USAID
FROM THE AMERICAN PEOPLE

CLIMATE CHANGE AND CONFLICT IN WEST AFRICAN CITIES:

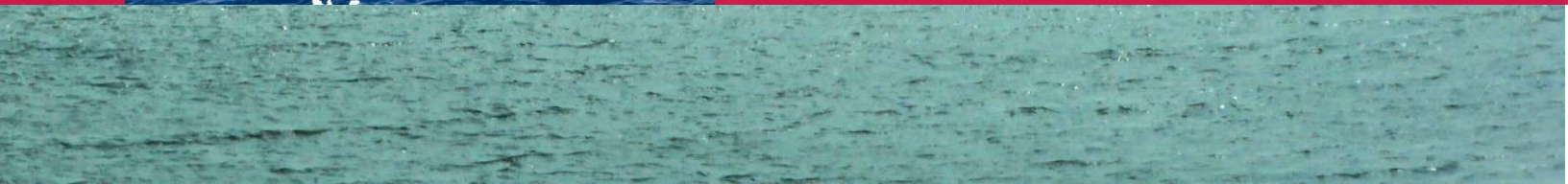
FINDINGS FROM LAGOS, NIGERIA, AND ACCRA, GHANA

DECEMBER 2013

This report is made possible by the support of the American people through the U.S. Agency for International Development (USAID). The contents are the sole responsibility of Tetra Tech ARD and do not necessarily reflect the views of USAID or the U.S. Government.

ARCC

African and Latin American
Resilience to Climate Change Project



Contributors to this report, in alphabetical order: Jeffrey Stark[1] and Katsuaki Terasawa[2]

[1] Director of Research and Studies, Foundation for Environmental Security & Sustainability (FESS)

[2] FESS Senior Fellow

The authors would like to acknowledge the valuable assistance and research contributions of Amanda Johnson, FESS Research Associate, and Elvis Efomanteng, FESS consultant.

FESS would like to acknowledge the contributions and assistance received in Lagos from Anthony Akpan, President of Pan African Vision for the Environment.

For valuable input, community meeting arrangements, and translations in Accra, FESS would like to give special thanks to Samuel Codjoe, Director of the Regional Institute of population Studies (RIP) at the University of Ghana and his staff and colleagues, including especially Adriana Biney, Ph.D. candidate; Ruben Larbi, researcher; Dorcas Ewoozie, researcher; Phildelia Armah, Mumuni Abu, Aaron Christian, Vincent Adams, Jonathan Armah, Solomon Tetteh, Bilal Tackie, Jonathan Armah, and Gwen Asare-Konadu.

Cover Photo: View across Lagos Lagoon to the Waterside Slum of Makoko, Katsuaki Terasawa

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).

Tetra Tech ARD Contacts:

Patricia Caffrey
Chief of Party
African and Latin American Resilience to Climate Change (ARCC)
Burlington, Vermont
Tel.: 802.658.3890
Patricia.Caffrey@tetratech.com

Anna Farmer
Project Manager
Burlington, Vermont
Tel.: 802-658-3890
Anna.Farmer@tetratech.com

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

AFRICAN AND LATIN AMERICAN RESILIENCE TO CLIMATE CHANGE (ARCC)

DECEMBER 2013

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

AMA	Accra Metropolitan Assembly
CAF	Conflict Assessment Framework
CCCAF	Climate Change and Conflict Assessment Framework
CIDA	Canadian International Development Agency
CSAG	Climate Systems Analysis Group, University of Cape Town
FESS	Foundation for Environmental Security and Sustainability
GAMADA	Ga Mashie Development Agency
GDP	Gross Domestic Product
IFPRI	International Food Policy Research Institute
IPCC	Intergovernmental Panel on Climate Change
IRIN	Integrated Regional Information Networks
LASEMA	Lagos State Emergency Management Agency
LAWMA	Lagos Waste Management Authority
LMDGP	Lagos Metropolitan Development and Governance Project
LSSTF	Lagos State Security Trust Fund
NCCP	Ghana National Climate Change Policy 2013
SRES	Special Report on Emissions Scenarios
UCCRN	Urban Climate Change Research Network
UN-HABITAT	United Nations Human Settlements Program
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
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: A Policy Brief on 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

In the wake of the latest findings of the United Nations Intergovernmental Panel on Climate Change (IPCC), debate and discussion continues over the concern that climate change impacts might increase instability and conflict in the developing world. In recent years, 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. Despite the efforts of many of these analysts to move toward a more nuanced understanding of the potential relationship between climate change and conflict, media reports continue to frame the topic in dramatic terms.

The focus of most early studies on climate change and conflict was on threats to rural livelihoods (agriculturalists, pastoralists); food security; and access to land, forest, and water resources among groups living in the countryside. This line of research was especially concerned with the effects of increasingly frequent drought in ethnically diverse zones of undemocratic or weakly democratic states. 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.

Yet, 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. According to the African Development Bank, 36 percent of Africa's population lived in urban areas; this is expected to reach 50 percent by 2030. Rural-to-urban migration is responsible for much of the population increase in many cities. Most rural migrants have little education and few skills, and they typically find their way into the informal sector, which produces more than 90 percent of new jobs (and 61 percent of all jobs) in Africa's urban centers. The surge in population is accompanied in many cities by mushrooming informal and illegal settlements, environmental degradation, poor health conditions, and insecurity and crime. These trends are creating immense challenges for municipal, regional, and national governments throughout the continent.

In the context of weak governance and inadequate adaptation planning, climatic threats to basic human needs have the potential to contribute to instability in densely populated urban areas. Some conflict analysts also view them as a main breeding ground and likely source of new conflicts in the developing world.

Scenarios of this kind remain at present deductive and speculative, but they testify to a growing convergence of interests between conflict analysts and climate specialists. They also reflect the increasing focus of many researchers and planners on large coastal cities in the developing world as a special area of concern.

One coastal zone that has a particularly dense and rapidly growing urban population is the littoral zone of the Gulf of Guinea in West Africa. According to the United Nations Environment Programme (UNEP), the 500-kilometer coastline between Ghana and the Niger Delta is likely to be an urban megalopolis of 50 million people by 2020. To address the relative lack of research on climate-conflict linkages in large urban coastal areas, USAID asked the Foundation for Environmental Security and Sustainability (FESS) to conduct a case study on two major West African cities located within this zone—Lagos, Nigeria, and Accra, Ghana.

The main purpose of the case study is to bring to light key issues and preliminary findings to begin to address two fundamental questions:

- Are the effects of climate change likely to lead to chaotic and conflictive scenarios in Lagos, Accra, or other West African cities?
- If so, under what sorts of circumstances and over what time frame might they take place, and are there preventive actions that governments, communities, and donors should undertake?

LAGOS

With an estimated population of around 20 million people, the "megacity" 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.

Northern and northeastern Nigeria have experienced the most dramatic effects of climate change through the steady encroachment of desertification, the loss of farmland and pasture, and increasingly difficult access to water sources and firewood. In combination with population growth and poor farming practices, these effects have severely disrupted the livelihoods of farmers, herdsmen, and fishermen in northern Nigeria.

However, it is not just climate effects or, more broadly, environmental conditions that have driven migration southward toward Lagos and other coastal cities. There is also a marked north-south divergence in terms of wealth and economic opportunities.

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. 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."

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

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 change. The city's low-lying coastal location, with an average elevation of less than 1.5 meters, makes its vulnerability quickly apparent. Around 70 percent of Lagosians live in poor, often illegal, settlements (such as the renowned slum of Makoko), in or near these low-lying areas. Data show that temperatures have been increasing and, although the data are mixed on overall precipitation, many observers believe that rainstorms have intensified. There also has been measurable sea level rise.

Recent intense storms and flood events resulting in dozens of fatalities have raised public concerns about flooding, although 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 uncertainty with respect to precipitation, but the broader scenario they imply in combination with other factors is fairly dire: a continuing stream of migrants from northern Nigeria; more frequent and intense rainfall; sea-level rise and stronger sea surges; 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 perhaps even in the case of serial flood events in the near to medium term, it is not difficult to envision crises that overwhelm the government's capacity to respond and lead to social unrest and violence.

ACCRA

While Ghana is not without its social, political, and economic cleavages and contradictions, it is a far more stable country than Nigeria. After experiencing high levels of violence during inter-chieftaincy ethnic disputes in northern Ghana in the 1980s and 1990s, as well as 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.

As in Nigeria, population growth in Ghana's capital of 3 million people is much more rapid than in the country as a whole. Many of those who have come to Accra from the north settled in poor, low-lying lands along Korle Lagoon, including the flood plains upon which Accra's largest slum, Old Fadama, is located.

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. Many of the poor neighborhoods of Accra are either near 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 intensify runoff that overloads drainage channels.

The poor areas wedged between the sea and Korle Lagoon suffer from precarious housing conditions, high malaria incidence, and a severe lack of solid waste management.

A new $596 million project, the multiyear "Accra Sanitary Sewer and Storm Water Drainage Alleviation Project," seeks to alleviate flooding by desilting, dredging, and removing waste from the Odaw River drains and Korle Lagoon. Yet, Accra also is hampered by very weak land use management and environmental enforcement as well as the environmental degradation caused by the everyday practices of poor residents, who dispose of trash haphazardly in the absence of proper services.

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 Old Fadama. Known by locals as Sodom and Gomorrah due to its reputation for drugs, prostitution, and crime, Old Fadama is a generator of huge quantities of uncollected garbage, sewage, and solid waste that clog waterways and drainage channels flowing into Korle Lagoon. In December 2013, the Government of Accra indicated that it had abandoned its earlier 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, the plans for which are only now being developed. The government 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 new approach envisioned by the Accra Metropolitan Assembly (AMA) is a test of whether that viable path forward has, in fact, been found.

Up to a few dozen lives may be lost to flooding each year in Accra (poor casualties sometimes go uncounted), and the numbers are expected to go up. Severe floods have become perennial events. Local officials and urban experts in Accra believe that climate change may be playing a role, as reflected in increasingly intense weather events.

Recent data, while inadequate to reach firm conclusions about aggregate annual precipitation trends, reinforce this view. Temperatures have been increasing and rainfall has become more variable and intense. Sea level rise along Ghana's coast is estimated at 2.1 mm per year over the last 40 years and is expected to accelerate. Climate models project a mid-century increase in year-round temperatures of approximately 2 °C and more torrential rains. A recent analysis predicts both increasing temperatures and declines in yields of rain-fed maize, rice, and groundnuts in northern Ghana through 2050. Hence, as

in Lagos, the residents of Ghana's coastal metropolis are likely to face a hotter future with perhaps more intense rainfall events, while their northern compatriots are likely to encounter a hotter and possibly drier climate that presents significant challenges for their agricultural livelihoods. This may spur migration southward to Greater Accra's urbanized coast.

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 and sea level rise 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 over time. Forced evictions without proper compensation and support for relocation are a recipe for conflict. Providing adequate infrastructure and sanitation to make these areas more habitable and less vulnerable to flooding and storm surges is a 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.

Both Lagos and Accra face very serious climate change challenges. However, it is unlikely that climate stresses will lead to the mobilization of significant organized conflict in Lagos or Accra in the near future. Due to the still-limited organizational capacity of civil society organizations and poor communities, any conflicts in the near term with climate linkages 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 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, whose presence may be resented or feared by some Lagosians. Over the medium to long term, these increasing pressures along lines of class and ethnicity could result in social explosions that endanger public security.

Climate trends are not encouraging. Climate change projections for Nigeria reflect a consensus on rising temperatures and mixed results from aggregate annual rainfall models, with the exception of northeast Nigeria, where heat and droughts are likely to negatively affect agricultural livelihoods, driving migration southward. Lagos itself is likely to experience both hotter weather and more intense and erratic rainfall. The residents of Accra, who are already subject to perennial floods, also probably face a hotter and (with less certainty) 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.

Government efforts to promote climate adaptation are still in their early stages in Lagos, and are only just beginning in Accra. There is a large gap in awareness at the community level in relation to climate change, and adaptation by vulnerable citizens in Lagos and Accra exists at a very rudimentary level. Actions taken to date to cope with flooding included simple measures such as the use of sand bags, sand filling of rooms, improvised clearing of drains, the construction of planking over waterlogged areas, and purchasing water from water vendors.

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 massive obstacles to the proper functioning of physical infrastructure, massive flooding will continue and possibly worsen. Physical infrastructure needs 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.

A summary of findings and recommendations can be found in Section 5.0.

1.0 INTRODUCTION

In the wake of the latest findings of the United Nations Intergovernmental Panel on Climate Change (IPCC, 2013), debate and discussion continues over the concern that climate change impacts might increase instability and conflict in the developing world.[1] In recent years, 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. Despite the efforts of many of these analysts to move toward a more nuanced understanding of the potential relationship between climate change and conflict, media reports continue to frame the topic in dramatic terms. In early December 2013, in a report that was picked up and republished by numerous public policy blogs, the online publication Global Post published an article about climate change in the Sahel with the headline, "How Climate Change is Helping Al Qaeda" (McConnell and Loomis, 2013). As usual, however, the specialists quoted in the article were much more circumspect and cautious about such causal claims than the headline suggested.

Most of the original discussions about possible climate-conflict linkages examined current and projected climate change effects (droughts, floods, sea-level rise) and asked how they might affect the incidence of the kind of violent conflict events (rebellions, uprisings) typically measured by security policy analysts. The number of cases was small and much of the analysis was speculative. Recent research has increased the number of cases by including historical or paleoclimatic reconstructions of climate-conflict relationships (Hsiang, Burke, and Miguel, 2013). In this analysis, climatic shifts from hundreds or even a few thousand years ago have been added to the climate change side of the ledger, while factors such as crime and civilizational collapse have been brought into the mix under the rubric of conflict. According to the authors of a widely cited study that appeared in *Science* in September 2013, the results of looking at this broader collection of quantitative cases (some 60 in all) are striking:

> We find strong causal evidence linking climatic events to human conflict across a range of spatial and temporal scales and across all major regions of the world. The magnitude of climate's influence is substantial: for each one standard deviation (1σ) change in climate toward warmer temperatures or more extreme rainfall, median estimates indicate that the frequency of interpersonal violence rises 4 percent and the frequency of intergroup conflict rises 14 percent. Because locations throughout the inhabited world are expected to warm 2° to 4° by 2050, amplified rates of human conflict could represent a large and critical impact of anthropogenic climate change (Hsiang et al., 2013).

That said, the authors add some important caveats to this apparently firm conclusion:

> Existing research has successfully established a causal relationship between climate and conflict but is unable to fully explain the mechanisms… It seems likely that climatic changes influence conflict through multiple pathways that may differ between contexts… (Hsiang et al., 2013).

Recent qualitative analysis has reached similar conclusions, finding that the connections between climate change and conflict, while worthy of sustained attention, are less direct than what early speculation

---

[1] According to the IPCC, "each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850." Further, "continued emissions of greenhouse gases will cause further warming and changes in all components of the climate system," and under all IPCC scenarios "the rate of sea level rise will very likely exceed that observed during 1971-2010..." (IPCC, 2013).

suggested and are more complex than was initially understood (Gleditsch, 2012; Stark, 2013). Historical case studies of "climate adversity" from across the globe echo and reaffirm this complexity (Parker 2013). Context-specific, non-climate factors (e.g., governance, livelihoods, identity, and history) remain the core variables that must be taken into account and understood first in relation to any conflict. The unfortunate tendency to regard these factors as "background information" to be given a cursory review before moving on to the main question of climate change impacts misses the deeply intertwined nature of climate and non-climate factors in relation to conflict. The main question to be addressed, therefore, is how climate stresses interact with these core non-climate variables, such as environmental challenges, in ways that may contribute to future conflict.

The focus of most early studies on climate change and conflict was on threats to rural livelihoods (agriculturalists, pastoralists); food security; and access to land, forest, and water resources among groups living in the countryside. This line of research was especially concerned with the effects of increasingly frequent drought in ethnically diverse zones of undemocratic or weakly democratic states. 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.[2]

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. According to the African Development Bank, 36 percent of Africa's population lived in urban areas in 2010, but is expected to reach 50 percent by 2030. Rural-to-urban migration is responsible for much of the population increase in many cities. Most rural migrants have little education and few skills, and they typically find their way into the informal sector, which produces more than 90 percent of new jobs (and 61 percent of all jobs) in Africa's urban centers (Ncube, 2012). The surge in population is accompanied in many cities by mushrooming informal and illegal settlements, environmental degradation, poor health conditions, and insecurity and crime. These trends are creating immense challenges for municipal, regional, and national governments throughout the continent.

One of the first comprehensive efforts to investigate the ways in which climate change impacts interact with the demographic and social problems in major cities was undertaken by the Urban Climate Change Research Network (UCCRN), which assembled input from researchers and officials from 50 cities around the world. With a focus on the differential impacts on the poor and non-poor, information was collected on the physical science, geographical settings, and formal and informal community responses to climate change. UCCRN's first assessment report on "Climate Change and Cities" found that the direct and indirect effects of climate hazards such as heat waves, downpours, and flooding were likely to threaten the needs of poor and vulnerable urban populations for reliable energy, water, sanitation, health, housing, and transportation systems. While the report took note of the efforts by municipal authorities in many cities to begin to develop climate change policies, it concluded that "adaptation planning is still a novelty… The process to conduct such planning is evolving and many cities lack the capacity to develop such plans" (Rosenzweig et al., 2011).

In the context of weak governance and inadequate adaptation planning, climatic threats to basic human needs have the potential to contribute to instability in densely populated urban areas. Some conflict analysts also view them as the main breeding ground and likely source of new conflicts in the developing world. For example, David Kilcullen sees threats from "crowded, coastal, connected cities" as the consequence of four factors increasingly coming together: population growth, urbanization,

[2] 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.

littoralization (development clustering on coastlines), and networked connectivity (cell phones, social media). Taking his analysis one step further, he proposes that:

> If we add the potential for climate-change effects such as coastal flooding, and note that almost all the world's population growth will happen in coastal cities in low-income, sometimes unstable countries, we can begin to grasp the complex challenges that lurk in this future environment (Kilcullen, 2013).

Warnings of this kind remain at present deductive and speculative, but they testify to the growing convergence of interests between conflict analysts and climate specialists. They also reflect the increasing focus of many researchers and planners on large coastal cities in the developing world as a special area of concern.

One coastal zone that has a particularly dense and rapidly growing urban population is the littoral zone the Gulf of Guinea in West Africa. According to the United Nations Environment Programme (UNEP), the 500-kilometer coastline between Ghana and the Niger Delta is likely to be an urban megalopolis of 50 million people by 2020 (UNEP, 2011). To address the relative lack of research on climate-conflict linkages in large urban coastal areas, USAID asked the Foundation for Environmental Security and Sustainability (FESS) to conduct a case study on two major West African cities located within this zone: Lagos, Nigeria and Accra, Ghana.

2.0 BACKGROUND AND METHODOLOGY

Field research was carried out for the case study by a four-person multidisciplinary team during two rounds of two-week visits in June and August 2013. Within the limits of these time constraints, climate analyses, government reports, other data were collected, and a variety of climate experts, national and local government officials, social scientists, civil society representatives, and community leaders were consulted for their firsthand knowledge and perspectives. Whenever possible, FESS acquired information directly from national government agencies or made use of publicly available climate information and government documents. Climate projections are derived from well-known sources that make use of multiple climate models to reach their findings. Interviews followed a semi-structured format that permitted the natural flow of conversation and discussion of each person's or organization's responsibilities and priorities. In Nigeria, interviews were conducted in Abuja and Lagos. In Accra, interviews were supplemented by a focus group composed of a cross-section of residents (differing age and gender) from three poor neighborhoods (Jamestown, Usshertown, and Abogbloshie).

The main purpose of the case study is to bring to light key issues and preliminary findings to begin to address two fundamental questions:

- Are the effects of climate change likely to lead to chaotic and conflictive scenarios in Lagos, Accra, or other West African cities?
- If so, under what sorts of circumstances and over what time frame might they take place, and are there preventive actions that governments, communities, and donors should undertake?

The research methodology for the case study relies on core concepts of a seven-phase Climate Change and Conflict Assessment Framework (CCCAF) developed by FESS and components of USAID's Conflict Assessment Framework (CAF).[3] Both the CCCAF and CAF emphasize that conflict is always the result of the interactions of specific political, economic, social, historical, and cultural factors. These factors require an understanding of the cleavages, frictions, and grievances found within the current national and local contexts. All societies not only are marked by such characteristics, but also possess a range of coping mechanisms or resiliencies that can be employed to reduce the likelihood of conflict. Formal and informal political, economic, and social institutions respond to threats in ways that are more or less successful in resolving or mitigating complaints and real or perceived injustices.

Additional key factors considered in the analysis include:

- Exposure to extreme weather events, climate variability and trends, and physical setting;
- Population growth, density, and migration patterns;
- Vulnerabilities in relation to livelihoods, shelter, health conditions, and identity;

[3] See Appendix I for more details on the CCCAF and see http://www.usaid.gov/gsearch/conflict%20assessment%20framework for more information on the CAF.

- Competing interests of public and private stakeholders;
- Coping strategies and responses of government, civil society, and communities;
- Expert and stakeholder perspectives on probable futures with or without interventions;
- Windows of vulnerability and "bright spots" (successful or promising forms of resilience); and
- Policy challenges and options for action that can help build resilience and reduce conflict.

In conducting research on instability and conflict, subjective judgments and personal perceptions can be just as relevant as factual information and empirical data. Individuals are the agents of conflict, and their readings of their personal and group circumstances form the basis for their actions. Even if inaccurate, these perspectives inform their propensity toward conflict, and may even reflect some larger truth. These sorts of considerations are important to keep in mind in assessing the mix of factors that may be contributing to potential conflict.

3.0 LAGOS, NIGERIA

3.1 BUILDING A MODEL MEGACITY AMID NATIONAL INSTABILITY

With an estimated population of around 20 million people, the "megacity" of Lagos is the commercial and financial engine of Nigeria, a huge country facing serious threats to its stability. Nigeria has over 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 in 1998–1999; 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. The oil pipelines of major international oil companies such as Shell, Exxon-Mobil, Chevron, and Total have been the targets of persistent theft and sabotage. In November 2012, the International Energy Agency reported that "oil bunkering, or theft, costs the government an estimated $7 billion in lost revenue per year" (*Vanguard*, November 13, 2012). Many observers believe that members of Nigeria's security forces themselves are involved in stealing and processing crude oil.

Violence and intercommunal strife has plagued Plateau State in Nigeria's Middle Belt. Muslim Hausa-Fulani settlers from the north have clashed repeatedly with Christian "indigenes" over land, economic resources, and political power. The conflicts have a long history, with several waves of in-migration, but drought and desertification in northern states contributed to the movement of Hausa-Fulani groups southward in the 1980s and 1990s. According to the International Crisis Group, "about 4,000 people have been killed [in the Middle Belt] in the past eleven years" (International Crisis Group, December 17, 2012).

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.) In December 2013, despite a government offensive aimed at suppressing the Islamic militants, members of Boko Haram stormed an air force base near Maiduguri, the capital of Borno State (AFP, December 4, 2013). A state of emergency is in effect in three of Nigeria's northeastern states.

Northern and northeastern areas of Nigeria have 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 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, herdsmen, and fishermen in northern Nigeria (WEP, 2011). In an interview with FESS, Mrs. Bahijjahtu Abubakar, the

National Coordinator of Nigeria's Renewable Energy Programme, and a native of Borno State, said that there is a "direct relationship between climate change and what is happening in Borno State."

Desertification and the drying up of the Lake Chad basin (caused also by diversion of water for irrigation) led to a loss of livelihoods and out-migration such that in some areas "no boys over 14 are left, and the women are left behind…hoodlums have moved in. Climate security is no longer a hazy idea, it is clear" (FESS interview, Abuja, August 13, 2013). Paradoxically, some areas in the north and Middle Belt also 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.

It is, however, not just climate effects or, more broadly, environmental conditions that have driven migration southward toward Lagos and other coastal cities. There is also a marked north-south divergence in terms of wealth and economic opportunities. According to the National Bureau of Statistics, 10 of the 12 poorest states in Nigeria are in the north, while the top 12 richest states are in the south.

The contrasting situation of Lagos is best understood in this broader context of national polarization and 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. Lagos State Government introduced the first Bus Rapid Transit system in West Africa, roads have been upgraded, and plans are underway for a light rail network. Since 2006, the city has benefited from a $200 million World Bank loan for the Lagos Metropolitan Development and Governance Project (LMDGP), which has developed basic infrastructure and social services such as roads, drainage, schools, and health care centers.

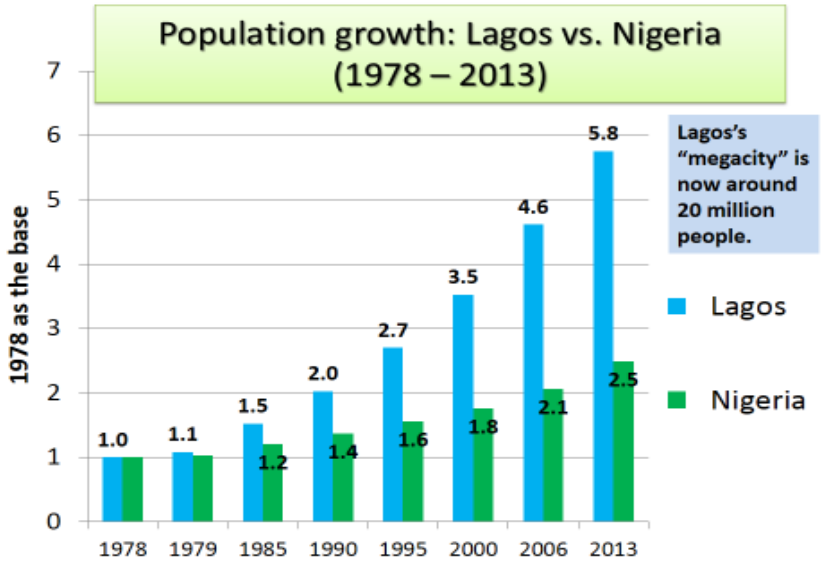
Far from suffering from the economic distortions of the Niger Delta's "resource curse" or the religious and ethnic conflicts of the Middle Belt and the north, Lagos's diversified economy is home to approximately 70 percent of Nigeria's industries as well as the great majority of its financial services and major company headquarters. The per capita gross domestic product (GDP) of Lagos State is approximately 33 times that of the 10 poorest northern states (National Bureau of Statistics). Tax collection also has been improved and now generates two-thirds of the state's revenues (*The Economist,* May 5, 2011).

Despite Lagos's dense population, only 9 percent of residents state that they fear crime, compared to rates of 20 percent to more than 40 percent from respondents in the northern and Delta states (Afrobarometer, 2012a). Part of the relative sense of public safety derives from the fact that in Lagos private sector companies and others contribute to a Lagos State Security Trust Fund (LSSTF) for a "rapid response squad" who staff checkpoints and monitor security in commercial areas of the city. The LSSTF public-private partnership was a direct response to the widely acknowledged weaknesses of the police and federal security agencies.

Perhaps the most notable achievement in Lagos (and one that has had many positive spinoff effects) has been in solid waste management. The Lagos Waste Management Authority (LAWMA) has implemented an unusually broad vision of solid waste management as not merely a technical challenge but also as the key to an inclusive and sustainable development path. 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.

The visible achievements of the Lagos State Government have paid political dividends to its chief executive. In April 2011, Governor Babatunde Fashola was overwhelmingly re-elected with 82 percent of the vote.

FIGURE 3.1: POPULATION GROWTH



Source: Calculated from data from the UN Population Division and Lagos State 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 a whole (see Figure 3.1). 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. In 2004, the Lagos State Ministry of Economic Planning and Budget estimated that 70 percent of Lagosians lived in poverty, while in 2006 the World Bank found that around 70 percent of the population lived in slums (Adelekan, 2009). The United Nations Human Settlements Program (UN-HABITAT) observed that, "In Lagos, the rich and well-serviced neighborhoods of Ikoyi, Victoria, or Apopa contrast sharply with overpopulated, under-equipped, and unsafe areas like Mushin, Shomulu, or Iju." Indeed, excluding the post-apartheid cities of South Africa, Lagos has the highest Gini index for income inequality (0.64) of any city in Africa (UN-HABITAT, 2010).

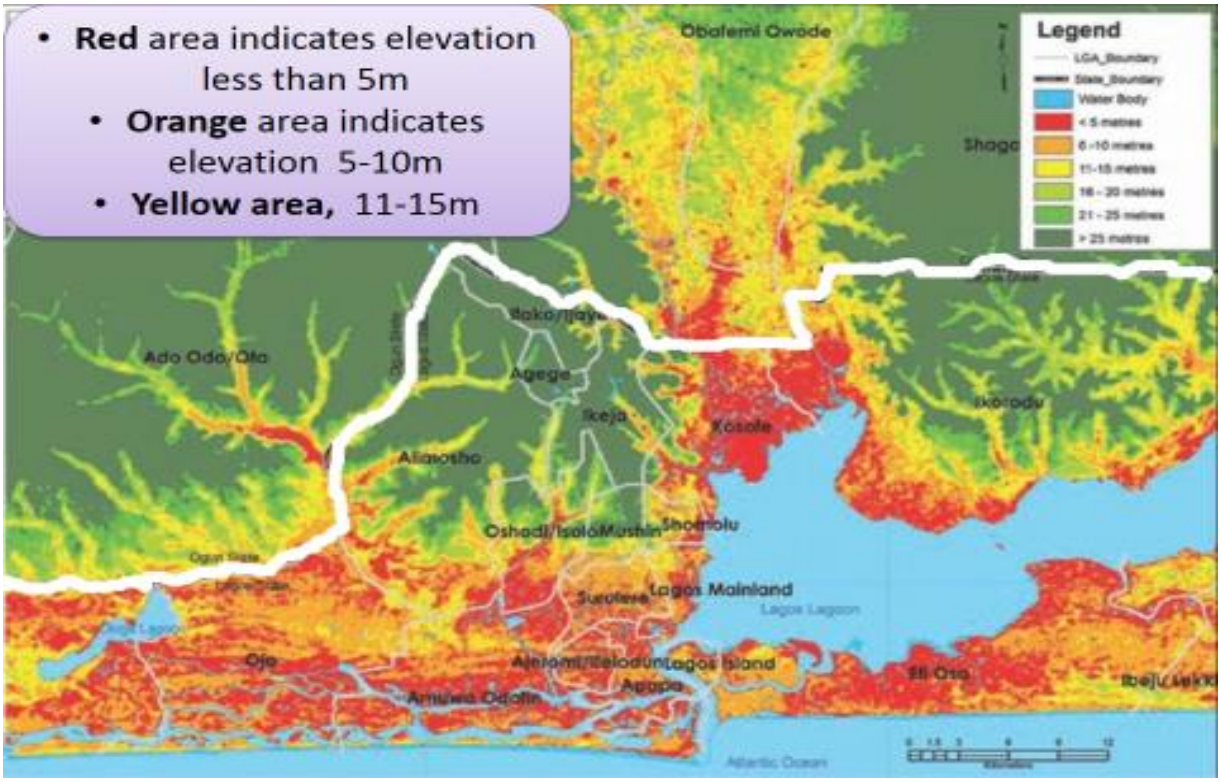
Water and sanitation services in Lagos are also far from adequate. Long hampered by erratic power, waterworks on the Ogun and Owo rivers supply water via a pipeline network that reaches approximately one-third of the population. As noted by several interviewees, the remainder comes from the "indiscriminate" use of boreholes and shallow wells that tap into the city's groundwater to provide water of dubious quality. Many residents obtain their water from plastic containers sold by vendors. Less than 2 percent of the population is connected to off-site sewage treatment; sewer networks often connect to storm-water lines, and much wastewater flows into open gutters or directly into rivers (Omojola in Rosenzweig et al., 2011). Standing water breeds mosquitoes, increasing the incidence of malaria. According to the Malaria Control Program of the Lagos State Ministry of Health, there were over 600,000 cases of malaria in 2011, and the disease accounts for over 60 percent of outpatient hospital visits.

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

3.2 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. 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 3.2, 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. The history of sea level rise in Lagos is not well documented by detailed empirical data, but there has been steady beach erosion over the past century. Most dramatic was the progressive loss of beaches on the southern shore of Victoria Island (located in the lower right of Figure 3.2), which threatened valuable properties, spurring large-scale land reclamation efforts and the construction of a massive seawall. The littoral areas of Lagos Island, Lagos Mainland, and Shomolu have population densities ranging from 30,000 to 40,000 persons per square kilometer, a concentration which is at or near the levels of the most densely populated cities in the world (Lagos Bureau of Statistics, 2011).

FIGURE 3.2: MAP OF LAGOS WITH ELEVATIONS



Source: Omojola in Rosenzweig et al., 2011

Under current trends, rainfall averages around 1,500 millimeters (mm) per year. Rains follow a bimodal pattern that brings peak rains in May–July and September–October. Mean monthly maximum temperatures over the past half-century are around 30 °C, and weather data show that temperatures in Lagos have been increasing in recent years (Building Nigeria's Response to Climate Change, 2012). In 2003, Nigeria's "First National Communication under the United Nations Framework Convention on Climate Change" concluded that "over the last few decades, there has been a general increase in temperature throughout Nigeria" (Federal Republic of Nigeria 2003).

Although less striking than the variable rainfall of the Sahel, precipitation in coastal West Africa is subject to the large decadal variability that is characteristic of the entire West African monsoon dynamics

(ARCC 2013). There do not appear to have been large changes in annual aggregate rainfall in Lagos in recent decades, but rainfall events may be increasing in intensity. Rainfall data from two different observed daily weather data time series produced by Ibidun Adelekan of the University of Ibadan provide a disaggregated look at rainfall patterns. In Table 3.1, daily rainfall data are compared for 1971–1995 and 1996–2005. These data show that while annual mean rainfall decreased by only 3 percent (from 1,698 mm to 1,647 mm), the mean number of rain days decreased by 27 percent (from 112 rain days to 82 rain days). From this, Adelekan concludes that "the fewer rainstorms recorded in the latter period are heavier than those of the earlier period with a tendency to produce more floods" (Adelekan, 2009).

This data set time series is insufficient to come to any conclusions about climate change and rainfall in Lagos. However, the apparent recent increase in more intense rainfall is in line with widespread perceptions of more torrential downpours expressed by a number of interviewees in Lagos. Heavy rains not only produce downpours in Lagos proper but also fill numerous upstream river systems (e.g., Ogun, Osun, Ogbere, Yewa, and Sunmoge) that then flow into Lagos Lagoon and Lekki Lagoon, raising water levels along the city's shorelines.

TABLE 3.1: RAINFALL IN LAGOS, 1971–1995 VS. 1996–2005

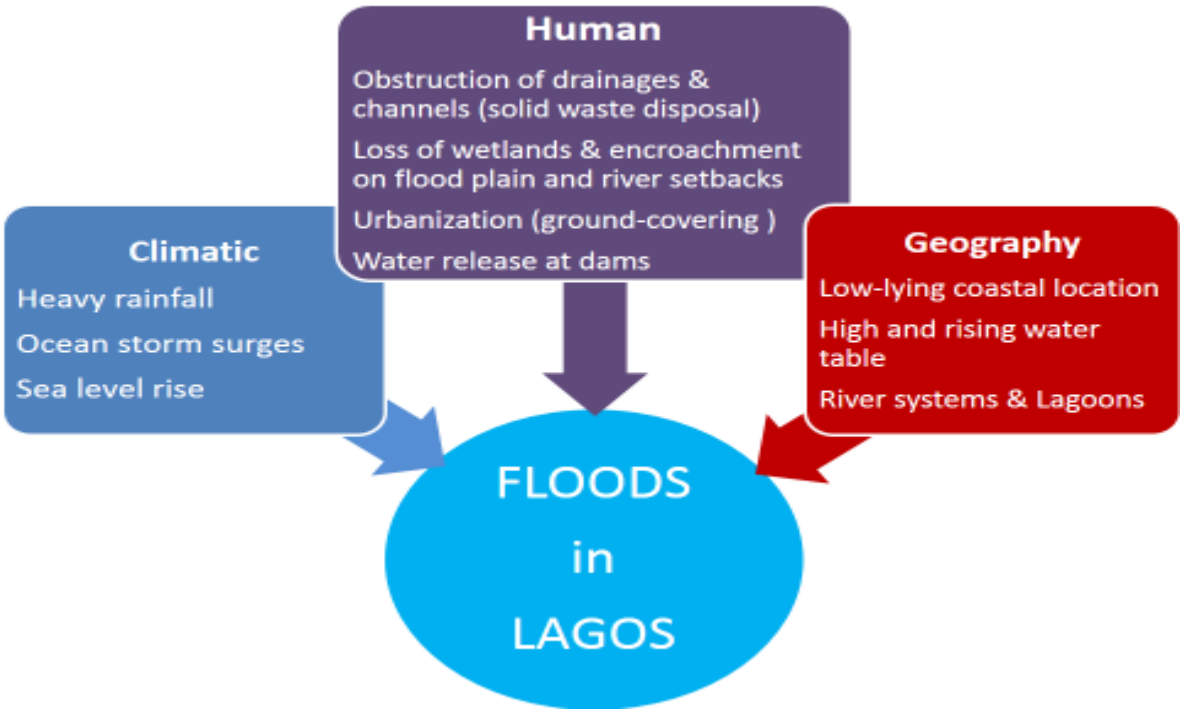
Rainfall Characteristics	1971–1995	1996–2005
Mean no. of rain days	112	82
Maximum no. of rain days	163	105
Minimum no. of rain days	76	69
Mean rainfall (mm)	1,697.79	1,647.26

Source: Adelekan, 2009

Climate variability has been accompanied by extensive environmental change caused by human activities. One of the most dramatic transformations in Lagos has been the loss of wetlands. While it is estimated that wetlands covered approximately 55 percent of Lagos State in 1965, today wetlands cover only around 2 percent of the region (Building Nigeria's Response to Climate Change, 2012). The loss of coastal mangroves and riverine swamps, mainly as the result of land clearing to make way for human settlements, has added to flood risks in Lagos. The city's ever-expanding commercial and residential development has resulted in the paving of more and more areas with impermeable, hard surfaces that impede drainage. Plastics and solid waste remain a huge challenge as well—a questionnaire given to 2,000 Lagosians found that the top two causes of flooding identified by respondents were blockage of canals and silted drainage channels (Aderogba, 2012).

Thus, while some climate variation can be observed in recent precipitation patterns in Lagos, the larger point to date is that downpours, storm surges, and floods are historically recurrent phenomena in the city, and their effects on human populations have been intensified in recent decades by the city's very rapid population growth, accumulating solid waste, loss of wetlands, dangerous settlement patterns, and harmful environmental behaviors. Water releases from Oyan dam in neighboring Ogun State also have been identified by some as a contributing factor (Olajuyigbe, Rotowa, and Durojaye, 2012). Figure 3.3 summarizes the main causes of flooding in Lagos.

FIGURE 3.3: CAUSES OF FLOODING IN LAGOS



Recent floods and storm surges in Lagos have regularly resulted in fatalities, although not yet in large numbers. A downpour in July 2011 led to a massive flood that killed 25 people (*Vanguard*, July 12, 2011), and in the words of one interviewee, "took people aback." 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. After inspecting some of the stricken neighborhoods, Governor Fashola said, "Those who are in buildings marked as structurally unstable or those who built on canals should leave the buildings immediately because we are coming to take possession, we are not going to risk human lives anymore…" (Aderogba, 2012).

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.

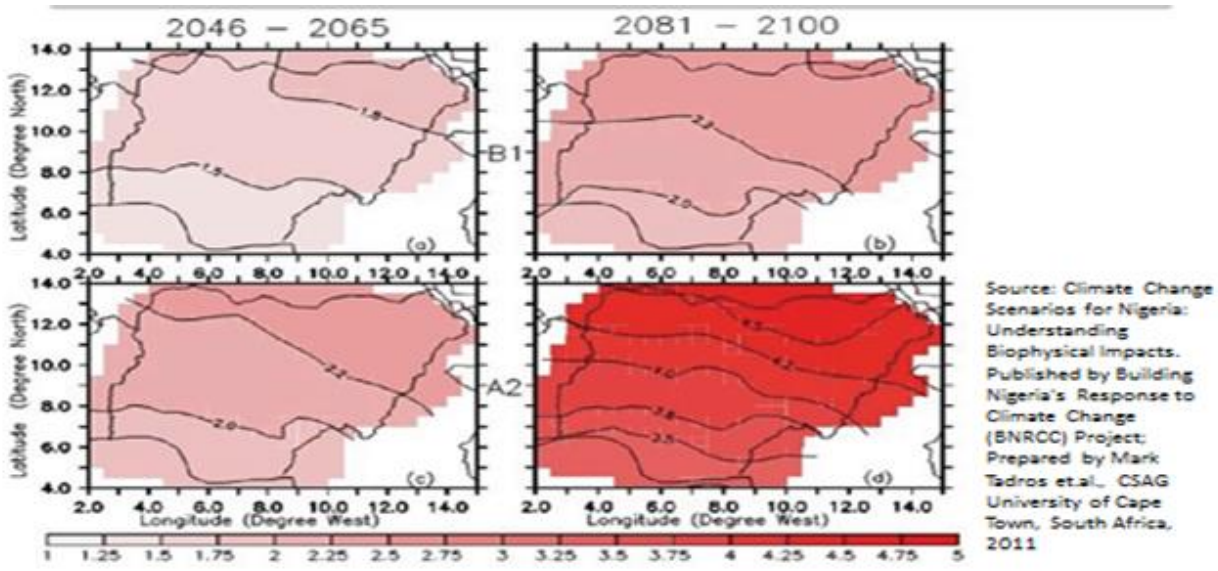
3.2.1 Climate Projections

Mid-century climate projections for Nigeria (based on models from the Climate Systems Analysis Group [CSAG] at the University of Cape Town) anticipate increasing climate-related stresses on the megacity in coming decades. Figure 3.4 shows that higher temperatures are projected throughout the country. Figure 3.5 shows that 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, Ikuenobe, Abdulai, Nelson, and Thomas, 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, 2012). Given these conditions, it is not surprising that increases in malaria are also projected for Nigeria's coastal states, as shown in Figure 3.6.

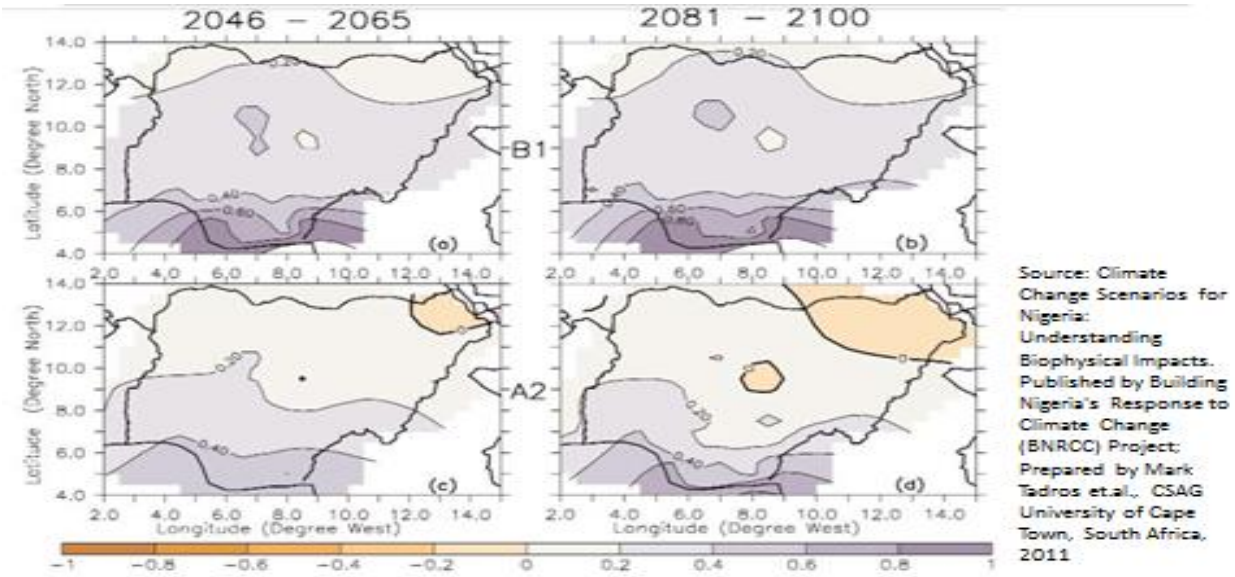
These climate projections have high uncertainty, but the scenario they imply is fairly dire: a continuing stream of migrants from northern Nigeria; rising temperatures; more frequent and intense rainfall; sea-level rise and stronger sea surges; heat risks for the young and elderly; more cases of water-borne 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 perhaps even in the case of serial flood events in the near to medium term, it is not difficult to envision crises that overwhelm the government's capacity to respond and lead to social unrest and violence.

FIGURE 3.4: PROJECTED INCREASE IN MAXIMUM TEMPERATURE FOR NIGERIA (1.5 TO 4.5 °C)



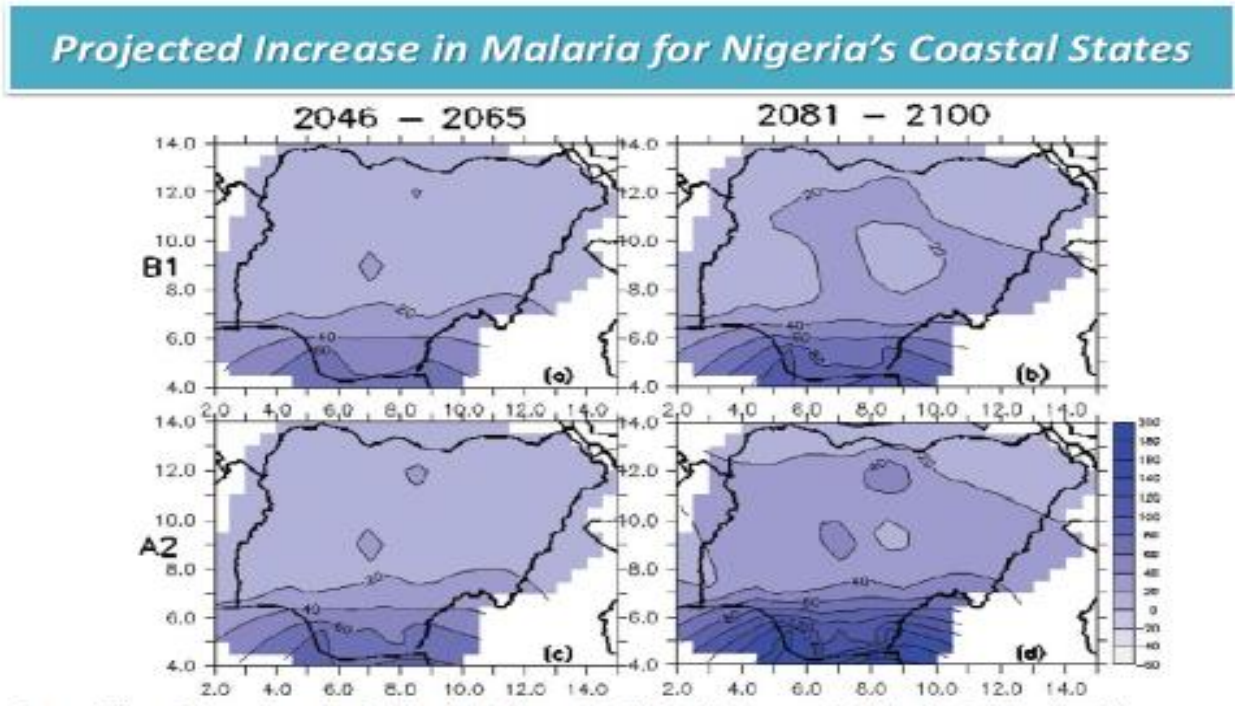
Source: Climate Systems Analysis Group, University of Cape Town

FIGURE 3.5: PROJECTED INCREASE IN RAINFALL FOR NIGERIA (0.2 TO 0.8MM) EXCEPT FOR NORTHEAST



Source: Climate Systems Analysis Group, University of Cape Town

FIGURE 3.6: PROJECTED MALARIA INCREASES IN COASTAL NIGERIA

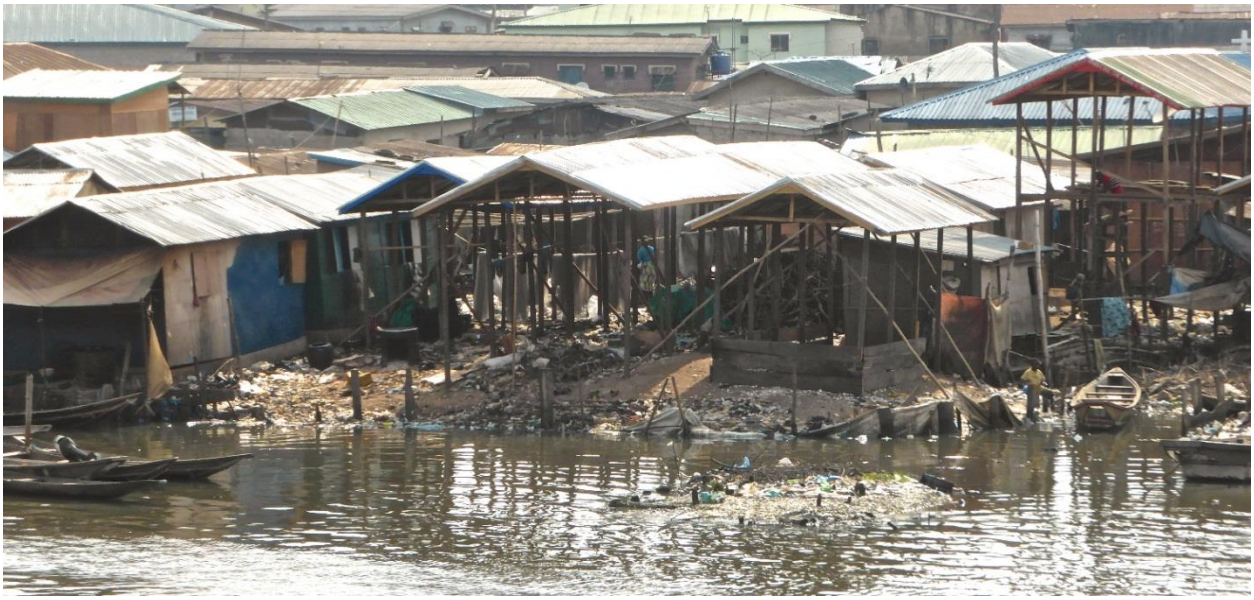


3.3 CHALLENGES OF GOVERNANCE AND SEEDS OF CONFLICT

In the abstract, these kinds of scenarios may seem plausible but with unclear linkages to conflict. Recent events in Lagos, however, highlight governance challenges that may intersect with climate scenarios to heighten tensions. There are already well over 100 slum communities in Lagos, most of them situated in low-lying areas. M.A. Akinsanya, the Permanent Secretary for Drainage Services in Lagos, citing a figure even higher than other estimates, asserts that "over 80 percent of Lagos residents live in the blighted areas which are more or less improvised [settlements on] 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.

FIGURE 3.7: CONSTRUCTION OF SHELTER AT THE WATER'S EDGE, MAKOKO IN LAGOS



Source: Katsuaki Terasawa

Concerns about a growing rich-poor divide in Lagos are deepened by the ongoing construction of a huge new "ocean-city" within the city, known as Eko Atlantic. Conceived as a response to beach erosion and the anticipated effects of accelerating sea level rise, Eko Atlantic is being built in part on land reclaimed from the sea at the rate of 400,000 tons of sand a day, protected by a 12-meter high "Great Wall of Lagos." As a multi-billion dollar project funded by private investors, Eko Atlantic is to be composed of ultramodern districts for commerce, finance, entertainment, and luxury residences.[4] The

[4] See the promotional website for Eko Atlantic at http://ekoatlantic.com/about-us/.

comparatively slow and incremental manifestations of sea level rise understandably generate less public concern than the dramatic effects of flooding from intense storms, but Eko Atlantic indirectly has raised other sorts of social issues for some observers. 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 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 Lagos 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 by 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 migrants from the north are now viewed by some residents 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 for other reasons. While Lagos has in many ways made impressive strides in beginning to build a model megacity, it is still enmeshed in the larger reality of Nigeria's political, ethnic, and religious cross-currents and conflicts.

4.0 ACCRA, GHANA

4.1 POST-CONFLICT STABILITY

Ghana is not without its 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 three-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.

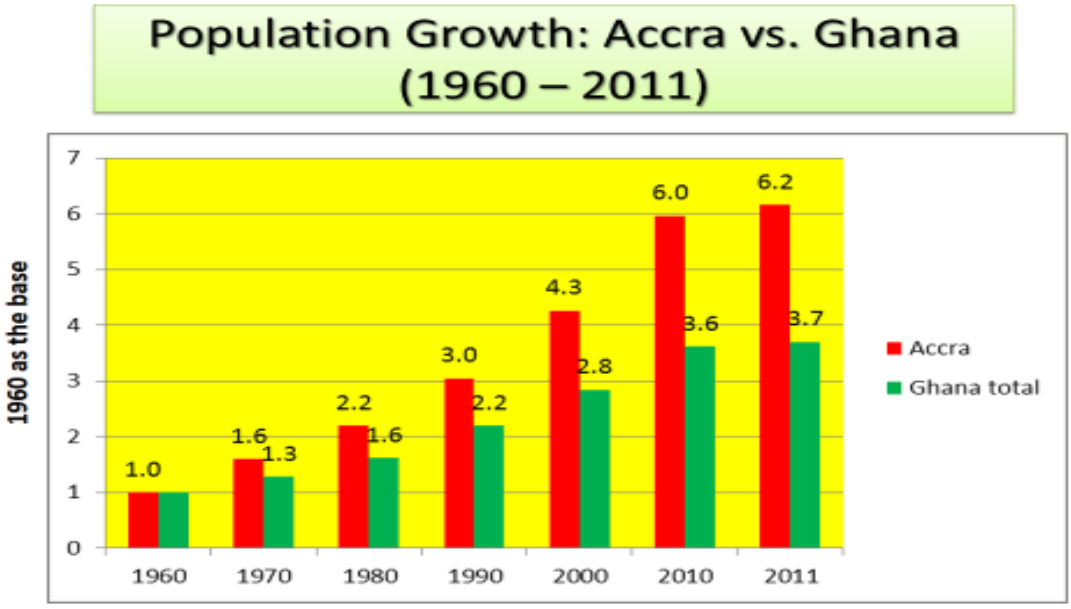
On August 28, 2013, despite noting some irregularities, the court upheld President Mahama's election. While the police took precautionary security measures in Accra, the country remained calm. Despite disagreeing with the court's decision, Mahama's electoral opponent Nana Akufo-Addo publicly accepted 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, as well as 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 justified as a 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 has increased by approximately 4 percent during the last decade. Compared to other African countries, Ghana also 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 $2 US a day (Nutsukpo, Jalloh, Zougmore, Nelson, & Thomas, 2012), while according to World Bank data for 2011, the national annual per capita GDP was $1,764 US. Ghana also has the highest level of national income inequality in West Africa, with a Gini index of 0.60 (UN-HABITAT, 2010).

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 Maks 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 (see Figure 4.1). A wave of migration from the north did come earlier, during the Kokomba and Nanumba chieftaincy conflicts of the 1980s; in 1994-95, more than 2,000 people were killed in northern regions and some 200,000 people were internally displaced (Integrated Regional Information Networks [IRIN], 2006).

FIGURE 4.1: POPULATION GROWTH IN ACCRA RELATIVE TO GHANA



Many of those who came to Accra from the north at that time settled in poor, low-lying lands along Korle Lagoon, including the flood plains upon which Accra's largest slum, Old Fadama, is located. The Ga people, who are considered to be the indigenes of Accra, also have long resided in nearby low-lying areas. While British colonial administrators lived in higher elevation residential areas farther inland, the Ga always lived on lands immediately along the sea coast and are today found in the old coastal neighborhoods of Jamestown and Usshertown. Tensions between the Ga indigenes and northern newcomers are a generally muted but persistent undercurrent in the political and social realities of contemporary Accra.

4.2 CLIMATE CHANGE VULNERABILITY

Accra experiences average maximum temperatures similar to Lagos, with average annual rainfall following the same bimodal pattern, but total accumulations are somewhat lower at around 787 mm per year. Local officials and urban experts in Accra believe that climate change is resulting in increasingly intense weather events. Government 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. Reuben Larbi, a researcher at the University of Ghana, reports that each decade from 1970 to 2010 shows temperatures for Accra increasing, with mean maximum temperatures increasing at an annual rate of 2.5 percent. He notes only "marginal variations in the decadal rainfall pattern," with a slight increase in annual rainfall but a decline in consecutive wet days and increases in extreme rainfall events (Larbi 2013). As in the case of Lagos, given the overall decadal variability of West African monsoon patterns, these local perceptions and findings do not provide a firm basis for conclusions about climate change and precipitation trends in Accra, but they do frame the current outlook for decision makers in government and concerned citizens in civil society.

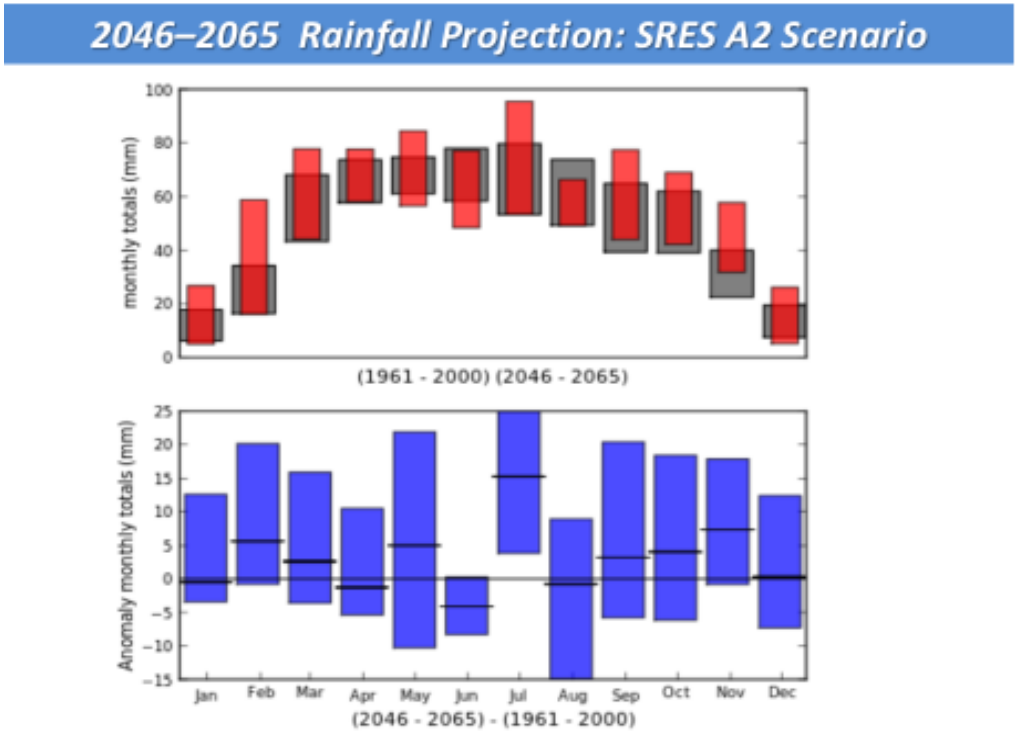
Sea level rise along Ghana's coast is estimated at 2.1 mm per year over the last 40 years (Ghana National Climate Change Policy 2013). According to Addo et al. (2011), "the historic rate of erosion in Accra is about 1.13 m/yr," but this includes additional non-climate factors such as "deficit in sediment budget for littoral transport, orientation of the shoreline, and anthropogenic influences." Very low-lying

areas such as the Dansoman area west of Accra and Jamestown in central Accra are susceptible to inundation during episodic spring tides.

4.2.1 Climate Projections

Looking toward 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 4.2 and 4.3, the same two models also show both an increase in rainfall and greater rainfall variability for the years 2046–2065.[5] A recent IFPRI analysis using two downscaled global climate models found that both 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 increasing sea level rise and 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 (or not) for many reasons, but to the extent that climate change influences migration in Ghana, it is very likely to spur migration southward to Greater Accra's urbanized coast.

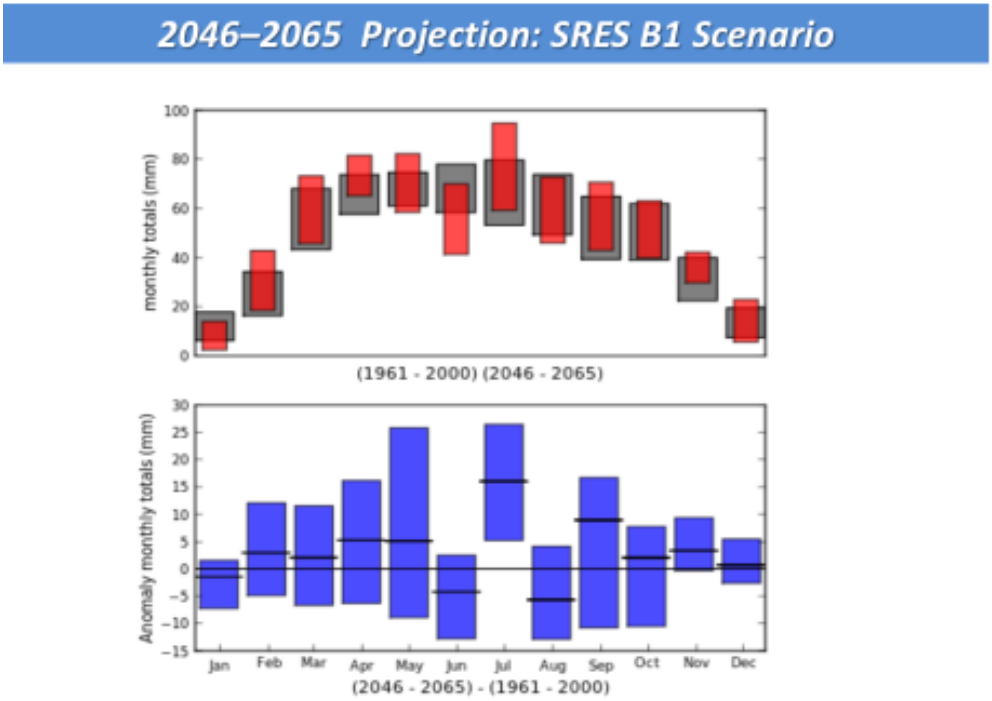
FIGURE 4.2 RAINFALL PROJECTIONS FOR ACCRA, 2046-2065



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

[5] An advance draft of Ghana's National Climate Change Policy does not anticipate increased rainfall and emphasizes more strongly the likelihood of torrential rains and extreme events.

FIGURE 4.3: RAINFALL PROJECTIONS FOR ACCRA, 2046-2065



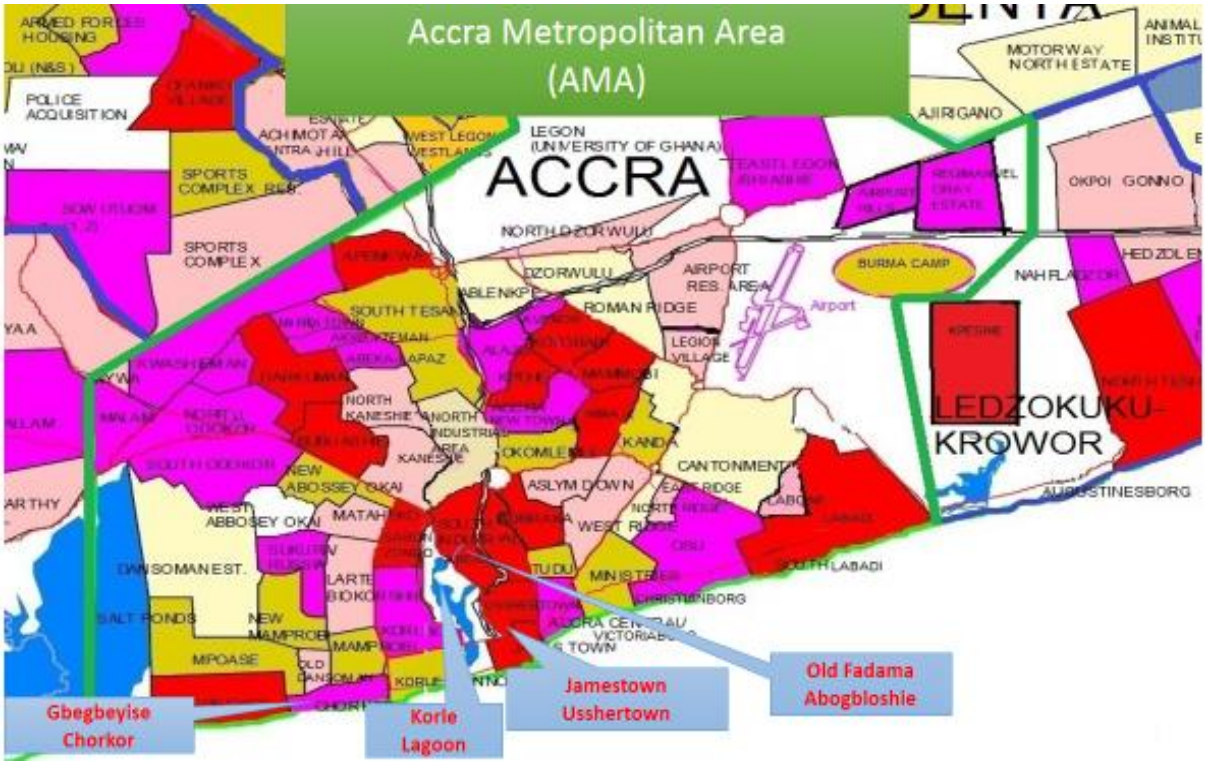
Reproduced from University of Cape Town, Climate Systems Analysis Group, Accessed July 8, 2013
http://cip.csag.uct.ac.za/webclient/map#title=stationobserved&folder_id=24&extent_id=46304

4.2.2 Social Vulnerability

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 [UNDP], 2011). The slum area of 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 the $596 million, 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 2013, include desilting, dredging, and removing solid waste from the city's channels and drains.

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. Indeed, the name given to the north central area of Accra known as "Dzorwulu" can be translated as "big channel." Figure 4.4 shows the location of several mostly poor neighborhoods of Accra, all of which are either near 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).

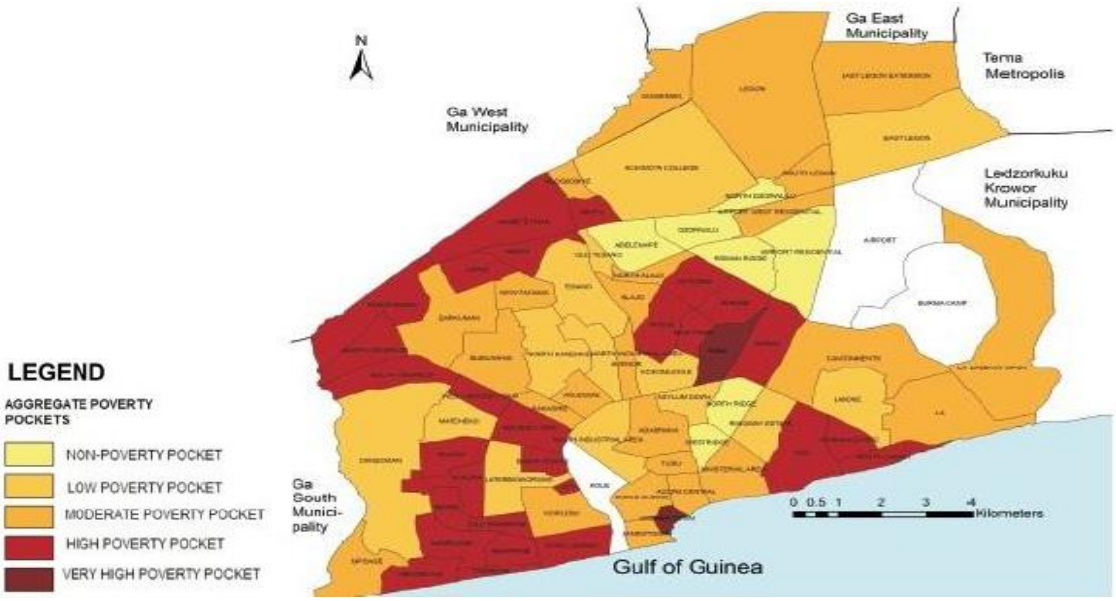
FIGURE 4.4: POOR NEIGHBORHOODS IN LOW-LYING AREAS OF ACCRA



Source: Adapted from http://commons.wikimedia.org/wiki/File:Greater_Accra_Metro_Area.jpg

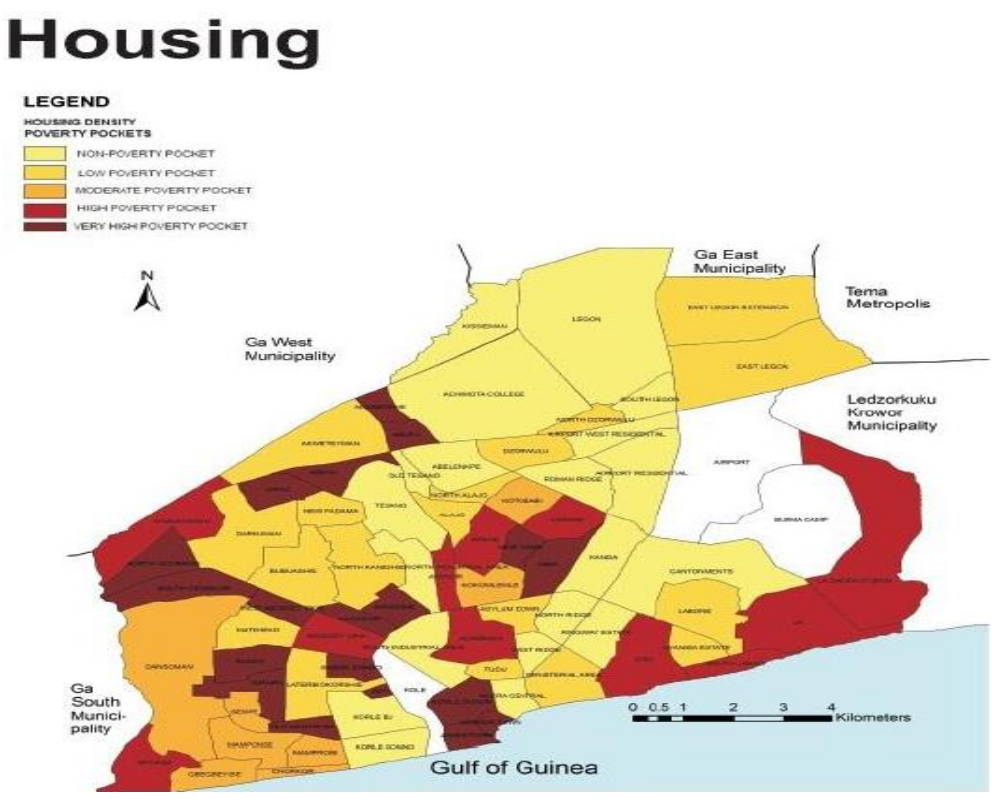
In 2009, CHF International Ghana conducted poverty mapping for Accra on behalf of the AMA. As can be seen in Figure 4.5, the coastal areas of Ga Mashie (Usshertown, Jamestown) and the areas running along the coast in Chorkor were among those ranked in the highest poverty categories. Some of the same areas, wedged between the sea and Korle Lagoon, are ranked at the highest poverty levels for their precarious housing conditions (see Figure 4.6). The vulnerability of these areas is even more strikingly seen in Figure 4.7, which assesses poverty in relation to the lack of solid waste management. The entirety of Korle Lagoon, with the exception of Korle Bu where a teaching hospital is located, is surrounded by areas with the highest levels of solid waste (CHF International Ghana, 2010).

FIGURE 4.5: RANKING OF AGGREGATE POVERTY IN ACCRA, 2010



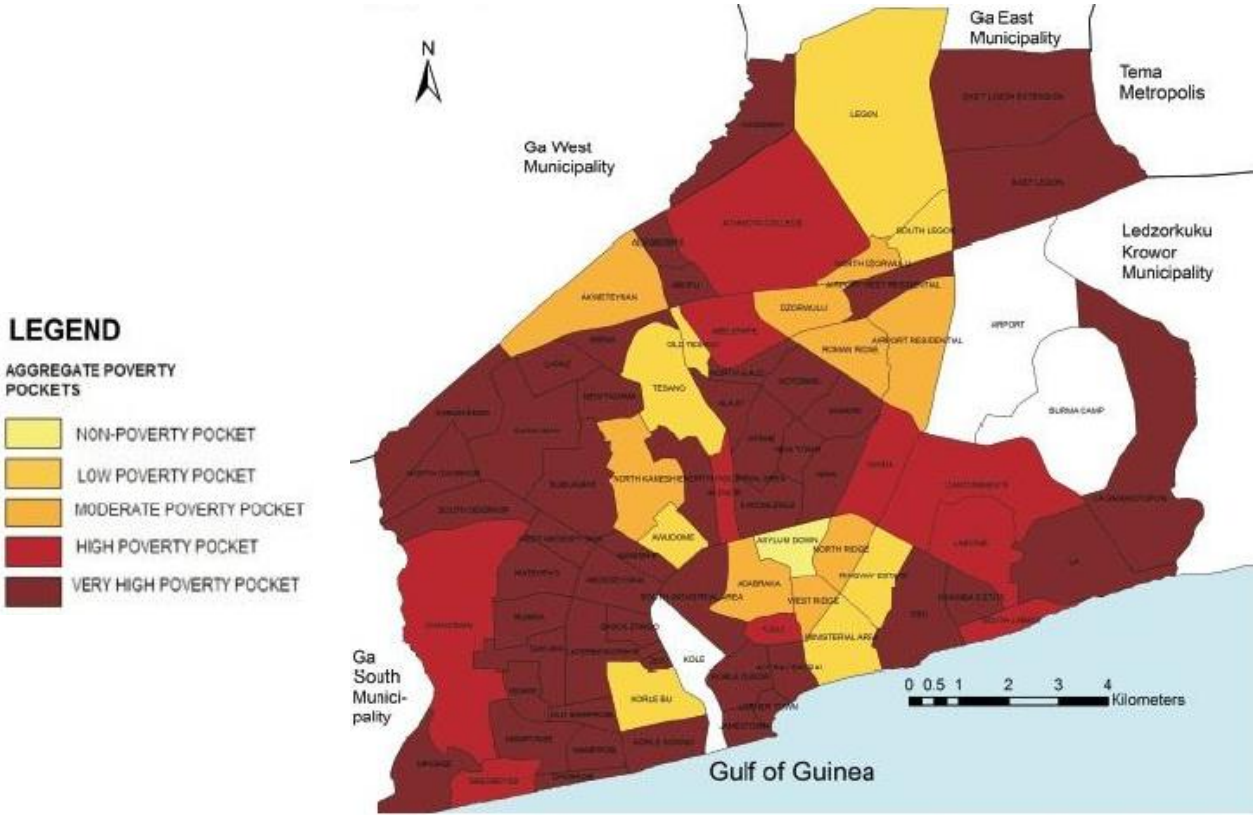
Source: CHF International Ghana

FIGURE 4.6: SHELTER AS A MEASURE OF POVERTY IN ACCRA



Source: CHF International Ghana

FIGURE 4.7: SOLID WASTE MANAGEMENT AS A MEASURE OF POVERTY IN ACCRA



Source: CHF International Ghana

In 2012, a team of researchers from Ghana and Germany published findings based on mapping urban malaria and diarrhea mortality in Accra. While deaths from diarrhea did not show any clearly defined hotspots in the city, "a 'hotspot' of high malaria mortality was observed in the neighborhood of an open lagoon [Korle Lagoon]" (Fobil, Levers, Lakes, Loag, Kraemer, & May, 2012). In response to survey questions posed by FESS at a community focus group meeting of 32 residents from Jamestown, Usshertown, and Abogbloshie, 84 percent of respondents indicated that a member of their household had suffered from malaria in recent years.

All of these indicators show that the areas of Accra with the highest levels of socioeconomic vulnerability also are located in areas highly susceptible to climate change impacts, especially flooding. Poor populations in precarious dwellings, who are highly susceptible to water-borne diseases, are extremely vulnerable to projected climate change impacts. During the rainy season, the city is subject to heavy downpours that with inadequate or obstructed drainage due to solid wastes can quickly flood vulnerable neighborhoods. While waste management is a perennial urban challenge in its own right independent of climate change, a new study on the perceptions of residents in three of the aforementioned 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). For smaller numbers of people in especially vulnerable coastal settlements, sea level rise also is a concern. With population on the rise, slums illegally located on floodplains, steady coastal erosion, and extremely poor solid waste management, the human impact of torrential rains is intensifying. According to Professor Christopher Gordon, Director of the Institute for Environment and Sanitation Studies at the University of Ghana, around 10 to 20 lives are likely lost every year (poor casualties sometimes go uncounted), and the numbers can be expected to go up. Severe floods have become perennial events.

4.2.3 Environmental Governance and the Relocation Dilemma

Numerous interviewees from civil society, academia, and community development groups expressed skepticism about the capacity or willingness of local government in Accra to address the city's environmental problems and climate challenges effectively. In the view of many, Accra is plagued by very weak and politicized land use management, and environmental enforcement by the Environmental Protection Agency is inconsistent. This is compounded by the environmental degradation caused by the everyday practices of poor residents, who dispose of trash haphazardly in the absence of proper services. In an interview, one geographer at the University of Ghana observed with respect to land use, "We have watched the migrants come and make their homes, and then we think about the fact that they should not be there. You have to resettle those people. They came there illegally so technically it's illegal. But we have made the illegal legal. Resettlement means building proper housing for them. The challenge is finding the resources to resettle." (FESS interview, August 26, 2013).

After a community meeting on climate change in Ga Mashie sponsored by the Regional Institute for Population Studies of the University of Ghana, the FESS research team visited the Ga Mashie Development Agency (GAMADA). Despite being a close working partner of the AMA, GAMADA's seaside offices are permeated by a persistent film of black soot, produced all day by a slaughterhouse immediately next door. The slaughterhouse is in blatant violation of environmental regulations. GAMADA staff said that plans had been made to move the slaughterhouse, but they were never acted upon.

Known by locals as Sodom and Gomorrah because of its reputation for drugs, prostitution, and crime, the slum of 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. This situation has appeared to be a potential stumbling block for the AMA's most recent drainage and flood prevention plans. 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. Until recently, an impasse persisted. 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 and "containing" its impact 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 new approach envisioned by the AMA is a test of whether that viable path forward has, in fact, been found.

FIGURE 4.8: OLD FADAMA AT THE EDGE OF KORLE LAGOON

Photo: Katsuaki Terasawa

Seen in perspective, Old Fadama presents the same dilemma for Accra as 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 extends to dozens of other slum communities in West African urban areas and is almost certain to spread and become more acute over time. Forced evictions without proper compensation and support for relocation are a recipe for conflict. Providing adequate infrastructure and sanitation to make these areas more habitable and less vulnerable to flooding and storm surges is a 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.

4.3 CLIMATE CHANGE ADAPTATION IN LAGOS AND ACCRA

Government efforts to promote climate change 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. Governor Fashola has called climate change "the biggest war of our time," and the government has held a series of annual climate change summits with help from the UNDP. Though not explicitly linked to climate change, since 2006 the city has benefited from the $200 million World Bank loan for the LMDGP. This loan has been used, in part, 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 early 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 just beginning to be implemented.

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 awareness at the community level 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. Actions taken to date to cope with flooding included simple measures such as the use of sand bags, sand filling of rooms, 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 showing departments and agencies which of their activities might be considered to be aspects of adaptation. 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." Numerous other interviewees identified the aforementioned 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 Usshertown 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 basic municipal services and the absence of such basic items such as trash cans and public toilets. Others volunteered their own labor to help their communities clean-up, if government would provide them the plastic bags and simple tools necessary to do the job. The potential for mobilizing citizens in Accra to build climate resilience clearly exists.

5.0 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 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, whose presence may be resented or feared by some Lagosians. Over the medium to long term, these increasing 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. Fears of Boko Haram, or similar extremist movements, also could intertwine and undermine the relative social cohesion that Lagos enjoys.

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 hotter weather and perhaps more intense and erratic rainfall. The residents of Accra, who are already subject to perennial floods, also probably face a hotter and (with less certainty) 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 (especially 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.

Sea level rise is a growing threat for Lagos and Accra, but the effects are just beginning to be felt, and officials in Lagos have shown a determination to respond through the Eko Atlantic seawall and other measures, while officials in Ghana have been focused on "Sea Defence" measures to address more immediate and severe coastal erosion 100 kilometers to the east of Accra in the areas of Ada and Keta. The population vulnerable to sea level rise in the Dansoman area of western Accra is estimated to be only about 2,200 for 2025, although that figure jumps markedly to around 28,000 in 2050 and to over 500,000 for 2100 (Addo et al. 2011). Those numbers and that time scale are indicative of why sea level rise has not yet generated the public complaints and conflict potential of storm-driven floods that lead to sudden and dramatic losses of life and shelter.

In terms of governance, the situations of the two cities are in some ways different and somewhat 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 much-admired democratic example. Yet the Lagos State Government appears to be much more dynamic and active in engaging a wide array of complex urban problems, and 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." To this 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 massive 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 the city. 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 solve satisfactorily 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 the issue of illegal and precarious settlements are extremely difficult, and the key to mitigating the potential for conflict will be to impart a sense of justice to those affected and 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 help to promote climate resilience and reduce the likelihood of conflict in Lagos, Accra, and other flood-prone West African cities by taking actions in five issue areas:

1. Land use and housing;
2. Environmental and climate awareness;
3. Drainage and solid waste management;
4. Upgrading of slums to reduce severe weather vulnerabilities; and

5. Cross-ethnic dialogue.

Recommended actions include the following:

- USAID should encourage and support the governments of Lagos, Accra, and other West African cities concerned about 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.
- "Risk varies inversely with knowledge." 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. USAID can undertake a wide range of actions, based on the principles of disaster risk reduction, 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 include:
  - 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 nongovernmental organizations; 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 both transportation and adequate temporary shelters (which currently do not exist) are urgent and indispensable.

  - Identify and support self-help community and school-based efforts to clean up neighborhoods (e.g., YES Ghana) 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 to not only raise awareness, but also to educate vulnerable communities about *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 encourage and support the latest plans of the governments of Lagos and Accra to upgrade existing slum areas, prioritizing measures that contribute to the reduction of the vulnerability of those areas to severe weather events.
- USAID should support forums for discussion of climate change challenges that bring together different ethnic groups and stakeholders from within one 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 differing national contexts, 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

African and Latin American Resilience to Climate Change (ARCC). 2013. Background paper: Regional climate change vulnerability assessment for West Africa. Paper prepared for USAID.

Abiodun, B. J., Salami, A. T. & Tadross, M. (2011). Climate change scenarios for Nigeria: Understanding biophysical impacts. Climate Systems Analysis Group, Cape Town, for Building Nigeria's Response to Climate Change Project. Ibadan, Nigeria: Nigerian Environmental Study/Action Team.

Addo, K. A., Larbi, L. Amisigo, B. and Ofori-Danson, P. K. (2011). Impacts of coastal inundation due to climae change in a cluster of urban coastal communities in Ghana, West Africa. *Remote* Sensing, 3, 2029-2050; doi: 10.3390/rs3092029.

Adelekan, I. O. (2009, June). *Vulnerability of poor urban coastal communities to climate change in Lagos, Nigeria.* Paper presented at Fifth Urban Research Symposium 2009: Cities and Climate Change: Responding to an Urgent Agenda, Marseille, France.

Aderogba, K. A. (2012, January). Global warming and the challenges of floods in Lagos Metropolis, Nigeria. *Academic Research International*, *2*(1), 448-468.

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/questionaires/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.

Agbola, T., & Jinadu, A. M. (1997). Forced eviction and forced relocation in Nigeria: the experience of those evicted from Maroko in 1990. *Environment and Urbanization*, *9*, 271.

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.

Akinwale, A. A., & Aderinto, A. A. (2012). Crisis of governance and urban violence in Nigeria. *African Journal of Criminology and Justice Studies*, *5*(1&2), 49-77.

Apata, T. G. (2010). Effects of global climate change on Nigerian agriculture: An empirical analysis. *CBN Journal of Applied Statistics*, *2*(1), 31-50.

ARD, Inc. (2002, April). *Nigeria environmental analysis final report.* Retrieved from http://pdf.usaid.gov/pdf_docs/PNACP627.pdf.

Aworemi, J. R., & Abdul-Azeez, I. A. (2011, June). An appraisal of the factors influencing rural-urban migration in some selected local government areas of Lagos State Nigeria. *Journal of Sustainable Development, 4*(3), 136-144.

Baiden, P., Arku, G., Luginaah, I., & Asiedu, A. B. (2011). An assessment of residents' housing satisfaction and coping in Accra, Ghana. *Journal of Public Health*, *19*, 29-37.

BBC News. (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.

Benjaminsen, T. A., & Sjaastad, E. *Property rights formalisation in Africa.* Retrieved from http://www.nai.uu.se/publications/news/archives/073benjaminsen_sjaastad/.

Blench, R., & Dendo, M. (2003, September 13). *The transformation of conflict between pastoralists and cultivators in Nigeria.* Retrieved from http://www.rogerblench.info/Development/Nigeria/Pastoralism/Fadama%20II%20paper.pdf.

Boyd, S., & Roach, R. (2006). *Feeling the heat: Why governments must act to tackle the impact of climate change on global water supplies and avert mass movements of climate change refugees.* Tearfund. Retrieved from http://reliefweb.int/report/nigeria/feeling-heat-why-governments-must-act-tackle-impact-climate-change-global-water.

Building Nigeria's Response to Climate Change. (2012). *Towards a Lagos State climate change adaptation strategy.* Retrieved from http://www.nigeriaclimatechange.org/projectpublications.php.

Building Nigeria's Response to Climate Change. (2011, November). *National adaptation strategy and plan of action on climate change for Nigeria (NASPA-CCN)*. Retrieved from http://www.nigeriaclimatechange.org/projectpublications.php.

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.

CHF. 2010. Accra poverty map: a guide to urban poverty reduction in Accra. Accra, Ghana. Retrieved from http://chfinternationalghana.org/index.php/reports.

Codjoe, S., Abu, M., & Sward, J. (2013, August). Climate change and internal migration intentions in the forest-savannah transition zone of Ghana. *Population and Environment.* DOI 10.1007/s11111-013-0191-y.

Codjoe, S., Owusu, G., & Burkett, V. (2013, June). Perception, experience, and indigenous knowledge of climate change and variability: The case of Accra, a sub-Saharan African city. *Regional Environmental Change*, *13*(3).

Dasgupta, S., Laplante, B., Meisner, C., Wheeler, D., & Yan, J. (2007, February). *The impact of sea level rise on developing countries: A comparative analysis.* World Bank Policy Research Working Paper 4136, Washington, D.C.

Dayo, F. (2010, May 5). *Climate change scenarios, sea level rise impacts and adaptation strategies for Lagos State.* United Nations Industrial Development Organization.

Dionisio, K., Rooney, M. S., Arku, R. E., Friedman, A. B., Hughes, A. F., Vallarino, J., Agyei-Mensah, S., Spengler, J. D., & Ezzati, M. (2010). Within-neighborhood patterns and sources of particle pollution: Mobile monitoring and Geographic Information System analysis in four communities in Accra, Ghana. *Environmental Health Perspectives*, *118*(5), 607-613.

Douglas, I., Alam, K., Maghenda, M., Mcdonnell, Y., Mclean, L., & Campbell, J. (2008). Unjust waters: climate change, flooding and the urban poor in Africa. *Environment and Urbanization*, *20*, 187-205. doi: 10.1177/0956247808089156.

du Plessis, J. (2005, April).The growing problem of forced evictions and the crucial importance of community-based, locally appropriate alternatives. *Environment and Urbanization*, *17*, 123-134. doi: 10.1177/095624780501700108.

The Economist. (2011, May 5). *Nigeria's business capital: A rare good man*. Retrieved from www.economist.com/node/18652563.

The Economist. (1994, November 12). *Ghana's guinea-fowl war. 333*(7889), 88-89.

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/.

European Commission. (m.d.) EC checklist for root causes of conflict. Retrieved from http://www.ceipaz.org/images/contenido/European%20Commission%20Checklist%20for%20Root%20Causes%20of%20Conflict_ENG.pdf.

Federal Republic of Nigeria. 2003. *Nigeria's first national communication under the United Nations Framework Convention on Climate Change*, Abuja, Nigeria. Available at: http://unfccc.int/resource/docs/natc/nignc1.pdf

Fobil, J. N., Levers, C., Lakes, T., Loag, W., Kraemer, A., & May, J. (2012). Mapping urban malaria and diarrhea mortality in Accra, Ghana: Evidence of vulnerabilities and implications for urban health policy. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, *89*(6), 977-991. doi: 10.1007/s11524-012-9702-x.

Frazier, T., & Alfons, A. (2012). *Simulating a close-to-reality synthetic population of the Greater Accra Region.* Retrieved from http://svn.vsp.tu-berlin.de/repos/public-svn/publications/vspwp/2011/11-32/CUPUM.pdf.

Gleditsch, N. P. (2012). Whither the weather? Climate change and conflict. *Journal of Peace Research, 49*(1): 3–9.

Government of Ghana, forthcoming. Ghana national climate change policy 2013. Accra,Ghana.

Graversen, M. K. (2009). *Does resource scarcity increase the severity of conflicts in Sub-Saharan Africa?* Retrieved from http://iopscience.iop.org/1755-1315/6/56/562013.

Hashim, I. (2007). Independent child migration and education in Ghana. *Development and Change*, *38*(5), 911-931.

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.

Hendrix, C. S., & Salehyan, I. (2012, January). Climate change, rainfall, and social conflict in Africa. *Journal of Peace Research*, *49*(1), 35-40.

Hsiang, So. M., Burke, M., & Miguel, E. (2013). Quantifying the influence of climate on human conflict. *Science*, 341(6151) doi: 10.1126/science.1235367.

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.

Intergovernmental Panel on Climate Change (IPCC). (2013). *Climate change 2013: The physical science basis*. Summary for policymakers. Working Group I contribution to the IPCC fifth assessment report. Retrieved from www.climatechange2013.org.

International Crisis Group. (2012, December 17). Curbing violence in Nigeria (I): The Jos crisis. *Africa Report No. 196*. Retrieved from http://www.crisisgroup.org/en/publication-type/media-releases/2012/africa/curbing-violence-in-nigeria-the-jos-crisis.aspx.

Jankowska, M.M., Weeks, J.R., & Engstrom, R. (2011). Do the most vulnerable people live in the worst slums? A spatial analysis of Accra, Ghana. *Annals of GIS*, *12*(4), 221-235.

Jönsson, J. (2009). The overwhelming minority: Inter-ethnic conflict in Ghana's Northern Region. *Journal of International Development, 21*, 507-519. doi: 10.1002/jid.1577.

Kaye, J. (2011, March). Informing grassroots development: The 1994-1995 peacebuilding experience in Northern Ghana. *Journal of Development Studies, 47*(3), 417-435.

Kilcullen, D. (2013). *Out of the mountains: The coming age of the urban guerrilla*. New York: Oxford University Press.

Konadu-Agyemang, K. (2001). A survey of housing conditions and characteristics in Accra, an African city. *Habitat International*, *25*, 15-34.

Konadu-Agyemang, K., & Shabaya, J. (2005). What has corruption got to do with it? Understanding the persistence of rural-urban and inter-regional inequalities in Ghana and Zimbabwe. *GeoJournal*, *62*(1/2), 129-146.

Lagos Bureau of Statistics. (2011). *Digest of statistics 2011*. Ministry of Economic Planning and Budget. Alausa, Ikeja, Lagos.

Lagos State Government. (2013, July). Lagos State climate change policy. Lagos, Nigeria.

Larbi, Reuben. 2013. Analysis of the history of extremes in rainfall and temperature trends in Accra, Ghana. Unpublished research note. Accra, Ghana

Madu, I.A. (2012, May). *Spatial vulnerability of rural households to climate change in Nigeria: Implications for internal security*. The Robert S. Strauss Center for International Security and Law. Working Paper No. 2. Retrieved from https://www.strausscenter.org/ccaps/publications/working-papers.html.

Markandya, A. (2011). Equity and distributional implications of climate change. *World Development*, *39*(6), 1051-1060.

McConnell, T., & Loomis, N. (2013, December 2). How climate change is helping Al Qaeda. *Global Post*. Retrieved from http://www.globalpost.com/dispatch/news/science/131126/calamity-calling-how-climate-change-helping-al-qaeda.

McGadney-Douglass, B. F., & Ahadzie, W. K. (2008). Displaced women in Northern Ghana: indigenous knowledge about ethnic conflict. *Affilia*, *23*, 324-337.

Ministry of Local Government and Rural Development and Maks Publications & Media Services. (2006). Demographic characteristics. Retrieved from http://www.ghanadistricts.com/home/.

Moritz, M. (2010). Understanding herder-farmer conflicts in West Africa: outline of a processual approach. *Human Organization*, *69*(2), 138-148.

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.

Ncube, Mthuli. (2012, December 13). Urbanization in Africa. African Development Bank. Retrieved from http://www.afdb.org/en/blogs/afdb-championing-inclusive-growth-across-africa/post/urbanization-in-africa-10143/.

Nigerian Environmental Study/Action Team (NEST). (2011). *Gender and climate change adaptation: tools for community-level action in Nigeria*. Building Nigeria's Response to Climate Change. Retrieved from http://www.nigeriaclimatechange.org/projectpublications.php.

Nigerian Environmental Study/Action Team (NEST), & Woodley, E. (2012). *Learning from experience – community-based adaptation to climate change in Nigeria*. Building Nigeria's Response to Climate Change. Retrieved from http://www.nigeriaclimatechange.org/projectpublications.php.

Nseabasi, A. S. (2012). Rural development practice in Nigeria: How participatory and what challenges? *Asian Journal Agriculture and Rural Development*, *2*(3), 381-393.

Nutsukpo, D., Jalloh, A., Zougmore, R., Nelson, G., & 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/aacccs_ghana_note.pdf.

Nzeadibe, T. C., Egbule, C. L., Chukwuone, N. A., & Agu, V. C. (2011). *Climate change awareness and adaptation in the Niger Delta Region of Nigeria.* Kenya: African Technology Policy Studies Network.

Ogunrinola, I.O., Adepegba, E.O. (2012, April). Health and economic implications of waste dumpsites in cities: The case of Lagos, Nigeria. *International Journal of Economics and Finance*, *4*(4), 239-251.

Olajuyigbe, A. E., O. O. Rotowa, E. Durojaye. (2012, May). An assessment of fold Hazard in Nigeria: the case of mile 12, Lagos. *Mediterranean Journal of Social Sciences*, 3 (2). doi: 10.5901/mjss.2012.v3n2.367.

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.

Otiso, K. M. (2002). Forced evictions in Kenyan cities. *Singapore Journal of Tropical Geography*, *23*(3), 252-267.

Parker, G. (2013*). Global crisis: War, climate change, and catastrophe in the seventeenth century*. New Haven: Yale University Press.

Pellow, D. (2011). Internal transmigrants: a Dagomba diaspora. *American Ethnologist*, *38*(1), 132-147.

Perez, C., Roncoli, C., Neely, C., & Steiner, J. L. (2007). Can carbon sequestration markets benefit low-income producers in semi-arid Africa? Potentials and challenges. *Agricultural Systems*, *94*, 2-12.

Ploch, L. (2013, April 24). *Nigeria: Current issues and U.S. policy.* Congressional Research Service. Retrieved from https://www.fas.org/sgp/crs/row/RL33964.pdf.

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., & Antos, S. (2011). Accra Ghana: a city vulnerable to flooding and drought-induced migration. Case study prepared for the Global Report on Human Settlements 2011. Retrieved from http://www.unhabitat.org/grhs/2011.

Roncoli, C. (2006). Ethnographic and participatory approaches to research on farmers' responses to climate predictions. *Climate Research*, *33*, 81-99.

Rooney, M.S., Arku, R.E., Dionisio, K.L., Paciorek, C., Friedman A.B., Carmichael, H., Zhou, Z., Hughes, A.F., Vallarino, J., Agyei-Mensah, S., Spengler, J.D., & Ezzati, M. (2012). Spatial and temporal patterns of particulate matter sources and pollution in four communities in Accra, Ghana. *Science of the Total Environment*,107-114.

Rosenzweig, 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.

Salaam, A. O. (2011, March). Motivations for gang membership in Lagos, Nigeria: Challenge and resilience. *Journal of Adolescent Research*, *26*, 701-726.

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.

Sayne, A. (2011, June). *Climate change adaptation and conflict in Nigeria.* United States Institute of Peace. Washington D.C.

Sarpong, D. B., & Anyidoho, Nana A. (2012, September). *Climate change and agricultural policy processes in Ghana.* Future Agricultures Working Paper. Retrieved from http://www.future-agricultures.org/research/climate-change/7775-climate-change-policy-in-ghana#.UehW3D7wJJ8.

Schilling, J., Scheffran, J., & Link, P. M. (2010). Climate change and land use conflicts in Northern Africa. *Nova Acta Leopoldina*, *112*(384), 173-182.

Shanahan, T. M., Overpeck, J. T., Anchukaitis, K. J., Beck, J. W., Cole, J. E., Dettman, D. L., Peck, J. A., Scholz, C. A., & King, J. W. (2009). Atlantic forcing of persistent drought in West Africa. *Science*, *324,* 377-380.

Simon, B. (2013, December 4). Boko Haram raid casts doubt on Nigeria security claims. *Agence France-Presse*. Retrieved from http://news.yahoo.com/boko-haram-raid-casts-doubt-nigeria-security-claims-210954008.html;_ylt=AwrSyCVr3qhS_2IAEF_QtDMD.

Slettebak, R. (2012). Don't blame the weather! Climate-related natural disasters and civil conflict. *Journal of Peace Research*, *49*, 163-176. doi: 10.1177/0022343311425693.

Society for Water and Sanitation (NEWSAN). (2013, March). *Indigenous coping and adaptation knowledge to the impacts of climate change in Nigeria.* Retrieved from http://newsan.org/research.htm.

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.

Stark, J., Guillén, S., & Brady, C. (2012). *Follow the Water: emerging Issues of Climate Change and Conflict in Peru.* CMM Discussion Paper No. 5. United States Agency for International Development. Washington, D.C.

Stark, J., & Mataya, C. (2011). *Climate change and conflict in Uganda: the cattle corridor and Karamoja.* CMM Discussion Paper No. 1. United States Agency for International Development. Washington, D.C.

Stark, J., Mataya, C., & Lubovich, K. (2009). *Climate security, adaptation, and conflict.* CMM Discussion Paper No. 1. United States Agency for International Development Washington, D.C.

Stark, J., Terasawa, K., & Ejigu, M. (2011). *Climate change and conflict in pastoralist regions of Ethiopia: mounting challenges, emerging responses.* CMM Discussion Paper No. 4. United States Agency for International Development. Washington, D.C.

Stoler, Justin. (2012). *Spatial patterns of water insecurity in a developing city: lessons from Accra, Ghana.* Doctoral dissertation. Retrieved from ProQuest Dissertations and Theses. Accession Order No. 3505467.

Stoler, J., Fink, G., Weeks, J. R., Otoo, R. A., Ampofo, J. A., & Hill, A. G. (2012). When urban taps run dry: Sachet water consumption and health effects in low income neighborhoods of Accra, Ghana. *Health & Place, 18*, 250-262.

Tonah, S. (2000). State policies, local prejudices and cattle rustling along the Ghana-Burkina Faso border. *Africa: Journal of the International African Institute*, *70*(4), 551-567.

Taylor, P., Boussen, C. R., Awunyo-Akaba, J., & Nelson, J. (2002). *Ghana urban health assessment*. Activity Report 114. United States Agency for International Development. Retrieved from http://www.ehproject.org/eh/eh_publications.html#urban.

United Nations Development Programme (UNDP). (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 (UNEP). (2011). Climate change, migration, and conflict in the Sahel. Retrieved from http://postconflict.unep.ch/publications/UNEP_Sahel_EN.pdf.

UN-HABITAT. (2010). *The state of African cities 2010: governance, inequality, and urban land markets*. Retrieved from http://www.unhabitat.org/content.asp?cid=9141&catid=7&typeid=46.

United States Agency for International Development. (2012). *Climate change adaptation plan.*

United States Agency for International Development. (2013). *Ghana country development cooperation strategy 2013-2017.*

United States Agency for International Development. (2013). *USAID strategy on democracy, human rights and governance.*

van de Sande, B., Lansen, J., & Hoyng, C. (2012). Sensitivity of coastal flood risk assessments to digital elevation models. *Water*, 4, 568-579.

van der Geest, K. (2011). North-south migration in Ghana: What role for the environment? *International Migration*, *49*(S1), 69-94. doi: 10.1111/j.1468-2435.2010.00645.x.

Vanguard. (2011, July 12). *Nigeria: Lagos flood kills 25*. Retrieved from allafrica.com/stories/201107120076.html.

Vanguard. (2012, November 13). Nigeria loses $7 billion to oil bunkering yearly – IEA. Retrieved from http://www.vanguardngr.com/2012/11/nigeria-loses-7b-to-oil-bunkering-yearly-iea/.

Welling, R., Carin, M., Baykono, D., & Diallo, O. (2012). *Volta River Basin Ghana & Burkina Faso: Transboundary water management through multi-level participatory governance and community projects.* International Union for Conservation of Nature. Retrieved from http://www.iucn.org/about/work/programmes/water/resources/wp_resources_case_studies/.

White, M. J., Tagoe, E., Stiff, C., Adazu, K., & Smith, D. J. (2005, February). Urbanization and the fertility transition in Ghana. *Population Research and Policy Review, 24*(1), 59-83.

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.

APPENDIX I: CLIMATE CHANGE AND CONFLICT ASSESSMENT FRAMEWORK (CCCAF)

PHASE I: IDENTIFICATION OF STUDY AREAS

- Through official documents, secondary literature, and expert interviews, identify regions, countries, or cities/communities in conflict-prone areas that have experienced extreme climate variability (e.g., droughts, floods, unseasonal temperature fluctuations).
- Where possible, identify instances of conflict within these areas that may have had direct or indirect linkages to climate variability.

PHASE II: PROFILE OF THE STUDY AREAS

- Analyze the linkages among economic, social, and environmental factors through the collection of quantitative and qualitative baseline and trend data.
- Compile background information on the areas' weather and climate patterns and predicted future changes in climate.
- Develop a preliminary assessment of potential political, economic, social, cultural, and historical cleavages that may contribute to instability or conflict.
- Develop a preliminary assessment of the governance capacity and resiliency mechanisms of existing political, economic, social, and cultural institutions.
- Identify the key concerns, grievances, and tensions that may be present. The profile should focus on the local unit of analysis but incorporate national, regional, and international influences.

PHASE III: ANALYSIS OF CRITICAL CLIMATE CHANGE CONCERNS

- Identify which underlying issues, sectors, and resources potentially influenced by climate change are critical to stability. How are they critical? Who is affected when these are threatened? Who is affected when these are well managed? What have been and what could be the potential consequences?
- Assess the impact of governance, with special attention to environmental governance,[6] on the identified issues, sectors, and resources. What mitigating or exacerbating role does it play?

[6] Environmental governance is defined as the traditions and institutions by which power, responsibility, and authority over natural resources are exercised.

PHASE IV: ASSESS THE IMPACT OF CLIMATE-RELATED EVENTS

- Confirm with selected communities the nature and characteristics of a specific climate-related event or specific period of climate variability.
- Investigate the responses applied to the recent climate-related event in the study areas. What range of response options did affected people and communities consider? What responses were applied? Who did affected people and communities reach out to for help? Were resilience-building strategies used? What were the results of those strategies?
- What role did social, human, physical, financial, and natural capital assets play in exacerbating the potential for conflict or mitigating conflict/building resilience?
- Assess why results were linked to improved resilience versus conflict potential. How did core grievances and social/institutional resilience play a role?

PHASE V: PERSPECTIVES OF THE AFFECTED POPULATIONS AND COMMUNITIES

- Identify stakeholders interested in and affected by the climate-related event(s).
- Collect information about the stakeholders' concerns, core grievances, and points of conflict; degree affected by the climate-related event(s); their response capacity; their perceptions of the social and institutional responses to the climate-related event(s); the means and resources for violent conflict; and the social, human, physical, financial, and natural capital assets that mitigated or prevented conflict.
- Seek to identify the indicators of resilience versus conflict potential and the indicators of vulnerability to conflict.

PHASE VI: GENERATE FUTURE SCENARIOS

- Develop scenarios based on the potential impact of similar climate-related events on the affected people or communities based on predicted future climate change patterns. What might be windows of vulnerability and opportunity? What bright spots might be built upon?

PHASE VII: COMPLETE ANALYSIS

- Identify lessons learned, best practices, programmatic gaps, and target areas and opportunities to improve the provision and coordination of interventions that can address climate change and climate-related conflicts in vulnerable regions or communities.
- Provide a comprehensive assessment of the case study areas that explains the impacts of climate variability, core grievances and drivers of conflict, mitigating factors and windows of opportunity, projected future climate vulnerability, and the links between climate change and potential conflict or climate change and adaptive resilience.
- Incorporate scenarios that suggest areas of future vulnerability to conflict and recommend potential ways in which international development assistance could make a positive contribution toward filling current programmatic gaps. The primary focus of recommendations will be on approaches and responses that are within USAID's manageable interest. This will include consideration of existing Mission and Agency programs and priorities vis-à-vis potential climate-related causes of conflict in order to identify gaps and possible areas of intervention.

- A broader set of recommendations for local, national, and international stakeholders in government, civil society, and the private sector may be included in an expanded and publicly available version of the report.

APPENDIX II: LIST OF PERSONS AND ORGANIZATIONS CONSULTED

GOVERNMENT OF NIGERIA

Bahijjahtu Abubakar
National Coordinator, Renewable Energy Programme
Federal Ministry of Environment

Samuel A. Adejuwon
Director, Department of Climate Change
Federal Ministry of the Environment

Peter Tarfa
Assistant Director, Climate Change Unit
Federal Ministry of Environment

Fouad Animashaun
Special Advisor to the Governor on Power
Lagos State Ministry of Energy & Mineral Resources

Abimbola A. Jijoho-Ogun
General Manager of Administration, Special Duties, Acting Director
Lagos State Waste Management Authority (LAWMA)

Izehi Oriaghan
Partnership Liaison Officer
Lagos State Waste Management Authority (LAWMA)
Lagos State Government Ministry of the Environment

Abiola Kosegbe
Controller, Projects Department
Lagos State Waste Management Authority (LAWMA)
Lagos State Government Ministry of the Environment

Tolu Adeyo
Recycling Manager
Lagos State Waste Management Authority (LAWMA)
Lagos State Government Ministry of the Environment

Yemisi Ogunlola
Deputy Director, Legal Services
Lagos State Waste Management Authority (LAWMA)
Lagos State Government Ministry of the Environment

Oluwaseun Fasuhanmi
Legal Advisory Services
Lagos State Waste Management Authority (LAWMA)
Lagos State Government Ministry of the Environment

Jimmy Odukoya
Director of Landfills in Lagos
Lagos State Waste Management Authority (LAWMA)
Lagos State Government Ministry of the Environment

Hauwa Momoh
Landfill Manager
Lagos State Waste Management Authority (LAWMA)
Lagos State Government Ministry of the Environment

Lukman Anjoylaiya
Lagos State Waste Management Authority (LAWMA)
Lagos State Government Ministry of the Environment

Alabis Abedayo Sunday
Lagos State Waste Management Authority (LAWMA)
Lagos State Government Ministry of the Environment

Sesan Odukoya
Lagos State Wastewater Management Office
Lagos State Government Ministry of the Environment

Maximus Ugwuoke
Head of Climate Change Unit
Lagos State Ministry of Environment

T.A. Bello
Climate Change Unit
Lagos State Ministry of Environment

Adeuye Jida
Climate Change Unit
Lagos State Ministry of Environment

Treaswe Abass
Climate Change Unit
Lagos State Ministry of Environment

CIVIL SOCIETY ORGANIZATIONS IN NIGERIA

Priscilla Achakpa
Executive Director
Women Environmental Programme

Queensley Ajuyakpe
Head of Governance Program
Women Environmental Programme

John Baaki
Head of Renewable Energy Program
Women Environmental Programme

Moses Adedej
Executive Directorate
Trees on the Earth Development Foundation

Surveyor Efik
National Coordinator
Climate Change Network Nigeria

Kelvin I. Uever
Charles & Doosurgh Abaagou Foundation

Attah Benson
Executive Director
Community Emergency Response Initiative (CERI)

Ewah Otu Eleri
Executive Director, International Centre for Energy, Environment & Development Nigeria (ICEED)
Coordinator, Climate Change Governance Reform Coalition Nigeria

Huzi Mshelia
Climate Change Specialist
International Centre for Energy, Environment & Development Nigeria

Esther Agbarakwe
Founder and Director
Nigerian Youth Climate Coalition (NYCC)

Nkiruka Nnaemego
CEO/Founder
Fresh & Young Brains Development Initiative

Nature Uchenna Obiakor
Youth, Water, Sanitation, and Hygiene Africa (Youth WASH Network)

Moussa Leko
Principle Program Officer for Forestry, Agriculture, Environment & Water Resources Department
Economic Community of West African States (ECOWAS)

Bertrand Zida
Environment and Climate Change Program Officer, Agriculture, Environment & Water Resources Department
Economic Community of West African States (ECOWAS)

Onyinye Onwuka
Directorate Analyst, Early Warning Directorate
Economic Community of West African States (ECOWAS)

Bukola Ademola-Adelehin
Program Manager for Conflict Prevention
West Africa Network for Peacebuilding (WANEP)

Okechukwu Ifeanyi
National Network Coordinator
West Africa Network for Peacebuilding (WANEP)

Anthony Akpan
President
Pan African Vision for the Environment (PAVE)

Titi Akosa
Executive Director
Centre for 21st Century Issues (C21st)

Elizabeth Bernard-Sowho
Program Officer for Women's Empowerment and Girls' Issues
Centre for 21st Century Issues (C21st)

DONORS AND IMPLEMENTERS

Nino Nadiradze
Office Director, Peace and Democratic Governance Team
U.S. Agency for International Development

Howard Batson
Senior Agriculture Specialist, Economic Growth & Environment Offices
U.S. Agency for International Development

Felicia Genet
Conflict Officer, Peace and Democratic Governance Team
U.S. Agency for International Development

O. Adamu Igoche
Deputy Team Leader, Peace and Democratic Governance Team
U.S. Agency for International Development

Agusta Akparanta-Emenogu
Civil Society and Media Specialist, Peace and Democratic Governance Team
U.S. Agency for International Development

ACADEMIC AND RESEARCH ORGANIZATIONS

Adeniyi Osuntogun
Professor
Obafemi Awolowo University

GOVERNMENT OF GHANA

Antwi-Boasiako Amoah
Senior Programmes Officer
Climate Change Unit
Environmental Protection Agency

Dr. Kingsford Asamoah
Head of Research
National Disaster Management Organization (NADMO)

Graham Sarbah
Drains Maintenance Director
Accra Metropolitan Assembly

CIVIL SOCIETY ORGANIZATIONS IN GHANA

Gabriel Nii Teiko Tagoe
Executive Director
Ga Mashie Development Agency (GAMADA)

DONORS AND IMPLEMENTERS

Stephanie Garvey
Office Director, Regional Peace & Governance Office, West Africa
U.S. Agency for International Development

Alex Apotsos
Climate Change Advisor, Africa Bureau
U.S. Agency for International Development

Anne Dix
Regional Environment Director, West Africa
U.S. Agency for International Development

Edgar Mason
Senior Regional Governance Specialist
Regional Peace and Governance Office
U.S Agency for International Development

Nicodeme Tchamou
Regional Natural Resource Manager & Climate Change Advisor
Regional Office of Environment & Climate Change Response, West Africa
U.S. Agency for International Development

Emmanuel Mensah-Ackman
Deputy Director
Democracy, Rights & Governance Office
U.S. Agency for International Development

Joao de Queiroz
U.S. Agency for International Development

Afua Ansre
Regional Programme Coordinator
UN Women

ACADEMIC AND RESEARCH ORGANIZATIONS

Samuel Codjoe
Director
Regional Institute for Population Studies (RIPS)
University of Ghana – Legon

Paul Vlek
Executive Director
West African Science Service Center on Climate Change and Adapted Land Use (WASCAL)
University of Ghana – Legon

Elias Ayuk
Director
Institute for Natural Resources in Africa
United Nations University
University of Ghana – Legon

Reuben Larbi
Researcher
Regional Institute for Population Studies (RIPS)
University of Ghana – Legon

Dorcas Ewoodzie
Researcher
Regional Institute for Population Studies (RIPS)
University of Ghana – Legon

Adriana Biney
PhD Researcher
Regional Institute for Population Studies (RIPS)
University of Ghana – Legon

Professor Felix Asante
Director
Institute of Statistical, Social and Economic Research (ISSER)
University of Ghana – Legon

Professor Chris Gordon
Director
Institute for Environment and Sanitation Studies
University of Ghana – Legon

Mariama Awumbila
Director
Center for Migration Studies
University of Ghana – Legon

Yasuko Kusakari
Socio-Economist
Institute for Natural Resources in Africa
United Nations University
University of Ghana – Legon

Kwabena Asubonteng
Geo-Information Analyst
Institute for Natural Resources in Africa
United Nations University
University of Ghana – Legon

Elaine Lawson
Research Fellow
Institute of Environmental and Sanitation Studies
University of Ghana – Legon

Foster Mensah
Executive Director
Centre for Remote Sensing and Geographic information Services (CERSGIS)
University of Ghana – Legon

Joseph Kofi Teye
Senior Lecturer
Geography & Resource Development
University of Ghana – Legon

COMMUNITY CONSULTATIONS

Residents of James Town (11)
Focus Group Discussion and Questionnaire
Sub-metro Stakeholders Meeting, Accra

Residents of Ussher Town (11)
Sub-metro Stakeholders Meeting, Accra

Focus Group Discussion and Questionnaire
Residents of Agbogbloshie (10)
Focus Group Discussion and Questionnaire
Sub-metro Stakeholders Meeting, Accra

U.S. Agency for International Development
1300 Pennsylvania Avenue, NW
Washington, DC 20523
Tel: (202) 712-0000
Fax: (202) 216-3524
www.usaid.gov