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AfricaInteract

Enabling research-to-policy dialogue for adaptation to climate change in Africa

Research and Policies for Climate Change Adaptation in the Central Africa Urban Sector SUMMARY



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Acronyms and Abbreviations

ACPC	African Climate Policy Centre
AfDB	African Development Bank
AMCEN	African Ministerial Conference on Environment
CAR	Central African Republic
CBLT	Lake Chad Basin Commission
CDM	Clean Development Mechanism
COMIFAC	Commission des Forêts d’Afrique Centrale
CORAF/WECARD	West and Central African Council for Agricultural Research and Development
CRMA	Climate risk management and adaptation
DRC	Democratic Republic of Congo
DRR	Disaster risk reduction
ECCAS	Economic Community of Central African States
EMP	Environmental Management Plan
GDP	Gross domestic product
GEF	Global Environment Facility
ICZM	Integrated coastal zone management
IDRC	International Development Research Centre

IPCC	Intergovernmental Panel on Climate Change
NAPA	National Adaptation Programme of Action
NGO	Non-governmental organization
PRODEBALT	Sustainable Development Programme of the Lake Chad Basin
REC	Regional economic community
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UN-Habitat	United Nations Human Settlements Programme

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1. Introduction

Central African cities are highly vulnerable to climate change, which is one of the most important challenges facing cities across Africa. Rapidly expanding urban settlements in Central African countries are facing severe climatic risks in light of the accelerating pace of change resulting from urban processes and an arena of low socio-economic resilience. Climate change adaptation in urban areas in Central Africa is not only a set of actions for the future but also an imperative for today. The urban population of Central Africa has more than doubled from 23.7 million in 1990 to an estimated 55.6 million in 2010. This has meant that urban populations will increasingly be forced to cope with increased incidents of inundation, air and water pollution and vector-borne diseases (UN-Habitat 2010).

Urban centres in Central Africa are at risk due to (i) high density of populations; (ii) lack of adequate drainage channels; (iii) concentration of solid and liquid waste; and (iv) unplanned settlements which often lack access to basic services and are home to residents compelled to live in risky sites (Bull-Kamanga et al. 2003;). Thus, increased climate hazards coupled with rapid urbanisation are likely to put increased strain on the capacity of local governments as they attempt to respond to the vulnerabilities of the urban population, particularly the urban poor.

Against this backdrop, AfricaInteract and CORAF/WECARD, with support from IDRC, commissioned a desk review of research and policies related to climate change adaptation in the urban sector in Africa. The objective of this study is to enhance the knowledge base and to support research-based policy formulation for climate change adaptation in urban areas of sub-Saharan Africa. This review assessed the existing knowledge on the impact of climate change on the urban sector of Central Africa and documented current research and the state of knowledge of climate change impact on urbanization and related threats. The extent to which urbanization issues are mainstreamed into national climate change policies and how these policies address climate change issues in the Central Africa region urban sector were also reviewed. Specifically, the review was guided by the following key questions:

1. What is the role of climate change challenges in the context of the multiple challenges and opportunities facing urban areas in the region?
2. What is the current state of knowledge on adaptation to climate change in urban areas in the region?
3. What is the current state of knowledge on whether and how research findings are integrated in urban area policies in the region?
4. What are the major gaps in research on adaptation to climate change in urban areas?

5. What is needed to ensure that research findings are better integrated into urban area policies?
6. What is the current state of knowledge on the stakeholders involved with research and policy on adaptation to climate change in urban areas in the region, and how could stakeholder involvement be improved?

The review covered countries in the Central Africa region, particularly on Cameroon, Gabon and Congo Republic. This publication is a Summary of the main report published by CORAF/WECARD and Future Agricultures.

2. Overview of the Central Africa Urban Sector

2.1 Key facts for urban areas in Central Africa

The Central African region comprises 10 countries¹ making up the Economic Community of Central African States (ECCAS). The urban sector in Central African countries has experienced very rapid growth. For example, it is estimated that the urban population of Central Africa has more than doubled from 23.7m in 1990 to an estimated 55.6m in 2010; the 100m mark could be reached by 2022, with further growth to 112.7m by 2030 (UN-Habitat 2010). The average rate of urbanisation in Central Africa in 2000 was 48 percent, ranging from 81 percent in Gabon, the most urbanised country in the region, to 24 percent in Chad, the least urbanised (UN-Habitat 2001a).

As Central Africa becomes more urbanised, environmental change, including climate change, is becoming a major and complex development challenge. The impacts of climatic variability and change on cities and urban areas are varied and complex. Major cities such as Douala, and Limbe that are situated along the Atlantic coast, and most of the large urban areas in Central Africa, are already affected by combinations of sea level rise, increased storm flooding, inundation, coastal erosion, increased salinity in estuaries and coastal aquifers, rising coastal water tables and obstructed drainage. Consequently, displacement of people, especially the urban poor, destruction of property and loss of livelihoods are common impacts of these climate change events. Low socio-economic resilience, institutional vulnerability and inadequate infrastructure, as well as removal of liquid and solid waste materials (domestic, business and industrial), compound the vulnerability of the urban milieu in Central Africa.

¹ The ten countries of ECCAS are Angola, Burundi, Cameroon, Central African Republic (CAR), Chad, Republic of Congo, Democratic Republic of Congo (DRC), Equatorial Guinea, Gabon and São Tomé and Príncipe.

Despite increased attention to and improved understanding of these issues, more information and actions are required to prepare for and manage the multitude of risks associated with environmental and climate change in Central African cities. Rapid urbanisation, increasing vulnerability and an urgent need to enhance the capacity of African institutions to work together to manage risks and foster adaptation and resilience through informed decision-making are vitally urgent to respond to the impacts of climate change in the region.

Although cities have become the main catalysts of economic growth in Central Africa, urbanisation has caused massive problems of poverty coupled with environmental degradation. Environmental impacts of the rapid urbanisation and urban population growth include intensifying pressures on natural habitats and resources to satisfy the ever growing demand for space, housing and potable water and sanitation. Municipalities and utility companies are unable to provide housing and infrastructure quickly enough to meet this demand and sub-standard services are therefore provided, with sub-optimal environmental standards and conditions.

Rapid development of informal settlements or slums, characterised by overcrowding, unstable and unhealthy housing, inadequate water supply and sanitation and lack of electricity supply and waste collection characterise urban vulnerability in Central Africa.

2.2 The challenges of climate change impacts

According to the IPCC's Fourth Assessment Report, warming is projected across Africa in the range of 0.2°C (low scenario) to 0.5°C (high scenario) per decade up to the year 2100 (IPCC 2007). This implies an increase in climate-related shocks on the continent including droughts, storms, flooding, extremes of temperature and rising sea levels. Climatic extremes and variability pose a serious challenge to sustainable urban development, placing many Central African cities at risk. Policymakers and city leaders are increasingly facing the challenge of finding ways to include adaptation strategies in their work programmes, but related knowledge and expertise are still scarce and fragmented.

Although greenhouse gas emissions are minimal in Central Africa and the region contributed only 2 percent of Africa's total emissions in 1996 (AfDB 2001), global atmospheric and climatic changes impact on urban areas in Central African countries. It is projected that sea level rise and increased vulnerability to inundation and storm surges will render some of the coastal areas of Central Africa uninhabitable, displace millions of people and threaten low-lying urban areas, such as Douala in Cameroon (IPCC 2001; IPCC 1998). Furthermore, generic studies of urban air quality linked pollutants arising from domestic combustion of traditional fuels to increased rates of respiratory diseases, particularly among children. Industrial emissions, although currently below international averages, are a potential threat as the needs of economic development continue to exert a pressure for greater industrial output.

Exploitation of the oil and gas reserves in the region for domestic energy production would involve clearing of forests and disturbance of marine ecosystems, as well as considerable increases in the region's contribution to emissions. Besides this, the World Bank (1997) reported that population densities in coastal urban centres in Central African countries are increasing under the dual pressure of population growth and migration. The resulting conversion of natural habitat to urban settlements and agricultural plantations, together with poor resource planning and management practices, has accelerated rates of coastal erosion and this is now an important problem in Central Africa.

2.3 Unplanned settlements and Uncontrolled Urbanization in Central Africa

Uncontrolled urbanisation in the Central Africa region spreads into fragile ecosystems, including delicate or highly erodible slopes, natural drainage waterways or valleys and areas that are prone to flooding. Due to the intense competition for space in urban areas, green spaces are rapidly disappearing and areas usually deemed unsuitable for housing are the only refuges available for the urban poor, who are then vulnerable to flooding, landslides and outbreaks of pests and diseases. Central Africa currently experiences the consequences of unplanned settlements and uncontrolled urbanisation. Water supply and sanitation provision has also fallen behind rates of urban growth largely due to lack of municipal funds and capacities. These issues have important implications for addressing the impacts of climate change to urban populations and the environment.

3. Research Related to Climate Change in the Central Africa Urban Sector

3.1 Status of scientific evidence for implications of climate change for urban areas.

Washington et al. (2006) observed that Central African stream flow from Congo River gauge stations shows no long term trend. Instead the time series is dominated by multi-decadal variability with links to the Atlantic atmospheric circulation but not to the El Niño Southern Oscillation. Other IPCC scenarios projected that sea level rise and increased vulnerability to flood and storm surges will render some of the coastal areas of Central Africa uninhabitable, displace millions of people and threaten low-lying urban areas, such as Douala in Cameroon (IPCC 2001; IPCC 1998).

In Central Africa, meeting the challenge of increasing agricultural productivity to provide substantial income to small scale farmers, while protecting environment sustainability is complicated by climate variability and change. The IPCC (2007) further stresses that climate changes would translate into increasing incidence of climate shocks such as drought and flooding, depleting underground water, decreasing crop yield and/or crop suitability and proliferation of pests and diseases. In this scenario, semi-arid zones of Central Africa are particularly at risk and among the most vulnerable areas.

There is evidence of non-climate trends affecting vulnerability to climate variability and change in urban areas in Central Africa. These include population growth amplified by rural-urban migration, rapid urbanisation and poverty which is becoming increasingly urbanised, as a growing proportion of the population suffering from absolute poverty live in urban and peri-urban areas in Central Africa.

3.2 Causes of vulnerability

Urban areas in Central Africa face increased risks from water scarcity and flooding. For example, Moutila (2011) showed, for the city of Douala in Cameroon that coastal areas are threatened by sea level rise as urban demographic pressures mount. These findings underscored the importance of increasing city-dwellers' understanding of coastal ecosystem protection to reduce pressure on mangrove forests. According to Bull-Kamanga et al. (2003), recurrent inundation in large cities across Central Africa results from multiple factors, such as coastal erosion that renders coastal settlements and economic activities more vulnerable to sea level rise caused by global climate change.

As more people move to cities, unplanned and uncontrolled settlements cover large tracts of land with houses set on particularly risky sites, roads and other infrastructure which compound flooding as soils can no longer absorb runoff water. Concerning drainage systems in the city of Douala, Tchuikoua (2010) found that uncollected garbage, impermeable surfaces and concentrations of buildings disrupt natural drainage channels, block storm water drains and slow down runoff water flows that trigger inundation. He further stressed that concentrations of solid and liquid wastes put Douala at particular risk from climate hazards. In terms of health and sanitation, Mbeugang (2013) characterised the whole of Logbessou II district (a peri-urban area of the city of Douala) as ranking lowest in access to drinkable water supply and sewerage. Furthermore, he pointed out that intense inundations cause latrines to run over thereby polluting drinking water wells and increasing the spread of waterborne diseases such as cholera.

3.3 Lessons from adaptation projects and interventions in urban areas in the region

Flooding in particular has been a recurring phenomenon in the city of Douala and this is set to increase in frequency and severity as a result of climate change, along with sea level rise. Consequently, Douala's poor and marginalised people are at risk of falling deeper into poverty. The threats are particularly acute for those living in low-lying areas, where a significant rise in sea level would directly affect thousands of people. Thus, adaptation to address sea level rise along the coastline should be foreseen now and will also be required over the medium to long term future. In this context, the research work carried out by Olinga (2012) examined successes and failures of the City Development Strategy Paper towards building the resilience of the city of Douala to recurrent hazards. The results show that leaders of the city of Douala can gain more insights on (i) what, why and how measures or instruments are chosen to optimise risk management more effectively; and (ii) what, why and how certain measures or instruments provide or fail to provide solutions to enhance urban resilience in the context of environmental change including climate variability and change.

Equally important to consider is that vulnerability in the context of climate variability and change is exacerbated by demographic changes and changes in settlement patterns. Poverty compels many people to live in dangerous places. The case study of Bepanda district in Douala, Cheteu (2012) noted that Douala has witnessed a rapid increase of populations settled in flood prone areas, which makes society much more sensitive to a change in rainfall patterns. Cases of urban adaptation projects have been reported in the city of Limbe, which offers important lessons on prioritizing adaptation in the cities in the vulnerable coastal zone of the Gulf of Guinea. The research activities on vulnerability of Limbe's urban settlement undertaken by Kometa (2012) particularly illustrate urban maladaptation in the context of climate variability and change, which has further increased adaptation costs to appropriately address the adaptation deficit of a road infrastructure exposed to the destructive effects of sea level rise.

Central Africa is also home to a number of landlocked countries including Chad, CAR and Burundi. Here too capital cities are confronted with urban vulnerabilities and climate challenges. The Yaoundé Sanitation project illustrates the attempts of municipality and government to cope with climate variability. Large cities in Central Africa suffer from an adaptation deficit that increases vulnerability to climate variability and change. Evidence from the Yaoundé Sanitation Project, shows that the adaptation deficit is particularly critical in Central Africa, with many capital cities already experiencing regular and severe disruption and economic losses as a result of climate variability.

4. Policies related to Climate Change in the Central Africa Urban Sector

4.1 Policies and strategies for climate change adaptation in urban areas

Central Africa countries that have submitted National Adaptation Programme of Action (NAPA) include Chad, CAR, DRC and Burundi. Climate change NAPA is a mechanism within the UNFCCC, specific to the Least Developed Countries (LDCs) and designed to assist countries in identifying priority options for climate change adaptation.

In addition to NAPAs, Central African countries have adopted other policies of particular relevance to urban areas and how they relate to climate variability and change. These policies were presented at the 25th Special Session of the United Nations General Assembly and Istanbul+5 Conference in June 2001. At this event Cameroon reported the development of an Environmental Management Plan including a Strategy for Urban Development. The Congolese delegation presented the Human Settlement Development Strategy of Congo consisting of four major components, namely (i) security of tenure, (ii) adequate housing for all, (iii) promotion of equality in access to credit and (iv) provision of basic social services. Gabon reported that a National Habitat Committee had been established, partnerships between national and local government and civil society had been forged and community infrastructure projects had been implemented with financial assistance from the World Bank.

Cameroon was part of the Accra Declaration and has approved the Declaration for Environmentally Sustainable Development of the Large Marine Ecosystem of the Gulf of Guinea (AEO 2005). The Declaration pledged political commitment to environmentally sustainable development in the Gulf of Guinea. The Declaration noted that one way of enhancing environmental conditions in the Gulf of Guinea was to develop integrated coastal zone management (ICZM) plans and relevant institutions to implement policy at the national level. Gabon and Congo have also designed ICZM plans to take into account issues of coastal erosion and sea level rise in every socioeconomic development coastline scheme.

Key policy actors and networks involved with climate change adaptation in urban areas of Central Africa include the following:

- The New Partnership for Africa's Development (NEPAD) of the African Union Commission
- The African Ministerial Conference on the Environment
- Economic Community of Central African States (ECCAS)

4.2 Key barriers to adaptation integration into policy and planning

Although integrating adaptation to climate variability and change into policy and planning processes is a prerequisite for sustainable development over the long term, Central African countries encounter difficulties in incorporating adaptation concerns into national policies.

Many barriers constrain uptake of research evidence for policy formulation and implementation and successful policy implementation for adaptation in urban areas to effectively address issues such as flooding and spread of disease, to name a few. These impediments include:

- Low staff capacity for planning;
- Lack of monitoring and evaluation;
- Data scarcity on effectual adaptation options and lack of mechanisms for information sharing (e.g. on what works and what doesn't) and management across sectors;
- Limited awareness of adaptation in the urban sector among stakeholders and the public; and
- Lack of cooperation among ministries and weak intergovernmental co-operation.

5. Gaps in Climate Change Adaptation Research and Policy in the Central Africa Urban Sector

By examining the literature and assessing case study examples of adaptation research in urban areas in Central Africa, it is apparent that there are a number of gaps in knowledge, capacity and experience as far as adaptation to climate change in urban areas is concerned. Also, there is a lack of research and knowledge across a range of interconnected/cross-cutting issues including water resources and gender bias. Capacity-building within and among different stakeholders; better ways to monitor and evaluate climate change adaptation work; and improved knowledge management, including the documentation of good adaptation practices, are crucial requirements.

5.1 Key research gaps: what knowledge are lacking on adaptation to climate change in urban areas in Central Africa?

Major gaps identified in climate change adaptation research in Central Africa include the following:

i. General lack of research. Cities located along the Atlantic coast are major climate variability and change 'hotspots' in Central Africa where large populations live in vulnerable areas. These

cities require substantial research work to better understand how they are affected by climate change and how they can adapt.

ii. Inadequate tools, knowledge and financial resources. There is currently a lack of information and statistical analysis related to climate and hydro-geological changes in the region. This is compounded by poor linkages between decision-makers and the scientific community, inadequate climate risk assessment methods and scarcity and inadequacy of technical instruments.

iii. Research on climate-induced migration is urgently required to explain rural-urban migration and the strain on resource-poor local municipalities, peri-urban centres and crowded cities. As a result, autonomous adaptation is likely to become more common and widespread. Tohnain's (2008) work is an illustration of documented adaptation by farmers in Yaoundé, with gender implications as a greater number of those involved are women and notably housewives. Box 5 below highlights the magnitude of urban agriculture in the city of Yaoundé.

To provide better understanding of the drivers of autonomous adaptation in urban areas, research across a number of related areas would benefit Central Africa, including:

- Research on economic diversification at household level and how this reduces the impacts of climate change.
- Research to examine the links between access to essential services such as energy, water, transport, finance, health and education and how these affect a community's ability to adapt.
- Research to identify opportunities for encouraging the spread of low-carbon technologies to support diversification and mobility in areas such as coastal zones undergoing rapid economic development.
- Research on use of financial institutions. As pressure keeps mounting on traditional risk-sharing strategies (borrowing from family, friends and social networks) so too does the unfair nature of moneylenders, predominantly during disasters. How people access financial institutions for micro-credit, insurance and financial services require further research and documentation. This could include micro-finance research to better capture how micro-finance can be linked to larger social support systems that strengthen livelihoods and increase disaster risk resilience rather than increase the risk and debt burden for the urban poor.

5.2 Key policy gaps: with regard to climate change adaptation in urban areas in national policy frameworks?

- Lack of integration among adaptation strategies in urban sector and development strategies. NAPAs so far have placed emphasis on climate sensitive natural resource-based livelihoods.

- Issues related to communicating what climate change actually is to different groups living in cities.
- Insufficient long-term perspective, aggravated by short-term funding cycles; and insufficient integration between institutions.

5.3 Options and possible policy spaces or opportunities for improved uptake of research findings

Given the challenges posed by rapid urbanisation and development in Central Africa and the need for research to feed into national and regional policies, regional political, scientific or development-oriented organisations, can play an important role in achieving the goals of adaptation in urban sector. ECCAS, which is mandated by the AU to implement the regional integration agenda on economic development in Central Africa, has an important role to play in addressing adaptation to climate variability and change in urban areas of Central Africa.

6. Stakeholders and Opportunities for Collaboration in Research on Climate Change in the Central Africa Urban Sector

6.1 Key institutional actors involved with research and policymaking on climate change adaptation in urban areas

Adaptation to climate change, be it in urban or rural sectors, is a complex issue that can be viewed from a various level of governance involving sub-regional institutions, government agencies, municipalities and populations. Adaptation to climate variability and change in urban areas is also a development issue addressed by various sector ministries as well as various stakeholders, including businesses, NGOs, and common initiative groups. In Central Africa, the key institutions working in areas related to adaptation to climate variability and change in the urban setting belong to at least one of four broad categories: economic and political institutions (ECCAS, UDEAC), river basin organisations (Sustainable Development Programme of the Lake Chad Basin [PRODEBALT], Lake Chad Basin Commission [CBLT], Congo Basin Commission), knowledge centres and international organisations (UNDP, UN-Habitat).

7.2 Lessons from efforts to promote research-policy dialogues on adaptation in urban areas

In Central Africa, communication and collaboration between stakeholders on climate change adaptation matters remains weak. To remedy this situation, it is important to address issues such as capacity building, to reinforce the scientific capacity of Central African organisations working on climate-induced hazards and urban development.

A regional framework for consultation involving various stakeholders should be created to facilitate knowledge exchange on topical issues related to adaptation to climate variability and change in the urban sector. Fact sheets should be published for policymakers in order to assist them in their decision-making tasks. A series of series of information and communication events should be organised to provide decision-makers with adequate information needed to understand the advantages and disadvantages of implementing climate change adaptation in urban areas.

Furthermore, stakeholder institutions working on climate adaptation in urban areas, should to identify and promote champions of adaptation.

7. Conclusions and Recommendations

7.1 Conclusions

Climatic extremes and variability pose serious challenges to sustainable urban development, placing many cities along the coastline of Central Africa at risk. City authorities are incorporating adaptation strategies in their work, although relevant knowledge and expertise remain scarce and fragmented. Current approaches are limited in scope and overlook local adaptation capacities of individuals and households.

Rates of economic growth and infrastructural development in Central Africa urban areas have considerably lagged behind rates of urbanisation, resulting in high levels of unemployment, inadequate standards of housing and services in unplanned settlements and impacts on human health and development. This situation is aggravated by climate hazards such as coastal erosion and inundation that put many people at risk. To reverse these trends, more research will be needed to support (i) coherent, integrated planning; (ii) development that is environmentally and socially sensitive; (iii) security of tenure and financing; (iv) sufficient investment in infrastructure to keep pace with the rate of growth of urban populations and their demands for essential services and security; and (v) rural development programmes to assist in slowing the rate of urban population growth.

In the Central African region, cities located along the Atlantic coast are major climate variability and change ‘hotspots’ where large populations live in vulnerable areas. These cities require

substantial research work to better understand how they will be affected and how they can adapt, to climate change. Policies related to urban issues with regard to climate change exist for each country, but the level of implementation is still very low.

Gaps in knowledge, capacity and experience include scanty information on climate impacts in a region with a large coastline and significant hotspots of climate variability and change. There are also serious gaps in research on all aspects of climate change adaptation.

7.2 Recommendations

1. Investing in research, capacity building and documenting best practices

Documentation and shared learning in adaptation research and practice is very important. This includes documentation of the 'what' but more importantly documentation that goes into details about the 'how' in order to explain the process of working with at-risk groups and other stakeholders. To achieve this objective, investment should be increased in research in climate change adaptation and in building capacity of staff working in ministries and knowledge centres, thereby enabling them to draft their work in a manner that promotes learning.

2. Improvement of living conditions in urban areas.

Central African governments need to plan urban development and support programmes that contribute to climate change mitigation and adaptation and wider development objectives. These may include business opportunities, sustainable water management and sanitation projects. Other measures that deal with climate variability (e.g. long-term weather forecasting and early warning systems) may also fall into this category.

Furthermore, Central Africa governments should formulate appropriate human settlement and waste management policies, laws and regulations, and promote private sector participation in improving urban infrastructure and the provision of municipal services.

Central African governments should also fulfil their obligations under the Habitat Agenda, and prepare integrated water and waste management strategies and action plans, ICZM and zoning.

3. Providing an enabling environment for the implementation of policies and uptake of research to inform policymaking.

Adaptation to climate variability and change in urban areas is a development issue which should be addressed through collaboration amongst sector ministries, researchers, educators,

policymakers, urban planners, development practitioners, donors, non-governmental and community-based organisations and private business sector.

4. Monitoring and evaluation frameworks for adaptation.

Monitoring, evaluating and learning of climate change adaptation projects should be undertaken because climate change is taking communities, local and national governments, and other stakeholders into uncertainties. All stakeholders should effectively collaborate to implement climate change adaptation projects and build upon successful strategies.

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