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CLIMATE CHANGE AND CONFLICT IN WEST AFRICAN CITIES: A POLICY BRIEF ON FINDINGS FROM LAGOS, NIGERIA AND ACCRA, GHANA

NOVEMBER 2013

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ARCC



African and Latin American
Resilience to Climate Change Project

This report was prepared by Jeffrey Stark and Katsuaki Terasawa of the Foundation for Environmental Security and Sustainability through a subcontract to Tetra Tech ARD.

This publication was produced for the United States Agency for International Development by Tetra Tech ARD, through a Task Order under the Prosperity, Livelihoods, and Conserving Ecosystems (PLACE) Indefinite Quantity Contract Core Task Order (USAID Contract No. AID-EPP-I-00-06-00008, Order Number AID-OAA-TO-11-00064).

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AFRICAN AND LATIN AMERICAN RESILIENCE TO CLIMATE CHANGE (ARCC)

NOVEMBER 2013

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS	III
ABOUT THIS SERIES	IV
EXECUTIVE SUMMARY	V
LAGOS	VI
ACCRA	VI
LOOKING FORWARD	VII
1.0 LAGOS, NIGERIA	I
1.1 BUILDING A MODEL MEGA-CITY AMID NATIONAL INSTABILITY	I
1.2 CLIMATE CHANGE VULNERABILITY	2
1.3 CHALLENGES OF GOVERNANCE AND SEEDS OF CONFLICT	5
2.0 ACCRA, GHANA	7
2.1 POST-CONFLICT STABILITY	7
2.2 CLIMATE CHANGE VULNERABILITY	8
2.3 CHALLENGES OF GOVERNANCE: THE RETURN OF THE RELOCATION DILEMMA	10
3.0 CLIMATE ADAPTATION IN LAGOS AND ACCRA	12
4.0 KEY FINDINGS AND RECOMMENDATIONS FOR PROMOTING RESILIENCE	14
REFERENCES	17

ACRONYMS AND ABBREVIATIONS

AMA	Accra Metropolitan Assembly
CIDA	Canadian International Development Agency
FESS	Foundation for Environmental Security and Sustainability
GDP	Gross Domestic Product
IFPRI	International Food Policy Research Institute
IPCC	Intergovernmental Panel on Climate Change
LASEMA	Lagos State Emergency Management Agency
LAWMA	Lagos Waste Management Authority
LMDGP	Lagos Metropolitan Development and Governance Project
NCCP	Ghana National Climate Change Policy
SRES	Special Report on Emissions Scenarios
USAID	United States Agency for International Development
WEP	Women Environmental Programme

ABOUT THIS SERIES

THE STUDIES ON CLIMATE CHANGE VULNERABILITY AND ADAPTATION IN WEST AFRICA

This document is part of a series of studies produced by the African and Latin American Resilience to Climate Change (ARCC) project that address adaptation to climate change in West Africa. Within the ARCC West Africa studies, this document falls in the subseries Climate Change and Conflict in West Africa. ARCC has also produced subseries on Climate Change and Water Resources in West Africa, Agricultural Adaptation to Climate Change in the Sahel, and Climate Change in Mali.

THE SUBSERIES ON CLIMATE CHANGE AND CONFLICT IN WEST AFRICA

Upon the request of the United States Agency for International Development (USAID), ARCC undertook the Climate Change and Conflict in West Africa series of studies to increase understanding of how climate change contributes to conflict. Other documents in the Climate Change and Conflict in West Africa series include: Climate Change and Conflict in West African Cities: Findings from Lagos, Nigeria, and Accra Ghana, Climate Change and Conflict in the Sahel: Findings from Niger and Burkina Faso, and Climate Change and Conflict in the Sahel: A Policy Brief On Findings from Niger and Burkina Faso.

EXECUTIVE SUMMARY

As discussion continues over the initial findings of the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), it is worth recalling one of the consequences of the IPCC's Fourth Assessment Report in 2007: the growing concern that climate change might increase instability and conflict in the developing world. Since then, intelligence and defense analysts, development specialists, think-tank experts, and academics from a variety of disciplines have proposed, discussed, mapped, and investigated potential climate and conflict linkages.

Generally speaking, that wave of analysis has found that the connections between climate change and conflict, while worthy of sustained attention, were less direct than early speculation had suggested and were more complex than was initially understood (Gleditsch, 2012; Stark, 2013). Context-specific, non-climate factors (e.g., governance, livelihoods, identity, history) remain the core variables that must be taken into account and understood first. The question then becomes how climate stresses interact with these core variables in ways that may contribute to future conflict.

Most early studies on climate change and conflict focused on threats to rural livelihoods (agriculturalists, pastoralists), food security, and access to land and water resources among groups living in the countryside. The work done to date for the United States Agency for International Development (USAID) on climate change and conflict reflects this orientation, with previous studies focusing on largely rural areas in Uganda, Ethiopia, Peru, Nepal, and the Niger River basin.¹ But Latin America and many parts of Asia already have high rates of urbanization, and Africa is witnessing an unprecedented shift of its population toward urban centers. One coastal zone that has a particularly dense and rapidly growing population is the littoral zone of the Gulf of Guinea in West Africa.

To address the relative lack of research on climate-conflict linkages in large urban areas, USAID asked the Foundation for Environmental Security and Sustainability (FESS) to conduct a case study on two major West African cities – Lagos, Nigeria and Accra, Ghana. Field research was carried out for the case study in June and August 2013, and this policy brief presents the findings on the central questions addressed by that investigation:

- Are the effects of climate change likely to lead to chaotic and conflictive scenarios in West African cities?
- If so, under what circumstances and over what time frame; and are there preventive actions that governments and donors should take?

For each city, the political, economic, and demographic setting relevant to stability and instability is briefly examined, as well as recent and projected climate trends and vulnerabilities, followed by adaptive responses from government and other stakeholders.

¹ See the technical publications for USAID's Office of Conflict Management and Mitigation at <http://www.usaid.gov/what-we-do/working-crises-and-conflict/technical-publications>.

LAGOS

With an estimated population of around 20 million people, the “mega-city” of Lagos is the commercial and financial engine of Nigeria, a huge country facing serious threats to its stability from political turmoil, oil-related conflicts, religious and ethnic strife, and the terrorism of Islamic extremists.

Today, Lagos is a sharply contrasting mix of economic growth, impressive urban achievements, and persistent social challenges that are deepened by its burgeoning population, which includes many migrants. The megacity is on a treadmill, trying to keep pace with the challenges created by its success.

Around 70 percent of Lagosians live in poor, often illegal, settlements, such as the renowned slum of Makoko, in or near low-lying areas. Data show that temperatures have been increasing and, although the data are mixed on overall precipitation, many observers believe that downpours have intensified. There also has been measurable sea-level rise.

Recent flood events have led to dozens of deaths. Non-climate factors such as the settlement of new migrants on wetlands and the blockage of drainage channels by trash and solid waste are key contributors to flooding. Lagos State Government has explored removing people from dangerous, flood-prone lands, but the issues of possible eviction and relocation are highly controversial, with a high potential for conflict.

Current climate projections for Lagos have high uncertainty, but the scenario they imply is fairly dire: a continuing stream of migrants from northern Nigeria; rising temperatures; more frequent and intense rainfall; sea-level rise and stronger sea surges; heat risks for the young and elderly; more cases of water-borne diseases; and the potential for increasing deaths, displacement, and damages in heavily populated, poor settlements in high-risk zones at the water’s edge.

ACCRA

Ghana is not without its social, political, and economic cleavages and contradictions, but it is a far more stable country than Nigeria. As in Nigeria, population growth in Ghana’s capital of 3 million people is much more rapid than in the country as a whole.

The geomorphology of Accra makes it extremely susceptible to flooding. Two main ridges bound the city to the northwest and northeast, within which lies the central catchment of the Odaw River, flowing into Korle Lagoon. Many of the poor neighborhoods of Accra are either near the ocean or Korle Lagoon, and many of these areas lack basic sanitation and garbage collection.

Severe floods have become perennial events in Accra, and local officials and urban experts in Accra believe that climate change is playing a role, as reflected in increasingly intense weather events. Temperatures have been increasing and rainfall has become more variable and intense. As in Lagos, the residents of Ghana’s coastal metropolis are likely to face a hotter and wetter future, while their northern compatriots are likely to encounter a hotter and possibly drier climate that presents significant challenges for their agricultural livelihoods. These changes may spur flows southward to Greater Accra’s urbanized coast

A major new sewer and drainage initiative seeks to alleviate flooding by desilting, dredging, and removing waste from the Odaw River drains and Korle Lagoon. But Accra also is hampered by very weak land use management and environmental enforcement.

A potential stumbling block for Accra’s drainage and flood prevention plans lies in the continued presence of the more than 80,000 people in the slum of Old Fadama, which is a generator of huge

quantities of solid waste that clogs waterways and drainage channels. In December 2013, the government of Accra indicated that it had abandoned its plans to relocate people and was now looking toward upgrading Old Fadama. This shifts the problem of dealing with poor and vulnerable neighborhoods to the implementation of slum improvement.

LOOKING FORWARD

How should cities deal with poor, illegal, low-lying, and already vulnerable neighborhoods in view of the stronger and more frequent storm events associated with climate change? While Old Fadama and Makoko are iconic examples, the problem extends to dozens of other slum communities in West African urban areas and is almost certain to spread and become more acute with time. Forced evictions without proper compensation and support for relocation are a recipe for conflict. The rehabilitation of slum areas also is a daunting challenge.

Both Lagos and Accra face very serious climate change challenges. It is unlikely, however, that climate stresses will lead to the mobilization of significant organized conflict in Lagos or Accra in the near future. In the near term, because of the still-limited organizational capacity of civil society organizations and poor communities, any conflicts with linkages to climate factors that do take place are unlikely to go beyond social unrest in and around the communities most directly affected.

Projections about urbanization trends, climate change, and their impacts on both Lagos and Accra, however, indicate that the potential costs of inaction will rise over time. The continued proliferation and growth of densely populated settlements in dangerously vulnerable low-lying areas will result in a proportionate escalation of economic costs associated with disaster relief and humanitarian assistance. The victims of flood-related disasters primarily will be the very poor. In Lagos, they are likely also to be migrants from different ethnic groups. Over the medium to long term, these increasing pressures along lines of class and ethnicity could result in social explosions that endanger public security.

For both cities, but especially for Lagos, the ability to ensure tolerable living conditions in the face of climate risks will depend in part on the success of efforts to promote agricultural resilience and economic diversification in the countryside and towns elsewhere in the country.

Projects for building physical infrastructure need to be accompanied by strengthened government institutions and “social infrastructure” – education and awareness campaigns, government services to enable and support constructive environmental behaviors, and formal and informal institutional arrangements that allow for the expression of citizen grievances or concerns about environmental problems, climate risks, and participation in the formulation of solutions.

Key findings and recommendations can be found on page 17.

1.0 LAGOS, NIGERIA

1.1 BUILDING A MODEL MEGA-CITY AMID NATIONAL INSTABILITY

With an estimated population of around 20 million people, the “mega-city” of Lagos is the commercial and financial engine of Nigeria, a huge country facing serious threats to its stability. Nigeria has more than 200 ethnic groups, a north-south division between a predominantly Muslim north and a predominantly Christian south, a history of military involvement in politics, and a concentration of vast oil riches in the Niger Delta. Competition for wealth and power among ethnic groups is based on a complex political game of alternating control of the presidency among religious and regionally based elites. Political contestation and succession frequently have been neither democratic nor free of conflict. Nigeria experienced coups in 1983, 1985, and 1993; a difficult transition to democracy from 1998 to 1999; and flawed elections in 2003 and 2007 (Campbell, 2011). According to Afrobarometer, a total of 98 percent of Nigerians polled believe that some, most, or all public officials are corrupt – including the president and his cabinet, state governors, members of parliament, and the police (Afrobarometer, 2012a). Recently, President Goodluck Jonathan’s apparent plans to extend his presidency past the end of his term of office in 2015 have caused public consternation.

The dramatic contrast between massive oil revenues and the poverty of local communities in the Niger Delta has unleashed a backlash ranging from peaceful protests to outbreaks of violence and criminality. Of even greater recent concern has been the rise of Boko Haram, a violent Islamic extremist group operating across the northern tier of Nigerian states, whose stated goal is the establishment of sharia law. It is estimated that Boko Haram has been responsible for more than 2,000 killings, including an estimated 143 civilians in Borno State in September 2013 (CBS News, September 20, 2013.) A state of emergency is in effect in three northeastern states.

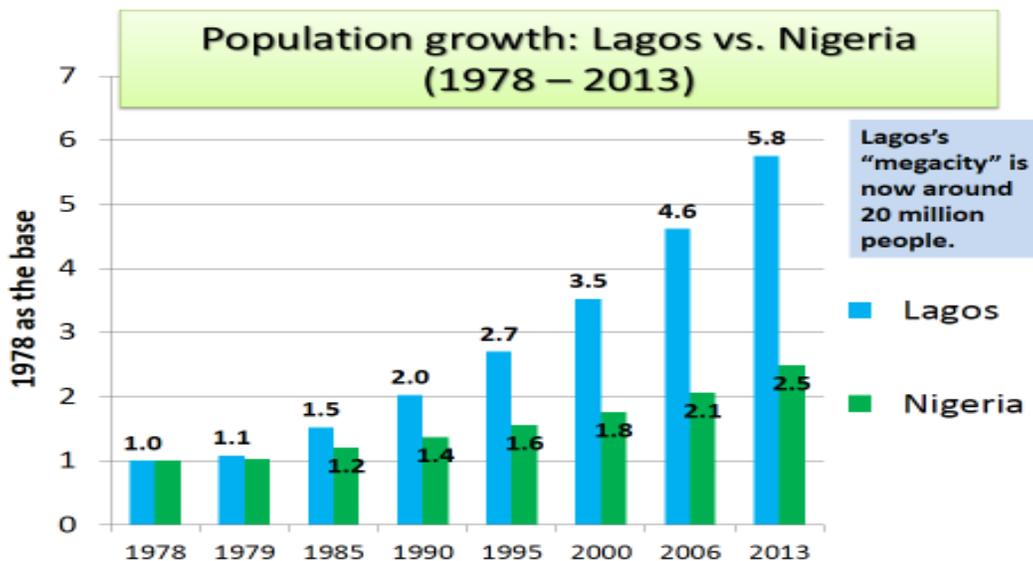
Meanwhile, economic divergences, environmental degradation, and climate impacts have combined to drive migration southward toward Lagos and other coastal cities. Ten of the 12 poorest states in Nigeria are in the north, while the top 12 richest states are in the south. It is also northern and northeastern Nigeria that has experienced the most dramatic effects of climate change. An extensive survey done by the Women Environmental Programme (WEP) with support from the Canadian International Development Agency (CIDA) shows that the progressive drying up of the Lake Chad basin (caused in part by diversion of water for irrigation) and the steady encroachment of desertification, along with deforestation, soil erosion, gullies, loss of pasture, and increasingly difficult access to water sources and firewood, have severely disrupted the livelihoods of farmers, herdsman, and fishermen in northern Nigeria (WEP, 2011). Paradoxically, some areas in the north have been hit by massive floods. With the disappearance of sustainable livelihoods, many young men are migrating from the north to Nigeria’s Middle Belt and the south.

The contrasting situation of Lagos is best understood in the above broader context of national instability. Fifteen years ago, Lagos was known as an overpopulated urban basket case. The city was filthy, unsafe, and snarled in traffic jams of legendary proportions. Since the return to civilian rule in 1999, however, Lagos has made remarkable progress in addressing its urban challenges. Far from suffering from the economic distortions of the Niger Delta’s “resource curse,” Lagos’s diversified economy is home to approximately 70 percent of Nigeria’s industries as well as the great majority of its financial services and major company headquarters. According to the National Bureau of Statistics, the per capita gross domestic product (GDP) of Lagos State is approximately 33 times that of the 10

poorest northern states. Tax collection also has been improved and now generates two-thirds of the state’s revenues (*Economist*, May 5, 2011). Despite Lagos’s dense population, only 9 percent of residents state that they fear crime, as compared to rates between 20 percent and more than 40 percent from respondents in the northern and Delta states (Afrobarometer, 2012a).

Perhaps the most notable achievement in Lagos — and one that has had many positive spinoff effects — has been progress in solid waste management. The Lagos Waste Management Authority (LAWMA) has implemented an unusually broad vision of solid waste management as the key to a clean and sustainable environment. LAWMA built a network of private-public partnerships to collect industrial, commercial, medical, and hazardous wastes while also generating thousands of jobs for uniformed employees who can be seen at work throughout the city.

FIGURE I. POPULATION GROWTH



Source: National Bureau of Statistics

As a consequence of the relative advantages and improving conditions in Lagos, the city has attracted millions of migrants, and its population has grown at an accelerating rate that far outstrips that of the nation as a whole (see Figure I). The cumulative and continuing pace of new arrivals to the city, most of whom settle in precarious housing on unregulated lands, means that the city is the home to dozens of slums or “blighted areas.” Poverty remains very high, even amid the dynamism of the growing formal economy. Lagos is on a treadmill, trying to keep pace with the challenges created by its success.

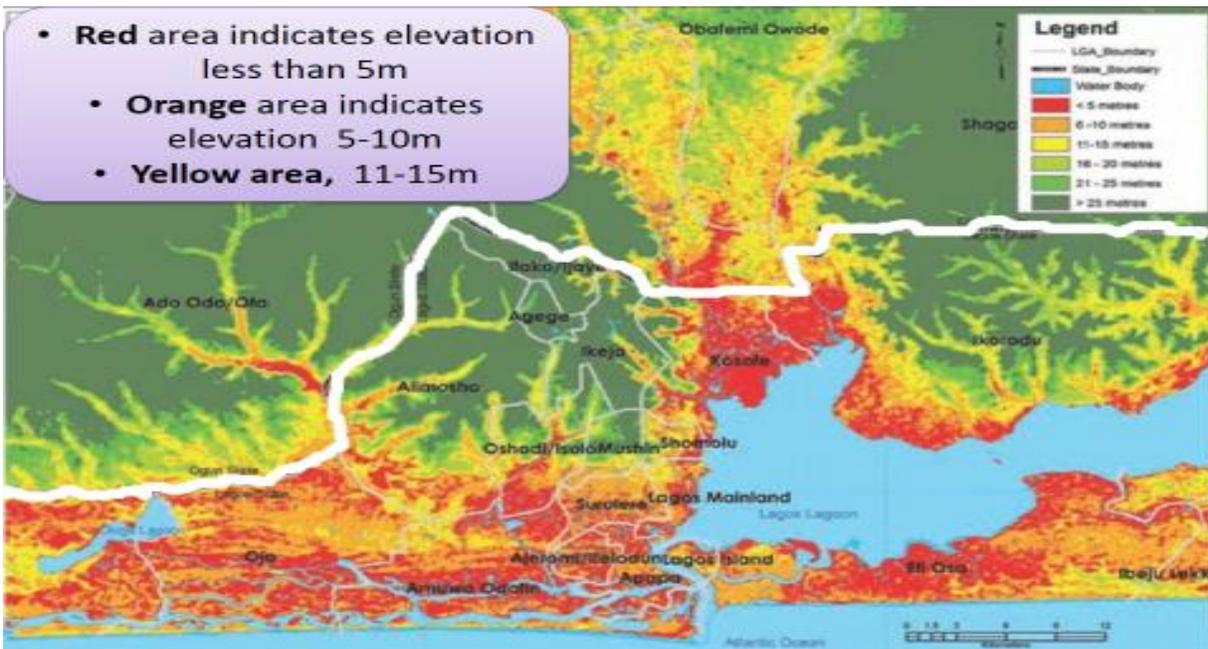
1.2 CLIMATE CHANGE VULNERABILITY

As Lagos struggles with migration, poverty, and the provision of adequate public services, it is also highly vulnerable to the effects of severe weather and climate variability. Rainfall is heavy, averaging around 1,500 millimeters (mm) per year. Rains follow a bimodal pattern that brings the heaviest rains in May to July and September through October. Mean monthly maximum temperatures are around 30 °C, and weather data show that temperatures have been increasing in recent years (Building Nigeria’s Response to Climate Change Project, 2012).

The city’s low-lying coastal location, with an average elevation of less than 1.5 meters, makes its physical exposure quickly apparent. As seen in Figure 2, the core areas of the city, where the great majority of

the population still resides, are located on the mainland or islands abutting either the Atlantic Ocean or Lagos Lagoon. Floods and storm surges are historically recurrent phenomena in Lagos, but their effects on human populations have been intensified in recent years by the city's very rapid population growth, accumulating solid waste, and increasingly haphazard and dangerous settlement patterns on wetlands and flood plains. Moreover, the city's commercial and residential development results in the paving of more and more areas with impermeable, hard surfaces that impede drainage.

FIGURE 2. MAP OF LAGOS WITH ELEVATIONS



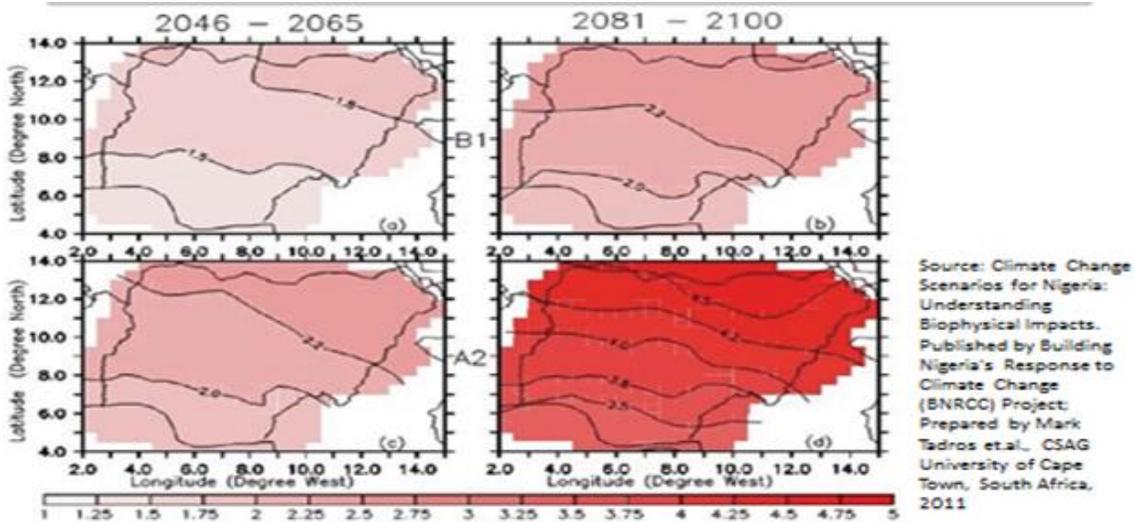
Source: Ademola Omojola in Rosenzweig et al., 2011

Recent floods and storm surges in Lagos regularly have resulted in fatalities, although not yet in large numbers. A downpour in July 2011 led to a flood that killed 25 people (*Vanguard*, July 12, 2011), while an Atlantic Ocean surge that hit Victoria Island in August 2012 swept away 16 people (*EnviroNews Nigeria*, 2012). Several other floods in Lagos during 2011 led to single-digit casualties. Such incidents also have sometimes left hundreds of people homeless, and floods have exposed increasing numbers of people to malaria, cholera, diarrhea, and skin infections. Schools, marketplaces, and bridges also have been damaged or destroyed. In early 2013, the Lagos State Emergency Management Agency (LASEMA) warned that Lagos would experience unusually heavy floods later that year. The general manager of LASEMA warned people living in flood-prone areas to relocate during the rainy season. Where they would relocate, however, was unclear.

Figures 3 and 4 show that mid-century climate projections for Nigeria (based on two models from the Climate Systems Analysis Group [CSAG] at the University of Cape Town) anticipate continued climate-related stresses on the megacity in coming decades. Higher temperatures are projected throughout the country. Rainfall is projected to decrease further in the already drought-stricken and conflict-ridden northeast region of Nigeria. According to the International Food Policy Research Institute (IFPRI), "all data suggest a decrease in harvested area in the northern Sahelian zone," although rainfall predictions for central Nigeria are diverse (Hassan et al., 2012). Most models suggest that Lagos is likely to experience both warmer temperatures and increased rainfall. A report prepared for the Lagos State Commissioner for the Environment anticipates sea-level rise of 3.1 mm per year, possibly reaching more than 1 meter by 2100 (Building Nigeria's Response to Climate Change Project, 2012).

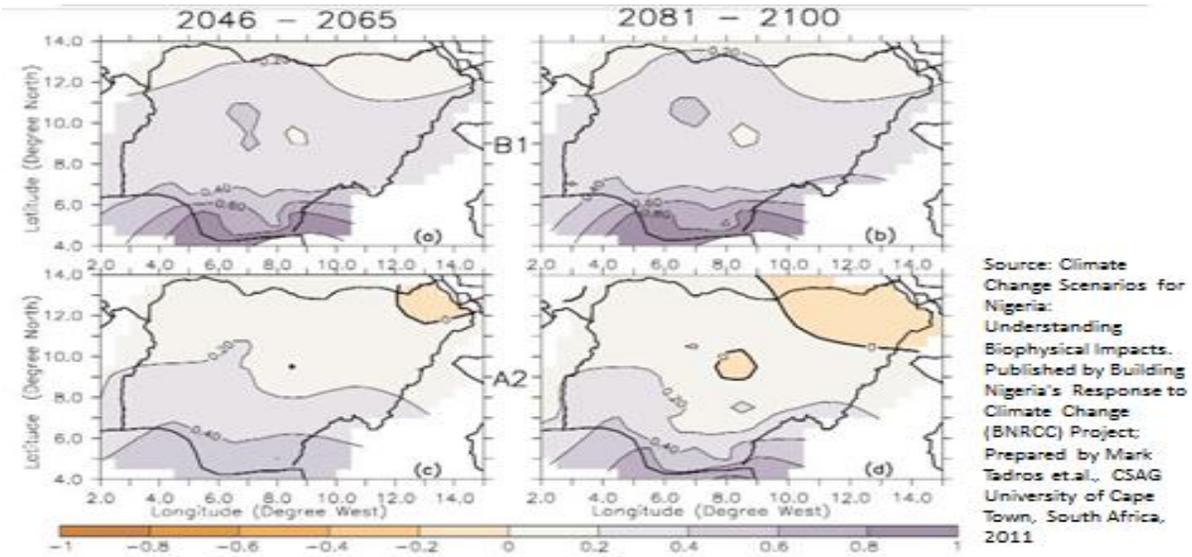
These climate projections have high uncertainty, but the scenario they imply is fairly dire: a continuing stream of migrants from northern Nigeria; rising temperatures; more frequent and intense rainfall; sea-level rise and stronger sea surges; heat risks for the young and elderly; more cases of water-borne diseases; and the potential for increasing deaths, displacement, and damages in heavily populated, poor settlements in high-risk zones at the water's edge. Under such circumstances, and even in the case of serial flood events in the near to medium term, it is easy to envision crises that overwhelm the government's capacity to respond and lead to social unrest and violence.

FIGURE 3. PROJECTED INCREASE IN MAXIMUM TEMPERATURE FOR NIGERIA (1.5 TO 4.5 °C)



Source: Climate Systems Analysis Group, University of Cape Town

FIGURE 4. PROJECTED INCREASE OF 0.2 TO 0.8 MM IN RAINFALL IN NIGERIA (EXCEPT FOR NORTHEASTERN NIGERIA)



Source: Climate Systems Analysis Group, University of Cape Town

1.3 CHALLENGES OF GOVERNANCE AND SEEDS OF CONFLICT

In the abstract, these kinds of scenarios may seem plausible but with unclear linkages to conflict. Recent events in Lagos, however, highlight problematic governance challenges with which they may intersect, heightening tensions. There are already more than 100 slum communities in Lagos, most of them situated in low-lying areas. M.A. Akinsanya, the Permanent Secretary for Drainage Services in Lagos, asserts that “over 80 percent of Lagos residents live in the blighted areas which are more or less improvised floodplains or wetlands” (Akinsanya, 2013). For municipal authorities already acutely concerned with the potential for climate-related disasters, these massive, highly vulnerable settlements present a dilemma. Can these communities be made more resilient, or should they be relocated?

In a controversial action in 2012, the Lagos State Government tried to demolish housing and remove residents from Makoko, a notoriously polluted and highly visible waterside slum lacking sanitation and basic infrastructure. The government’s actions came to a halt after severe criticism from human rights organizations and protests from residents, who claimed they did not receive advance notice or proper compensation for their (illegal) dwellings (BBC News, July 17, 2012). Given the number of such “unsustainable” communities and the potential for loss of life or housing due to severe weather events, this kind of incident involving forced evictions may become increasingly common.

Concerns about a growing rich-poor divide in Lagos also appear in other areas, such as in the case of ongoing construction of a huge new “ocean-city” within the city, known as Eko Atlantic. This development is being built on land reclaimed from the sea at a rate of 400,000 tons of sand per day. A 12-meter high “Great Wall of Lagos” protects it. Eko Atlantic is a multi-billion dollar project funded by private investors that is to be composed of ultramodern districts for commerce, finance, entertainment,

and luxury residences.² Interviewees both inside and outside of government cited the protection of rich Lagosians with a massive sea wall (while poor Lagosians face evacuation or eviction in response to severe weather events) as being likely to increase social frictions in the city.

Recent events also indicate that the Lagos State Government feels that the pace and pressure of migration to the city is approaching unsustainable levels. In August 2013, the government transported 17 “destitute” Igbos from Anambra State to the state border and “deported” them. This move set off a local and national firestorm, sparking debates about the rights and responsibilities of indigenes and migrants and the obligations of individual Nigerian states to provide for their citizens. Many commentators were appalled at the idea that Nigerian citizens could be “deported” from one state to another, while others saw it as “an aspect of the war against the poor and poverty” (*Business Day*, 2013). Under a barrage of criticism, Governor Babatunde Fashola responded provocatively in ethnic terms, noting, “It will be very uncharitable for anybody to suggest that Lagos is no-man’s land. This is the land of my Ancestors...” (Chidubem, 2013). This issue, too, appeared to be the start of a potentially chronic problem with political reverberations that could further stress Nigeria’s already fractured political scene.

Lastly, intimations of the threat of terror also have reached Lagos in the past year. In March 2013, 14 suspects were arrested with explosives and self-proclaimed or alleged links to Boko Haram (*The Nation*, 2013). Those arrested were alleged to have confessed plans to carry out a series of bombings. Several interviewees in Lagos observed that some residents now view migrants from the north through a new lens of fear and suspicion. If terrorist acts do occur in Lagos, the potential exists for even higher levels of resentment or rejection of migrants to the city, whether they are driven by climate stresses or by other factors.

² See the promotional website for Eko Atlantic at <http://ekoatlantic.com/about-us/>.

2.0 ACCRA, GHANA

2.1 POST-CONFLICT STABILITY

Ghana also has social, political, and economic cleavages and contradictions, but it is a far more stable country than Nigeria. President John Dramani Mahama, who first took office upon the death of his predecessor John Atta Mills in July 2012, was elected president in December 2012 by a 3-percentage point margin. The main opposition party alleged that the elections were manipulated by voter fraud, and a case contesting the election was filed with Ghana's Supreme Court.

On August 28, 2013, despite noting some irregularities, the court upheld President Mahama's election. While the police took precautionary security measures in Accra, the country remained calm. Despite disagreeing with the court's decision, Mahama's electoral opponent Nana Akufo-Addo publicly accepted the ruling and called the president to officially accept the final outcome of the electoral process (BBC, August 29, 2013).

The election saga reflected the stability and normative underpinnings of the state in Ghana. After experiencing high levels of violence during inter-chieftaincy ethnic disputes in northern Ghana in the 1980s and 1990s — and seeing the costs of conflict in neighboring Nigeria and Cote d'Ivoire — Ghanaians are proud of the country's democratic culture and are conflict averse. Recent Afrobarometer polls reflect these attitudes. In early 2013, 82 percent of those polled identified democracy as the best government, while 84 percent either strongly or very strongly agreed with the proposition that violence is never a justified response to political disputes (Afrobarometer, 2012b).

The country's recent economic performance also has contributed to stability. Spurred in part by high prices for Ghana's mineral exports (gold, oil, bauxite), real GDP increased by approximately 4 percent during the past decade. Compared to other African countries, Ghana has a diversified economy. Only 57 percent of the population engages in agriculture, with 29 percent and 14 percent employed in services and industry, respectively. As in Nigeria, Ghana's mostly rain-fed agricultural production (and poverty) is largely concentrated in the north. In the three northern regions, over 95 percent of the population lives on less than USD 2 a day (Nutsukpo et al., 2012). According to World Bank data for 2011, the national annual per capita GDP was USD 1,764.

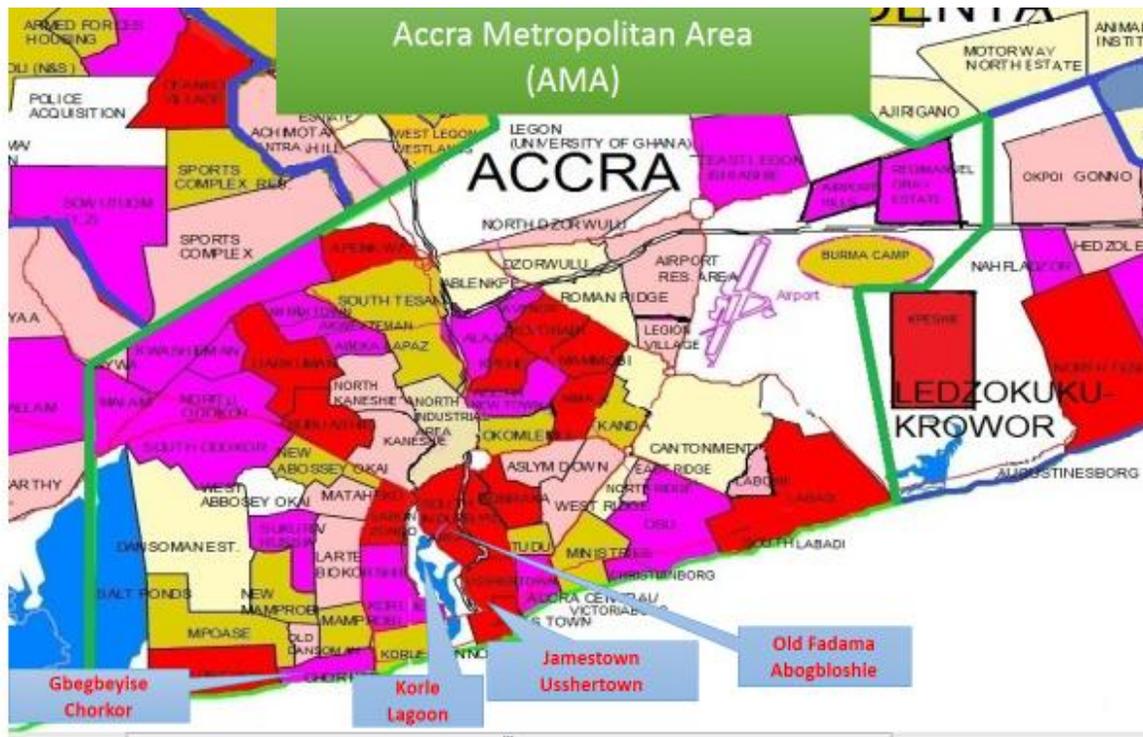
Despite the relative poverty in the north, figures from the 2010 Population and Housing Census show that recent migration to Accra from that part of the country has not been notably large in recent years. Over 85 percent of Accra's approximately 3 million current residents were born either in Accra or in regions immediately adjacent to it (Ministry of Local Government and Rural Development and Moks Publications & Media Services, 2006). Still, as in Nigeria, population growth in the nation's largest city is much more rapid than in the country as a whole. A wave of migration from the north did come earlier, during the Kokomba and Nanumba chieftaincy conflicts of the 1980s; from 1994 to 1995, more than 2,000 people were killed in northern regions, and some 200,000 people were internally displaced (IRIN, 2006).

Many who came to Accra from the north settled in poor, low-lying lands along Korle Lagoon, including Accra's largest slum, Old Fadama. The Ga people, who are considered to be the indigenes of Accra, also live in low-lying areas. While British colonial administrators lived in higher-elevation residential areas farther inland, the Ga lived on lands immediately along the sea coast and today are found in the old coastal neighborhoods of Jamestown and Ussherstown. Tensions between the Ga indigenes and northern newcomers are a moderate but persistent undercurrent in the political and social realities of Accra.

2.2 CLIMATE CHANGE VULNERABILITY

The geomorphology of Accra makes it extremely susceptible to flooding. Two main ridges bound the city to the northwest and northeast, within which area lies the central catchment of the Odaw River, flowing into Korle Lagoon. Indeed, the name given to the north central area of Accra, “Dzorwulu,” can be translated as “big channel.” Figure 5 shows the location of several mostly poor neighborhoods of Accra, all of which are near either the ocean or Korle Lagoon. Many of these areas lack basic sanitation and garbage collection. The Odaw River empties into Korle Lagoon, where waste and garbage clog drains, and the city’s increasing areas of hard surfaces (such as new roads and sidewalks in the northern suburbs) intensify runoff that overloads drainage channels (Rain et al., 2011).

FIGURE 5. POOR NEIGHBORHOODS IN LOW-LYING AREAS OF ACCRA



Source: Accra Metropolitan Area

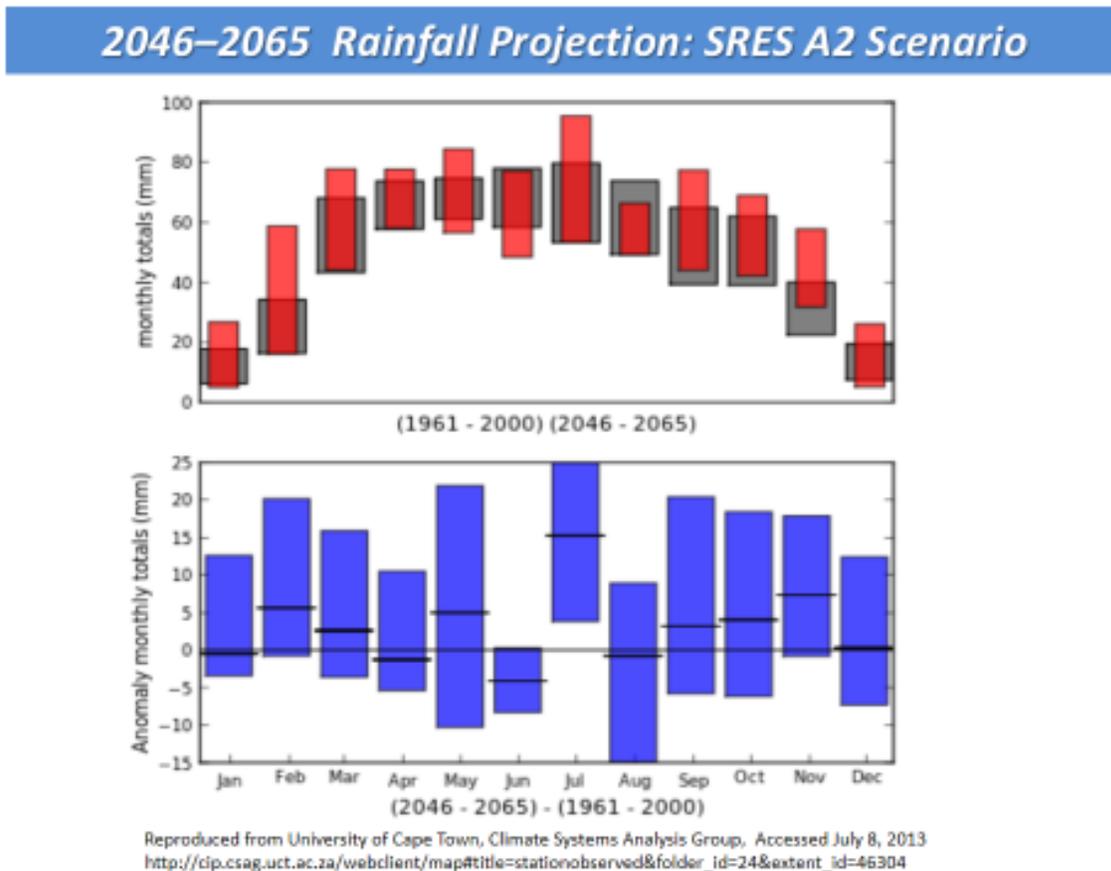
During the rainy season, the city is subject to heavy downpours that, with inadequate or obstructed drainage, can quickly flood vulnerable neighborhoods. A new study on the perceptions of residents in three poor Accra neighborhoods about climate-related challenges ranked floods and choked gutters at the top of the list of most respondents (Codjoe, Owusu, and Burkett, 2013). With population on the rise, slums illegally located on floodplains, steady coastal erosion, and extremely poor solid waste management, the human impact of these torrential rains is intensifying. According to Professor Christopher Gordon, Director of the Institute for Environment and Sanitation Studies at the University of Ghana, some 10 to 20 lives are likely lost every year (poor casualties sometimes go uncounted); the numbers can be expected to go up. Severe floods have become perennial events.

Local officials and urban experts in Accra believe that climate change is playing a role, as reflected in increasingly intense weather events. Available data reinforce this view. According to the Ghana National Climate Change Policy 2013 (NCCP), national data for 1960-2000 show a temperature increase of approximately 2 °C throughout the country and increasingly erratic rainfall patterns marked by

torrential downpours. Sea-level rise along Ghana’s coast is estimated at 2.1 mm per year over the past 40 years.

Looking to the future, two downscaled climate models from the Climate Systems Analysis Group at the University of Cape Town agree that mid-21st century Accra should anticipate an increase in year-round temperatures of approximately 2 °C. As shown in Figures 6 and 7, the same two models also show both an increase in rainfall and greater rainfall variability for the years 2046-2065. A recent IFPRI analysis using two downscaled global climate models found that both models predict increasing temperatures and declines in yields of rain-fed maize, rice, and groundnuts in northern Ghana through 2050 (Nutsukpo et al., 2012). Hence, as in Lagos, the residents of Ghana’s coastal metropolis are likely to face a hotter and possibly wetter future, while their northern compatriots are likely to encounter a hotter and possibly drier climate that presents significant challenges for their agricultural livelihoods. Migration occurs for many reasons, but to the extent that climate change influences migration in Ghana, it is very likely to spur flows southward to the urbanized coast.

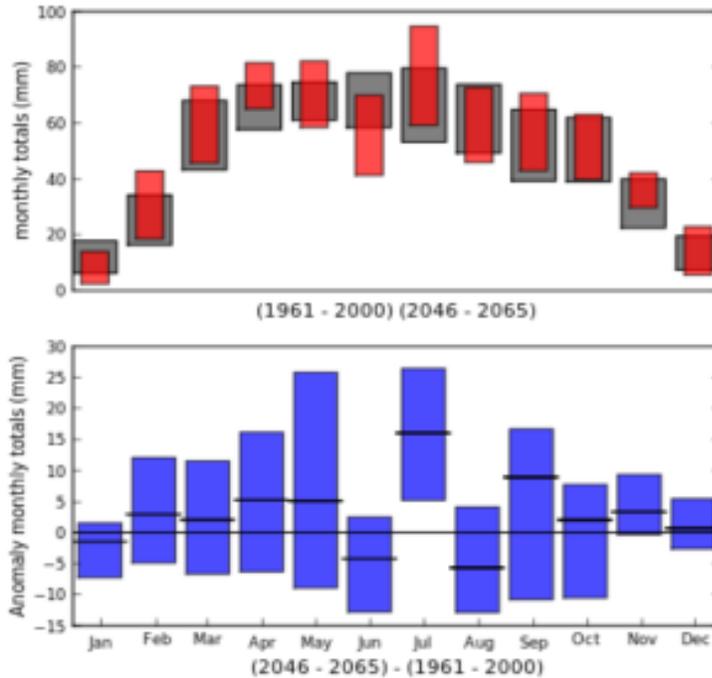
FIGURE 6. RAINFALL PROJECTIONS FOR ACCRA, 2046-2065



Note: SRES stands for Special Report on Emissions Scenarios

FIGURE 7. RAINFALL PROJECTIONS FOR ACCRA, 2046-2065

2046–2065 Projection: SRES B1 Scenario



Reproduced from University of Cape Town, Climate Systems Analysis Group, Accessed July 8, 2013
http://cip.csag.uct.ac.za/webclient/map#title=stationobserved&folder_id=24&extent_id=46304

2.3 CHALLENGES OF GOVERNANCE: THE RETURN OF THE RELOCATION DILEMMA

During the two-day period of October 24-25, 2011, Accra Airport registered a massive 156 mm of rain, roughly equivalent to the average monthly rainfall for the rainiest month of the year (United Nations Development Programme, 2011). Old Fadama was particularly hard-hit by intense flooding, and nine people died in the storm. In response, the national government and the municipal government of Accra, the Accra Metropolitan Assembly (AMA), decided that a more permanent solution to Accra’s worsening flood situation had to be found. Government leaders consulted with the U.S. embassy, which solicited expertise from American companies with experience in public works. An agreement was reached between the Government of Ghana and the Conti Group, a firm with post-Hurricane Katrina experience in storm drainage and flood protection. Partial support for a USD 596 million project, the multiyear “Accra Sanitary Sewer and Storm Water Drainage Alleviation Project,” came through a financial commitment from the U.S. Export-Import Bank. The main tasks of the project, which began in January 2013, include desilting, dredging, and the removal of waste from the Odaw River drains and Korle Lagoon.

The problem is that a stumbling block for the AMA’s most recent plans persists from earlier plans – the presence of the more than 80,000 people in Old Fadama. According to Graham Sarbah, the AMA Drains Maintenance Unit Director, the first stage of the Conti project is intended to dredge and restore Korle Lagoon, as was envisioned in the previously designed Korle Lagoon Ecological Restoration Project. Known by locals as Sodom and Gomorrah because of its reputation for drugs, prostitution, and crime,

Old Fadama is a generator of huge quantities of uncollected garbage, sewage, and solid waste that clogs waterways and drainage channels flowing into Korle Lagoon. In 2009, the AMA, supported by traditional Ga leaders resentful of the environmental problems caused by the Old Fadama squatters, had announced its intentions to relocate the people of Old Fadama. But rights activists and residents vigorously resisted. The inhabitants refused to move, largely because their livelihoods depend on commerce in the immediate area.

In a phone interview in December 2013, however, Mr. Sarbah indicated that the AMA had abandoned its plans to relocate people and was now looking toward upgrading Old Fadama and other areas as well as “containing” the impact of this issue on the Accra Sanitary Sewer and Storm Water Drainage Alleviation Project. He also emphasized that blocked drains farther upstream on the Odaw River are of even greater consequence.

This shifts the problem of dealing with poor and vulnerable neighborhoods to the actual implementation of slum improvement, the plans for which are only now being developed. The AMA clearly does not want to trigger potential conflict associated with large-scale mass evictions, but it has not yet found a viable path to deal with the problems of the Old Fadama squatter community and their implications for urban renewal and flood prevention. The AMA’s new approach tests whether or not that viable path forward has, in fact, been found.

IMAGE 1. OLD FADAMA AT THE EDGE OF KORLE LAGOON



Photo: Katsuaki Terasawa

In essence, Old Fadama presents the same dilemma for Accra that Makoko does for Lagos: How should cities deal with poor, illegal, low-lying, and already vulnerable neighborhoods in view of the stronger and more frequent storm events and sea-level rise likely to be associated with climate change? While Old Fadama and Makoko are iconic examples, the problem of the potential need for relocation extends to dozens of other slum communities in West African urban areas and is almost certain to spread and become more acute with time. Providing adequate infrastructure and sanitation to avoid relocation and make these areas more habitable and less vulnerable to flooding and storm surges is an equally daunting undertaking. The third alternative is to do nothing, with the very likely consequence of mounting and costly humanitarian disasters, social unrest, and rising death tolls as demographic and climate trends converge.

3.0 CLIMATE ADAPTATION IN LAGOS AND ACCRA

Government efforts to promote climate adaptation are still in their early stages in Lagos, and are only just beginning in Accra. The Lagos State Government is aware of and sensitive to the threat of climate change. Indeed, Governor Fashola has called climate change “the biggest war of our time,” (Akoni and Olowoapejo, 2013) and the government has held a series of annual climate change summits with help from the United Nations Development Programme. Though not explicitly linked to climate change, since 2006 the city has benefited from a USD 200 million World Bank loan for the Lagos Metropolitan Development and Governance Project (LMDGP), which in part has been used to develop basic infrastructure including crucial drainage networks. A draft document for the Lagos State Climate Change Policy has been prepared and was under final review in the fall of 2013. The document anticipates mainstreaming climate change adaptation throughout all sectors of government, including not only environment and disaster risk management but also land use, agriculture, food security, human settlements, and protection of economic assets. These plans, however, are not yet fully underway.

Civil society and community awareness of the nature and implications of climate change threats in Lagos is by all accounts extremely low. In April 2013, several representatives from civil society organizations, working together under the Policy Advocacy Partnership on Climate Change, produced a report on “Climate Change Mapping in Some Constituencies in Lagos State” (Oshaniwa and Chikwendu 2013). Most of the report identified types of climate change impacts, but it also noted a large gap in community awareness in relation to climate change. Most of those surveyed saw changes in the weather or their environment as “acts of God.” The report also showed that climate change adaptation by vulnerable citizens in Lagos exists at a very rudimentary level. To date, actions taken to cope with flooding included simple measures such as the use of sand bags, improvised clearing of drains, the construction of planking over waterlogged areas, and purchasing water from water vendors.

In the second half of 2013, the Government of Ghana was in the process of drafting a national climate change policy, strategy, and action plan, including frameworks for individual sectors such as disaster response and health. According to one participant in the process, the emphasis has been less on introducing new measures than on showing departments and agencies which of their activities might be considered to be aspects of adaptation (personal communication, August 27, 2013). Another interviewee noted that while the mapping of flood areas has been done, no master plan for drainage in Accra has been implemented, and “urban planning is where the problem is” (personal communication, August 26, 2013). Numerous other interviewees identified a lack of enforcement and political will as the key obstacles preventing government from taking a stronger role in building climate resilience.

For poor residents in Accra, environmental awareness remains low, and there is inadequate provision of public services. It is common practice in Accra to simply dispose of trash and other waste in open drains and improvised dump sites. This practice has huge negative consequences for drainage during severe weather events. But many people do want to do better. In August 2013, at an open meeting on climate change in Ushertown sponsored by the Regional Institute of Population Studies of the University of Ghana, over 100 local officials, community association representatives, leaders of women’s groups, and students gathered to learn about the possible effects of climate change on poor neighborhoods in Accra. In the energetic discussion that followed, many participants complained about the lack of such basic

items as trash cans and public toilets. Others volunteered their own labor to help their communities clean up, on the condition that government would give them the plastic bags and simple tools to do the job. Thus, the potential to mobilize citizens in Accra to build climate resilience clearly exists.

4.0 KEY FINDINGS AND RECOMMENDATIONS FOR PROMOTING RESILIENCE

Both Lagos and Accra face very serious climate change challenges. It is unlikely, however, that climate stresses will lead to the mobilization of significant organized conflict in Lagos or Accra in the near future. In the near term, because of the still-limited organizational capacity of civil society organizations and poor communities, any climate-related conflicts that do take place in these cities are unlikely to go beyond social unrest in and around the communities most directly affected.

Projections about urbanization trends, climate change, and their impacts on both Lagos and Accra, however, indicate that the potential costs of inaction will rise with time. The continued proliferation and growth of densely populated settlements in dangerously vulnerable low-lying areas will result in a proportionate escalation of economic costs associated with disaster relief and humanitarian assistance. The victims of flood-related disasters primarily will be the very poor. In Lagos, they are likely also to be migrants, whose presence some Lagosians may increasingly resent. Over the medium to long term, these growing pressures along lines of class and ethnicity could result in social explosions that endanger public security and tarnish Lagos's reputation as an attractive venue for investors.

Climate trends are not encouraging. Climate change projections for Nigeria reflect a consensus on rising temperatures and mixed results from rainfall models with the exception of northeast Nigeria, where heat and droughts are likely to negatively affect agricultural livelihoods, spurring migration southward. Lagos itself is likely to experience both hotter and (with less certainty) wetter weather. The residents of Accra, who are already subject to perennial floods, probably face a hotter and wetter future, while their northern compatriots are likely to encounter a hotter and possibly drier climate that reduces agricultural yields and increases the incentives for out-migration. For both cities, but especially for Lagos, the ability to ensure tolerable living conditions in the face of climate risks will depend in part on the success of efforts to promote agricultural resilience and economic diversification in the countryside and towns elsewhere in the country.

In terms of governance, the situations of the two cities differ and are in some ways paradoxical. While Lagos is enmeshed in the very unstable context of Nigerian national politics, Accra has the benefit of being the capital city of Ghana's frequently praised democracy. Yet the Lagos State Government appears to be much more dynamic and active in engaging a wide array of complex urban problems, while Accra's government has yet to turn its attractive modernizing discourse into tangible actions to address the city's mounting environmental woes.

Both Lagos and Accra suffer the consequences of the inability or lack of political will to enforce land use policies, zoning regulations, and laws mandating environmental protection standards. These failures of governance are compounded by the lack of awareness and environmentally harmful behaviors of many citizens in poor neighborhoods, especially in Accra. In Lagos, the permanent secretary for drainage has coined the adage, "No drainage, no Lagos" (Akinsanya, 2013). To this adage might be added the corollary: "No solid waste management, no drainage."

In Lagos and Accra, major projects to construct or improve physical infrastructure for drainage are either already underway or soon to begin. Yet, while necessary, physical infrastructure and “technical fixes” are not sufficient. If governments fail to provide basic waste management services, and the urban populations of these metropolises persist in everyday practices of waste disposal that produce obstacles to the proper functioning of physical infrastructure (as in Old Fadama), massive flooding will continue and possibly worsen. This dilemma partly reflects a huge collective action problem, as poor residents may reasonably ask, “Why should I trouble myself with the time and effort required to find ‘sanitary’ means of disposal when no one else is doing it? My efforts will change nothing.” Physical infrastructure needs to be accompanied by “social infrastructure” – education and awareness campaigns; government services to enable and support constructive environmental behaviors; and formal and informal institutional arrangements that allow for the expression of citizen grievances or concerns about environmental problems, climate risks, and participation in the formulation of solutions.

LAWMA has tapped into the previously unrealized potential of civic pride and transformed it into the impetus for a powerful municipal agency that has decongested and revitalized large areas of Lagos. In Ghana, despite the country’s democratic bona fides, the AMA has been unable to move forward to address fundamental issues of solid waste management and sanitation that affect the lives of Accra’s citizens. The example of LAWMA shows that with strong leadership and political will, huge environmental improvements *can* be accomplished even in one of the world’s most challenging urban settings, and dramatic results can be achieved within a decade.

In neither city, however, have government officials been able to satisfactorily solve the problem of either renovating or relocating vulnerable slum areas in danger of destruction and deaths resulting from severe storms and flooding. The social, political, and technical challenges of dealing with illegal and precarious settlements are extremely difficult. The key to mitigating the potential for conflict will be to impart a sense of justice to those affected and to allow them a voice in decisions about their own fate. As long as these problems are allowed to fester and multiply without a satisfactory resolution, the possibility of future conflict will steadily increase.

USAID and other donors can consider actions to promote climate resilience and reduce the likelihood of conflict in Lagos, Accra, and other flood-prone West African cities in four issue areas: land use and housing, environmental and climate awareness, drainage and solid waste management, and cross-ethnic dialogue. Recommended actions include the following:

- USAID should encourage and support the governments of Lagos, Accra, and other West African cities concerned with climate risks to enforce existing land use and housing laws and regulations in order to reduce the number of illegal settlements vulnerable to flooding. Failure to take this action is the primary reason why these cities face high levels of climate vulnerability.
- USAID should encourage and support the governments of Lagos, Accra, and other West African cities to address the critical need to either rehabilitate or relocate highly vulnerable and illegal settlements in low-lying, flood-prone areas. The complexities and urgency of this critical challenge are such that a workshop of experts, officials, and civil society representatives to frame the relevant problems and issues would be a helpful first step.
- As evidenced in interviews with civil society organizations and communities in Lagos and Accra, the extremely low knowledge of poor urban dwellers about intensifying threats from climate change (or, simply, severe weather) places them at serious risk. Based on the principles of disaster risk reduction, USAID can undertake a range of actions to increase environmental and climate awareness and actions, help build the adaptive capacity of local institutions, and support local efforts to increase engagement and dialogue between residents of poor neighborhoods and responsible government authorities. Specific actions follow:

- Support and strengthen civil society organizations like those involved in the Policy Advocacy Partnership on Climate Change in Lagos, which seeks to both educate and give a voice to poor communities that are most vulnerable to climate change.
 - Encourage and support local governments and community associations to work together on risk assessments of neighborhoods known to be highly vulnerable to severe weather associated with climate change. The results of these risk assessments should be disseminated in public outreach events and used to formulate and discuss climate adaptation responses.
 - Support and strengthen engagement and dialogue between civil society organizations and environmental committees in legislative and municipal assemblies (recent efforts of the Policy Advocacy Partnership on Climate Change provide one such example). Most legislators are very poorly informed about climate risks and climate adaptation. In Lagos, state legislators have requested capacity building assistance from local NGOs, and this example can serve as a model for other cities.
 - Support and strengthen citizen outreach programs on climate awareness like that of the Regional Institute for Population Studies of the University of Ghana, which helps to bridge the gap between residents of poor neighborhoods and municipal authorities with responsibilities for environmental protection and climate adaptation. On some occasions, community meetings with public officials do not take place due to a simple lack of funds.
 - Encourage and support efforts to ensure that early warning announcements by government authorities concerning anticipated severe weather events or trends are accompanied by information on practical and viable steps that citizens can take to protect themselves or to temporarily relocate as needed. In the latter case, planning and implementing arrangements for adequate temporary shelters (which currently do not exist) are indispensable.
 - Identify and support community- and school-based self-help efforts to clean up neighborhoods and eliminate clogged drains that exacerbate storm surges and flooding, focusing in particular on changing public behaviors and educating youth.
 - Work with civil society organizations, schools, local researchers, government officials, and climate adaptation experts not only to raise awareness, but also to develop and disseminate lists of *specific actions* residents can take to increase climate resilience.
- USAID should take affirmative steps to promote and disseminate knowledge and lessons learned throughout West Africa (beginning with Accra) from the successes of LAWMA. The LAWMA model provides possible measures for replication across the full range of waste management issues, as well as examples of public-private partnerships that produce jobs and revenue for financial sustainability. (LAWMA has already established outreach mechanisms that can help facilitate regional dialogue on these issues.)
 - USAID should support forums for discussion of climate change challenges that bring together various ethnic groups and stakeholders from different parts of each country. These dialogues could help to increase mutual understanding and reduce tensions in Nigeria and Ghana on issues of climate-related migration and the perceived needs and interests of different ethnic groups in poor urban areas. (Allowing for the differing national context, one example of this kind of approach is USAID's work on natural resource management and climate change with peace committees composed of different ethnic groups in Ethiopia.)

REFERENCES

- Afrobarometer. (2012a). Summary of results Afrobarometer round 5 survey in Nigeria, 2012. Retrieved from <http://afrobarometer.org/results/results-by-country-n-z/nigeria/264-english/questionnaires/nigeria-questionnaire/695-nigeria-round-5-questionnaire-2012>
- Afrobarometer. (2012b). Summary of results Afrobarometer round 5 survey in Ghana, 2012. Retrieved from <http://www.afrobarometer.org/results/results-by-country-a-m/ghana>
- Akinsanya, M. A. (2013, June). Resilient drainage infrastructure models: Panacea for sustainable development of Lagos State. PowerPoint presentation at the 5th Lagos State Climate Change Summit.
- Akoni, O and Olowoapejo, M. (2013, March 14). Vanguard. Climate change: Lagos shops for N27bn to protect shorelines. Retrieved from <http://www.vanguardngr.com/2013/03/climate-change-lagos-shops-for-n27bn-to-protect-shorelines/>
- BBC. (2013, August 29). Ghana's supreme court upholds John Mahama's win. Retrieved from www.bbc.co.uk/news/world-africa-23878458
- BBC News. (2012, July 17). Lagos Makoko slums knocked down in Nigeria. Retrieved from <http://www.bbc.co.uk/news/world-africa-18870511>
- Building Nigeria's Response to Climate Change (BNRCC) Project. (2012). Towards a Lagos State Climate Change Adaptation Strategy. Prepared for the Commissioner for Environment. Lagos, Nigeria.
- Business Day. (2013, August 20). Lagos megacity and inclusive development: A case for the vulnerable (2). Retrieved from <http://businessdayonline.com/2013/08/lagos-megacity-and-inclusive-development-a-case-for-the-vulnerable-2/>
- Campbell, J. (2011). *Nigeria: Dancing on the brink*. New York: Rowman & Littlefield.
- CBS News. (2013, September 20). Nigeria workers find 143 civilian bodies in region plagued by Islamic extremist group Boko Haram, Retrieved from http://www.cbsnews.com/8301-202_162-57603839/.
- Chidubem, C. (2013, August). Fashola blasts Nigerians who claim that 'Lagos is no man's land': Calls them, novice. *Nigeria on Point*. Retrieved from <http://www.nigeriaonpoint.com/2013/08/fashola-blasts-nigerians-who-claims.html>
- Codjoe, S. N. A., Owusu, G., & Burkett, V. (2013). Perception, experience, and indigenous knowledge of climate change and variability: The case of Accra, a sub-Saharan African City. *Regional Environmental Change* 13(3).
- Economist. (2011, May 5). Nigeria's business capital: A rare good man. Retrieved from www.economist.com/node/18652563.
- EnviroNews Nigeria. (2012, August 20). Four dead, 12 missing in Lagos Atlantic Ocean surge. Retrieved from <http://www.environewsnigeria.com/2012/08/20/four-dead-12-missing-in-lagos-atlantic-ocean-surge-2/>
- Climate Change and Conflict in West African Cities: A Policy Brief on Findings from Lagos, Nigeria and Accra, Ghana

- Gleditsch, N. P. (2012). Whither the weather? Climate change and conflict. *Journal of Peace Research*, 49(1): 3–9.
- Hassan, S.M., Ikuenobe, C.E., Abdulai, J., Nelson, G., and Thomas, T.S. (2012, December). West African agriculture and climate change: A comprehensive analysis – Nigeria. International Food Policy Research Institute. Retrieved from <http://www.ifpri.org/publication/west-african-agriculture-and-climate-change-nigeria>
- Integrated Regional Information Networks (IRIN). (2006, January 31). Ghana: Chieftaincy tussle brews conflict in northern town. Retrieved from <http://www.irinnews.org/report/57990/ghana-chieftaincy-tussle-brews-conflict-in-northern-town>
- Lagos State Government. (2013). Lagos State climate change policy. Lagos, Nigeria
- Ministry of Local Government and Rural Development and Maks Publications & Media Services. (2006). Demographic Characteristics. Retrieved from <http://www.ghanadistricts.com/home/>
- The Nation. (2013, July 30). 42 Boko Haram suspects arrested in Lagos, Ogun. Retrieved from <http://thenationonlineng.net/new/42-boko-haram-suspects-arrested-in-lagos-ogun>
- Nutsukpo, D., Jalloh, A., Zougmore, R., Nelson, G., and Thomas, T. (2012, December). West African agriculture and climate change: A comprehensive analysis – Ghana. International Food Policy Research Institute. Retrieved from http://www.ifpri.org/sites/default/files/publications/aaccs_ghana_note.pdf
- Oshaniwa, T. and Chikwendu, C. (2013, April). Climate change mapping in some constituencies in Lagos State. Policy Advocacy Project Partnership on Climate Change (PAPPCC). Lagos, Nigeria.
- Radio France Internationale (RFI). (2011, July 11). Floods leave scores homeless in Lagos. Retrieved from <http://www.english.rfi.fr/africa/20110711-nigeria-rains>.
- Rain, D., Engstrom, R., Ludlow, C., and Antos, S. (2011). Accra Ghana: A city vulnerable to flooding and drought-induced migration. Prepared for Cities and Climate Change: Global Report on Human Settlements. Retrieved from www.unhabitat.org/grhs/2011
- Rosenweig, C., Solecki, W.D., Hammer, S.A., Mehrotra, S. (Eds.) (2011). *Climate change and cities: First assessment report of the Urban Climate Change Research Network*. New York: Cambridge University Press.
- Sam, P.A. (2009, June 24). Flooding in Accra research report. Modern Ghana. Retrieved from <http://www.modernghana.com/news/223780/1/flooding-in-accra-research-report.html>
- Stark, J. (2013). Climate change and conflict in Africa and Latin America: Findings and preliminary lessons from Uganda, Ethiopia, and Peru. African and Latin American Resilience to Climate Change Project. United States Agency for International Development (USAID). Washington, D.C.
- United Nations Development Programme. (2011). A brief analysis of the October 2011 floods in Accra, Ghana. Retrieved from <http://www.modernghana.com/news/363941/1/a-brief-analysis-of-the-october-2011-floods-in-acc.html>
- United Nations Environment Programme. (2011). Climate change, migration, and conflict in the Sahel. Retrieved from http://postconflict.unep.ch/publications/UNEP_Sahel_EN.pdf
- Vanguard. (2011, July 12). Nigeria: Lagos flood kills 25. Retrieved from allafrica.com/stories/201107120076.html.

Women Environmental Programme. (2011). Assessment of gender knowledge and awareness, vulnerability, and adaptation strategies to the impacts of climate change in Northern Nigeria. Abuja, Nigeria: Women Environmental Programme.

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