rise. Some of the most vulnerable infrastructure includes plants and products; equipment for producing and distributing energy; roads; ports (for instance, Maputo); and other transportation facilities; residential areas; institutional and commercial properties and coastal embankments. In the semi-arid and arid zones, many urban settlements (such as Gaborone, in Botswana, Dodoma, Tanzania etc.) are associated with inland drainage water sources. Frequent droughts will exacerbate water supply related vulnerabilities. Similarly water supply and irrigation reservoirs in seasonal river catchments might fail, leading to poor sanitation and food shortages in urban areas. Large cities like Lagos, Nairobi, Cairo, Kampala and Dar es Salaam have almost permanent water crisis, which has affected livelihoods as well as industrial production.

Hydroelectric power generation could be restricted during dry periods, and where it is a major contributor to the energy budget, reduced power generation, like what is happening in Tanzania, and Nigeria could lead to a multiplicity of other problems. In this regard, it is advisable for African states to develop other sources of renewable energy. Temperature changes will lead to altered distribution of disease vectors such as mosquitoes, making urban settlements currently free of vector diseases vulnerable. Cities like Nairobi, Harare and many others that never used to experience this problem are now in the midst of it all.

The dry savannahs of Africa are projected as possible future food deficit areas. Recurrent crop failures would lead to transmigration to urban areas, creating more problems for municipal governments. Pastoralists are likely to undertake more trans-boundary migration and probably come into conflict with settled communities. Already, in many African countries, declining agricultural productivity due to climate change related weather patterns, and population pressures, are pushing greater numbers of rural residents towards cities. Even in urban areas food security is now a major problem and no simple solution is available currently.

Lastly most cities are affected by air pollution caused by a rise in CO₂, which in turn leads to more climate change. Many of the mega cities such as Cairo, Alexandria, and Johannesburg are currently choked with acrid smoke. A study of transport in Senegal found that the health costs associated with vehicle emissions were among the factors costing the country equivalent of 5% of its Gross Domestic Product.(UNEP 2002b).In 1991, the number of cars in the city of Algiers was approximately 560,000 vehicles, and they polluted the city excessively (Benoar, 2004).

Adaptation and mitigation policies: implications for urban development in Africa

Urban governments play a critical role in climate change adaptation and in mitigating (reducing) greenhouse gas emissions. They however need a supportive institutional, regulatory and financial framework, backed by their highest decision-making organs. In addition, low- and middle-income nations need the backing and full support of international agencies (Satterthwaite, 2007). Emission of GHGs is one of the major policy issues that need to be addressed (APF, 2007). Urban authorities in Africa should strengthen the policies and legislation aimed at reducing carbon emissions, but this should be reciprocated by a commitment to the reduction of global greenhouse emissions. For these policies to be effective there must be incentives that recognise the development needs of urban authorities. Africa has legitimate energy needs, hence the problem of carbon emission in her urban centres. Policies encouraging clean energy technologies should be formulated and encouraged through capacity building and financial support from national governments. International partnership should also be established in a bid to bolster these efforts.

Most African urban centres are located within the tropics or sub-tropic regions where solar energy and hydro-power are abundant. Policies encouraging development of Africa's vast solar energy potential and hydro-power should be enacted. The World Bank and the African Development Bank Clean Energy and Development Investment Framework should be fully implemented as a mitigation measure.

In regard to United Nations Framework Convention on Climate Change (UNFCCC), there is a growing realisation that African governments, including urban authorities, should respond with a unified voice in terms of action plans and commitment. This response must take into account Africa's acute vulnerability to climate change, legitimate development needs, and broader principles of equity and fairness. To mainstream adaptation to climate change in urban areas, the strategy should be a continuous process, which addresses both current climate variability and extremes and future climate risks. Africa's urban authorities should take actions that link climate change adaptation to disaster risk management, because many are not doing this at the moment.

Similarly, the city of Durban has also come up with a climate change adaptation strategy that includes human health, water and sanitation, coastal zones, food security and agriculture, infrastructure, and cross-sectoral activities. Many African countries have now recognised that policies on climate change adaptation and mitigation need to shift from a purely environmental concern, to addressing a growing threat to development. Managing both current and future climate risks should be an integral part of development processes at both the national and regional levels, and should involve a cross-sectoral approach that is reflected in the budget, thus the need for greater attention by ministries of finance and national planning.

Urban authorities in Africa should adapt to climate change impacts through: Increased efforts to improve access to climate data; Investment and transfer of technologies for adaptation in key sectors; Developing and implementing best practices for screening and assessing climate

change risks in development projects and programmes; and Mainstreaming climate factors into development planning and implementation; and providing significant additional investment for disaster prevention. For Africa to adapt to the impacts of climate change, it will need development partners to deliver on their commitments. Urban authorities in Africa need to access the clean development mechanism (CDM) fund, which has not yet delivered for Africa, so as to promote development projects that reduce emission of greenhouse gases. There is also a need to simplify access to Global Environment Facility (GEF) so that projects which reduce GHGs emission are funded.

Africa's low emissions and extreme energy deficiency demand a more equitable allocation of carbon resources. Assisting Africa's development through its largely unexploited hydropower potential will help to meet her objective of increasing energy access while limiting GHG emissions. Compensation for avoiding deforestation could also be introduced so as to limit GHG emissions; but this will require an understanding of the factors that encourage deforestation. Incentives to landholders could also be considered in a bid to discourage deforestation. It must be recognised that future climatic conditions are likely to be different from current ones. Climate change management policies should therefore make provision for this reality by adopting improved forecasting and planning methods, and developing new coping strategies.

Urban authorities in Africa should integrate climate issues into economic planning and management by putting more effort into assessing development projects and programmes, while at the same time being sensitive to current and future climate risks. They should also attempt to improve the investment environment so as to encourage private-sector investments in carbon activities and improve access to weather and climate-related information. To adapt to climate change, attendant barriers should be removed in order to motivate urban authorities and development partners. These barriers include: Inadequate human and institutional capacity to deal with uncertainty; little guidance and lack of political will; conflict with competing agenda, often driven by external partners; aversion to change; and difficulties in working with non-state bodies and local communities.

The planning and development budgets of urban authorities need to take into account the possible impacts of climate change so as to reflect the adaptation efforts. Adaptation is projected to cost African countries billions of dollars a year, hence increasing pressure on development budgets. Changing climatic conditions make it increasingly difficult to extrapolate the costs of adaptation from past practices. The costs arising from the need for Africa to adapt to climate change makes international assistance for adaptation even more critical. This notwithstanding, types of support for climate adaptation have to be clearly stated, especially capacity support, transfer of low-carbon technologies to Africa, and promotion of regional co-operation.

Policies that build on existing strategies to support adaptation to climate change are amongst the most likely to succeed. Growing evidence suggests that mobility, in conjunction with income diversification, is an important strategy for reducing vulnerability to environmental and non-environmental risks (Tacoli, 2009). To urban authorities, especially in the low and middle-income countries, migration is generally considered problematic, with most policies trying to influence the volume, direction and types of movement, rather than accommodating flows and supporting migrants. To most authorities, rural-urban migration is often blamed for the growth of urban populations and urban poverty (Tacoli, 2009). Some of the climate change problems envisaged include drought, desertification, land degradation, floods and the rise of sea level. It is projected that between 75 and 250 million people in Africa will not have access to

fresh water by 2030 (IPCC, 2007). Climate stress usually overlaps with other factors in determining migration duration and composition. It is therefore important that socio-economic, political and cultural factors are integrated into the adaptation policies.

The high vulnerability of urban systems and their impact on climate can be reduced through adaptation and mitigation measures based on known technology and design methodology. To counter climate change disasters, African urban authorities must have preparedness programmes and plans, ingredients often lacking in most African cities (WMO, 1994). African urban centres located along the coast and river deltas (or estuaries) are highly exposed to flooding due to their proximity to the sea (e.g. Free Town, Alexandria, Cairo, and Beira). In this regard, mitigation measures required include designing and building appropriate flood shelters, improving and expanding sewerage and drainage systems, and putting in place an information system on climate change effects and responses (WMO, 1994). Governance is an important element in climate change risk exposure. Urban authorities with limited incomes or assets are the most exposed. This is because they lack quality infrastructure and have poor disaster-preparedness provisions for planning and coordinating disaster-response. Besides, the extent to which the poor can buy, build or rent “safe” housing in “safe” sites, and the degree to which the local government creates an enabling environment for local civil-society action to address these issues is limited (Satterthwaite, 2007). Most urban authorities in Africa cannot afford the requisite cost of reducing the impact of climate change. Climate change health adaptation and mitigation measures required in African urban centres include putting in place an information system that profiles air conditions, observation networks and programmes and impact assessments and predictions. Bioclimatic GIS can be a useful tool in urban planning and design, and can be used in predicting climate change impact on mortality.

In terms of the impact of climate change on planning and architecture, there is need to take into account proper use of materials and architectural detailing, as well as drafting plans that maximise on outdoor spaces. Climate-sensitive designs should be done in a way that protects the environment from pollution. Architects and planners should use widely available knowledge and information on climate, while urban climatologists need to simplify the language in which climatic data is availed to planners and architects. Planning and building codes should be made public and their objectives clearly set out. A specific design guide that incorporates climate information is required. In a nutshell, the key to adaptation is competent, capable and accountable urban governments that understand how to incorporate adaptation measures into aspects of their work and departments (Satterthwaite, 2007).

CONCLUSIONS AND FURTHER RESEARCH

Climate change is both a threat and a challenge to Africa. Climate variability affects agricultural production, influences hunger, health, access to water and consequently food security and poverty in the continent. Prolonged droughts and floods, which are associated with climate change, impacts negatively on the livelihoods of farmers, making traditional agriculture across Africa less profitable. This in turn results in a number of people from rural areas migrating to cities in search of better livelihoods. The increased urban population in turn exerts pressure on urban services and natural resources such as urban space, urban water supplies, infrastructure, sanitation systems, creating a challenge for urban planners and policymakers. The effects of climate change must therefore be factored into African countries’ urban policies and unequivocally address the current and emerging urban challenges, especially the rapid urbanisation, poverty, informality and safety.

This paper contends that the most crucial priority should be to deal with the incapacity of urban authorities and government agencies in Africa so as to cope with both rapid urbanisation and climate change. The critical first step for policy-makers is to recognise the rights of poor people to live in cities and to share in the benefits of urban life. The next is to plan ahead (be proactive) for their land and housing needs within a constantly updated vision of sustainable land use. A business-as-usual approach that simply reacts to urban growth will be utterly untenable. The next step is to speed up rural development programmes so as to prevent rural towns from turning into ghost towns. The last step is to address leadership and governance challenges in municipalities, including weak responses and accountability to communities: deal with problems of poor financial management, corruption, insufficient municipal capacity and inadequate human resource. If properly managed and planned for, urbanisation could be an engine of economic growth and industrialization. However, without a proper policy in place, urbanisation will contribute to the rising urban poverty, proliferation of slums, regional inequalities and degradation of urban infrastructure and environment. As a result, some African cities could become centres of crime and slum settlements rather than being engines of industrialisation and economic growth.

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