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CLIMATE CHANGE AND CONFLICT: FINDINGS AND LESSONS LEARNED FROM FIVE CASE STUDIES IN SEVEN COUNTRIES

JULY 2014

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ARCC

African and Latin American
Resilience to Climate Change Project

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AFRICAN AND LATIN AMERICAN RESILIENCE TO CLIMATE CHANGE (ARCC)

JULY 2014

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ACRONYMS AND ABBREVIATIONS

AMA	Accra Metropolitan Assembly
AR4	Assessment Report 4
AR5	Assessment Report 5
ARCC	African and Latin American Resilience to Climate Change
CAF	USAID Conflict Assessment Framework
CCCAF	Climate Change and Conflict Assessment Framework
CCAPS	Climate Change and African Political Stability Program, University of Texas
CMM	Office of Conflict Management and Mitigation (CMM)
COFOB	Rural Land Commission (*Commission Foncière de Base*)
DRC	Democratic Republic of the Congo
EPRDF	Ethiopian Peoples' Revolutionary Democratic Front
ESAF	Environmental Security Assessment Framework
FESS	Foundation for Environmental Security and Sustainability
FEWSNET	USAID Famine Early Warning Systems Network 0
FMNR	Farmer Managed Natural Regeneration
GDP	Gross Domestic Product
GTP	Growth and Transformation Plan of Ethiopia
IFPRI	International Food Policy Research Institute
IPCC	United Nations Intergovernmental Panel on Climate Change
MCA	Millennium Challenge Account
MINAM	*Ministerio del Ambiente del Perú*
NGO	Nongovernmental Organization
PCCSR	Peace Centers for Climate and Social Resiliency
WRI	World Resources Institute
UN	United Nations
UNEP	United Nations Environment Programme
UPDF	Uganda Peoples' Defence Force

EXECUTIVE SUMMARY

Given the many potential risks, vulnerabilities, and impacts on human security resulting from climate change detailed in the United Nations (UN) Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report, it is natural that policymakers, researchers, and development experts should ask, "Will climate change cause conflict in the developing world?"

These five field-based case studies in seven countries (Uganda, Ethiopia, Niger, Burkina Faso, Ghana, Nigeria, and Peru) demonstrate that trying to isolate a single chain of climate-conflict causality is not particularly helpful or productive. With many factors potentially contributing to conflict in each of these countries, answering the question with a flat "yes" is inaccurate and inadequate. Yet, answering the question with a flat "no" is counterproductive and misleading, since there *are* significant and identifiable interactions between climate change (or variability) and known conflict risks in each of these fragile locales.

What can be said is that trying to understand conflict dynamics in northeast Uganda, Ethiopia's pastoralist regions, Niger's arid zones, Burkina Faso's high-demand land areas, the low-lying slums of coastal West Africa, and the water-stressed Andes of Peru *without* taking into account the impact of climate change would result in an incomplete and flawed analysis. Climate-related impacts are directly and indirectly affecting the populations that are already the poorest, most vulnerable, and most aggrieved groups in each of these countries. The task is to investigate how climate events associated with credible climate change projections may contribute to conflict within that larger context.

The five case studies in these seven countries show that climate change—especially as reflected in observed temperature data; reports by local inhabitants of increases in severe, erratic weather; and consistent accounts from agriculturalists and pastoralists of marked changes in seasonality—has an appreciable impact on livelihoods and economic development, rights and responsibilities of citizens and the state, resource governance and the performance of political institutions, and relations among privileged and disadvantaged identity groups. A large body of literature indicates that these are important and enduring conflict variables.

Setting aside simplistic questions of direct causality and replacing them with more pragmatic and productive questions about how climate change may be consequential for conflict, making use of some of the well-established categories of conflict analysis, facilitates the construction of a more substantive, qualitative analysis that goes beyond general references to climate change as a threat multiplier, stressor, or potential trigger for conflict. It also generates discussion of specific issue areas with linkages to programmatic interventions that United States Agency for International Development (USAID) or other international assistance agencies may wish to undertake or may already have underway.

Equally important, because they incorporate the input of the agents who actually decide whether to take part in or refrain from conflict (i.e., the affected individuals, communities, and institutions), the case studies identify some of the specific stakeholders in government and society whose interests are threatened by climate change and whose participation may be key to the success or failure of climate-related program initiatives aimed at strengthening resilience.

While these five case studies provide only a limited comparative base, it is possible to identify three climate-related patterns of change and four areas of institutional challenges that are likely to be relevant and consequential for many other developing countries in Africa and Latin America.

PATTERNS OF CHANGE

Climate Change and the Disruption of Traditional Knowledge and Coping Mechanisms

Recent climate trends have contributed to increased insecurity for millions of people living in the rural regions of Uganda, Ethiopia, Niger, Burkina Faso, and Peru. One of the major sources of insecurity has been the decreasing salience and viability of traditional knowledge and coping mechanisms in these rural communities. In each of these countries, rural inhabitants commented on challenges resulting from the increasingly erratic nature and sheer unpredictability of weather events and weather patterns.

The key dimension of highly variable weather patterns for groups heavily dependent on the land and natural resource base for daily subsistence is marked shifts in seasonality, especially the unusually late arrival or early cessation of rains. In the Andes, highland residents also note the effects of unprecedented extremes of heat and cold.

One thread of the fabric of conflict is woven of an already aggrieved group's further loss of the sense of control over its own destiny. The diminished efficacy of indigenous knowledge brought about by climate change is contributing to this effect in many of the rural communities visited during the case studies.

Climate Change and the Erosion of Identity and Social Roles

Related to but distinct from the issue of the loss of traditional knowledge, group identity and clearly defined social roles are stabilizing forces that provide both security and meaning for individuals and communities. Threats to group identity and social values (e.g., ethnicity or religion) are well-known factors contributing to conflict, especially in Africa.

Traditionally, elders made group decisions about planting crops and where and when community members would be likely to find pasture and water. With the chronic and severe droughts of recent years, this role has become increasingly irrelevant. In Uganda and Ethiopia, elders who were interviewed lamented their diminished capacity to prevent conflict resulting from a variety of factors, including the effects of climate change. In Niger, traditional Tuareg life was altered by the drought and desertification of the 1970s and 1980s. Successive national governments either failed to respond to Tuareg needs or heightened the potential for conflict by favoring other groups. Climate change and government policies combined to destabilize and disempower Tuareg groups across large areas of the country's northern regions.

Climate variability also has been destabilizing for identity and social roles in the Peruvian Andes. In the highlands, glacial lakes both provide water resources and are closely linked to the identity and cultural values of Quechua speakers. As rainfall becomes more erratic, competition between farmers and energy and mining companies over these valued resources increases. In highland communities, in addition to the negative impact on economic well-being, the effects of climate change and resource competition on cultural values is sometimes a cause of conflict.

Climate Threats to Livelihoods in the Context of Rapid Economic Development

In terms of conflict potential, climate threats to livelihoods are much more consequential in the context of rapid economic development of other sectors or groups within the economy, especially when explicitly favored by national policies.

This is a significant pattern of change observable in both the African case studies and the Peruvian Andes. In East Africa and West Africa, rising temperatures and climate variability are driving the crisis of

pastoralism from bad to worse, when combined with state-led development plans that marginalize pastoralists and anticipate their eventual sedentarization.

Pastoralists in Uganda and Ethiopia are wary of their national governments' plans for "sedentarization" and support for large-scale commercial agriculture and other high-value investments that require large land acquisitions. The same is equally true for the Tuaregs and other herders in Niger, in what could easily become an explosive situation. These groups perceive the vision of government central planners to be one in which pastoralists decrease in numbers or entirely disappear.

In Peru, farmers in the Andes do not perceive the government to be intrinsically "anti-campesino," but they do feel threatened by what they perceive to be deliberate policies giving preferential water access to the highly promoted and rapidly expanding mining and export sectors. This commingling of climate change threats to livelihoods with a sense of vulnerability resulting from the country's prevailing development strategy exemplifies an important pattern with the potential to contribute to conflict in rural areas in many countries.

CLIMATE CHANGE AS A CHALLENGE FOR POLITICAL INSTITUTIONS AND RESOURCE GOVERNANCE

Rural Land Access/Use and Water Management

The case studies demonstrate that many of the key aspects of bad governance and institutional failure classically linked to conflict find their most concrete expression in conflicts having to do with rural land use and water management. In Uganda and Ethiopia, recurrent droughts have forced pastoralists to expand their search for land and water to new areas. In Ethiopia, access to land is even more conflictive because it is also linked to the administrative boundaries and jurisdictions associated with ethnic federalism. The intertwining of climate change impacts with land disputes and controversial internal border policies is potentially destabilizing.

In Niger, the Tuareg feel squeezed and compromised by climate-driven landscape change and ever-further encroachment by farmers and commercial developments into the Tuareg's (and other herding groups') traditional grazing zones. The extremely weak institutionalization of Niger's Rural Code, which regulates the use of natural resources, leads to further frustration and anger. In Burkina Faso, similar confusion over rural land use laws allows already tense land disputes to fester into situations ripe for conflict.

Disputes over scarce and inefficiently managed water supplies are perhaps the main source of conflict in Peru. Irrigation rights are complex and often blatantly unfair. Small farmers frequently protest against large mining companies that use increasing amounts of water. Glacier melt contributes to the increasing potential for glacier lake outbursts, reducing water sources used for agriculture and threatening communities with catastrophic floods. Warming temperatures and the disappearance of glaciers like Coropuna will lead to further reduced water supplies in the future. Water conflicts in highland Peru are increasingly contingent on a race between improved and more equitable water management and the growing impact of climate change.

Land Use, Migration, and Precarious Settlements in Large Coastal Cities

The case study of Lagos and Accra makes clear that two sets of climate-related issues that have to date received no effective institutional response are very likely to become more conflictive in the years ahead: 1) the conundrum of rehabilitating or relocating low-lying slum areas highly vulnerable to flooding and sea-level rise; and 2) the effects of (possibly climate-driven) migrants arriving from drought-affected

regions. The growth of poor and illegal settlements on highly flood-prone wetlands in Lagos is such that relocation of residents appears to be inevitable for at least some of them. Absent such adaptation measures, flood casualties can be expected to rise steadily. However, the question of eviction or relocation is fraught with social and political tensions. Remarkably little has been done in Lagos, Accra, or other major coastal cities in Africa to grapple with this looming crisis.

In Lagos, the question of in-migration from climate-affected areas of northern Nigeria is becoming more acute and volatile as public services are being overwhelmed and the threat of terrorism from Boko Haram begins to enter the public mind. The Lagos State Government has raised the idea of discussions to find common ground on contentious migration issues with other Nigerian states to help dampen the potential for misunderstandings and sudden outbreaks of conflict.

Marginalization and Lack of Voice

Tensions arising from national development plans that place a low priority on poor, vulnerable, and climate-affected populations' traditional livelihoods and give high priority to large-scale commercial rural or urban development do not merely reflect the outcome of technical economic decisions. Rather, they also are an expression of the political power of respective groups, and they are understood as such by those communities who feel marginalized, or even abused.

As climate change sharpens the challenges faced by farmers and pastoralists, or the daily living conditions of urban petty traders, the government's allocation of resources to party favorites and well-connected entrepreneurs deepens resentments among those who feel a sense of injustice. In Lagos, slum dwellers see a new "Eko" city protected by a massive seawall for modern commercial and residential use, while severe climate events threaten the majority poor with the possibility of devastating floods or relocation to areas far away from the places they work.

In Peru's very different political context, both rural community associations and young professionals in the highlands are trying to get more attention for grievances over natural resources and climate change threats from a central government traditionally more responsive to the political interests of wealthier coastal elites. The political space in Peru is much greater than in Africa, and civil society has more experience voicing concerns. Yet, the tipping point from nonviolence to violence is not always evident when passions are high in relation to resource-related protests and mobilizations.

Institutional Gaps: Public Information and Disaster Preparedness and Response

The IPCC recently noted that "A changing climate leads to changes in the frequency, intensity, spatial extent, duration, and timing of extreme weather and climate events, and can result in unprecedented extreme weather and climate events." There is both observed and anecdotal evidence of increasingly erratic and extreme weather events in most of the locations covered by these case studies. Building communities that are resilient to such events is a challenging and complex task involving a long list of issues, including knowledge of climate risks, early warning, public awareness, risk reduction, and disaster response preparedness.

There is a significant lack of time-series weather data and location-specific knowledge about climate change in all seven countries of the case studies. In some places, conflict itself is a reason for the absence of data, as violence sometimes has made the collection of temperature, precipitation, and hydrological readings impossible.

The dissemination of timely and accurate weather information to farmers and pastoralists is spotty at best. As frustrations with the unpredictability of climate change rise, the lack of help or reliable guidance from government institutions becomes a source of grievances.

In Lagos, frustrations rise when public officials announce the likelihood of unusually intense rainfall and flooding in the coming rainy season and advise residents to be prepared to leave, although they have no place to go. Over time, the gap between citizen expectations for clear risk reduction measures and essential disaster response services on the one hand and actual institutional capacity and performance on the other is likely to result in protests and conflict.

CLIMATE, CONFLICT, CLIMATE ADAPTATION, AND RESILIENCE

The complexity of interactions of climate change with non-climate factors is similar to the interactions of other factors commonly believed to contribute to conflict. While it is known, for example, that very poor countries have higher incidences of conflict, few analysts would be comfortable asserting in unqualified terms that "poverty causes conflict." Yet, poverty is a major focus for researchers and international assistance agencies both because of its contributions to instability and conflict and because of its intrinsic human costs. The same holds true of the relationship between climate change and conflict.

The salient questions for international assistance agencies seeking to identify effective programmatic interventions are how and in what ways climate change impacts may be consequential for conflict, and how that knowledge can be used in conflict mitigation and climate change adaptation. The kinds of interrelationships between climate and non-climate factors identified in the case study summaries below (and in more detail in the full-length versions of the five case studies) provide many examples of the kinds of institutional and community stakeholders who are likely to need to be a part of successful climate adaptation initiatives. The selection of the precise program initiatives appropriate for any given country or location is contingent, of course, on context-specific priorities and conditions.

One thread that runs through all of the case studies is the absolute necessity of including the participation of the residents of affected communities. In many of the communities across the seven countries visited, people lack either the opportunities or standing to participate in inclusive political processes. However, their perceptions, decisions, and actions will serve to animate or inhibit conflict in the face of climate change impacts; their participation will be essential for building sustainable climate resilience over time.

Fortunately, a great deal can be done in terms of climate adaptation to avoid many of the worst-case scenarios envisioned in the early climate-and-conflict literature. A brief list of some of the most important measures would include climate-resilient seeds, crop storage, water and soil conservation, small-scale irrigation, livestock diversification, improved farming techniques, better market linkages, insurance schemes for pastoralists and agriculturalists, integrated water resources management, enforcement of land use regulations, viable plans for relocation or evacuation, disaster risk reduction, and improved climate information services.

As the case studies indicate, however, it would be a mistake to consider these simply technical fixes. Their implementation will also require a combination of institutional reforms and strengthened social organization that will be as or even more challenging to achieve. Not infrequently, these sorts of transformations will require political support, consume state resources, or otherwise have implications for the competing interests of stakeholders in government, civil society, the private sector, and communities. One group's climate adaptation may be another group's maladaptation. The climate adaptation agenda can be diverted, obstructed, or undermined by tensions among a variety of social, economic and political interests.

A global USAID analysis found that 81 percent of countries considered fragile also are projected to experience significant climate change impacts. Thus, the climate change adaptation agenda and the conflict mitigation agenda are bound up with each other. Conflict specialists can no longer do their job

without asking about the possible implications of climate change, and climate adaptation specialists cannot do their job without considering conflict sensitivities and implications.

If the aim of new assistance programs is to build climate resilience, the strengthening of formal and informal institutions that can prevent or mitigate conflict over climate-affected natural resources is essential. The case studies show that there are many opportunities for participatory climate change adaptation to make a lasting contribution to conflict mitigation and peacebuilding—from supporting dialogue on natural resources among ethnic rivals in Ethiopia to implementing rural resource rights in the Sahel and engaging slum communities in flood prevention in Lagos and Accra. Peacebuilding or conflict resolution interventions also can be essential precursors or elements of effective climate change adaptation measures. By engaging marginalized communities, climate adaptation programs address the perceived lack of participation and representation that is one of the main sources of instability in each of these seven countries.

1.0 INTRODUCTION

1.1 CLIMATE CHANGE AND CONFLICT AS A POLICY ISSUE IN 2014

Every six years since 2001, the release of a new United Nations (UN) Intergovernmental Panel on Climate Change (IPCC) Assessment Report has produced an upsurge in expressions of concern from policymakers, security analysts, and development experts about the potential linkages between climate change and conflict. The pattern was repeated in 2014 with the release of the findings of the first two working groups of the Fifth Assessment Report (AR5) of the IPCC, "The Physical Science Basis," produced by Working Group I in October 2013 (IPCC, 2013) and "Impacts, Adaptation, and Vulnerability" produced by Working Group II in March 2014 (IPCC, 2014). Both sets of findings were interpreted by commentators in and out of government as providing further evidence that the climate change and conflict relationship is of increasing importance.

Working Group I's findings observed that climate models had improved since the Fourth Assessment Report (AR4) and now allowed higher degrees of confidence in a number of key statements about both observed and projected climate trends. Human influence is described as "extremely likely" (above 95 percent) to be the "dominant cause of the observed warming since the mid-twentieth century." Warmer days and nights are described as "likely" (66–100 percent) in the next two decades and "virtually certain" (over 99 percent) by the last few decades of the century. Increases in the frequency, intensity, and/or amount of heavy precipitation are termed "very likely" (over 90 percent) by the late twenty-first century, while increases in intensity and/or duration of drought are "likely" over the same time frame. Three of the four different climate models used by IPCC AR5 anticipate that by the end of the twenty-first century, global surface temperature is "likely" to exceed 1.5 °C relative to a century earlier. Sea level rise is "very likely" to accelerate from the rate observed between 1971 and 2010. The IPCC AR5 estimates that sea level rise may range from 0.26 meters to 0.98 meters by century's end, while noting that many other models show even higher sea level rise projections.

The potential relationship between climate change and armed conflict is addressed in Chapter 12 on "Human Security" and Chapter 19 on "Emergent Risks and Key Vulnerabilities" in the findings of Working Group II. While both note the increase in research on the topic, they deviate with somewhat different methodological emphases, and the respective chapters come to broad conclusions that differ to some degree. The chapter on human security concludes there is "justifiable common concern that climate change or changes in climate variability increase the risk of armed conflict in certain circumstances," despite uncertainties about the strength of such effects. In large part, this conclusion rests on the worsening effects of climate variability on intervening factors already believed to have linkages to conflict such as poverty, economic shocks, and weak political institutions. The chapter on emergent risks relies on a meta-analysis of recent quantitative studies to assert more strongly that "evidence suggests that climatic events over a large range of time and spatial scales contribute to the likelihood of violence through multiple pathways." Both chapters agree on socioeconomic insecurity and bad governance as the likely key variables that increase the risks of climate-related conflict. While the chapter on human security is cautious about the relationship between warming and armed conflict the chapter on emergent risks cites research associating warmer temperatures with increased violence as the basis for warning of potentially "large relative changes to global patterns of personal violence, group conflict, and social instability" (IPCC, 2014).

These warnings did not go unnoticed or fail to find an echo in formal government statements. In a February 2014 speech in Jakarta, Indonesia, U.S. Secretary of State John Kerry announced that he would

be initiating a series of discussions "on the urgency of climate change, particularly on the national security implications." Reflecting upon the costs of such challenges as heat waves, water shortages, agricultural losses, and natural disasters, Kerry labeled climate change "perhaps the world's most fearsome weapon of mass destruction" (Kerry, 2014). In March 2014, the U.S. Department of Defense's Quadrennial Defense Review asserted that climate change effects "are threat multipliers that will aggravate stressors abroad such as poverty, environmental degradation, political instability, and social tensions — conditions that can enable terrorist activity and other forms of violence" (United States Department of Defense, 2014). Earlier in the year, U.S. Director of National Intelligence James Clapper told Congress that "extreme weather will increasingly disrupt food and energy markets, exacerbating state weakness, forcing human migrations, and triggering riots, civil disobedience, and vandalism" (Clapper, 2014).

Influential groups outside of government sought to build on the IPCC's most recent findings to publicize the dangers of climate-conflict linkages. Just as it had after IPCC AR4 in 2007, the Military Advisory Board of CNA Corporation, a group of retired generals and admirals, released a report on "National Security and the Accelerating Risks of Climate Change" in May 2014 that asserted "climate change impacts are already accelerating instability in vulnerable areas of the world…" (CNA Military Advisory Board, 2014). While the CNA Corporation's 2007 report had labeled climate change as a "threat multiplier," the 2014 report said that the latest scientific findings and recent conflict events indicated that climate impacts could also be considered "a catalyst" for conflict. Although careful not to attribute direct causation, the report noted the effects of environmental stressors in conflict zones such as Mali, Darfur, South Sudan, Niger, and Nigeria.

As conflict increased in Syria and spread to Iraq, some observers began to suggest that climate change may have played an important contributing role in generating underlying instability in the region (Werrell and Femia, 2013). Pressing the case, *New York Times* columnist Thomas Friedman described drought conditions in Syria as having "produced a million [climate] refugees that basically laid the predicate for that revolution" (Face the Nation, April 6, 2014). Increasing media coverage of the terrorism of Boko Haram, an Islamic extremist group in northern Nigeria, produced news reports that attempted to connect the dots between climate-related desertification and population displacement in Nigeria's Sahelian northeast, and the recruitment of idle young men to engage in violent acts in Borno State (Eichelberger, 2014).

All of these public statements, expert analyses, and journalistic reports have met with varying degrees of criticism and skepticism, but their overall impact has been to reinforce the message that climate change is likely to increase the potential for instability and violence in the decades ahead, especially in places already affected by conflict and fragility. Yet, if there seems to be an emerging consensus in policy circles that climate change is a significant threat to stability and potentially a catalyst for conflict, it is accompanied by a proliferating research literature on the topic that reflects quite divergent methodological approaches and often reaches contradictory conclusions regarding causal linkages.

1.2 RECENT STUDIES AND APPROACHES TO CLIMATE CHANGE AND CONFLICT

In the six years between IPCC AR4 and IPCC AR5, there have been dozens of studies by researchers and scholars working in many different disciplines on various aspects of the relationship between climate change and conflict, and a full literature review would exceed the scope of this paper.[1]

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[1] See the Resources section at the end of this report for an extensive list of examples from this literature.

However, the recent studies receiving the greatest media attention have been a new wave of quantitative studies that have sought to answer basic questions about causality. One team of academic researchers analyzed historical linkages from 1981–2002 between civil war and temperatures in sub-Saharan Africa. Combining those findings with climate model projections for the future, Burke, Miguel, Satyanath, Dykema, and Lobell (2009) found their data suggested "a roughly 54 percent increase in armed conflict incidence by 2030." Buhaug (2010) contested those findings on technical methodological grounds and claimed that "political exclusion, poor economic performance, and changes in the international system"—not climate change—better help to explain civil conflict in Africa. Burke and his colleagues refused to concede on the technical issues or their original conclusions, but when they extended their analysis to include the years from 2003 to 2008, they found that the climate-conflict relationship was notably weaker, perhaps due to improved economic growth and democratization (Burke, Dykema, Lobell, Miguel, and Satyanath, 2010).

Taking a somewhat different approach, Hsiang, Meng, and Cane (2011) examined the El Niño Southern Oscillation and data on civil conflicts in the tropics from 1950 to 2004 and concluded that the probability of civil conflicts doubled during warmer and drier El Niño years relative to La Niña years. In a further attempt to quantify the influence of climate on human conflict, Hsiang, Burke, and Miguel (2013) assembled 60 previous quantitative studies of various time periods from pre-history to the modern day and claimed to 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 methods of the study and this far-reaching assertion, however, elicited considerable criticism from other scholars (e.g., Busby, 2013). First, the concept of "human conflict" used in the paper was so broad as to include events as diverse as domestic violence and the collapse of ancient civilizations. Second, the study offered no analysis of what climate-related causal mechanisms could be at play in producing such extremely divergent conflict outcomes, noting only "the likely situation that multiple mechanisms contribute to the observed relationships" and providing a short list of work by other researchers on such possible causal mechanisms as difficult economic conditions, weak and revenue-poor government institutions, migration and urbanization, and "grievances" (placed in quotation marks by the authors).

Other quantitative studies have produced mixed results. For example, while Hendrix and Salehyan (2012) found that "extreme deviations in rainfall…are positively associated with all types of political conflict," Slettebak's (2012) data analysis concluded that "countries that are affected by climate-related disasters face a lower risk of civil war," and Koubi, Bernauer, Kalbhenn, and Spilker (2012) were "not able to identify a systematic, causal relationship." An innovative quantitative study done by Harari and La Ferrara (2012) tried to look more closely at the issue of tangible causal mechanisms. Making use of several new methodological techniques to incorporate intra-annual effects of temperature and precipitation, they found a significant local-level relationship between weather shocks on agriculture during the growing season and civil conflict. Conversely, they found that "climatic conditions outside the months of the growing season have zero effects on conflict." While these results were preliminary and based on previously untested methodologies, they point in the direction of quantitative approaches that might make a practical contribution to applied research.

For policymakers and development planners, of course, it is precisely the specific mechanisms by which climate change affects conflict potential that are of interest, because understanding them is the prerequisite for the creation of improved policies, programs, and projects aimed at conflict prevention and conflict mitigation. In this context, it is important to note that political scientists, sociologists, anthropologists, and area experts specializing in the origins of instability and conflict have reached consensus on one fundamental conclusion: conflict is *always* the result of multiple factors (or causal mechanisms) and how they interact with one another in a given circumstance. Many common risk factors are well-known (if sometimes described using different terms), including poverty and livelihood insecurity, corruption and perceptions of injustice, political exclusion and absence of rule of law, social

marginalization of minority ethnic or religious groups, spillover effects from conflict-prone neighbors, competition over (or the plunder for profit of) natural resources, and citizen perspectives on historical experiences (especially past conflict). As a consequence, whatever the relationship between climate change and conflict may be, it will unfold *within* the context of some or all of these other highly influential factors as they manifest themselves in a given country or region.

This suggests that one central thread of research on climate change and conflict is centered on how climate change affects and interacts with these other known variables that contribute to the potential for conflict. The group of variables identified by conflict analysts as perhaps having the strongest explanatory power are those broadly associated with governance, roughly defined as the traditions or institutions by which authority in a country (or community) is exercised. Where governance is visibly ineffective, corrupt, and/or unaccountable, citizen grievances that may be the precursors to violence are likely to accumulate and deepen. In the case studies discussed below, there is a particularly strong focus on the role of these traditions and institutions.

Given the complexities in establishing clear linkages between climate change and conflict, one related area of study that has emerged is the somewhat broader domain of climate security, which incorporates a wide variety of measures of vulnerability and insecurity. One of the most comprehensive initiatives in this area in recent years has been the climate security "vulnerability" mapping done by researchers at the Climate Change and African Political Stability (CCAPS) project at the University of Texas. Making use of composite variables derived from physical exposure, population density, household and community resilience, and governance and political violence, the latest iteration of CCAPS data maps areas of Africa at the subnational level where large numbers of people are at risk of death from climate-related hazards (Busby, Smith, White, and Strange, 2013). Comparing the findings from composite climate security vulnerability for the late twentieth century and the mid-twenty-first century, the study finds "more extensive vulnerability throughout the Sahel belt," as well as worsening vulnerability in West Africa, "driven in particular by increases in the projected number of heat wave days and in coastal areas by heavy precipitation days." As the data sources become richer and more refined, these mapping efforts appear to be improving, but the authors caution against using them "as the sole source of information to prioritize resources." Both the Sahel and West African coastal regions receive closer attention in the case studies below.

There remains at present a gap between the clarity desired by decision makers on the exact nature of the climate-conflict relationship and the still-evolving state of knowledge. Case studies offer more detailed sources of information that offer few universally applicable generalizations but produce more actionable recommendations and an accumulating comparative base of lessons learned.

In the debates and discussions about climate change and conflict, one additional constraint is often overlooked. Viewed over a longer time frame and in the context of the climate projections of the IPCC, it is clear that climate change impacts are just beginning to be felt. Even the effects of greenhouse gas emissions that have already occurred are not yet fully apparent. Much climate-conflict analysis is thus an exercise in "early detection," and inevitably the evidence is at times more suggestive than unambiguous. Nevertheless, the case studies that follow show that a number of early indications of conflict potential can be identified, and the consequences of ignoring early harbingers of conflict may be costly. Conversely, the case studies also show that important opportunities exist to address climate challenges and build resilience in ways that support democracy, reduce poverty, and increase stability.

2.0 BACKGROUND AND METHODOLOGY

2.1 BACKGROUND

2.1.1 Case Studies 1–3

Between 2010 and 2012, the Office of Conflict Management and Mitigation (CMM) of the United States Agency for International Development (USAID) asked the Foundation for Environmental Security and Sustainability (FESS) to conduct three preliminary country case studies with two main purposes: 1) to help fill the gap in knowledge regarding how climate-related vulnerabilities interact with the dynamics of fragility, instability, and conflict in specific selected locations around the world; and 2) to identify target areas and opportunities for USAID to improve the provision and coordination of programmatic interventions that can address climate change and conflict vulnerabilities in those countries.

The three countries chosen were Uganda, Ethiopia, and Peru. Specific subnational regions were identified in each country as the principal areas of investigation. In Uganda, research was conducted along the so-called "Cattle Corridor" that runs from central districts (Luwero, Nakseke, and Nakasongala) to the northeast of the country, with a particular concentration on the region of Karamoja. In Ethiopia, field research was conducted in rural communities in the predominantly pastoral and agropastoral areas of Oromia, Somali, and Afar national regional states. In Peru, the geographic focus was the Andean mountain highlands, especially the highland zones of Ancash and Arequipa regions. Despite very different national contexts and local circumstances, all of these subnational locales have experienced some level of conflict and significant climate variability in recent years. In each of these three case studies, interviews were conducted with representatives from national and local government, civil society organizations, research institutes, international organizations, and the private sector. Interviews and/or focus groups were held with local community groups.

2.1.2 Case Study 4

In 2013, to help inform its new programmatic activities in the Sahel, USAID asked FESS to conduct a case study under its African and Latin American Resilience to Climate Change (ARCC) project to analyze the potential linkages between climate impacts and conflict in two countries in the heart of the Sahel: Niger and Burkina Faso. In addition to their history of droughts and food insecurity, both countries are marked by three factors that analysts have found strongly correlated with instability and conflict: they are populations with very low-incomes, the countries are landlocked, and all three governments rely on sizable revenues from mineral exports. Rapid population growth produces further stresses. All of these factors add to the complexity of the challenges these countries face in building resilience and ensuring security for their citizens.

Field research for the Sahel case study was carried out in June and October 2013. In Niger, field work was carried out in the capital, Niamey, with two brief trips to Filingue and Tillakeina in the region of Tillabery and a focus group in Niamey with customary chiefs from Tchintabaraden and Abalak of the pastoral zone in Tahaoua. In Burkina Faso, after interviews in the capital of Ouagadougou, field work

was conducted in the provinces of Yatenga and Loroum (near the Mali border) and in Sanmantenga in the central plateau. In both countries, a number of climate experts, national and local government officials, social scientists, civil society representatives, and community leaders were consulted, although time limitations and security considerations placed constraints on the scope of the field study.

While all of these country studies focused on mostly rural areas, there has been recent increasing interest and concern about the possibly destabilizing effects of climate change in fast-growing metropolises of the developing world, especially in coastal areas (Kilcullen, 2013).

2.1.3 Case Study 5

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 (UNEP, 2011). To address the relative lack of research on climate-conflict linkages in large urban coastal areas, USAID asked FESS to conduct a case study through ARCC on two major West African cities located within this zone: Lagos, Nigeria and Accra, Ghana.

Field research was carried out for the West African cities case study during two rounds of two-week visits in June and August 2013. Within these time constraints, climate analyses, government reports, and 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. 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 (of differing ages and genders) from three poor neighborhoods (Jamestown, Usshertown, and Abogbloshie).

All of the case studies described below present the political, economic, and demographic setting relevant to stability and instability for each country or city and examine available information on recent and projected climate change, sensitivities, and adaptation responses. This is accompanied in each case by a discussion of key institutional weaknesses. Each study concludes by identifying key climate adaptation needs and promising current activities, along with options for action that can help build resilience and reduce conflict.

Each of the five full-length case studies is available online. The studies for Uganda, Ethiopia, and Peru are available at www.fess-global.org and under "Conflict Technical Publications" at http://www.usaid.gov/what-we-do/working-crises-and-conflict/technical-publications. The case studies on the Sahel (Niger and Burkina Faso) and West African cities (Lagos and Accra), as well as a "Preliminary Synthesis Paper" on lessons learned from Uganda, Ethiopia, and Peru, can be found on the ARCC project website at http://community.eldis.org/.5be92db5 and http://community.eldis.org/.5bc7a162.

The present report distills the main findings of the five case studies in narrative form, with the goal of emphasizing key institutions and the interactions of non-climate and climate factors in each country or city. The full-length reports cited above provide much more country-specific context and data, climate information, full citations, persons and organizations consulted, and a complete set of recommendations. Readers seeking more information should consult the full reports at the links given above.

2.2 CONCEPTUAL FRAMEWORK AND METHODOLOGY

To help guide the methodological approach to the climate change and conflict case studies, FESS developed a seven-phase framework — the Climate Change and Conflict Assessment Framework

(CCCAF). The framework provides a process for gathering a wide variety of background data that supply relevant context for analysis of the climate-conflict nexus. It relies in part on FESS's Environmental Security Assessment Framework (ESAF) methodology, while integrating core components of USAID's Conflict Assessment Framework (CAF). Both the ESAF and CAF emphasize one of the main conclusions of recent conflict analysis: Conflict is always the result of the interactions of multiple political, economic, social, historical, and cultural factors, and each of these five domains is always marked by the often competing perspectives and interests of groups and individuals with divergent and asymmetrical capacities to advance or defend their interests. The influence of climate change or variability on conflict can only be understood within this already existing web of relationships.

Although the five case studies took place over the course of several years, and concepts, terminology, and methodology evolved somewhat during that time, they all focused on four basic research questions, modified as appropriate in each case:

1. Does (or could) climate change/variability contribute to the conditions for organized, political violence?
2. Does climate change/variability contribute to circumstances with high-conflict potential linked to the access and use of natural (or economic) resources by specific livelihood groups, identity groups, or urban dwellers? If so, how and why?
3. What is the relationship of either of these with resilience?
4. What are possible programmatic options or approaches to enable USAID (or others) to invest more effectively in programs or initiatives to build resilience and prevent or mitigate conflict?

In addressing these core questions, the CCCAF raises case-specific questions about the factors mentioned above and the way they interact with the effects of climate change. While presented sequentially, the seven phases of the CCCAF allow for continual feedback for revisiting and revising preliminary information and findings.

To facilitate a close focus on the climate-conflict nexus, the first phase of the CCCAF identifies conflict-prone areas of the selected country or geographic area that have experienced extreme climate variability, e.g., droughts, floods, and unseasonal temperature fluctuations. (As a practical matter, site location for the studies also has taken into account USAID's programmatic commitments, such as its climate-related programs in the Ancash and Arequipa regions in Peru).

Phase II, which is the most data- and information-intensive phase, seeks to ground the analysis in the specific context of the country and/or city under study. Understanding how climate change may be contributing to conflict requires substantive knowledge about the relevant national context and areas of contention and conflict. While all societies are marked by such cleavages, they 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—i.e., governance, broadly speaking—respond to threats in ways that are more or less successful in resolving or mitigating complaints and real or perceived injustices.

Phase II also collects available information from published scholarly articles and official documents on recent and projected climate trends and climate change in the study area and surrounding regions.

Phase III links environmental and socioeconomic factors to ask how climate change/variability may pose threats to essential resources, livelihoods, food security, existing demographic patterns, and cultural values in the areas under study. This phase focuses more specifically on environmental governance and natural resource management. Is natural resource management and related authority (e.g., land allocation and use) reducing or contributing to the potential for conflict?

Phase IV of the CCCAF looks more closely at the responses of affected communities and individuals to climate variability, extreme weather events, and their consequences. It asks how social, human, physical, financial, and natural capital and assets are used to build resilience or coping strategies for communities and social groups. It also seeks out unintended or unanticipated consequences of coping strategies (maladaptation) and forms of divergent adaptation among differing groups that can lead to conflict.

Phase V identifies the relevant stakeholders from government, civil society, and affected communities and solicits their perceptions and experiences of the impacts of climate trends and natural hazards. It investigates whether and how these impacts intertwine with citizen grievances, stakeholder interests, mobilizing factors, and the potential for conflict. Stakeholders are asked to describe how they and other stakeholders respond and to give their various perceptions of the political, social, and institutional responses to climate-related challenges.

In Phase VI, based on the synthesis of all of the data and field research, scenarios are developed to illuminate potential futures. These scenarios are not predictions, but ways of envisioning plausible future outcomes and their accompanying levels of potential conflict. The scenarios include consideration of windows of vulnerability and opportunity (or triggering events).

The CCCAF concludes in Phase VII by bringing together the contextual impacts of environmental and climate change, relevant core grievances and drivers of conflict, patterns of resilience, windows of vulnerability or opportunity (triggers), and projected future climate vulnerabilities to determine the mechanisms that underlie the interaction between climate change and potential conflict. It also highlights links between climate change, adaptation, and resilience. Phase VII identifies lessons learned, good 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.

It is also important to note that 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 the potential for conflict.

The full CCCAF methodology is given in Annex I.

3.0 PASTORALISM IN THE GREATER HORN OF AFRICA: UGANDA AND ETHIOPIA

3.1 UGANDA

3.1.1 From Promise to Lost Legitimacy

Yoweri Museveni became the president of Uganda in 1986 after a quarter-century of military coups, ethnic conflict, economic crises, and massive political violence. He set out to stabilize a country desperate for peace and security.

From a macroeconomic perspective, Uganda had considerable success under President Museveni. In the late 1980s, he instituted reforms to liberalize the Ugandan economy, and gross domestic product (GDP) growth during the Museveni era has been consistently at or above the six percent growth rate necessary to outpace a rapidly growing population. Since the mid-1990s, inflation has been held in check and poverty levels have decreased. Nevertheless, with about half the population under 15 years of age, job creation is still a major challenge for the country.

By the mid-1990s, Museveni was receiving international praise as one of a new breed of promising African leaders. Despite the optimism, Museveni's reelections in 2001, 2006, and 2011 were marked by often repressive and divisive campaigns that soured most observers on the president's democratic credentials.

In the late 1990s, Uganda became embroiled in the political turmoil and armed conflict of its neighbor, the Democratic Republic of the Congo (DRC). The Uganda People's Defence Force (UPDF) controlled the northeast region of the resource-rich DRC and became engaged in the illicit extraction of gold, diamonds, timber, coltan, and ivory. A 2010 UN report stated that Ugandan troops engaged in "torture and various other cruel, inhuman, or degrading treatments" while in the DRC (*New Vision* 2010).

Domestically, the use and allocation of land, water, and forests have been tied to allegations of government corruption and political patronage. While Uganda has well-developed environmental laws, they are poorly implemented and enforced. Thus, while President Museveni's lengthy tenure as Uganda's head of state provided stability and generally good economic performance for a long time, the current conflict environment—and any role that climate change may play within it—includes persistent poverty, electoral turmoil, mismanagement of natural resources, ethnic tensions, and poor military command and control. Evidence of some of these problems can be seen in the latest World Bank Worldwide Governance Indicators for Uganda, which are given in Table 3.1; the percentile rank is in relation to the complete global set of 215 countries and territories.[2]

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[2] With data covering 1996–2012, the World Bank's Worldwide Governance Indicators (see http://info.worldbank.org/governance/wgi/index.aspx#home) is a composite index that makes use of multiple surveys from think tanks;

TABLE 3.1. UGANDA GOVERNANCE INDICATORS 2012

Indicator	Percentile Rank
Voice/Accountability	34
Political Stability/Violence	19
Government Effectiveness	33
Regulatory Quality	44
Rule of Law	45
Control of Corruption	18

Source: http://info.worldbank.org/governance/wgi/index.aspx#home

3.1.2 Pastoralism in Uganda

Pastoralism is a livelihood and set of cultural practices based on cattle herding that uses mobility to make maximum use of scarce natural resources in arid or semi-arid environments with limited and erratic rainfall. In these drought-prone areas, pastoralists move their cattle to water and pasture, based on annual weather cycles and prevailing climatic conditions. Pastoralists are among the poorest Ugandans, with high rates of infant and maternal mortality, low levels of literacy, and limited political participation. Both government and their fellow citizens often hold pastoralists in poor regard. Pastoralism is considered by many Ugandans to be a backward or declining livelihood with a limited future and headed toward a more or less inevitable transition to ranching, farming, or other alternative livelihoods. Nevertheless, pastoralists, not ranchers, hold the majority of the national cattle herd and produce the great majority of the country's milk and beef.

Despite its economic contributions and environmental advantages, pastoralism in Uganda is besieged by a series of difficult challenges, involving demographic change, land rights, the apportioning of land for protected areas and mineral exploration, and landscape conversion and fencing for areas under development. Uganda's rapidly growing population has expanded the land under cultivation, disrupting pastoralists' traditional access to pasture and water and bringing them increasingly into conflict with farmers. Land disputes have overwhelmed the already weak, corrupt, and overburdened court system. As seen in Figure 3.1 (next page), the case study focused on two areas: the so-called Cattle Corridor in central Uganda and the highly conflictive Karamoja region in the northeast.

nongovernmental organizations; international organizations; and the private sector, including Afrobarometro, Latinobarometro, Freedom House, Global Competitiveness Survey, Reporters Without Borders, Economist Intelligence Unit, Ibrahim Index of African Governance, and Polity IV. A full discussion of the World Bank's methodology is found in Kaufmann, Kraay, and Mastruzzi (2010).

FIGURE 3.1. DROUGHT-AFFECTED AREAS OF THE CATTLE CORRIDOR IN UGANDA

(with Karamoja in green)

Source: Adapted from Barihaihi, 2010

3.1.3 Climate and Conflict in Central Uganda

While annual average rainfall does not appear to have shifted much in Uganda, many people interviewed about weather in Luwero, Nakaseke, and Nakasongola districts complained about erratic rains in the planting season:

- "We used to plant at the same time every year, late February or early March. Now, we do not know when to plant."
- "We have to plant whenever the rain comes. However, sometimes the rain comes, we plant, and then the rain disappears, causing our crops to fail."
- "Yes, there are more droughts, and the rains are unpredictable."

Poor weather forecasting and weak natural resource management accompany climate change effects. Weather forecasts are poorly communicated and are viewed with great skepticism by farmers. Farmers and pastoralists alike believe that more frequent hot spells are bringing new or worsening infestations of pests and diseases in their crops and in their livestock. These outbreaks are contributing to low livestock and crop productivity.

For most farmers interviewed in Nakasongola, conflicts with cattle keepers are generally low-level affairs. Cattle encroach on crops and disputes occur at water sources, but these are often settled through negotiations or payments. Pastoralists in northern Nakasongola experience more serious conflicts when numerous pastoralists bring their cow herds to valley dams at the same time.

Few pastoralists or farmers appear to be practicing any sort of climate change adaptation. A few nongovernmental organizations (NGOs) are just beginning to assist farmers in "timely" or "early" land preparation so their gardens will be ready for immediate planting when the rains arrive. Other strategies include drought-resistant and longer-lasting crops, better storage, and kitchen gardens.

Among the factors contributing to local conflict in the Cattle Corridor are public perceptions of arbitrary and corrupt government rulings over land issues. The thread that unites these disputes is competition over scarce pasture and water scattered over a patchwork of locations that are either shrinking or blocked by new developments and subject to uncertain land tenure.

Climate variability (erratic rains) may at times interact with these factors in ways that multiply the number of conflictive circumstances. The weak capacity of pastoralists in the Cattle Corridor to organize and mobilize for conflict probably represents a limit on the scale of violence. At the local level, however, sporadic episodes of deadly violence remain probable.

3.1.4 Climate and Conflict in Karamoja

The situation in Karamoja is far more challenging in terms of culture, livelihoods, security, national policy, climate change, and conflict.

Cattle are highly valued by the Karamojong pastoralists, not only as a means of providing sustenance but also for social and cultural reasons. The Karamojong have longstanding practices of cattle raiding among their various tribes and groups. In recent decades, the Karamojong conducted cattle raids not only against their tribal counterparts but also against farming communities in other regions of Uganda. When the Idi Amin government fell in 1979, Ugandan army soldiers abandoned their barracks in Moroto, leaving behind a huge stockpile of 60,000 weapons, which quickly began circulating throughout Karamoja. Other arms came to the region from Sudan and across the border from Kenya.

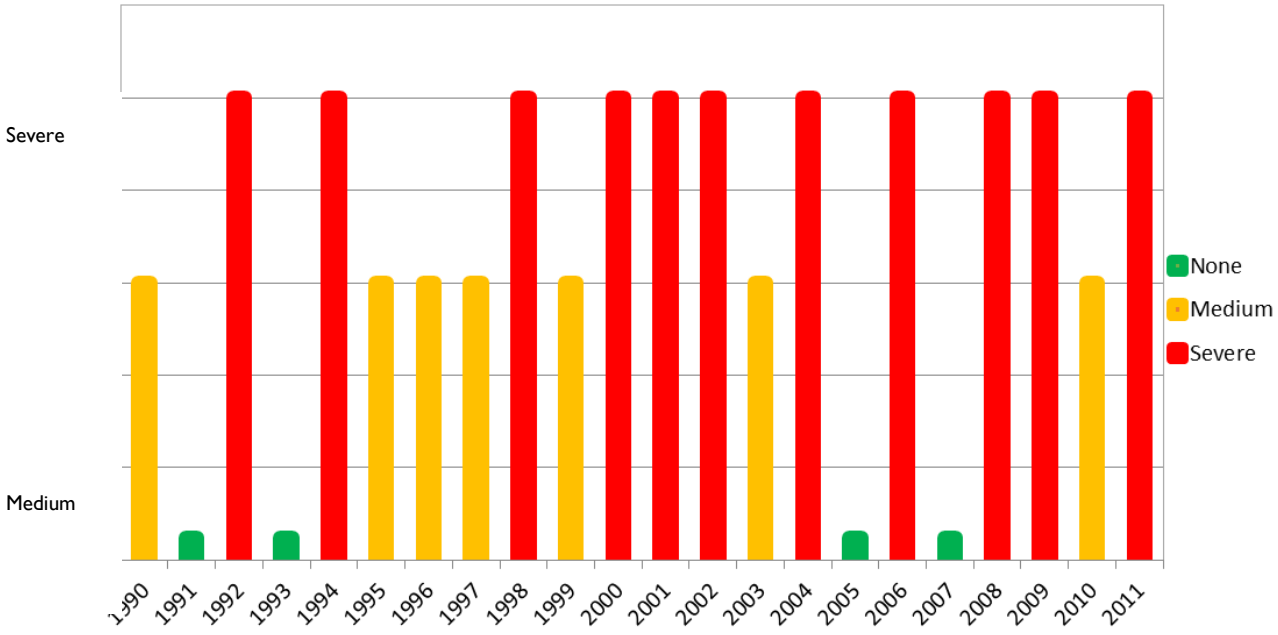
The Ugandan government launched a series of disarmament campaigns in 1984, 1987, 2001, and an ongoing effort that began in 2006. The disarmament campaigns began on a voluntary basis, but evolved into forcible disarmament. Disarmament by the UPDF in 2006–2007 through so-called "cordon and search" operations was heavily criticized by human rights groups for including beatings, torture, and killings. As resentments grew, UPDF soldiers increasingly became the targets of Karamojong warriors.

Interwoven with this background of chronic conflict are conditions of deep poverty, rapid population growth, and severe food insecurity. The percentage of the national population living below the poverty line is 31 percent; in Karamoja, it is 82 percent.

Locals ranging from 40 to 70 years old who were interviewed in Karamoja stated—often using vivid examples—that the climate has changed markedly in recent years. Perennial rivers and streams are now seasonal. Riverbeds that traditionally were reliable dry season sources of water now yield no water. In 2007, when the rains did come, they were torrential downfalls and crops were destroyed.

Severe droughts that used to occur on average approximately every five years have more recently arrived every two-to-three years, or even less (see Figure 3.2). It takes an estimated two years to recover from such drought events; the time between droughts has become so short that the asset base of communities has dwindled. Poverty, deprivation, cattle raiding, food insecurity, and social disintegration are now intertwining with the effects of reported climate change in ways that aggravate tensions and conflict.

FIGURE 3.2. DROUGHT IN KARAMOJA



Source: Adapted from Famine Early Warning Network System (FEWSNET), 2005; and ReliefWeb, n.d.

The Government of Uganda is seeking to improve water availability, increase crop and livestock production, restore degraded natural resources, improve storage facilities, and promote markets in Karamoja. Yet according to former local officials and Catholic Church leaders, the government suffers from a legacy of severe mistrust.

The Government of Uganda's view of pastoralism as an archaic and outdated livelihood is perceived by many in Karamoja to be a condescending and unrealistic posture that discourages cooperation. Efforts by the government to promote a rapid shift from pastoralism to agriculture, however reasonable as an alternative development strategy over the long term, appear likely to increase tensions.

Despite efforts by local authorities to engage in dialogue and address Karamoja's historical marginalization, the continuation of cattle raiding, restrictions on pastoralist movements, persistent mistrust of the UPDF, the erosion of traditional social roles such as the exercise of authority by elders, and the severe consequences of increasingly frequent droughts all make efforts to reduce conflict extremely difficult.

3.1.5 Conflict Management and Climate Change in Uganda

In Karamoja, conflict is severe and chronic, with a constellation of contributing factors embedded in a distinctive pastoral culture. With so many contributing factors at play, it might be said that climate change plays a relatively minor role in conflict in Karamoja. Nevertheless, just as it would be simplistic

and wrong to assert that climate change is the major driver of conflict in Karamoja, so too would it be a mistake to not recognize that recent climate trends have placed tremendous pressure on the pastoralist livelihoods and food security of the people of Karamoja, increasing the potential for conflict.

The strategic policy choice in Karamoja is not between the return of pastoralism as traditionally practiced or a sudden transformation to a predominantly agricultural model about which the Karamojong have had little to say. The key task is to empower Karamojong communities to participate actively in the design and implementation of alternative livelihood, food security, and climate adaptation programs in collaboration with both the Ugandan government and donors. Without their direct involvement and the actual incorporation of some of their ideas, conflict in Karamoja is likely to continue unresolved. As one church leader put it in an interview, "Change must come to Karamoja, but it cannot be forced change."

Climate adaptation offers the unique possibility of engaging Karamojong participation and building resilience through the explicit incorporation of indigenous knowledge as an important part of coping strategies.

In Uganda, some of the worst-case generalizations and predictions of climate-related conflict appear to be overstated. The good news is that a great deal can be done to mitigate climate change effects through climate adaptation measures (e.g., water harvesting, better crop storage, improved crop selection, and alternative livelihoods), and that many of these are "no-risk" steps addressing development challenges already on the agenda of international assistance agencies. Climate change and the potential for climate-related conflict simply make such actions more urgent and strengthen their rationale.

3.2 ETHIOPIA

3.2.1 From Military Marxism to One-Party Ethnic Rule

Drought and famine have been powerful factors in shaping governance in Ethiopia over the past 40 years. Drought and famine in 1973 and 1974 exposed the paralysis and incompetence of Emperor Haile Selassie's aging regime, and contributed to its overthrow by the military committee known as the Derg. Amid continuing violence and the failure of the Derg's economic policies, drought and famine once again struck Ethiopia from 1983–1984, compounding the sense of crisis in the country. The Derg government failed to respond and seemed to be in blatant denial of a humanitarian catastrophe. Only a massive international relief effort brought eventual stability to regions experiencing mass starvation.

The highly centralized Derg regime was overthrown in 1991 and eventually was replaced by the Ethiopian Peoples' Revolutionary Democratic Front (EPRDF). To reduce conflict, a process was put into motion to draft and ratify a new constitution based on federalism, multiculturalism, and self-determination. The constitution resulted in the creation of nine ethnically based regional states.

The past decade has been marked by the EPRDF's concentrated focus on economic development, but the formula of federalism through ethnically based regional states has proved controversial, and disputes over the country's local and national elections have raised increasing concerns about political freedom in Ethiopia. The government rejects these concerns as mistaken or misguided, but they are clearly reflected in Table 3.2.

TABLE 3.2. ETHIOPIA GOVERNANCE INDICATORS 2012

Indicator	Percentile Rank
Voice/Accountability	12
Political Stability/Violence	7
Government Effectiveness	40
Regulatory Quality	14
Rule of Law	31
Control of Corruption	32

Source: http://info.worldbank.org/governance/wgi/index.aspx#home

From 2005–2010, Ethiopia experienced rapid economic growth, approaching or surpassing double-digit annual increases in GDP. Approximately 80 percent of the population is still engaged in agriculture; it remains the key sector for overall economic development. The Growth and Transformation Plan (GTP) for 2010–2015 aspires to help Ethiopia reach the level of a middle-income economy by 2020–2023. The GTP's plan for pastoral development gives priority to water development and sets ambitious targets increasing export earnings from live animals and meat exports, from US$125 million in 2010 to US$1 billion in 2015. The GTP projects "resettlement of pastoralists on a voluntary basis…in areas convenient to irrigation development" (Government of Ethiopia, 2010).

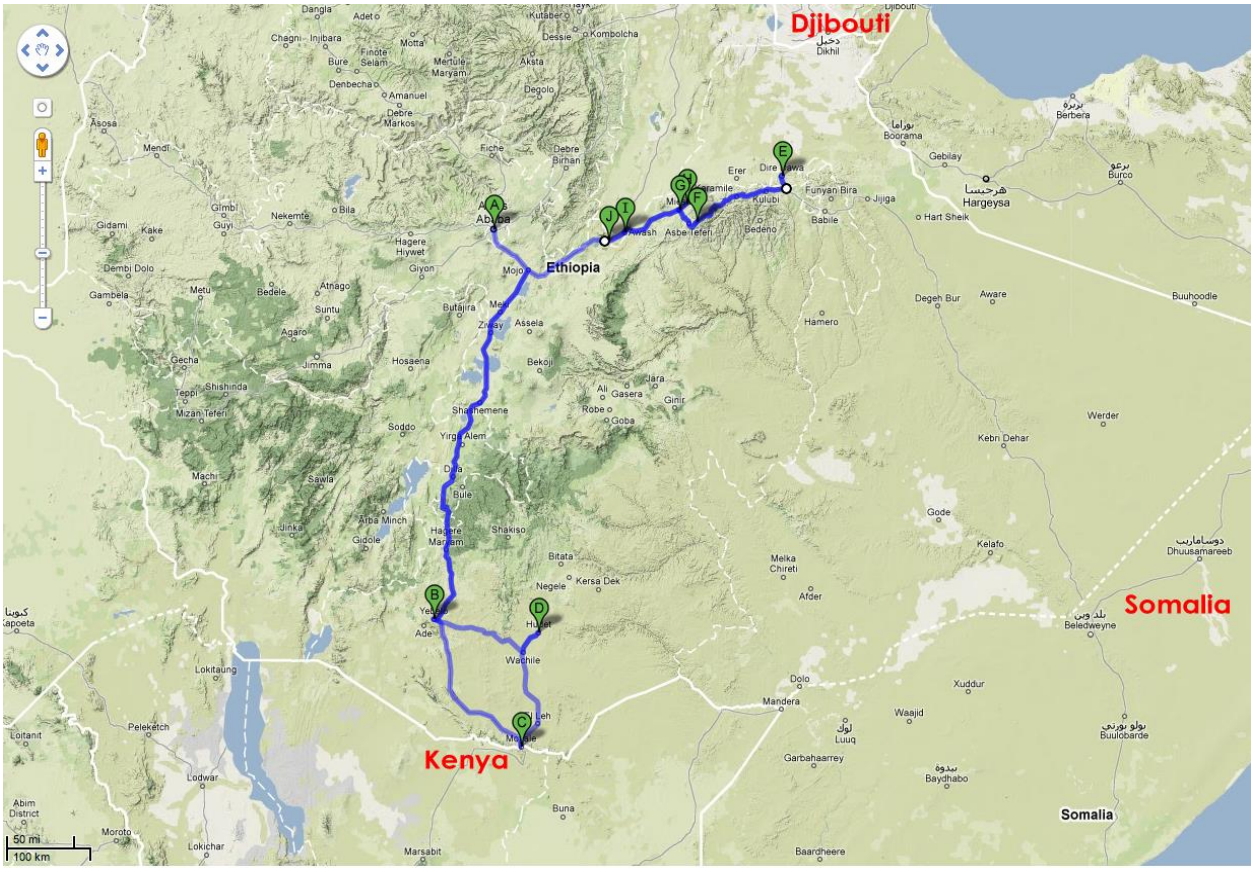
Ethiopia's pastoralists and agro-pastoralists live in the country's arid and semiarid rangelands of the south and east, and they compose nearly 13 percent of the population. As in Uganda, mobility is fundamental to pastoralists' strategies for coping with unpredictable rainfall, livestock diseases, and the sustainable use of scarce natural resources.

3.2.2 Shrinking Grazing Areas and Growing Climate Threats

Pastoralists in Ethiopia also face a number of challenges that threaten the sustainability of their traditional practices. As the country has sought to develop and diversify its economy, land has been allocated by the state for other uses. The combination of diminishing grazing areas and population growth (both human and animal) has contributed to land degradation, competition for pasture and water, and inter-ethnic and intra-ethnic conflict. According to pastoralist leaders, the loss of traditional lands and the constraints on mobility resulting from the EPRDF regime's administrative boundaries have disrupted and disarticulated social coping mechanisms and made traditional means of dispute resolution more difficult.

Ethiopia is among the countries most vulnerable to climate risks in Africa because of its extremely heavy reliance on rain-fed, subsistence agriculture. Average national rainfall has not been decreasing on an annual basis, but the *belg* rains—which fall from March through May, and constitute the main rains for the southern regions of Ethiopia—have seen increasing variability and extremes. This includes alarming declines in rainfall in recent years; southern Ethiopia experienced severe droughts in 2006, 2008, and 2010–2011. Drought and climate variability are part of the natural cycle in lowland Ethiopia, and pastoralist communities have an array of traditional coping mechanisms and resiliencies. A pattern of rising temperatures and the increased frequency of extreme weather and droughts nevertheless threaten to overwhelm these traditional practices.

FIGURE 3.3. ROUTE TRAVELED AND PRINCIPAL COMMUNITIES VISITED IN ETHIOPIA



Southern Leg: Addis (A) to Yabelo (B), Moyale (C), and Wachile/Hudet (D)
Eastern Leg: Addis (A) to Dire Dawa (E), Chiro (F) Mieso (G), Mulu (H), Awash/Amibara (I), and Metehara (J)

3.2.3 The Crisis of Pastoralism and Climate Change in Southern Ethiopia

Herders and local officials reported that erratic patterns, fluctuating between late or failed rains and heavy, concentrated downpours are increasingly common in Yabelo in the Borana Zone in southern Ethiopia. By the time the rains arrived in April 2011, the resulting reduction of pasture and water resources already had pushed local pastoral groups toward crisis, with many people losing all or virtually all of their cattle.

At an SOS Sahel Ethiopia project site outside of Yabelo town, field researchers met with a group of pastoralists (both men and women) to discuss the impact of environmental trends on their livestock holdings. Householders reported an average loss of 80 percent of livestock from their peak holdings over the past 10 years. According to these and other interviewees in Yabelo, recurrent drought has made the search for water and pasture more difficult, and moving into new areas in search of these resources often provokes conflict. Other causes are also at play, however. Population growth, tracts of land provided to investors for ranching, and environmental degradation have reduced available land. With the banning of burning in recent years, bush encroachment and the spread of invasive species also have reduced pasture land.

Traditionally, Boran systems of social solidarity and support provided clans with crucial resiliency in relation to the sharing of natural resources, livestock holdings, essential daily needs, and conflict.

Leaders of the community redistributed cattle to those determined to be legitimately in need through no fault of their own. Yet these redistributive systems presume that at least some clan members have a surplus that can be shared. Recently, the number of people who can contribute to this system is in decline, while those who seek support are increasing. While some pastoralists have sought to turn to agriculture, success in dryland agriculture is equally dependent on unreliable rainfall.

Facing food insecurity caused by drought, many pastoralists sell their livestock on the market. Increasing numbers of livestock, often in poor condition, drive down prices. Rich pastoralist entrepreneurs are able to take advantage of this situation. Pastoralist areas can sometimes export increasing numbers of livestock while also seeing increasing levels of destitution. Interviewees expressed mounting concerns about the increasing number of "pastoral dropouts" who are poorly educated and have few other employment prospects.

Pastoralist communities in the area view drought as their major threat, and water as the key challenge. The Oromia National Regional State government envisions the development of infrastructure and pipelines for an extensive water network, and the government is aware of the potential for competition and conflict among potential water users. Yet, as one interviewee asked, "For whom will the water network be developed? Pastoralists or investors?" The question of settlements—or "sedentarization"—is a delicate issue, with some fearing that settlements will be created on an involuntary basis. These concerns raise the possibility of increasing tensions as the Borana Zone enters a period of socioeconomic transition contemporaneous with intensifying climate challenges.

In Moyale, sitting uneasily on the borderland between Somali and Oromia regions, separate district administrative offices represent the traditionally antagonistic interests and claims of Somali and Oromo clans. In interviews, government officials from both clans said that they view increasing heat and drought as an obvious and visible reality whose negative impacts they have been experiencing for more than a decade.

These observations were echoed and elaborated in group meetings with both Somali and Boran elders. Somali elders stated that there was no water nearby for animals or humans, the long rains had been reduced to only 15 to 30 days, and temperatures had become at times "overwhelming, like a hot iron." The Boran elders also noted seasonal changes in precipitation and the loss of farming they formerly practiced. In the current drought, they said, "we are not just afraid for our livestock but for our lives—if things continue, we may not survive." Both Boran and Somali elders conveyed apprehension about the rising number of young pastoralist dropouts who come to Moyale and other towns but find no work there. With different clans in competition for scarce resources, clashes between Oromo (Borana) and Somali (Garri) clans involve cycles of cattle rustling and theft as they seek to restock or exact revenge for raids and killings. Severe drought temporarily reduces conflict as communities enter a survival mode; yet over the longer perspective, negative climate impacts worsen the problems of scarcity and intensified competition.

Both Boran and Somali elders also voiced concerns about what they perceive as the negative effects of the creation of the ethnic-based boundaries of Oromia and Somali regions. For these pastoralists, constraints on mobility to access land based on political claims are a source of strong grievances. The creation of new boreholes or wells in one jurisdiction to the benefit of one clan and the perceived disadvantage of another can easily trigger intense and lethal conflict.

The major new development, about which there was agreement on all sides, was a promising increase in the level of engagement between government officials and clan elders on issues of conflict. In recent years, regional and local authorities of the state have had difficulty dealing with clan violence and chronic thievery and assaults. In response, they have turned to respected customary institutions and elders for support. The creation of an "elders committee" (or "peace committee") has been facilitated by the zonal government and has begun to play an important role in dealing with livestock theft and other violations.

Elders are working to change attitudes among pastoralists and sensitize communities, with hopes of eroding the pattern of eye-for-an-eye responses.

FIGURE 3.4. SICK AND DYING CATTLE NEAR MOYALE, ETHIOPIA, APRIL 2011

Source: Katsuaki Terasawa

3.2.4 Climate, Invasive Species, and Conflict Resolution in Northeastern Oromia and Afar

People in areas of northeastern Oromia said the scarcity of pasture and water resulting from recurrent drought has caused unprecedented resource competition, driving theft, looting, and raiding involving Issa, Afar, Oromo, and Hawiya clans. Recently, federal, regional, and zonal government officials—frustrated with the difficulty in containing this proliferating conflict—have begun to engage with clan leaders to explore the use of customary laws to restore inter-clan peace in those instances where formal state institutions fall short. According to a high-level security official, a draft accord to reduce conflict, including understandings about water use, was being offered by clan leaders for feedback in their respective communities.

Elders from both the Issa and Hawiya clans expressed strong concerns about climate variability and its impact on local communities. The Hawiya believe that with decreasing rainfall, the water table has fallen, and lowlands have become hotter. The Issa elders observed that rainfall has changed in both quantity and distribution, occurring only in small pockets that have not reached traditional grazing areas. Several of the elders said they had lost all their livestock except for two or three camels.

Here, as elsewhere, it was stated by interviewees that a "peace-building" committee has been formed for dialogue with government and among the communities. The head of the local *woreda* administration stated that livelihood diversification through the promotion of agro-pastoralism was one main pathway forward to alleviate tensions. This would represent a significant change for the Issa, in particular, but the Issa elders said they were open to this possibility.

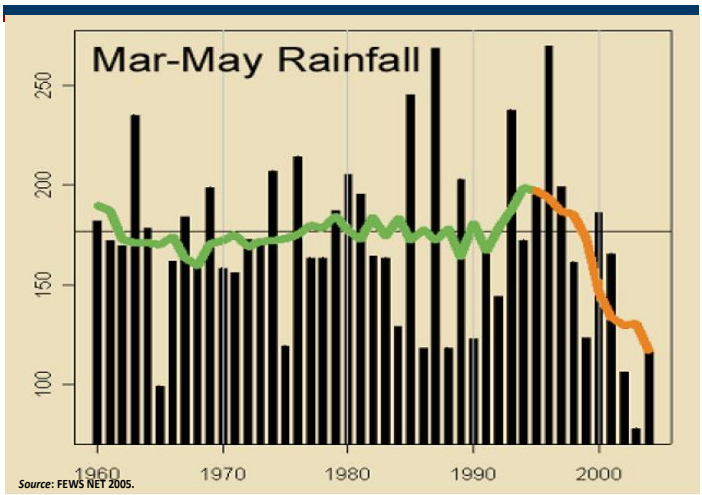
In Afar Region, climate-conflict linkages followed a more circuitous route to resource scarcity through the harmful effects of a devastating invasive species, *Prosopis juliflora*. *Prosopis* is highly adaptive, with deep roots that produce a strong tolerance for drought and marginal soils. Under conditions of severe drought such as those experienced in recent years, *Prosopis* displaces indigenous vegetation, according to representatives from Farm Africa and local researchers.

The Afar Region is made up of mostly very hot and arid lowlands that are chronically drought-prone. For hundreds of years, the Afar pastoralists have been in conflict over pasture and water with the Issa. But with some land already lost to commercial farms, the *Prosopis* invasion has drastically affected the availability of pasture in Afar. Meanwhile, the Issa have continued to push into Afar, closer and closer to the waters of the Awash River. Complicating matters further, there are serious boundary disputes between the Issa and Afar. The confluence of these stresses—repeated weather shocks, massive *Prosopis* invasion, the loss of pasture to irrigated farmland on state-supported commercial enterprises, the disputed border, and the forays of the Issa onto Afar lands—has raised tensions and the potential for escalating conflict to high levels. Only the recent emergence of peace (or "salaam") committees and the efforts of NGOs to combat the *Prosopis* invasion stand out as forms of social and institutional resilience in the face of these mounting problems and antagonisms.

Whither Pastoralism and Pastoralists? Pastoralists in Ethiopia are under increasing pressure. Population growth, increasing numbers of livestock produced for export, deforestation, soil degradation, bush encroachment, and invasive species are increasing stresses and competition over a shared and shrinking resource base. In some areas, administrative boundaries, at times contested or not clearly demarcated, constrain the movements of pastoralists in search of water and pasture, or are used to exclude one pastoralist group to the advantage of another.

Climate trends in pastoralist areas over the last decade indicate that climate change may be bringing a "new normal" that adds unprecedented challenges. The two most important features of climate change impacts are 1) increased frequency of severe droughts, and 2) the chronic failure (late arrival, early cessation, or non-appearance) of the long rains in the period from March through May. The latter trend is reflected in Figure 3.5.

FIGURE 1.5. DECLINES IN MARCH–MAY RAINFALL IN ETHIOPIA



Source: FEWSNET, 2005

These transformed climate trends bring with them severe weather events whose effects may overwhelm political and social institutions, especially as they intertwine with other demographic, environmental, and developmental problems. Resource scarcity puts into motion the adaptive strategies that pastoralists

have developed over many generations. The most important adaptive strategy remains the mobility of pastoralists. However, the combination of more people with more animals competing for the use of ever-shrinking pastures and water sources produces conflict. When administrative boundaries are used to try to regulate these movements, resulting in actual or perceived differential benefits for different clans, potentially explosive grievances are likely to arise.

Severe drought now seems to occur persistently. In many instances, especially in southern Ethiopia, with no time to recover from year to year, household assets collapse. Throughout southern Ethiopia, pastoralists themselves expressed doubts about the viability and future of pastoralism as a livelihood.

One consequence of this new pattern is an increase in the number of pastoral dropouts who have few or no alternative economic activities to pursue in the near term. This raises the possibility of a growing and potentially aggrieved population that might gravitate toward urban areas and contribute to climate-related conflict of a quite different sort than the resource competition normally envisioned. It also suggests that the need for alternative livelihoods and urban planning is more urgent than has been recognized to date.

All other things being equal, pastoralism is perhaps the most efficient land use system for Ethiopia's extensive dry rangelands. However, with intensifying climate change and an approach to pastoralism in the government's development plans that favors transition toward settlements rather than continuity in support of traditional mobility, it is clear that all things are *not* equal. Instead, pastoralism is likely to come under increasing climatic and developmental pressures.

Current trends suggest that the need to address the impacts of these constraints and their effects is even more urgent than has been realized to date. There is a danger of international assistance programming falling behind the real curve of the pastoralist transition that is underway.

Nascent forums for dialogue need additional support and offer the opportunity for the development of new forms of institutional cooperation between local government and customary institutions put in the service of the peaceful sharing of natural resources valued by pastoralist communities. Support for government-community engagement around the themes of climate change, natural resource management, and the peaceful sharing of natural resources could both advance progress on resolving resource conflicts and build important new institutional relationships of significant value in their own right.

4.0 THE SAHEL: NIGER AND BURKINA FASO

4.1 NIGER

4.1.1 A History of Coups and Droughts

Weak or flawed governance and coups have plagued Niger since independence in 1960, and weather shocks have sometimes played a part. In 1974, a military coup overthrew President Hamani Diori. The proximate cause was Diori's failure to effectively respond to massive food insecurity produced by an extended drought. As Niger fell victim to the regional debt crisis of the 1980s, his successor, Seyni Kountché, failed to marshal resources to respond to successive drought-driven famines, especially the distress that afflicted and threatened the way of life of the minority Tuareg population. Many Tuareg left Niger for Libya, while others mobilized a variety of resistance movements that engaged in low-intensity conflict in pursuit of autonomy for the northern regions of the country.

Over the next two decades, failed or corrupt efforts to decentralize power were accompanied by two more flare-ups of Tuareg rebellion. Today, despite development and security assistance from external donors, President Mamadou Issafou presides over weak political institutions, beset by the spillover effects of instability in neighboring countries and troubled by the lingering grievances and unmet expectations of Niger's own citizens. Table 4.1 indicates not just the weakness but the precariousness of Niger's state institutions.

TABLE 4.1. NIGER GOVERNANCE INDICATORS 2012

Indicator	Percentile Rank
Voice/Accountability	35
Political Stability/Violence	14
Government Effectiveness	28
Regulatory Quality	29
Rule of Law	28
Control of Corruption	28

Source: http://info.worldbank.org/governance/wgi/index.aspx#home

The most important climate event of the last century in the Sahel was the "great drought" of the early 1970s and its successors in the mid-1980s. In Niger, the great drought was transformative, drying up bodies of water and drastically reducing vegetative cover over vast areas. Pastoralists in the north were especially hit hard, as the loss of forage decimated their herds.

While the country has received an increase in total rainfall since the 1990s, the twenty-first century has seen the return of a series of droughts and severe food insecurity in 2005, 2010, and 2012. Researchers also have noted what they characterize as changes in seasonal patterns and intense rain events..

4.1.2 Climate Projections, Adaptation, and Conflict

There is no consensus about future rainfall in the Sahel, but scientists have recently suggested the likelihood of a "near-term scenario" for a somewhat wetter Sahel, with more variable precipitation on all time scales, from intra-seasonal to multi-decadal, and projected increases in daily rainfall intensity rather than frequency (Giannini, Salack, Lodoun, Ali, and Ndiaye, 2013). There *is* a strong consensus that increases in Sahelian temperatures will continue. Downscaled climate model projections for 2040–2060 compared to 1980–2000 anticipate an increase of between 1°C and 3°C. Niger is likely to face difficult climate challenges ahead, with perhaps more total rainfall than in previous decades but punctuated by unpredictability, soaring temperatures, dry spells, and intense storms.

Erratic rainfall and rising temperatures already interact with non-climate factors to increase livelihood vulnerability. Yields from rain-fed crop production have decreased over time due to the combined effects of population increases, environmental mismanagement, and climatic shifts. With population increases, fields cannot be left fallow to regenerate. Tree cutting to clear land for agriculture and for fuel wood has had a huge impact on soil erosion and soil quality.

FIGURE 4.1. NIGER

Source: Ezilon Maps, 2009

Various forms of adaptation to climate variability have been pursued for many years in Niger, sometimes with notable success. After the droughts and famines of the 1970s and 1980s, native trees and shrub stumps still present within cleared fields were regenerated, reducing soil erosion and providing fuel wood, building materials, fodder, and food. By 2006, farmer-managed natural regeneration (FMNR) had extended new tree cover over nearly five million hectares. While communities that practiced FMNR

were more food secure than those that had not, population growth meant that FMNR alone was not sufficient to stay ahead of Niger's food and livelihood needs (WRI, 2008).

New seed varieties for traditional crops are now being tried that come to harvest more quickly, and new crops like sesame and potatoes are being grown in some areas. Other agricultural adaptations seek to regulate water flows to prevent erosion and maintain soil moisture. These and other adaptive experiments are making some progress, but within the overall national context they are still limited in number and scope.

Farming households have diversified, with the majority choosing livestock production to supplement household income. Conversely, many pastoralists have diversified by engaging in cultivation. There has been a convergence toward agropastoralism as a more resilient livelihood, and a strengthening of commercial activities. Amid these shifts, resentments sometimes arise against those with the capital and connections to gain preferential access to land, water, and pasture.

In principle, cultivation is forbidden in the northern pastoral zone of Niger. There is, however, a strong northward extension of agriculture due to land pressures in the south. Both pasture areas and livestock routes are being cultivated, increasing the incidence of farmer-herder conflicts where this has occurred. Farmer-herder conflicts have claimed hundreds of lives since the 1990s, and they continue to persist. Recent economic activities such as cutting pasture and wood, charcoal production, the encroachment of commercial farms into pastoral zones, and the fencing-in of large territories by rich and powerful individuals have proceeded unchecked in some areas of the pastoral zone.

These cumulative forces—increasing climate variability and intensity, rapid demographic change, continual extension of agriculture to new lands, environmental degradation, and new forms of commercial activities—are configuring new situations of competition over resources that increase the potential for conflict. The Tuareg, who believe that their concerns have never been satisfactorily dealt with by the state, feel especially marginalized by the effect of these forces in northern Niger.

FIGURES 4.2 AND 4.3. THE EXTENSION OF AGRICULTURE INTO PASTORALIST AREAS

Pastoral well surrounded by fields

Field in pastoral zone

Source: Julie Snorek

4.1.3 Incomplete Institutions and the Potential for Conflict

These conflicts take place in the context of institutional failure. Niger's Rural Code provides a legal and institutional framework to protect the rights of all Nigerien citizens to access and use rural resources, including land, water, pasture, and forests. According to both government officials and development specialists, most of the population does not know, ignores, or disobeys the Rural Code. Many rural groups still believe traditional leaders, especially those at the village or local levels, best handle conflict prevention, and adjudication. The reliability and effectiveness of the Nigerien state are viewed skeptically by most rural dwellers, especially pastoralists.

Traditional chiefs from predominantly Tuareg areas observed that while Niger's Rural Code attempts to organize the territory for both pastoral and agricultural purposes, it provides simpler and more easily verifiable means to claim land for sedentary groups. As a rule, they believe, farmers are better represented and better informed about legal processes, and thus are more likely to hold sway with local authorities.

The Rural Code retains the potential to reduce conflict in Niger significantly, but there is extremely weak institutionalization of the most important legal provisions on the country's most climate-affected and contentious issues, i.e., natural resources and their use. With a powerful population boom and increasing climate stresses, this situation is leading to persistent, though localized, conflict.

There are few indications of strong linkages between climate change and large-scale violent conflict in Niger. Climate trends and the sometimes divergent adaptive responses of different livelihood groups are more consequential for the kind of frequent, low-intensity, and localized conflict among farmers and herders typical of many areas of the country. The number of fatalities resulting from such conflict is usually low, but the persistence of violent encounters complicates efforts to implement effective and sustainable development programs.

Even so, although the probability is low, the effects of climate change in northern Niger, in combination with the rebellious history and unresolved grievances of the Tuareg population, could have the potential to produce more serious violence. The Tuareg never fully recovered from the effects of the great droughts of the 1970s and 1980s, and the loss of pastoral areas to rapidly expanding agriculture has left them in an insecure and unstable position. Many Tuareg believe that inadequate (or discriminatory) government policies, including the Rural Code, work against them. Repeated climate stresses or a severe climate shock with a weak response from the central government could plausibly spark a renewal of Tuareg rebellion in Niger.

4.2 BURKINA FASO

4.2.1 Weakening Rule under an Aging Autocrat

Burkina Faso has not had the sort of ethnic and cultural tensions that have sometimes destabilized Niger, but its political life has been subject to stronger ideological crosscurrents. Military involvement in politics took a revolutionary turn in 1983. Captain Thomas Sankara, supported by Blaise Compaoré and other officers, acquired power through a coup d'état. In 1987, Compaoré and his allies overthrew Sankara's "popular democracy" and established a new regime of "rectification." Compaoré proved to be a formidable political leader who was able to balance old political alliances and promises of new democratic spaces, while maintaining support from the military. He maneuvered without serious challenge to his power for nearly a quarter century.

Between February and June 2011, however, Burkina Faso experienced a political crisis. Dissatisfaction in the military, student protests against police brutality, and fears in the business community over

vandalism and assaults led to a crisis of insecurity in Ouagadougou and elsewhere. As the security situation deteriorated, many expatriates fled the country.

The deeper roots of disenchantment with the regime sprang from years of authoritarianism, impunity, and limits on political freedom. Under intense pressure, President Compaoré devised a series of reforms and reallocation of resources that temporarily shored up his support among key sectors and political supporters.

The matter of presidential succession in 2015 (Article 37 of the constitution prohibits Compaoré from assuming another term of office) hangs over the entire political system as an unanswered question. In January 2014, with the political opposition stronger and better organized, thousands of demonstrators protested efforts by Compaoré to abolish constitutional term limits. In response, the president offered unconditional dialogue with the opposition, but a resolution of the political crisis was not in sight. The relatively favorable governance indicators in Table 4.2 for 2012 appear to lag behind the current political realities in Burkina Faso.

TABLE 4.2. BURKINA FASO GOVERNANCE INDICATORS 2012

Indicator	Percentile Rank
Voice/Accountability	37
Political Stability/Violence	26
Government Effectiveness	30
Regulatory Quality	48
Rule of Law	42
Control of Corruption	38

Source: http://info.worldbank.org/governance/wgi/index.aspx#home

4.2.2 Climate Challenges and Migration

Burkina Faso's recent political instability is unfolding in the context of serious climate challenges that appear likely to worsen over time. Weather trends and impacts in Burkina Faso generally parallel those in Niger. According to the National Council for the Environment and Sustainable Development, the country has recently experienced increasing temperatures as well as greater rainfall intensity and variability. Downscaled climate model projections for 2,000–2,050 agree on temperature increases ranging from 1–1.5 °C to 3–3.5 °C across Burkina Faso. Climate model projections for mean annual precipitation do not reflect a clear consensus, although some evidence exists for the likelihood of more erratic and intense rainfall events.

In some areas of Burkina Faso, a negative cycle of mutually reinforcing climate impacts and human actions threatens to spiral downward. Desertification and harsh dry spells have degraded land quality and contributed to low agricultural productivity and food insecurity. To obtain new and more productive land for cultivation, many people have turned to tree cutting. The effects of deforestation include further soil erosion and degradation, which is then exacerbated by the rain and winds of more intense storm events. Nearly half of all available lands are degraded in Burkina Faso. The relative contribution of climate factors and human actions to this negative cycle is a matter of debate, but the net result is an extreme sense of livelihood vulnerability felt by the majority of people living in the countryside.

While tree-planting efforts have been mounted by some local groups, the survival rate of seedlings is low. With more erratic and unseasonal precipitation patterns, water management is an increasingly

important adaptive response. Only around 12 percent of irrigable lands have been converted from rain-fed to irrigated agricultural production, although government officials believe that, if properly managed, the hydrological network comprising the country's five main rivers would permit the replenishing of groundwater. Broadly speaking, while there are efforts to increase artificial water reservoirs, strengthen local water committees, and promote integrated water resource management, both government officials and other interviewees agreed that water management in Burkina Faso has been poor.

FIGURE 4.4. BURKINA FASO

Source: Ezilon Maps, 2009

Burkina Faso also has not had notable success with FMNR. The main constraint that has affected FMNR innovators in Burkina Faso has been the lack of clear land tenure or property rights. Burkinabé advocates of FMNR call for the securitization of land rights and the promotion of agroforestry parks for FMNR at the community level. As in Niger, farmers have acquired livestock when possible, and pastoralists have turned to cultivation to increase their own resilience.

The challenges presented by land degradation and climate variability have spurred internal migration to more developed areas of the south and southwest, where irrigated agriculture and commercial investments are increasingly found, and to less-developed areas in the east, where available land is relatively more abundant. In both instances, these demographic reconfigurations have contributed to conflicts over land. In the south, intra-familial disputes occur over the sale of land to "outsiders" from elsewhere in the country, while in the east disagreements are common among differing ethnic groups over the duration and validity of tacit agreements allowing newcomers to cultivate unused plots of land. Nationally, the Ministry of Animal Resources roughly estimates that approximately 4,000 farmer-herder conflicts took place between 2005 and 2011.

Despite government fears that cross-border resource conflicts would be sparked by the arrival of refugees fleeing violence in Mali with their livestock, relief efforts helped to manage the situation, and conflicts appear to have been limited. Within the country, Burkinabé pastoralists, squeezed by the progressive restriction of pastoral spaces and access to pastoral resources, face the potential for more frequent farmer-herder conflicts.

4.2.3 The Slow Implementation of Rural Land Laws

The institutional factor that increases the significance of these internal conflicts in Burkina Faso is the *Régime Foncier Rural* (Law on the Use of Rural Lands) of 2009, whose stated purposes include equitable access to rural lands for all actors in the countryside, the promotion of rural investments, sustainable management of natural resources, and preservation of social peace. Although it is not as far-reaching as the Rural Code in Niger, the Regime Foncier is a cornerstone in the efforts of the Government of Burkina Faso to maintain stability in the countryside, and implementation has been difficult. The rules and regulations are not well understood, and critical observers believe the government does not have the capacity to communicate them properly. The Millennium Challenge Account (MCA) provided initial support for the Regime Foncier, but was able to reach just 13 percent of the communes in the country.

The Regime Foncier has led to new conflicts at times, as uncertainties about its provisions and intent have raised questions for some families unsure about the future security of their land. Should they worry about losing the land? Should they consider selling it or taking other actions before new, unwanted arrangements are imposed on them? The decisions discussed or made by family members can lead to disputes—sometimes intergenerational in nature—that can turn violent and are sometimes fatal.

These sorts of mistaken fears about the Regime Foncier also have led some people to sell their land to speculators who exploit the situation, reinforcing perceptions that the new land laws are mechanisms intended for the use and benefit of the powerful. With the end of support from the MCA, the sustainability of the overall effort is a matter of concern. If stability in rural areas is indeed a prerequisite for building resilience, the sustained and successful implementation of the Regime Foncier is an essential part of the equation.

4.2.4 Artisanal Gold Mining and Uncertain Stability

It is uncertain in what ways stability in rural areas is being enhanced or weakened by the rapidly expanding artisanal gold mining sector, which may be seen as an additional form of livelihood adaptation (or maladaptation) in the face of climate challenges. In the dry season, when cultivation becomes unproductive or impossible, some villages in Burkina Faso are seeing as much as 60 percent of their population leave to engage in artisanal gold mining. Approximately one million Burkinabé are now working in the artisanal mining sector for part of the year. The majority of these workers are male (including large numbers of minors), but thousands of women also depart for mining sites. As one development worker put it during an interview conducted on October 11, 2013, in Ouagadougou, Burkina Faso, "Every project now faces the problem of disappearing labor." Child labor, school absenteeism, drugs, prostitution, toxic chemicals, price distortions of basic goods and services, and the abuse of women are common in these unregulated settlements.

The only clear threat to stability in Burkina Faso is the question of President Compaoré's intentions and actions in relation to the 2015 elections. Tensions are likely to increase if uncertainties remain as that date draws closer, and they could get considerably worse if the president tries to manipulate events in a way that tightens his grip on power. A serious crisis related to weather events such as a severe drought or devastating floods could open such a possibility, but the likelihood of that confluence of circumstances is very low.

It is very probable, however, that conflicts over natural resources, partly caused by climate change and adaptive responses such as the turn to agropastoralism and internal migration, will continue to hamper Burkina Faso's efforts to achieve more rapid economic growth. Until the Regime Foncier is better understood and accepted by affected rural populations, many conflicts will result from fears and misunderstandings. The emergence of artisanal gold mining as a major new coping mechanism for populations affected by climate impacts and other factors adds uncertainty to the potential for instability in rural areas.

5.0 WEST AFRICAN CITIES: LAGOS AND ACCRA

5.1 LAGOS

5.1.1 A Rising Megacity in a Besieged National State

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. 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 (Campbell, 2011). 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. 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. Table 5.1 reveals how many observers view Nigeria's political stability as hanging by a thread.

TABLE 5.1. NIGERIA GOVERNANCE INDICATORS 2012

Indicator	Percentile Rank
Voice/Accountability	27
Political Stability/Violence	3
Government Effectiveness	16
Regulatory Quality	25
Rule of Law	10
Control of Corruption	11

Source: http://info.worldbank.org/governance/wgi/index.aspx#home

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. 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, Lagos has made remarkable progress in addressing its urban challenges, especially through large and innovative programs to deal with solid waste.

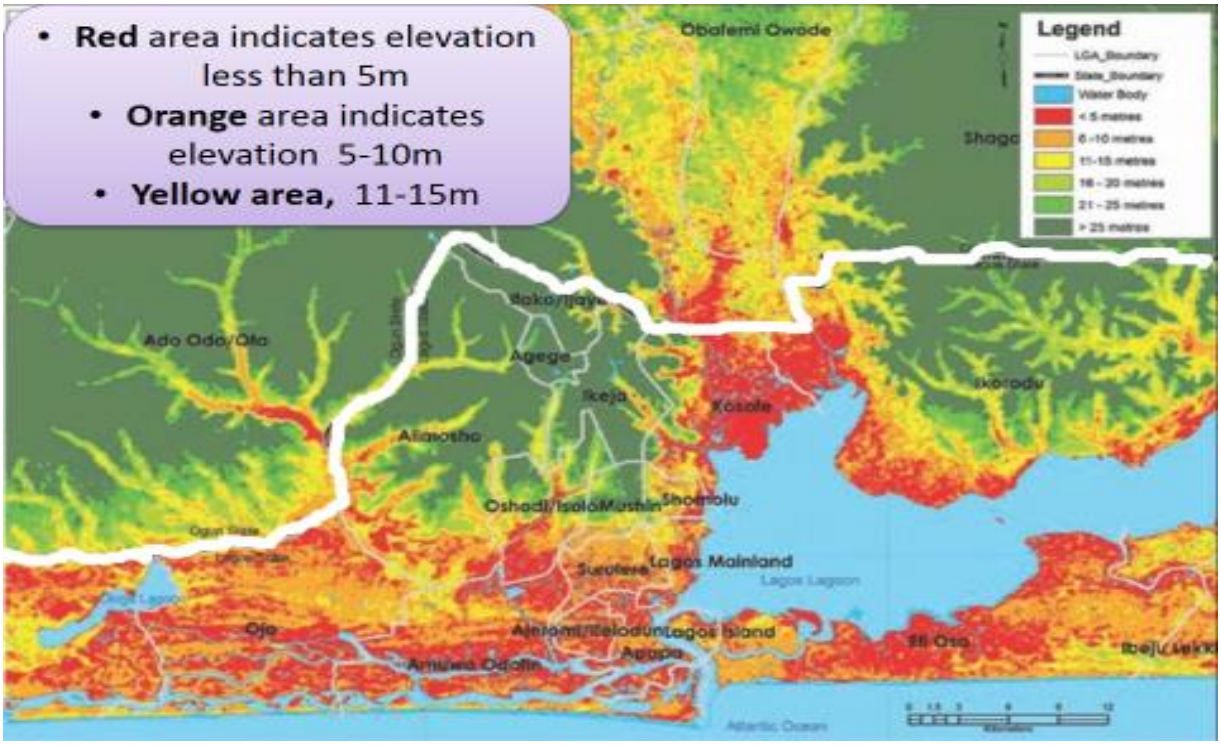
As a consequence of the relative advantages and improving conditions in Lagos, the city has attracted millions of migrants, and its population has grown at an accelerating rate that far outstrips that of the nation as a whole. The cumulative and continuing pace of new arrivals to the city, most of whom 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.

5.1.2 Extreme Climate Vulnerability of the Poor

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.

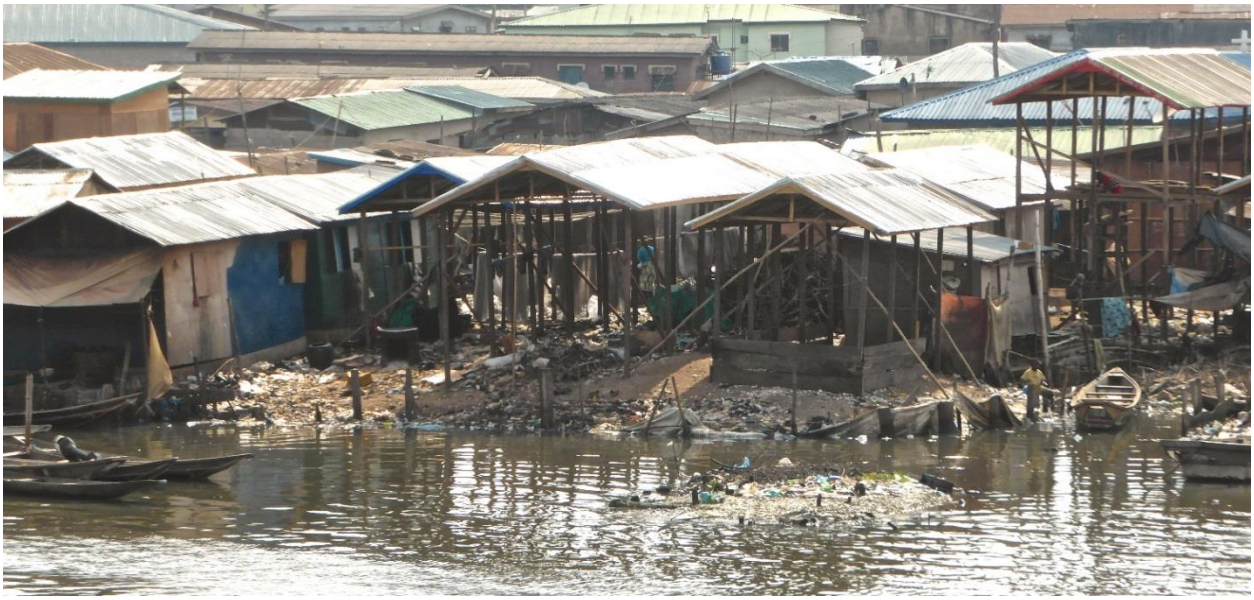
FIGURE 5.1. MAP OF LAGOS WITH ELEVATIONS



Source: Mehrotra, Rosenzweig, and Solecki, 2011

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. 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. 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. The issues of possible eviction and relocation are highly controversial, with a high potential for conflict.

FIGURE 5.2. CONSTRUCTION OF SHELTER AT THE WATER'S EDGE, MAKOKO IN LAGOS



Source: Katsuaki Terasawa

5.1.3 Rich-Poor Divides, Migration, and Climate Threats

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 per 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.[3] The 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 cite 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.

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

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 around 70 "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.

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. 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 by other reasons.

While Lagos has in many ways made impressive strides as it begins to build a model megacity, it is still enmeshed in the larger reality of Nigeria's political, ethnic, and religious cross-currents and conflicts.

Current climate projections for Lagos have uncertainty with respect to annual 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 waterborne diseases; and the potential for increasing deaths, displacement, and damage 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 could overwhelm the government's capacity to respond, leading to social unrest and violence.

5.2 ACCRA

5.2.1 National Stability, Metropolitan Vulnerability

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. 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. Ghana's institutional strengths and stability are captured in Table 5.2.

TABLE 1.2 GHANA GOVERNANCE INDICATORS

Indicator	Percentile Rank
Voice/Accountability	60
Political Stability/Violence	50
Government Effectiveness	52
Regulatory Quality	56
Rule of Law	54
Control of Corruption	55

Source: http://info.worldbank.org/governance/wgi/index.aspx#home

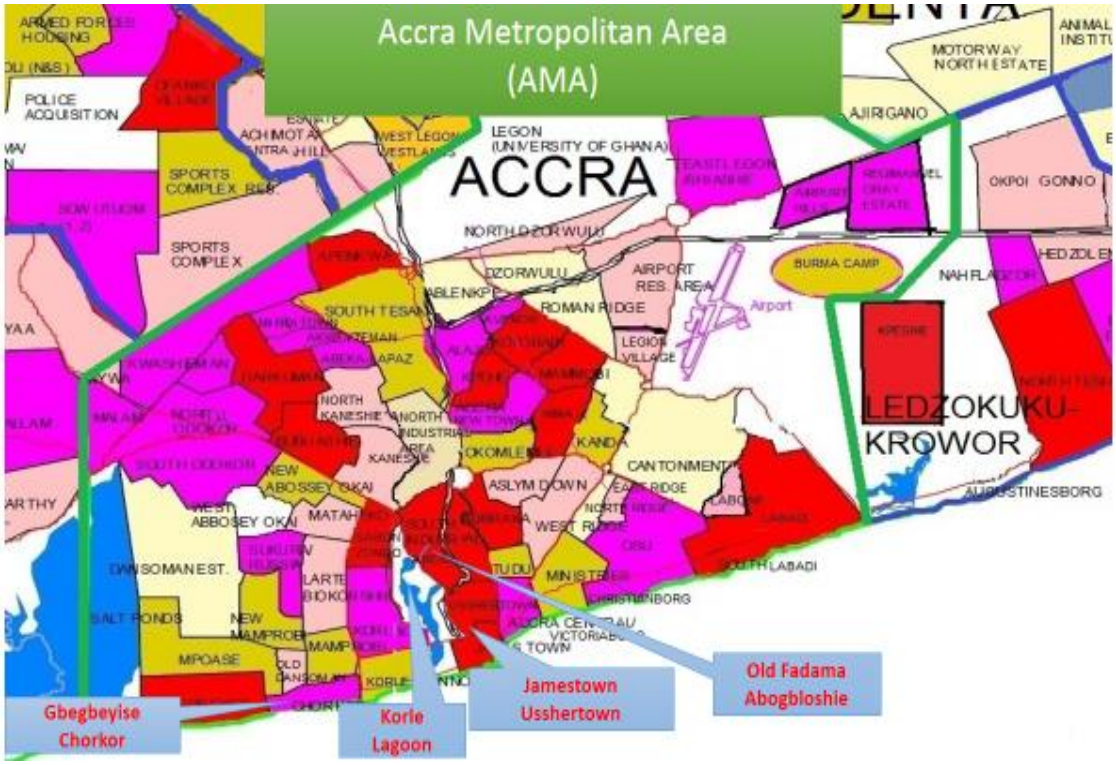
As in Nigeria, population growth in Accra, Ghana's capital of 3 million people, is much more rapid than in the country as a whole. Many of those who came to Accra from the north settled in poor, low-lying lands along Korle Lagoon, including the flood plains upon which Accra's largest slum, Old Fadama, is located. The Ga people, who are considered to be the indigenes of Accra, also have long resided in nearby low-lying areas such as Jamestown and Usshertown.

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 Accra Metropolitan Assembly (AMA), supported by traditional Ga leaders resentful of the environmental problems caused by the Old Fadama squatters, 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 depended on commerce in the immediate area.

According to recent weather data, temperatures have been increasing in Accra. Interviewees in the capital believe that rainfall has become more variable and intense as well. Sea level rise along Ghana's coast is estimated by the government at 2.1 millimeters per year over the last 40 years and is expected to accelerate.

The geomorphology of Accra already 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.

FIGURE 5.3. POOR NEIGHBORHOODS IN LOW-LYING AREAS OF ACCRA



Source: Adapted from Greater Accra Metro Area, n.d.

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 (IFPRI, 2012). 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.

Social 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 waterborne 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, 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 the population increasing, slums illegally located on floodplains, steady coastal erosion, and extremely poor solid waste management, the human impact of torrential rains is intensifying. Around 10 to 20 lives are lost every year (poor casualties sometimes go uncounted), and the numbers can be expected to go up. Severe floods have become perennial events.

5.2.2 In Search of Credible Adaptive Responses

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 new $596 million, multi-year 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. 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 AMA is a test of whether that viable path forward has, in fact, been found.

6.0 OUTSIDE OF AFRICA: PERUVIAN ANDES

6.1 DIVERSITY AND DEVELOPMENT IN A WEAK STATE

Peru's geography can be roughly divided into three zones: the arid plains of the Pacific coast; the mountainous highlands, or *sierra,* of the Andes; and the tropical jungle, or *selva,* of the Amazon Basin. These three regions are home to culturally and ethnically different majority identity groups, each with very different ecological endowments. The Andean highlands are populated by Amerindian-mestizo descendants with deep roots in Amerindian cultural practices and traditional forms of social solidarity.

These fractures of ethnicity, identity, economic power, and culture have made state-building extremely difficult in Peru. The weakness of the political system and its inability to give effective voice and representation to the nation's diverse population has led to correspondingly weak government institutions. The 1980s and early 1990s saw an upsurge in illicit coca production, and the rise of an extremely violent revolutionary movement, Shining Path (*Sendero Luminoso*), was a serious and direct challenge to the state.

It was in this deeply troubled national context that Alberto Fujimori was able to ascend to the presidency in 1990. Fujimori dissolved congress and suspended the constitution in a so-called "self-coup" in 1992. He implemented an extensive privatization program that reversed statist economic structures but also facilitated cronyism and corruption. Between 1990 and 1997, mining investment increased twenty-fold. In 1992, Abimael Guzmán, the leader of Shining Path, was captured in a dramatic blow to the extremists. However, it became increasingly clear that, under Fujimori's direction, state officials had engaged in widespread human rights abuses and killings. Fujimori was eventually convicted and imprisoned for human rights abuses, embezzlement, wiretapping, and bribery.

The promotion of foreign investment in the extractives sector was intensified under President Alan García (2006–2011). Economic growth accelerated, and investment increased in the extractives sector (spurred by high international mineral prices, which played an important role in overall growth). Some of the national confidence regained during the García years is reflected in the governance indicators in Table 6.1 below, although not for political stability. Yet complaints about the environmental costs of poorly regulated mining activities proliferated, and there was little evidence that mining brought lasting benefits to affected communities. Community-company relationships were frequently tense and sometimes explosive. Mining communities suffered damages to both the supply and the quality of their water resources.

García's successor, President Ollanta Humala, a former army officer, campaigned on a platform of greater social inclusion for Andean and Amazonian groups, as well as a more equitable distribution of the revenues generated by the extraction of the nation's mineral resources. The country's existing institutional structures and capacities, however, remained inadequate to the task of addressing many of these conflicts.

High levels of social and economic inequality still create a strong sense of deprivation among vulnerable groups in the countryside. Table 6.1 captures the disjuncture between Peru's mobilized society and its latent political instability, as well as the pro-business regulatory regime that is in itself the cause of much

dissent. Given Peru's heavy dependence on its natural resource base for its well-being and stability, climate change is a major conditioning factor, and its effects, which already can be seen and felt, are increasingly consequential.

TABLE 6.1. PERU GOVERNANCE INDICATORS 2012

Indicator	Percentile Rank
Voice/Accountability	54
Political Stability/Violence	20
Government Effectiveness	49
Regulatory Quality	68
Rule of Law	33
Control of Corruption	43

Source: http://info.worldbank.org/governance/wgi/index.aspx#home

6.2 FOLLOW THE WATER: COMPETITION AND CONFLICT

Peru is highly vulnerable to climate change impacts, with seven of the nine vulnerability characteristics recognized in the 1992 United Nations Framework Convention on Climate Change: low coastal zones; arid and semi-arid areas; exposure to floods, droughts, and desertification; zones prone to natural disasters; areas of high urban pollution; fragile mountain ecosystems; and significant economic dependence on the production and export of fossil fuels. Few countries are as ecologically diverse as Peru, both in terms of biodiversity and distinct climatic zones, and Peru holds 71 percent of the world's tropical highland glaciers.

Extreme weather events and related phenomena have been increasing in frequency, intensity, and duration, sometimes occurring at unusual times of the year. These include flash floods, landslides, droughts, freezes, and hailstorms. Peruvian glaciers have diminished in size by 22 percent since 1980. Some 95 percent of Peru's population uses water resources originating in the high Andean regions. Along the Pacific coast, about 80 percent of total water resources are used for irrigated export agriculture. The mining sector also is a significant consumer of water. In the poor, rural highland agricultural sector, irrigation is based on low technology, and water availability for irrigation is often limited.

The interests of these myriad water users are diverse and frequently contradictory. Water management in the agricultural sector raises complex questions about irrigation rights, appropriate technology, and upstream-downstream distributions. Public concerns about mining companies' privileged water access and water pollution caused by mining operations can lead to protests that disrupt or even shut down mining projects. Under Peru's 2009 Water Resources Law, the availability of water for human consumption is considered a human right. As climate-related threats to adequate water supplies increase, the potential for conflict among stakeholders with competing needs and divergent interests is increasing.

The most authoritative tracking of social conflicts in Peru is done by the *Defensoría del Pueblo,* or Ombudsman's Office, in Lima. According to the Ombudsman, more than half of the conflicts in the country are classified as socio-environmental conflicts. Most of these are water conflicts, and a majority is related to conflicts involving extractive industries. The Ombudsman's office is investigating climate change in the context of human rights, focusing on water availability, water quality, and access.

Conflicts between communities and extractive industry companies are at a high level in Peru, and they are likely to increase in number. Large mining companies are moving to locations with higher populations and more easily mobilized communities. The impacts of climate change on water scarcity

and water quality have significant implications for both potential conflict and the stability and overall investment climate of the mining sector.

FIGURE 6.1. PERU (ANCASH AND AREQUIPA REGIONS HIGHLIGHTED)

Source: Library of Congress, n.d.

6.3 CLIMATE CHANGE AND WATER MANAGEMENT: QUANTITY, QUALITY, AND ACCESS

The Santa River Basin in Ancash Region is one of the areas most affected by climate change. The scope of climate change effects go beyond the diminishing water supply. With the loss of one-third of the glaciers of the Cordillera Blanca, and as temperatures increase and precipitation becomes more erratic, highland pastures, wetlands, and prairies are losing their capacity to provide their usual regulation and filtration of water flows and groundwater recharge. Changes in the climate that have been observed include prolonged droughts, more intense and shorter precipitation periods, and more intense frosts.

A percentage of mining revenues is used to provide funds to regional and local governments to address local needs. However, preference is given to immediate and politically popular projects, such as town soccer stadiums or bricks-and-mortar infrastructure. This is a source of frustration for the growing number of local advocates urgently recommending measures to reverse water insecurity and address conflicts in the Santa River Basin.

Little attention has been given to the problem of climate change and water quality, but it is a looming issue, and one with potentially serious implications for conflict in Ancash. As the glaciers recede, water and oxygen combine with sulfur in the newly exposed surfaces to make sulfuric acid. The sulfuric acid releases the toxic heavy metals found in the exposed rocks, and they are then carried by glacier melt into surface and ground waters. In addition to its harmful effects on human health, contaminated water is potentially a huge problem for irrigated agriculture. At the same time, toxic heavy metals also are produced by mining activities throughout the region. In addition to the very real consequences of poor water quality in the area, the uncertainties about the source of any specific instance of contaminated water could lead to finger pointing and serious conflicts. In the judgment of local experts, the issue of water quality is "a time bomb."

Conversely, concerns about melting glaciers and water scarcity appear to be somewhat exaggerated or misplaced. Recent research suggests that once the glaciers melt completely, the effects on total water discharge will be variable, differing widely depending on location. Researchers and government officials in Ancash agree that problems of water scarcity are less related to absolute shortages than poor management of water supplies, especially in agriculture. Existing water rights are inefficient and inequitable, and those who benefit are resistant to change.

The current dysfunctional management of water is a reflection of the fact that the politics and cultural underpinnings of water governance in Peru are thorny and complex. Regional water governance policy reforms and project initiatives need to be crafted and implemented with extreme sensitivity and an acute awareness of how they may affect social, political, and economic interests and unintentionally generate conflict.

Many regional water experts regard integrated water basin management, starting with micro-basins and moving to sub-basins and macro-basins, as the crucial mechanism for achieving sound water management and conflict prevention.

Because of its naturally arid climate, climate change challenges are perhaps even more daunting in Arequipa Region. Cutting across Arequipa Region is the Ocoña River Basin, whose waters originate in the snow and ice cover of Coropuna, a snowcapped mountain that has been greatly reduced in size by the effects of global warming. Desertification has advanced in some parts of the region, while the highlands have seen a reduction in wetlands, springs, and lakes, as well as an increase in extreme weather events that have led to landslides, floods, and crop losses.

In an open meeting in Chuquibamba in Condesuyos Province, a discussion of climate change produced an outpouring of worries, complaints, and laments concerning changes in the area's weather, landscapes, and livelihoods. Participants agreed that there are many consequences of recent changes in the climate for plants, animals, and humans. Pastures no longer grow as they once did, and the milk production of camelids (llamas, alpacas, and vicuñas) and cattle (goats and bovines) is declining. Skin cancer is on the rise. Increasing population and the search for firewood for sale has contributed to deforestation and soil erosion. The water for irrigation is decreasing due to these climatic and environmental transformations, and scarcity is producing localized conflicts among water users.

As in Ancash, water scarcity is greatly aggravated by poor water management that is inefficient and often contentious. Small farmers who benefited from earlier land reforms in the 1970s did not receive water rights in sufficient quantity to meet their irrigation needs. As a consequence, the rights to use water for irrigation are still disproportionately concentrated in a few hands.

There are also cross-border conflicts with neighboring regions. One such recent conflict was the "war over water" on the border between Arequipa and Moquegua, the region that lies to its south. A second regional violent conflict has taken place between Arequipa and Cuzco over the use of water for irrigation projects.

Regional institutions such as Arequipa's Regional Environmental Authority and the regional Ombudsman's Office are trying to develop their capacities to prevent and manage water conflicts, and they recognize that climate change is an increasingly important contributing factor. They are significantly constrained by limited human and financial resources. Nevertheless, there are clear opportunities to build on resilient community attitudes that reflect a readiness to work together on common problems. In Condesuyos, for example, community representatives agreed to form committees to address water, environmental, and climate challenges in three issue-areas: reforestation; improved irrigation; and environmental education. Communities and municipalities generally have strong capacity for self-organization but lack resources and technical expertise.

6.4 THE TRAJECTORY OF CLIMATE CHANGE AND CONFLICT IN PERU

While weather station data are generally lacking, there is strong agreement among climate experts, extensive oral testimony, and convincing biophysical evidence that highland areas of Peru are experiencing serious negative impacts from climate change that go well beyond the highly publicized risks of glacier melt. While there is significant variation among specific micro-climates and micro-watersheds, the general effects include continuing glacier retreat, warmer temperatures, more erratic and intense weather events (e.g., droughts, rains, frosts), significant changes in seasonal precipitation patterns, and deteriorating highland ecosystems (*Ministerio del Ambiente del Perú* [MINAM], 2010; Obregón et al., 2009; and Célleri and Feyen, 2009). According to Professor Julio Palomino of the *Universidad Nacional de Ancash*, water contamination in the Andean highlands produced by glacier melt leading to acid rock drainage adds to problems of water scarcity (FESS interview, October 16, 2012). Cesar Portocarrero, the former director of the Huaraz Glaciology Unit of the National Water Authority, notes the increasing risks of natural hazards such as landslides and glacier lake outburst floods (FESS interview, October 18, 2012). These long-term climate trends are unlikely to go away. In the near term, they are likely be exacerbated by poor environmental governance.

These stresses and hardships add significantly to conflict potential all along the watersheds that extend from the highlands to the middle basin small producers and on to the coastal agro-export plantations dependent on abundant irrigation.

Climate change is not yet the dominant reason for water scarcity (inefficiency in water use in the agricultural sector is the leading factor), but it is a contributor, and it is likely to steadily increase in importance in the coming years if water resource management is not improved. The continuing expansion of the mining sector also will add to water stresses.

At present, the clear trend is toward increasing conflict linked to the accumulating effects of climate change coupled with weak environmental governance. The increasing water requirements of export agriculture and mining are at loggerheads with the reality of climate change trends. Some highland communities are headed toward ecological and economic crisis. Mining companies are encroaching upon fragile ecosystems that are essential for the regulation of the natural water regime. In this context, a proliferation of local social explosions, whose cumulative effects could have ramifications for national stability, is entirely possible.

New institutional arrangements in Peru's national, regional, and local governments are steps in the right direction, but they will require time, course corrections, and much better institutional coordination before they become fully effective. In the meantime, improved and participatory water management is both an important form of climate adaptation and a useful step toward reducing conflict. There is also considerable capacity in Andean communities for self-organization to take further steps not only to increase resilience but also to institutionalize mechanisms to reduce conflicts, climate-related and otherwise. In fact, joining the agendas of strengthening resilience and promoting conflict prevention could strengthen both outcomes.

7.0 LESSONS LEARNED

7.1 FROM CAUSATION TO CONSEQUENCES

Given the many potential risks, vulnerabilities, and impacts on human security resulting from climate change detailed in the IPCC's Fifth Assessment Report, it is natural that policymakers, researchers, and development experts should ask, "Will climate change cause conflict in the developing world?"

Yet, as the complexities of these five field-based case studies demonstrate (see Annex II for a summary), when posed in its simplest form, this is actually not the right question. Seeking to isolate and understand a single chain of climate-conflict causality is not particularly helpful or productive. Is climate change likely to be an important cause of conflict in Uganda, Ethiopia, Niger, or Burkina Faso? Or in the cities of Lagos or Accra? Are climate threats likely to be destabilizing in Peru? It seems obvious that, with so many, often much more powerful, factors potentially contributing to conflict in each of these locales, answering with a flat "yes" would be inappropriate based on the evidence as well as unsatisfactory and inadequate. Conversely, answering the question with a flat "no"—a tendency observable among those who wish to debunk the early hype of some climate-conflict warnings—is counterproductive and misleading since there are significant and identifiable interactions between climatic change and pathways of conflict in these and similarly fragile locales.

> The five case studies show that climate change — especially as reflected in observed temperature data; reports by local inhabitants of increases in severe, erratic weather; and consistent accounts from agriculturalists and pastoralists of marked changes in seasonality — has an appreciable impact on livelihoods and economic development; the rights and responsibilities of citizens and the state; resource governance and the performance of political institutions; and relations among privileged and disadvantaged identity groups.

Based on our case studies, we instead can say that trying to understand conflict dynamics in northeast Uganda, Ethiopia's pastoralist regions, Niger's arid zones, Burkina Faso's high-demand land areas, the low-lying slums of coastal West Africa, and the water-stressed Andes of Peru *without* taking into account the effects of climate change would also produce an incomplete and flawed analysis. Climate-related impacts are directly and indirectly affecting the populations that are already the poorest, most vulnerable, and most aggrieved groups in each of these countries. The task then becomes to trace out how climate events associated with credible climate change projections might contribute to conflict within that larger context.

The five case studies in these seven countries confirm our initial methodological premise that "conflict is always the result of the interactions of multiple political, economic, social, historical, and cultural factors." Yet, what they also show is that climate change—especially as reflected in observed temperature data; reports by local inhabitants of increases in severe, erratic weather; and consistent accounts from agriculturalists and pastoralists of marked changes in seasonality—has an appreciable impact on livelihoods and economic development; the rights and responsibilities of citizens and the state; resource governance and the performance of political institutions; and relations among privileged and disadvantaged identity groups. Since we know from a very large body of literature that these are

important and enduring conflict variables, how could climate change not have an impact on conflict, albeit often mediated and indirect?[4]

The results of the case studies argue for setting aside simplistic questions of direct causality and replacing them with more pragmatic and productive questions about how climate change may be consequential for conflict, making use of some of the well-established categories of conflict analysis. This facilitates the construction of a more substantive, qualitative analysis that goes beyond general references to climate change as a threat multiplier, stressor, or potential trigger for conflict. It also generates discussion of specific issue areas with linkages to programmatic interventions that USAID or other international assistance agencies may wish to undertake or may already have underway. Equally important, because they incorporate the input of the agents who actually decide whether to take part in or refrain from conflict (i.e., the affected individuals, communities, and institutions), the case studies identify some of the specific stakeholders in government and society whose interests are threatened by climate change and whose participation may be key to the success or failure of climate-related program initiatives.

Recognizing that these five case studies provide only a limited comparative base, it is nevertheless possible to identify three climate-related patterns of change and four areas of institutional challenges that are likely to be relevant and consequential for many other developing countries in Africa and Latin America.[5]

7.2 PATTERNS OF CHANGE

7.2.1 Climate Change and the Disruption of Traditional Knowledge and Coping Mechanisms

Recent climate trends have contributed to increased insecurity for millions of people living in the rural regions of Uganda, Ethiopia, Niger, Burkina Faso, and Peru. One of the major sources of insecurity has been the decreasing salience and viability of traditional knowledge and coping mechanisms in these rural communities. For all of the affected rural groups, whether pastoralists or agriculturalists, day-to-day activities to meet basic needs are grounded in sophisticated, centuries-old knowledge of the flora, fauna, and annual patterns of their environment. All of these societies, especially in the pastoralist areas of the Horn of Africa and West Africa, have long-established coping mechanisms to respond to the challenges of sometimes extreme climate variability. These episodes of climate variability have nevertheless occurred within certain parameters and a horizon of expectations that allow for a measure of predictability. Today, however, these rural inhabitants, especially in the Horn of Africa, comment frequently on the increasingly erratic nature and sheer unpredictability of weather events and weather patterns.

The key dimension of variability of weather patterns for such groups so heavily dependent on the land and natural resource base for daily subsistence is marked shifts in seasonality. In East Africa, farmers and pastoralists face the unusually late arrival or early cessation of rains (Funk, 2011). Rains often arrive in intense outbursts, followed by the return of a period of drought. One farmer in the Cattle Corridor of Uganda observed that she is only planting on one-fourth of her land because she fears squandering

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[4] As seen in the cases of Ethiopia and Niger in the 1970s and 1980s, climate effects such as drought and famine can also combine with other factors to produce regime change.

[5] The state of case-based knowledge on climate change and conflict is akin to that with respect to democratization studies in the 1970s and 1980s—an inadequate but developing comparative base that is still in the initial stages of gathering lessons learned. In both cases, geographic gaps are noteworthy, and cases studies from Asia were (and are) largely missing.

seeds. In the Andes, the Quechua expression "*chirimanta ruphaymanta*" is used to capture the phenomenon of unprecedented extremes of heat and cold (MINAM, 2010).

One thread of the fabric of conflict is often woven of an already aggrieved group's further loss of the sense of control over its own destiny. The erosion of the efficacy of indigenous knowledge brought about by climate change is contributing to this effect in the rural communities of the case studies. This was summed up by one Karamojong interviewee, who said, "If knowledge is power, then the Karamojong feel they are losing the power of their indigenous knowledge as the climate changes. It is one more aspect of their feeling of powerlessness."

7.2.2 Climate Change and the Erosion of Identity and Social Roles

Related to but distinct from the issue of the loss of traditional knowledge, group identity and clearly defined social roles are stabilizing forces that provide both security and meaning for individuals and communities. Threats to group identity and social values (e.g., ethnicity or religion) are well-known factors contributing to conflict in Africa (Williams, 2011). For pastoralists, distinctions between the economic, social, and cultural spheres of life are somewhat artificial. What one does in the tasks and routines of pastoralist daily life is essentially the same as who one is in the social order of the community. The possession of cattle is not merely a marker of wealth or source of livelihood but also a reflection of group identity. In such settings, climate-related threats to livelihoods are simultaneously threats to group identity and the social roles played by individuals.

In many areas, the gradual loss of authority of elders has been consequential for social cohesion. Traditionally, elders made group decisions about where and when community members would be likely to find pasture and water. With the chronic and severe droughts of recent years, this role has become increasingly irrelevant. In Uganda and Ethiopia, elders who were interviewed lamented their diminished capacity to prevent conflict resulting from a variety of factors, including the effects of climate change.

In Niger, traditional Tuareg life was altered by the drought and desertification of the 1970s and 1980s. Successive national governments either failed to respond to Tuareg needs or heightened the potential for conflict by favoring other groups. Although inter-ethnic tensions were already a feature of Niger's national reality, climate change and government policies combined to destabilize and disempower Tuareg groups across large areas of the country's northern regions.

Climate variability also has been destabilizing for identity and social roles in the Peruvian Andes. In the highlands, glacial lakes both provide water resources and are closely linked to the identity and spiritual values of Quechua speakers. As rainfall becomes more erratic and water scarcity increases, these resources become even more important. In 2009, when Duke Energy surpassed its projected water consumption for the Cañón del Pato hydroelectric facility and lowered the water level in Lake Parón, panicked farmers took over and shut down the company's hydraulic machinery. However, livelihood concerns were not the only reasons for these actions. Communities also objected because of the lake's spiritual significance for them. In the countryside, the effects of climate change on social cohesion and cultural values can be just as powerful a cause of conflict as its more apparent negative effects on economic well-being.

7.2.3 Climate Threats to Livelihoods in the Context of Rapid Economic Development

It is obvious that climate change can threaten livelihoods, especially in rain-dependent rural communities. But in terms of conflict potential, climate threats to livelihoods are much more consequential in the context of rapid economic development of other sectors or groups within the economy, especially when explicitly favored by national policies. The resulting dynamic is one of vulnerable groups who

experience relative deprivation and injustice that they perceive to be, in some measure, the result of the conscious decisions of powerful actors about the use of scarce natural resources. This is a highly consequential pattern of change observable in both the African case studies and, in a different way, the Peruvian Andes. In East Africa and West Africa, rising temperatures and climate variability are driving the crisis of pastoralism from bad to worse, when combined with state-led development plans that marginalize pastoralists and envision their eventual sedentarization. In Karamoja and southern Ethiopia, the near disappearance of a recovery period between severe droughts has contributed to the depletion of the asset base of households and communities. Formerly practiced traditions of sharing resources during times of scarcity—at times even including among the antagonists of competing clans—are not feasible in the context of a severely reduced asset base.

In pastoralist areas of Ethiopia, interviews made clear that under conditions of severe drought communities were fully occupied with the need to survive and had no inclination or capacity to engage in conflict. Cattle raiding and restocking occur only at some indeterminate point in the future when "the rains have returned and communities have recovered." In Karamoja, armed young Karamojong shifted from traditional cattle raiding to participate in gangs involved in violent thievery and banditry in and around the growing number of small towns. In Ethiopia, the questionable future of pastoralism appeared to be leading many young people to become "pastoral dropouts" drifting into more urban areas. The fate and implications for social stability of this rapidly growing, unskilled cohort of youths remains an important unanswered question.

Pastoralists in Uganda and Ethiopia are wary of their national government's plans for "sedentarization" and support for large-scale commercial agriculture and other high-value investments that require large swathes of land. The same is equally true for the Tuaregs in Niger in what could easily become an explosive situation. It is clear to these groups that the vision of government central planners for the future is one in which pastoralists decrease in numbers or entirely disappear.

In Peru, farmers in the Andes do not perceive the government of President Humala to be intrinsically "anti-campesino" but they do feel threatened by what they perceive to be deliberate policies giving preferential water access to the highly promoted and rapidly expanding mining and export sectors. As in Africa, climate-related threats to livelihoods in the Andes are intertwining with communities' existing feelings that the government's main priorities for economic development lie elsewhere. This commingling of climate change threats to livelihoods with a sense of vulnerability resulting from the country's prevailing development strategy exemplifies an important pattern with the potential to contribute to conflict in rural areas in many countries.

7.3 CLIMATE CHANGE AS A CHALLENGE FOR POLITICAL INSTITUTIONS AND RESOURCE GOVERNANCE

7.3.1 Rural Land Access/Use and Water Management

The case studies demonstrate that many aspects of bad governance and institutional failure classically linked to conflict find their most concrete expression in conflicts having to do with rural land use and water management. For pastoralists, mobility and access to water and pasture are existential issues. In Uganda and Ethiopia, recurrent droughts have forced pastoralists to expand their search for these resources to new areas. In Ethiopia, access to land is even more conflictive because it is linked both to resource scarcity and the administrative boundaries and jurisdictions associated with ethnic federalism. The intertwining of climate change impacts with land disputes and controversial internal border policies is potentially explosive.

In Niger, the Tuareg feel squeezed and compromised by landscape change and ever-further encroachment by farmers and commercial developments into the Tuareg's (and other herding groups') traditional grazing zones. The woefully incomplete institutionalization of Niger's Rural Code, which discredits the law in the eyes of many, leads to further frustration and anger. In Burkina Faso, confusion over the Regime Foncier allows already tense land disputes fester into situations ripe for conflict.

Disputes over scarce and inefficiently managed water supplies are perhaps the main source of conflict in Peru. Irrigation rights are complex and often blatantly unfair. Small farmers frequently protest against large mining companies that use increasing amounts of water as they expand their operations across the country. In 2012, in an effort to quell persistent protests in mining communities, President Humala pledged that the government would never approve mining operations whose water use would prejudice the needs of local communities. Nevertheless, the protests continued. Glacier melt contributes to the increasing potential for glacier lake outbursts, reducing water sources used for agriculture and threatening communities with massive, life-threatening floods (Carey, 2010). Climate change is already making the situation more difficult in some highland communities because toxic contamination from acid rock drainage from melting glaciers is affecting water quality.

Warming temperatures and the disappearance of glaciers like Coropuna in Arequipa will lead to further reduced water supplies in the future. Peru has already experienced violence linked to water conflicts between neighboring regions subject to those projected climate impacts. Divided water management between Arequipa and Moquegua led to violence on the border between these two regions, and a second conflict was caused by fears in Cuzco that Arequipa's massive Majes Siguas II irrigation project would leave some Cusqueños without sufficient water. Water conflicts in Peru are increasingly contingent on a race between improved and more equitable water management and the growing impact of climate change.

7.3.2 Land Use, Migration, and Precarious Settlements in Large Coastal Cities

The case study of Lagos and Accra makes clear that two sets of climate-related issues that have to date received no effective institutional response are very likely to become more conflictive in the years ahead: 1) the conundrum of rehabilitating or relocating low-lying slum areas highly vulnerable to flooding and sea-level rise; and 2) the effects of (possibly climate-driven) migrants arriving from other parts of Nigeria and Ghana (or elsewhere). The growth of poor and illegal settlements on highly flood-prone wetlands in Lagos is such that relocation of residents appears to be inevitable for at least some of them. Absent such adaptation measures, flood casualties can be expected to steadily rise. However, the question of eviction or relocation is fraught with tensions, and remarkably little has been done in Lagos (or other major coastal cities in Africa) to grapple with this looming crisis. The "original sin" was failure to enforce existing land use and environmental laws, which still remains a large and unresolved problem. This problem is proportionately smaller but equally serious in Accra.

In Lagos, the question of in-migration is becoming more acute and volatile as public services are being overwhelmed and the threat of terrorism from Boko Haram begins to enter the public mind. To a large degree, this may be a problem without a viable solution. Barring migrants from entering or evicting them would be inflammatory in the context of Nigeria's current political instability. Efforts by the Lagos State Government to find common ground on migration issues with other Nigerian states may help to dampen the potential for misunderstandings and sudden outbreaks of conflict. More broadly, dialogue on responding to the linked challenges of drought and threatened livelihoods in the north and floods and overcrowding in the south, with negative effects on both sending and receiving communities, could provide a useful forum for the discussion of the challenges of migration to major urban areas throughout coastal West Africa.

7.3.3 Marginalization and Lack of Voice

Tensions arising from national development plans that place a low priority on poor, vulnerable, and climate-affected populations' traditional (or alternative) livelihoods and give high priority to large-scale commercial rural or urban development do not merely reflect the outcome of technical economic decisions. Rather, they also are an expression of the political power of respective groups, and they are understood as such by those communities who feel marginalized, or even abused. This feeling is especially acute in Karamoja, but it is also present in southern Ethiopia, the slums of Lagos and Accra, and the highlands of Peru. As climate change sharpens the challenges faced by farmers and pastoralists, or the daily living conditions of urban petty traders, the government's allocation of resources to party favorites and well-connected entrepreneurs (or favored pastoralists with strong market linkages) deepens resentments among those who feel a sense of injustice. In Ethiopia, it is widely perceived that the regional and national governments play one vulnerable pastoralist group against another (e.g., Somalis over Oromos, or Issa over Afar) in a persistent political game. In Lagos, slum dwellers see a new city reclaimed from the sea for modern commercial and residential use, while they face potentially life-threatening floods or relocation to areas far away from the places they work.

In Peru's very different political context, where democracy is flawed but not absent, both rural community associations and young professionals in the highlands of Ancash and Arequipa regions are trying to get more attention for climate change threats from a central government traditionally more responsive to the political interests of wealthier coastal elites. It is an irony that the climate adaptation measures fought for by Andean activists (e.g., ecological restoration, protection against glacial lake outburst floods, and the construction of small dams) are actually the best insurance for a healthy water regime able to service the needs of commercial farms and urban dwellers downstream. The political space in Peru is much greater than in Africa, and civil society is both more highly developed and more capable of collective action. This at times actually heightens conflict—witness the dozens of "socio-environmental" conflicts registered by Peru's national Ombudsman's Office each month. In Peru, as elsewhere in Latin America's democracies, conflict can in fact play a positive role when kept within nonviolent limits. The tipping point from nonviolence to violence, however, is not always readily apparent when passions are high, as they are in most resource-related protests and mobilizations.

7.3.4 Institutional Gaps: Data, Public Information, and Disaster Preparedness and Response

In its report "Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation," the IPCC states that, "A changing climate leads to changes in the frequency, intensity, spatial extent, duration, and timing of extreme weather and climate events, and can result in unprecedented extreme weather and climate events" (IPCC, 2012). While there remain significant degrees of uncertainty that vary from location to location, there is both observed and anecdotal evidence of increasingly erratic and extreme weather events in most of the locations covered by these case studies. Building communities that are resilient to such events is a challenging and complex task involving a long list of issues. The Hyogo Framework for Action, endorsed by UN member states in 2005, however, identifies five priority areas: 1) institutional capacity; 2) knowledge of climate risks and early warning; 3) building understanding and awareness; 4) risk reduction planning and measures; and 5) disaster response preparedness.

In the context of the case studies, these (largely unaddressed) priority areas arise as concerns with potential linkages to conflict that are at present mostly latent, but may not remain so as climate change effects increase. As the full-length case studies explore in some detail, there is a significant lack of time-series weather data and location-specific knowledge about climate change in all seven countries. In Uganda, Ethiopia, and Niger, in addition to limited weather station coverage, conflict itself is a reason for the absence of data, as violence sometimes has made the collection of temperature, precipitation, and

hydrological readings impossible. In Peru, the multiplicity of microclimates in the Andean highlands and valleys presents a severe challenge to the government's data collection capacity. All of the countries are devoting or seeking resources to upgrade the ability of government institutions to collect information and understand the effects of climate change at subnational and local levels.

The dissemination of timely and accurate weather information to farmers and pastoralists is spotty at best. As frustrations with the unpredictability of climate change rise, the lack of help or guidance from government institutions becomes a source of grievances. As one local natural resource official in Uganda put it, "They tell us to expect rains and we don't get rains. They predicted an El Niño, but we never got it." The problem often appears to be as much a failure of communication as an outright lack of information, but the frustrations are the same in either case.

In Lagos, in a potentially more explosive context, frustrations rise when public officials announce (appropriately) the likelihood of unusually intense rainfall and flooding in the coming rainy season and advise residents to be prepared to leave, although they have no place to go. Over time, the gap between citizen expectations for clear risk reduction measures and essential disaster response services on the one hand and actual institutional capacity and performance on the other is highly likely to eventually result in protests and conflict. Given the general lack of national disaster preparedness and response capacity in the seven countries, this sort of potential for generating instability and conflict extends quite broadly. Most of the countries are very heavily dependent on the international community for disaster and relief assistance in response to severe droughts and floods. An analytic distinction is sometimes made between the instability associated with these sorts of "complex emergencies" and instability leading to violent conflict. However, these kinds of distinctions are much neater after the fact than in real time. Much depends on the local context and specific political moment. In the past, sizable protests and violence have resulted from citizen discontent with disaster responses in Ethiopia, Niger, and Peru. Similar events are likely to occur in other countries in the future.

7.4 CLIMATE, CONFLICT, CLIMATE ADAPTATION, AND RESILIENCE

Based on what we already know about conflict analysis, the complexity of interactions of climate change with non-climate factors is only to be expected. In fact, it is of a piece with other factors commonly believed to contribute to conflict. It is known that very poor countries have higher incidences of conflict (Collier, 2007), and the recent studies by scholars like Burke et al. (2010); Hsiang et al. (2013); Scheffran, Brzoska, Kominek, Link, and Schilling (2012a); and Miguel, Hsiang, and Burke (2013) suggest a similar statistical relationship between climate change and conflict in developing countries. Few analysts, however, would be comfortable asserting in unqualified terms that "poverty causes conflict." Any country-specific example that one might choose of "poverty driving conflict" would easily be open to an alternative explanation of conflict based on non-poverty factors. There are many poverty-stricken places where violent conflict is not happening. Predictions about the level and location of poverty also are no more reliable than climate predictions, with the likelihood of possible mitigation measures equally uncertain.

Yet, poverty is a major focus for researchers and international assistance agencies both because of its contributions to instability and conflict and because of its intrinsic human costs. The same holds true of the relationship between climate change and conflict.

The salient question, especially for international assistance agencies seeking to identify effective programmatic interventions, is how and in what ways climate change impacts may be consequential for conflict, and how that knowledge can be used in conflict mitigation and climate change adaptation. The kinds of interrelationships between climate and non-climate factors identified in the patterns of change and institutional challenges described above suggest a variety of points of intervention (see Annex III for a set of diagnostic questions). The full-length versions of the five case studies also provide many

examples of the kinds of institutional and community stakeholders who are likely to need to be a part of successful climate adaptation initiatives. The selection of the precise program initiatives appropriate for any given country or location is contingent, of course, on context-specific priorities and conditions. Climate funds channeled through existing state institutions in non-democratic or weakly democratic states where the "climate-threatened livelihoods vs. favored economic groups" dynamic is at play may actually increase the potential for conflict. For example, interviewees speaking on background in Ethiopia complained that a sizable proportion of climate adaptation funds were being controlled and distributed by ruling party officials in line with party preferences rather than community needs.

The one thread that runs through all of the case studies is the absolute necessity of including the participation of the women, young people, and men from affected communities. In many of the communities across the seven countries visited, residents lack either the opportunities or standing to participate in inclusive political processes. However, their perceptions, decisions, and actions will serve to animate or inhibit conflict in the face of climate change impacts and their participation will be essential for building sustainable climate resilience over time.

Based on the findings from these studies, locally based climate adaptation offers a sound starting point. As the World Bank noted in its 2011 report on "Conflict, Security, and Development," "Restoring confidence through inclusion and early, visible results at the local level is important before taking wider institutional reforms." The development of local-level climate resilience in ways that support democratic governance and conflict prevention can serve this goal. As a consequence of the recommendations of the Ethiopia study described above, USAID has begun this work with the creation of the Peace Centers for Climate and Social Resiliency (PCCSR) in southern Ethiopia. The PCCSR initiative uses dialogue on climate-related resource challenges among different pastoralist groups as a mechanism for conflict prevention. Adapted to local circumstances, the idea could be extended to many other ethnically diverse regions and climate-vulnerable communities in Africa.

The early analysis of the relationship between climate change and conflict provided here is the beginning of the story, not necessarily a fully reliable barometer of what may unfold in the future. Nevertheless, understanding and addressing climate-conflict issues now is like buying an insurance policy with a fairly low premium. Later, the costs are likely to go up.

Fortunately, a great deal can be done in terms of climate adaptation to avoid many of the worst-case scenarios envisioned in the early climate-and-conflict literature.[6] Many of these climate adaptation measures are enumerated and described in the full-length versions of the case studies, but a brief list of some of the most important would include climate-resilient seeds, crop storage, water and soil conservation, small-scale irrigation, livestock diversification, improved farming techniques, better market linkages, insurance schemes for pastoralists and agriculturalists, integrated water resources management, enforcement of land use regulations, viable plans for relocation or evacuation, disaster risk reduction, and improved climate information services.

As the case studies indicate, however, it would be a mistake to consider these simply technical fixes. Their implementation will also require a combination of institutional reforms and strengthened social organization that will be as or even more challenging to achieve. Not infrequently, these sorts of transformations will require political support, consume state resources, or otherwise have implications for the competing interests of stakeholders in government, civil society, the private sector, and communities. One group's climate adaptation may be another group's maladaptation (Dabelko, Herzer,

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[6] The relationship is reciprocal. Where actual or potential conflict exists, investments in collaborative and peacebuilding approaches to resource management can increase resilience in times of stress, whether driven by climate or other factors (Mercy Corps, 2012).

Null, Parker, and Sticklor, 2013). In short, the climate adaptation agenda can be diverted, obstructed, or undermined by a variety of social tensions and conflicts based on economic and political interests.

As the maps of climate security vulnerability in Africa produced by CCAPS and others demonstrate (Busby et al., 2013), one can assert almost as a general rule that the places most affected by conflict are also likely to be seriously impacted by the effects of climate change and are in need of climate adaptation. A global USAID analysis found that 81 percent of countries considered fragile also were projected to experience significant climate change impacts.[7] Thus, the climate change adaptation agenda and the conflict mitigation agenda are bound up with each other. Conflict specialists can no longer do their job without asking about the possible implications of climate change, and climate adaptation specialists cannot do their job without considering conflict sensitivities and implications. Similarly, the analysis of climate vulnerability will be incomplete when not supplemented by considerations of conflict potential, because without an appreciation of conflict dynamics the programmatic interventions recommended by those analyses will face higher risks of failure or of doing harm.

If the aim of new assistance programs is to build climate resilience, the strengthening of formal and informal institutions that can prevent or mitigate conflict over climate-affected natural resources is essential. The case studies show that there are many opportunities for participatory climate change adaptation to make a lasting contribution to conflict mitigation and peacebuilding—from supporting dialogue on natural resources among ethnic rivals in Ethiopia to implementing rural resource rights in the Sahel and engaging slum communities in flood prevention in Lagos and Accra. Peacebuilding or conflict resolution interventions also can be essential precursors or elements of effective climate change adaptation measures. By engaging marginalized communities, climate adaptation programs address the perceived lack of participation and representation that is one of the main sources of instability in each of these seven countries.

[7] This statistic was reported during a USAID presentation at the Wilson Center in Washington, D.C. for a panel on "New Research on Climate and Conflict Links" on December 19, 2011.

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ANNEX I. CLIMATE CHANGE AND CONFLICT ASSESSMENT FRAMEWORK (CCCAF)

PHASE I: IDENTIFICATION OF COUNTRY STUDY AREAS

Through official documents, secondary literature, and expert interviews, identify subnational regions or 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 qualitative baseline and trend data (include quantitative data, when available). Information collection will be guided by the **Qualitative Profile**, which follows Phase VII below.

Compile background information on the areas' weather and climate patterns (exposure) 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/VARIABILITY CONCERNS

Identify which underlying issues, sectors, and resources potentially influenced by climate change/variability 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, on the identified issues, sectors, and resources. What mitigating or exacerbating role does it play?

PHASE IV: ASSESS THE IMPACT OF CLIMATE-RELATED EVENTS

Confirm with selected communities the nature and characteristics of specific climate-related events or specific periods of climate variability.

Investigate the responses applied to the recent climate-related event(s) 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/or opportunity?

PHASE VII: COMPLETE FINAL REPORT

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/variability 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 projected climate change, potential conflict, 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 includes considering existing Mission and Agency programs and priorities against 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.

QUALITATIVE PROFILE

Enviro-Sustainability Profile

Land and Agriculture (where applicable)

- What is the size of the land area under study?
- Approximately what percentage is employed for agriculture?
- What kind and level of inputs are used by farmers, if any (e.g., irrigation, fertilizer, pesticides)?
- What is known and what is perceived by the inhabitants about the degree of land degradation?
- What is the type of land on which people are farming (hilly, flat, forested) and what techniques are they using?
- What is the average size of farming plots?
- What is the state of land tenure (practices and ownership) including differences between men and women, and what is the general predicted trend for land ownership rights and plot sizes in the future?
- What are some of the challenges with respect to soil conditions (e.g., erosion, salinization, and desertification)?
- Is climate change/variability contributing to land degradation? If so, how?

Land and Forests

- To what extent is the area forested?
- What is the historical and future trend of forested areas in the area under study?
- Is there a high or low rate of dependency on fuel wood or biomass?
- Is climate change/variability a factor in the condition and sustainability of forested areas?

Water Sources and Availability

- Where do the communities receive water from (e.g., well, collection, pipe)?
- Are there any sustainability concerns in relation to water withdrawal?
- Will current water withdrawal practices be affected by climate change/variability? If so, how?

Water Use

- What are the primary uses of water (e.g., agriculture, domestic, industrial, hydropower diversion)?
- Which uses withdraw the most water?

- Are there any planned projects, changes in population, or other factors that might change the current water usage?

Water Quality

- How do communities and health officials perceive the quality of water?
- Is it known to be relatively clean or contaminated?
- If polluted, what are the sources/causes?
- What water-borne diseases are endemic to the area?
- How will climate change/variability affect water quality?

Energy

- What sources of energy are used and at what levels (e.g., biomass, hydroelectric, fossil fuels, biofuels, solar)?
- Where do the energy sources originate from (e.g., local forest or ground cover, public or private electricity agency)?
- What sectors consume the most energy (e.g., household, agriculture, industry, transportation)?
- Is climate change/variability affecting current or future sources of energy?
- Is climate change/variability anticipated to change energy demand in the study area?

Natural Hazards

- Are there local or national authorities responsible for monitoring and responding to hazards (e.g., earthquakes, droughts, floods)? What is their response capacity?
- What are the most serious natural hazards likely to occur in the area under study?
- How frequently do natural hazards occur and what is their average level of intensity?
- How prepared are communities to respond to a hazard event?
- Is climate change/variability contributing to the frequency or severity of natural hazards?

Econo-Environmental Profile

General Economic Indicators

- What is the estimated level of income for the average family in the area under study?
- Is the area's income more, less, or similar to the country's GNI or GDP per capita?
- Is the region experiencing economic growth, stagnation, or loss?
- What is the level of employment/unemployment?
- Is the informal sector critical to livelihoods?
- What factors are contributing to economic stability or instability?

Sectoral Breakdown

- What economic sectors employ people and what is their relative importance to the local economy (e.g., agriculture, mining, manufacturing, construction, trade, public administration)?
- To what extent are key economic sectors of the economy susceptible to climate change/variability (positive or negative)?
- What economic roles do women play in the economy versus men?
- Are certain economic sectors dominated by specific ethnic groups?
- Do divisions of labor result in instability or tensions?
- Are there economic opportunities for youths?
- If not, do they remain without jobs, migrate, etc.?
- Does the area produce any important exports for the country?
- To what extent are these exports providing stability to the local economy?
- How critical is the natural resource base to any export sector?

Socio-Environmental Profile

Livelihoods and Demography

- What is the estimated total population of the area?
- How rural versus urban is the area under study?
- Is the population growing, decreasing, or remaining stable?
- Are there obvious forces affecting the demographic profile (e.g., migration, health, economic decline, conflict)?
- What is the relationship between arable land and historical, current, and future population?
- What is the age distribution of the population?
- What identity groups (ethnic, religious) live in the area?
- Is there a history of grievance among these groups?
- Are there internally displaced persons or refugees inhabiting the region?
- In what numbers and from where?
- What is the prevalence of female-headed households?

Education

- What is the literacy rate for the area and to what extent is it functional?
- What is the level of primary and secondary enrollment?
- What are the differences by gender for literacy and enrollment rates?

- How many teachers work in the area under study, serving how many students?
- How does the area compare in relation to the country as a whole?

Food Security

- Is the area known for chronic or severe undernourishment and periodic food shortages?
- How does the area compare to the country as a whole?
- What are the primary items of consumption (e.g., cereals, fruits, vegetables, meats, other)?
- Has this changed recently?
- What food items are grown locally?
- Does the area have access to markets where local or regional food products are sold and traded?
- Does the community or do individual households have a food reserve?
- Is climate change/variability affecting food security?

Health

- What health care facilities does the area under study have access to?
- How easy is it to reach a doctor or health center?
- What are the primary diseases endemic to the area (e.g., malaria, cholera, TB)?
- To what extent is HIV/AIDS prevalence a concern, and what is the general level of awareness?
- How does access to health care compare with the rest of the country?
- Do inhabitants have access to an improved water source?
- Are there any sanitation facilities in the area?
- Are changes in the climate contributing to new health problems or exacerbating the prevalence of existing diseases?

ANNEX II. CURRENT OUTLOOK AND FUTURE CHALLENGES IN BRIEF

TABLE A11.1. CURRENT OUTLOOK

Country	Relevant Context	Climate Threats, Projections	Environmental, Social Vulnerability	Adaptation/Resilience
Uganda	Presidential succession (Museveni); deep roots of crisis/conflict in Karamoja	Increasing drought frequency/severity in Karamoja; erratic seasonal changes	Landscape change, both manmade and climate-related (loss of soil/water sources); disintegration of traditional social roles and norms	"Early" preparation for planting season, drought- resistant crops, kitchen gardens; local systems of farmer-herder negotiations
Ethiopia	One-party rule; ethnic federalism; crisis of pastoralism	Increased frequency of severe drought; late arrival, early cessation of long rains (March–May)	Shrinking grazing lands; invasive species (*Prosopis juliflora*); pastoral "dropouts"	Diversification of cattle (grazers to browsers); agropastoralism; elders peace committees
Niger	Pattern of weak state, droughts, coups; history of Tuareg grievances, rebellion; extremists/violence in neighbors (Mali, Nigeria)	Increasing heat; more variable rainfall, and intense droughts and floods likely; flood risks in Niamey	Desertification from "Great Drought" 1970s-80s; rapid population growth; declining crop yields; increasing encroachment of pastoral zones	FMNR; farmer and herder both move toward greater agropastoralism
Burkina Faso	Presidential succession (Compaoré); protests from strengthening civil society and opposition; poor north and more dynamic southern and western provinces	Increasing heat; more variable rainfall, and intense droughts and floods likely; flood risks in Ouagadougou	Desertification from "Great Drought" 1970s-80s; migration out of central plateau to south and east in search of more productive land	Limited success with tree-planting and FMNR; govt. plans for mobile water pumps where appropriate; dry season maladaptive turn to artisanal gold mining
Nigeria (Lagos)	National state failures, ethnic conflict, and terrorism vs. more dynamic but overstretched Lagos State Government	Rising temperatures, more intense rain events; sea level rise; annual flooding, likely to worsen	Low-lying slums w/o basic services; constant stream of migrants; water-borne diseases; sea wall for rich, evacuation/eviction for poor	Very limited community adaptation (sand bags, planking); Eko Atlantic 12-meter sea wall; much improved solid waste management
Ghana (Accra)	National state stability vs. Accra municipal govt. ineffectiveness; poor communities w/o basic services, threats of eviction	Rising temperatures, coastal erosion, sea level rise; more intense rain; acute perennial flooding	Low-lying poor and conflictive slum area; very poor solid waste mgmt.; water-borne diseases	Limited community adaptation ("Yes" NGO efforts); govt. plans for huge ($596M) drainage and waste management project
Peru (Andes)	Disappointing performance of Humala government; campesinos perceive preferential treatment of mining, export sectors (water users)	Myriad micro-climates and poor data; erratic seasonal changes; floods, freezes, and hailstorms; glacial lake outbursts	Loss of highland biodiversity; Invasive species; water contaminated by mining; water scarcity for poor water users; loss of highland pastures	Limited and inadequate small-scale irrigation; youth migration to the coast; strong community solidarity and capacity to organize

TABLE AII.2. FUTURE CHALLENGES

Country	Potential for Conflict	Climate Adaptation/ Resilience Measures	Key Challenges/Opportunities
Uganda	Chronic localized violence likely in Karamoja, sporadic incidents in Cattle Corridor; banditry in Karamoja	Improve seasonal forecast quality and dissemination; support existing local efforts for crop diversification; support local farmer-herder dialogues; involve Karamojong in all local adaptation planning	Transition from Museveni era; pastoralist transition (alternative livelihoods) and improved state-society relations in Karamoja; improvement of national Climate Change Unit and district-level NRM capacity
Ethiopia	Chronic to sporadic violence across pastoralist zones (less in severe droughts); NR user rights and internal border tensions	Area enclosures, water harvesting, small-scale irrigation, agricultural diversification where possible, commercial possibilities of *Prosopis juliflora*	Developmentalist state planning (land, water, commerce) vs. pastoralist realities/transition; peace committees with women, youth participation
Niger	High potential for continuing low-level conflict among agro-pastoralists and pastoralists over NR user rights; possible serious conflict in northern zones and areas of Tuareg discontent	Continue and extend FMNR; strengthen seasonal forecasting and outreach of Niger Met Agency; replicate small-scale water mgmt. successes (e.g., Tahoua)	Implementation of Rural Code for NRM and building local COFOBs; engaging pastoralists (especially Tuareg) on rights and alternative livelihoods; use of climate change adaptation dialogue for peace-building with Tuareg and other vulnerable groups
Burkina Faso	Instability associated with 2015 presidential election; increasing land disputes, both intra-family and inside-outsider conflict with migrants	Renew efforts at FMNR, with secure land rights; integrated water resource management; sustainable extension of irrigation; regulate artisanal gold mining as alternative livelihood with social protections	Transition from Compaoré era; implementation of Regime Foncier in dialogue with local communes; Inclusive and geographically balanced market opportunities and economic growth
Nigeria (Lagos)	High national conflict potential; Boko Haram threats; resentment of migrants; flood disasters; forcible evictions	Community education for environmental and climate awareness; engage communities on flood preparedness; relocate dangerous illegal settlements	Avoid spillover effects (terrorism, unregulated migration) of national state; enforce land use laws and engage poor neighborhoods on housing and environment; reduce rich-poor divide
Ghana (Accra)	Low potential for serious conflict, but possible protests in poor neighborhoods; gap between expectations and performance of Accra government	Rehabilitate slums in flood zones; engage local communities on solid waste management; local campaigns for climate awareness; sea defenses against sea level rise	Implementation of Accra drainage and waste management project; engagement with poor, vulnerable neighborhoods on rehabilitation plans; enforce land use laws
Peru (Andes)	Declining mineral prices have caused retrenchment in environmental regulation, antagonizing communities; mining company-community conflicts likely, with potential to spread; failure of Humala government could spark further protests and instability or radical groups	Integrated water resources management within water basins, moving from micro-basins to sub-basins; shift toward greater emphasis on small dams and irrigation schemes; alternative youth livelihoods; community self-organization for environmental remediation	Maintaining peace and stability among competing water users, from the highlands to coast; effective revenue sharing schemes with mining companies, administered fairly by local governments; build upon new institutional relationships, including water basin committees and regional ombudsman

ANNEX III. DIAGNOSTIC TASKS AND QUESTIONS ON CLIMATE CHANGE AND CONFLICT

PART ONE

This is a group exercise is to generate contextual information and background material for discussion. It assumes some firsthand knowledge of the country or area to be discussed, but it is not intended to represent a formal assessment or require extensive additional research. Where there are gaps in your knowledge, note them for follow-up and continue with your discussion.

I: Identification of Study Area

Select a conflict-prone area that has experienced extreme climate variability (e.g., droughts, floods, unseasonal temperature fluctuations).

Where possible, identify instances of conflict within these areas that you believe may have had direct or indirect linkages to climate variability.

II: Profile of the Study Area

Using both quantitative and qualitative data, what are the area's known weather and climate patterns and predicted future changes in climate?

What are the potential political, economic, social, cultural, and historical cleavages that may contribute to current instability or conflict?

What is your assessment of the governance capacity and resiliency mechanisms of existing political, economic, social, and cultural institutions in the area?

Identify the key concerns, grievances, and tensions that may be present. This should focus on the local unit of analysis but incorporate national, regional, and international influences.

III: Analysis of Critical Climate Change Concerns

Identify which economic sectors, livelihoods, and resources potentially influenced by climate change are critical to stability.

How are they critical? Who is affected when these are threatened? What have been and what could be the potential consequences?

Assess the impact of governance, with special attention to environmental governance,[8] on the identified sectors, livelihoods, and resources. What mitigating or exacerbating role does it play in relation to conflict?

IV: Assess the Impact of Climate-Related Events

Identify a specific climate-related event or specific period of climate variability in the area under study.

What range of response options did affected people and communities consider? What responses were applied? Whom 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?

V: Perspectives of the Affected Populations and Communities

Identify stakeholders interested in and affected by climate-related challenges.

In your estimation, what are the stakeholders' concerns, core grievances, and points of conflict? To what degree is each affected by climate threats? What is their response capacity, and what are their perceptions of the social and institutional responses to climate-related events? Do they have the means or potential to engage in violent conflict?

Seek to identify indicators of resilience versus indicators of vulnerability to conflict.

VI: Generate Future Scenarios

Based on the findings from your discussions and projected climate change trends, develop scenarios of the potential impact of climate-related events on the affected people or communities in the area. Is potential or actual conflict a part of any of these scenarios? If so, what are the mechanisms or pathways by which conflict might emerge?

PART TWO

The second exercise provides questions for thinking about patterns of change and institutional challenges linking climate change and conflict, especially in rural settings with traditional societies or in densely populated and vulnerable urban areas.

- In what ways is environmental change occurring?
- What are the drivers and impacts of this environmental change?
- Are there marked shifts in seasonality or the onset, duration, and intensity of rains?
- Are there are other major shifts such as increased intensity of heat and dry spells?

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

- How is environmental change disrupting traditional knowledge and practices? In urban areas, how are environmental threats affecting households, work life, and health conditions? Is this environmental change related or unrelated to climate change?
- How is climate change negatively affecting livelihoods? How does that change relate to larger economic transitions in the country? Are national and local governments responding to the negative effects of climate change on livelihoods? How do affected communities perceive their situation and government responses?
- How is climate change affecting identity groups and social cohesion in the study area? Within identity groups, are social roles changing in response to climate change effects? If so, why and how?
- What information about climate trends or anticipated erratic weather is needed in affected communities? Is this information available? Is available information communicated effectively and appropriately to key groups? Is it actionable? What is the perception of affected communities?
- What is your estimation of the level of disaster preparedness and response in view of increasingly frequent climate-related hazards (droughts, floods, etc.)? Could citizen perceptions of inadequate disaster response lead to instability and conflict?
- How does climate change differentially affect the needs and interests of stakeholders in the region or area? Do communities perceive government to be responding to climate change challenges in an evenhanded manner or are some groups seen as favored over others? How does this relate to existing asymmetries of political and economic power among various groups?
- How do concerns about land use rights and access to water intertwine with climate change impacts? What are the manifestations of competition and tensions among stakeholders for scarce resources? Do the national and local institutional mechanisms of resource governance ameliorate or exacerbate these frictions?
- Are territorial rights applied or adjudicated fairly or are these the source of further stresses that may contribute to conflict?
- In low-lying and vulnerable urban areas, are there plans or discussions between communities and government officials about evacuation or relocation in case of severe floods? Are communities properly informed about these plans? Are there plans to increase resilience by rehabilitating slum areas? What are community attitudes about government statements and actions in relation to each of these areas?
- Reviewing your answers to the foregoing questions, what are the possible precursors to climate-related conflict in the area? What are the most powerful or significant components of these factors, patterns of change, and institutional challenges?
- Given your analysis, what sorts of programs or initiatives might help to advance conflict mitigation, promote conflict-sensitive climate change adaptation, and build resilience?
- Are there opportunities to involve the participation of local communities in climate change adaptation activities that support confidence building and peacebuilding among local groups and government authorities?

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