

WORKING PAPER

**Climate Change Adaptation in Nigeria:
Key Considerations for Decision Makers**

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Editor¹

Ashley Moran

Authors

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Joshua Busby, Todd Smith, and Kaiba White

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Unintended Consequences of Adaptation and Opportunities for Building Resilience

Ashley Moran

¹ Ashley Moran, Joshua Busby, Todd Smith, Kaiba White, Catherine Weaver, and Christian Peratsakis are based at the LBJ School of Public Affairs at the University of Texas at Austin. Clionadh Raleigh is based at Trinity College Dublin. All authors are researchers in the Climate Change and African Political Stability Program at the Robert S. Strauss Center for International Security and Law, <http://ccaps.strausscenter.org>. The CCAPS program is funded by the U.S. Department of Defense's Minerva Initiative. Material included in this paper is based upon work supported by, or in part by, the U.S. Army Research Laboratory and the U.S. Army Research Office under contract/grant number W911NF-09-1-0077.

ABSTRACT

This paper assesses sub-national vulnerabilities to climate change in Nigeria as a foundation for evaluating current and future adaptation priorities within the country and highlighting the security implications of climate change and adaptation. Nigeria's climate security vulnerability lies predominantly along the coast and the north of Nigeria. Vulnerability along the coast stems from moderately high physical exposure coupled with high political violence, while vulnerability in the north results from high physical exposure and low household and community resilience.

Nigeria does not currently have a national adaptation strategy or cross-cutting institution empowered to guide national response to climate change, though both are in development. Current adaptation initiatives in Nigeria have positively impacted food security, but must take additional steps to address security risks that could arise from conflict contagion and unequal resource distribution. Opportunities for building Nigeria's resilience to climate change include articulating a national framework for adaptation, leveraging the new Ministry of Niger Delta Affairs in capacity building and conflict management, working through new national and regional mechanisms to address security challenges, and ensuring transparent aid management and allocation.

NIGERIA'S VULNERABILITY TO CLIMATE CHANGE

The Climate Change and African Political Stability program has developed a multi-dimensional model to assess sub-national climate change vulnerability in Africa. It aims to provide fine grain analysis necessary to evaluate current adaptation strategies and security challenges, and identify opportunities for targeted response.

Areas experiencing many challenges simultaneously are more likely to be vulnerable to the security consequences of climate change, such as conflict and humanitarian disasters. This vulnerability assessment model aims to go beyond saying Nigeria is vulnerable to climate change to identify which parts of the country are most vulnerable, and why.

Methods

The security consequences of climate change are likely to emerge based on a confluence of vulnerabilities.¹ Physical exposure alone is not enough to explain a region's climate security vulnerability. This model thus considers four broad processes, or 'baskets,' important in assessing an area's overall climate security vulnerability: physical exposure to climate related hazards, population density, household and community resilience, and governance and political violence (see Appendix A for a more detailed discussion of methods).² The research team is iteratively updating the vulnerability maps involved in this model based on fieldwork and new data sources and methods. By mapping and layering these four areas of vulnerability, the model portrays a composite map combining all four areas of vulnerability. In this composite map, each area is weighted equally.

The vulnerability model uses measures of physical exposure based on historic exposure to climate related hazards. However, additional analysis seeks to triangulate these findings with projections of future vulnerability based on a mid-century regional model of climate change based on a derivation of the NCAR/NOAA Weather Research and Forecasting (WRF) Model.³

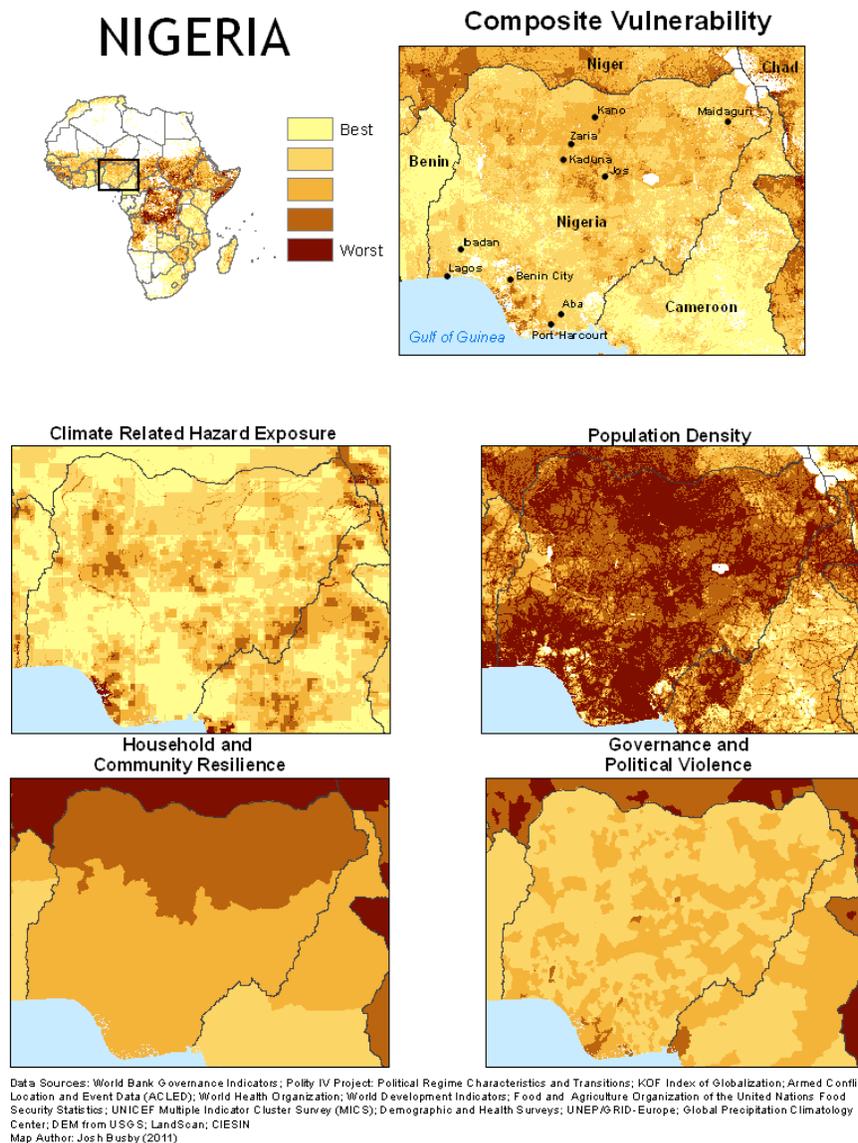
The operating assumption is that the most vulnerable places are likely to be those where high physical exposure to climate related hazards conjoins with high population density, low levels of household and community resilience, and poor governance and widespread political violence.

Findings

This multi-dimensional vulnerability model finds that Nigeria overall is only moderately vulnerable to climate security consequences, compared to other countries on the continent and its immediate neighbors. There are several pockets of medium-high vulnerability (seen as quintile 4 in brown in Figure 1) located around the city of Jos in the north and in parts of the south coast, south of Benin City and west of Port Harcourt.⁴

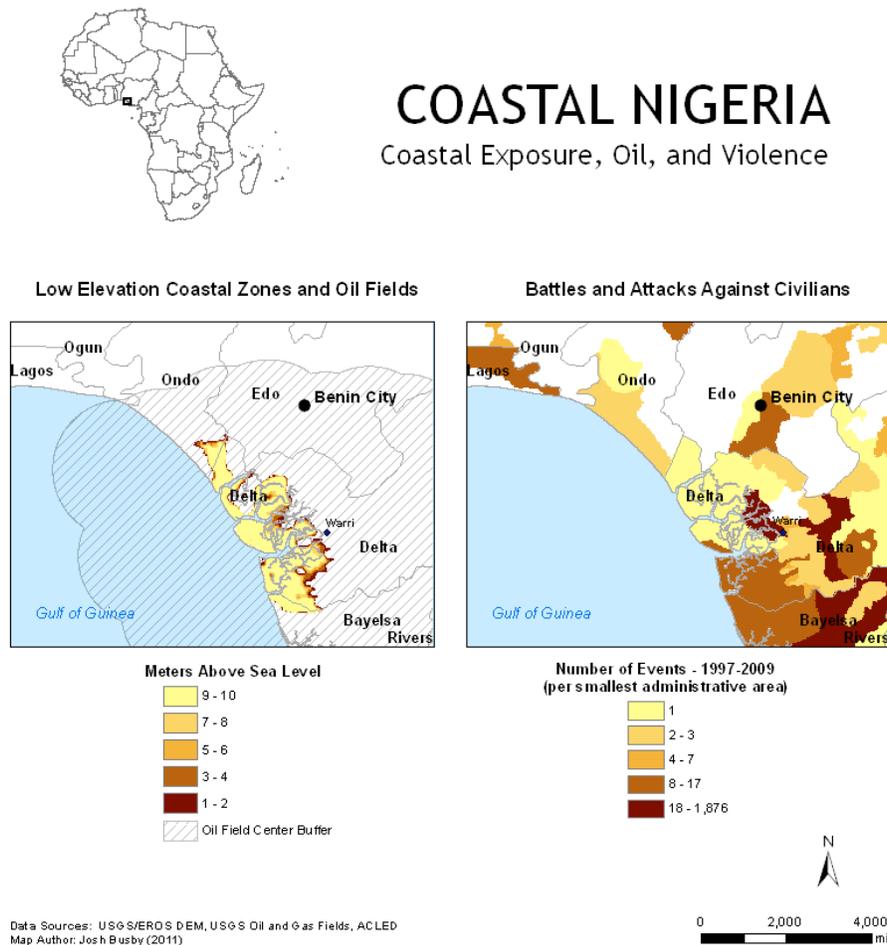
While the entire country is densely populated, specific climate vulnerabilities are primarily concentrated along the coast. Northern Nigeria has lower household and community resilience compared to the southern half of the country. Nigeria's governance and stability are not high relative to the rest of the continent but also not among the worst in terms of government effectiveness, voice and accountability, stability, and degree of global integration. Pockets of political violence have historically dotted much of the country, with the most frequent violent spots located along the coast (see Figure 1).

Figure 1.



A further examination of coastal vulnerability shows that low-elevation coastal zone exposure, coupled with pockets of political violence near the city of Warri (which has a population of roughly a million people in the wider metropolis), drives much of the vulnerability in Delta state. This is also one of the major oil-producing regions of Nigeria (see Figure 2).

Figure 2.



Nigeria's physical exposure to climate hazards is more muted compared to other countries in Africa. For example, the Sahelian countries to the north face more scarce and variable rains. However, northern Nigeria shares many of the same sources of physical exposure as the Sahel with drought and scarce and variable rains concentrated in Kaduna, Plateau, Katsina, and Yobe states (see Figures 3 and 4). Pockets of physical vulnerability also exist along the coast, stemming particularly from the risk of coastal inundation in Delta state.

Figure 3.

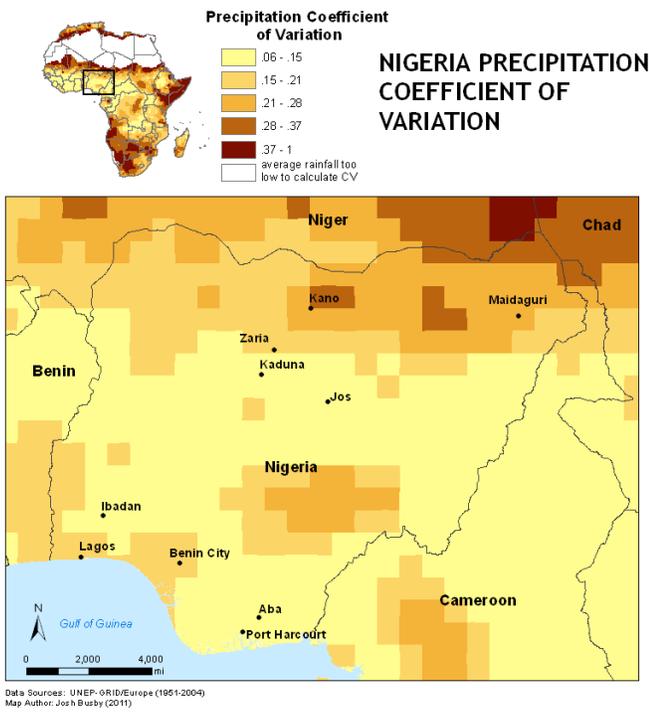
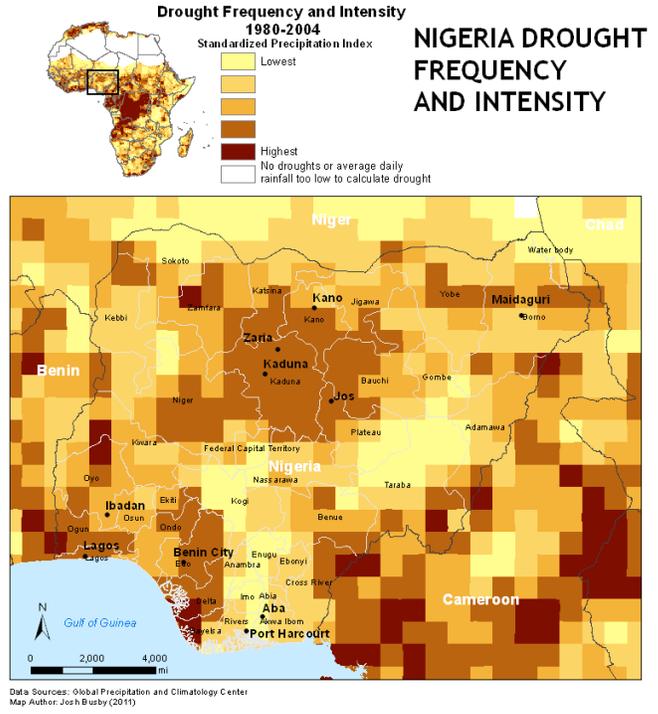


Figure 4.



Nigeria's droughts and scarce and variable rains also tend to overlap with areas of low household and community resilience in the north where child malnutrition and infant mortality are much higher than in the rest of the country (see Figures 5 and 6).

Figure 5.

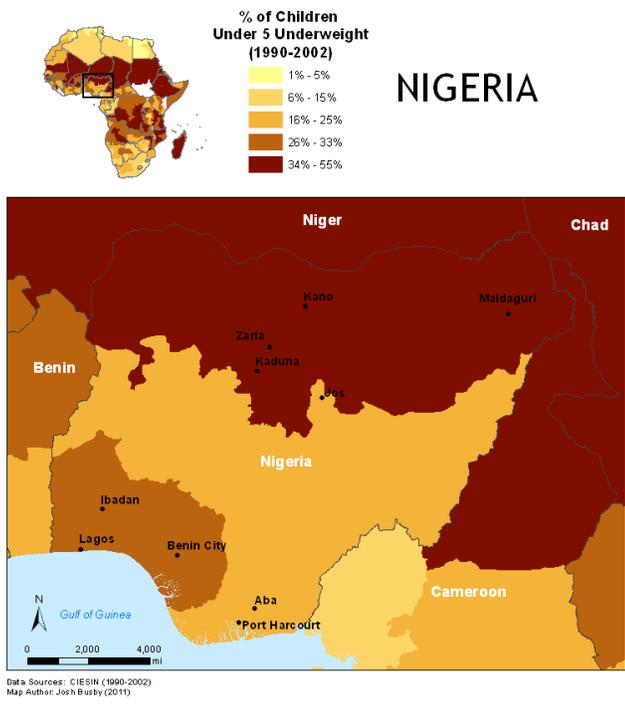
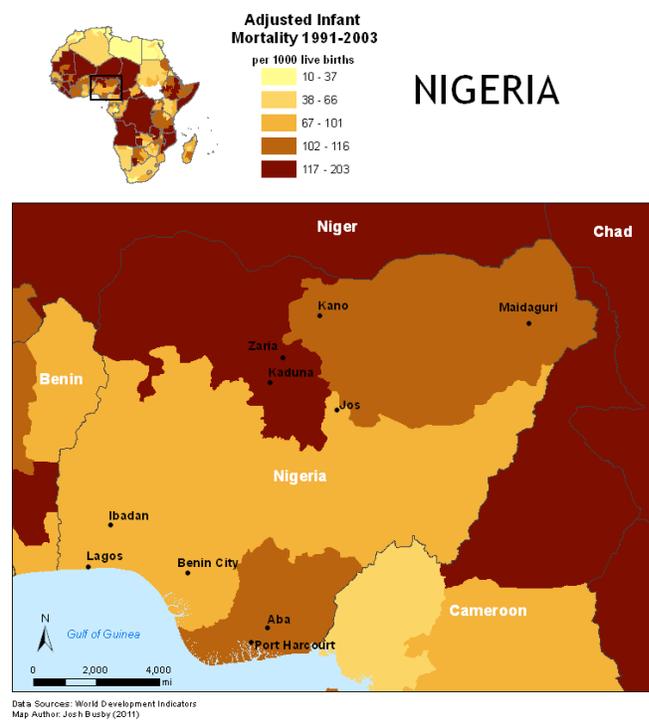


Figure 6.



Future Vulnerability

According to new projections from a mid-century model of climate change in Africa, much of northern Nigeria in Kaduna and Kano states will be subject to an additional 51 to 100 heat wave days per year and an additional 20 to 50 drought days per year (see Figures 8 and 9). These are also areas of historic droughts, scarce rains, and highly variable precipitation. Northern Nigeria also has lower household resilience in terms of infant mortality, access to improved water sources, and child malnutrition. (See Appendix B for maps showing present day validations of this new mid-century climate model for Africa, as well as continent-wide projections for changes in temperature and precipitation from present day to mid-century.)

Figure 8.

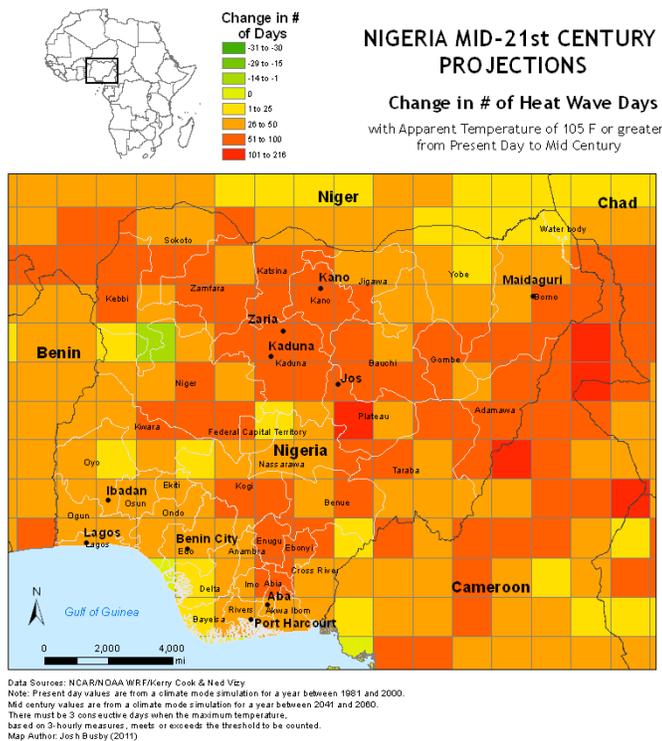
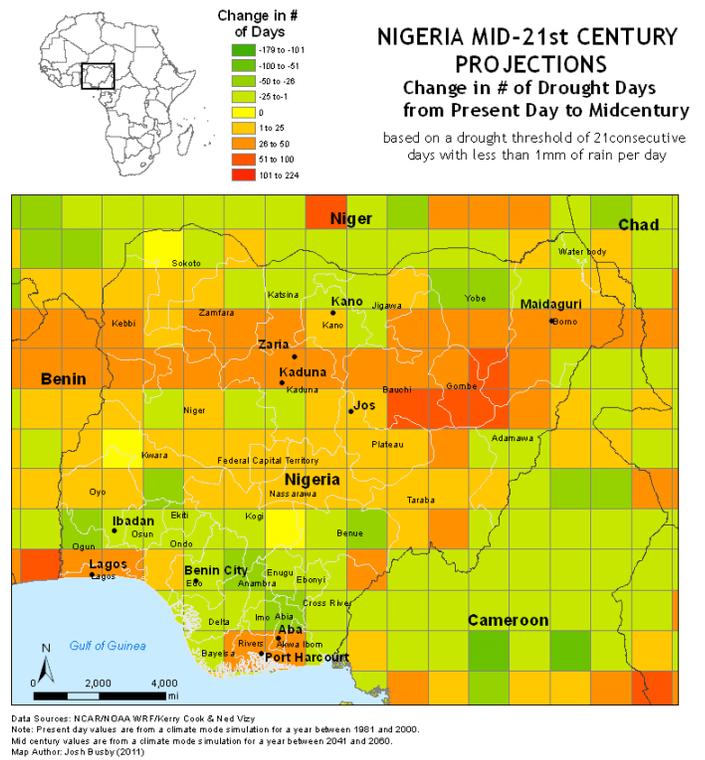


Figure 9.



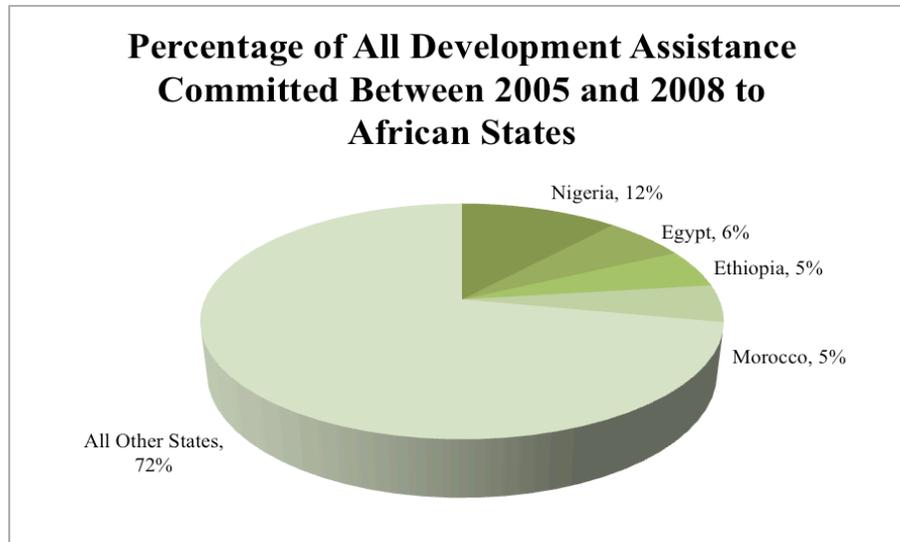
Conclusions

Based on this vulnerability mapping work, Nigeria's overall vulnerability to climate change is modest relative to other parts of the continent. However, there are pockets of acute vulnerability. Low-lying Delta state—given its exposure to coastal flooding, historic violence, and a concentration of oil reserves—is a priority area for risk reduction measures including disaster preparedness and conflict resolution. States in the north of Nigeria such as Kaduna, Plateau, Katsina, and Yobe states—with their historic exposure to drought and highly variable rains, coupled with low household resilience—are also areas of concern. In these northern states, adaptation measures would include development of drought-resistant agriculture, diversification of income, measures to improve health and nutrition, as well as conflict prevention measures, particularly between pastoralists and farmers.

INTERNATIONAL AID FOR ADAPTATION

Government response to climate change in Nigeria has been inextricably tied to the programs of international donors working in Nigeria. Nigeria remains the top recipient of international development aid in Africa. Between 2005 and 2008, donors committed roughly USD21 billion in development assistance to Nigeria, accounting for 11.64% of all foreign development assistance to Africa in this period (see Figure 10).⁵

Figure 10. Numbers are given as a percentage of total international development financial flows (ODA as well as OOF) committed to all African states from 2005 to 2008 in USD 2000 constant figures



Source: AidData.org

Countries receiving large amounts of development aid often express concerns that mainstreaming adaptation aid into ongoing development projects represents a potential loss in aid, both in terms of aid available for existing development projects and aid for adaptation activities. Many international actors maintain that international aid for climate change adaptation should be ‘new and additional’ to current aid flows. Yet a baseline of adaptation activities must be established before the debate over ‘new and additional’ funding can move forward.

Establishing a baseline, however, is a difficult, and often subjective, endeavor. Over two dozen different definitions of adaptation can be found in documents from individual donors and the United Nations Framework Convention on Climate Change (UNFCCC), and development agencies have developed a fragmented system of self-reporting on what they count as adaptation aid.

A narrow definition of adaptation could include projects, programs, and policies that directly respond to climate risks. For example, building higher levies and floodwalls, transitioning to drought-resistant crops, or moving groundwater supplies away from coastal areas newly subject to saltwater intrusion are clearly adaptation projects that serve little development benefit in the absence of climate change. Categorizing adaptation as only *work that would not happen without climate risks* captures only a small percent of efforts by development agencies.

A broader definition of adaptation takes the view that ‘good development is good adaptation,’ asserting that more resilient citizens are better able to cope with the effects of climate change. In this understanding, any programs that work to ensure citizens’ welfare could be considered adaptation for

climate change. Under this broad concept, adaptation would include programs supporting economic diversification, improved public education, stronger local governance, basic infrastructure improvements, and more. However, such a loose interpretation of adaptation makes it difficult to convey what new efforts are undertaken specifically *because of climate change*.

The CCAPS program partnered with AidData to develop a system to better track adaptation aid in Africa, laying the foundation for evaluating current adaptation strategies and targeting future aid to areas of unmet need.⁶ AidData developed an advanced computer methodology to extract only potentially climate-oriented projects from the universe of development aid in Africa. CCAPS researchers then coded these potential projects for their climate-relevance based on seven independent coding schemes.⁷

In Nigeria, if adaptation aid is assessed by the most narrow definition, only 13 adaptation projects were committed to Nigeria from 2005 to 2008, accounting for USD10 million of the total USD21 billion in development aid to Nigeria during this period. Using the broadest definition of adaptation aid, however, yields 84 adaptation projects in Nigeria totaling USD696 million over the same period (see Table 1).

Table 1. Adaptation Aid as a Percentage of All Development Aid to Nigeria, 2005 to 2008[†]

	Number of Projects	Amount in USD 2000	Percent of Total Development Aid
Narrow Definition of Adaptation Aid	13	10 million	0.05%
Broad Definition of Adaptation Aid	84	696 million	3.31%

Source: AidData.org

[†] See Appendix C for a complete list of international donors' adaptation projects in Nigeria, as defined by narrow and broad definitions of adaptation.

Such a wide disparity of perceived commitment levels begins to highlight the challenges of assessing foreign aid for climate change. What can be agreed upon, however, is that climate aid, under any definition, makes up a small percentage of total development aid committed to Nigeria.

REGIONAL AND NATIONAL ADAPTATION STRATEGIES

Nigeria has been a key facilitator and participant in the growing number of regional initiatives on climate change in recent years. While still in the early stages of development, these regional initiatives can provide mechanisms to support adaptation in Nigeria, and they could also be particularly critical in addressing the security implications of climate change since Nigeria's security challenges stem from both internal and regional drivers of instability.

Recent regional initiatives have helped build a shared agenda among member states and provide key frameworks for cooperation across a range of policymaking and implementing institutions. The Nairobi Declaration adopted by the African Ministerial Conference on the Environment (AMCEN) in May 2009 outlines a detailed agenda for regional cooperation and national commitments to mainstream adaptation steps in national and regional development policies.⁸ The Committee of African Heads of State on Climate Change (CAHOSCC), created in July 2009, is comprised of eight states including Nigeria and has played an active role in developing common positions among African states on climate change. In 2010, Nigeria hosted a study group among African legislatures that produced recommendations on concrete steps parliaments can take to use their legislative, oversight, and representative functions to address the effects of climate change.⁹ Also in 2010, in the second year of Nigeria's current chairmanship, the Economic Community of West African States (ECOWAS) adopted the Framework of Strategic Guidelines on the Reduction of Vulnerability and Adaptability to Climate Change in West Africa; this agreement seeks to build scientific and technical capacity to reduce climate change

vulnerability in member states, integrate climate change in national and regional development policies, and implement national and regional climate change adaptation programs.¹⁰

At the national level, Nigeria does not have a comprehensive, national adaptation strategy or a strong central institution to oversee such a strategy. The Nigerian government encapsulated the challenge eight years ago in its First National Communication (FNC), noting “one absolutely critical factor that needs to be emphasized here is the general inability of the national and regional agencies in charge of the environment to enforce codes, regulations and laws, especially with respect to urban planning and infrastructure development, mineral prospecting, adherence to industrial standards, and installation of facilities and utilities in ecologically sensitive zones.”¹¹ This challenge remains today. Both before and since its FNC, Nigeria has developed various climate initiatives and institutions, but the impact to date has remained minimal in terms of advancing a cohesive national adaptation strategy.

Each Nigerian ministry now has a climate change focal point within the ministry, and several ministries have developed adaptation policies in their respective sectors, with the Ministry of Environment’s Special Climate Change Unit coordinating these policies.¹² However, these policies remain segmented, and the two institutions perhaps best positioned to develop a comprehensive government adaptation policy—the Inter-ministerial Committee on Climate Change¹³ and the National Committee on Climate Change¹⁴—have not mainstreamed climate change issues into government operations or developed a unified government strategy.

Nigeria has, however, made important progress over the last 12 months in advancing initiatives critical to building a national adaptation strategy, with both houses of the National Assembly passing bills to create a National Climate Change Commission, and the government making progress in drafting Nigeria’s Second National Communication.

As outlined in legislation adopted by the Nigerian National Assembly in November 2010, the National Climate Change Commission will be a statutory body charged with the country’s national and international responses to climate change. It will serve as the central body developing the national strategy to reduce greenhouse gas emissions and develop a low-carbon economy, and will coordinate climate change policy across all government agencies. It is also tasked with commissioning research and preparing reports needed to assess and track the effects of climate change. The commission is comprised of the Vice President, ministers responsible for a cross-section of issues, the director general of the Nigeria Meteorological Agency, six other members representing the six geopolitical zones, and an executive secretary.¹⁵ The commission has been granted both statutory authority and funding streams. The allocation of budgetary funds and 10% of the dedicated Ecological Fund as planned, along with additional funds it could generate through carbon financing, would put the commission on solid footing to start its work.¹⁶ The commission has been approved in a conference report harmonizing language between both chambers of the National Assembly.

Nigeria’s Second National Communication (SNC) to the UNFCCC is currently in development and will serve as the government’s central organizing document on climate change in the absence of a national adaptation policy.¹⁷ Even with the eventual submission of the SNC to the UNFCCC, there remains a need for a separate national adaptation policy to guide the implementation of these broad goals through specific implementation steps and directives to ministries.

As Nigeria is not a Least Developed Country, it does not have a National Adaptation Programme of Action (NAPA) under the UNFCCC to guide the country’s climate change activities or international donor investments. However, a recent effort led by non-governmental organizations working with the Nigerian government has initiated a similar process, conducting participatory assessments to identify climate change vulnerabilities and develop a comprehensive adaptation strategy. This process, dubbed

the National Adaptation Strategy and Plan of Action (NASPA), builds on prior collaboration between government, civil society, and international actors in the field of climate change in Nigeria.

In the immediate term, the NASPA process is focused on producing two key documents: a Climate Change Adaptation Strategy Technical Report and a policy document titled *Adapting to Climate Change Towards a National Adaptation Strategy and Plan of Action (Towards NASPA)*. Drafts of both documents are projected for completion in March 2011.

While the NASPA process was initially planned to draft the NASPA through multi-sector working groups comprised of government, civil society, and international actors, the structure has shifted significantly over the last year.¹⁸ The writing and production of these documents is now led predominantly by the non-profit Nigerian Environmental Study/Action Team (NEST) in partnership with the Ministry of Environment's Special Climate Change Unit. NEST has worked with researchers at the Climate Systems Advisory Group of the University of Cape Town to develop the Towards NASPA policy report. This report includes:

- Findings from its study based on downscaled simulations of nine General Circulation Models (GCMs) over 40 Nigerian Meteorological Agency (NIMIT) stations and four climate zones,
- Assessments of Nigeria's vulnerability to natural disasters, and
- Assessments of climate change impacts on disaster management, migration, and internal security.¹⁹

NEST currently plans to send the Towards NASPA draft document to the Minister of Environment by mid-March 2011. The document is intended to then serve as the basis for national and regional stakeholder workshops and public meetings that will shape it in to the final NASPA. In a departure from past adaptation policy efforts in Nigeria, the NASPA process plans to not only identify adaptation needs and program options, but also outline an enabling framework detailing the implementing agencies, funding and policy needs, and monitoring and evaluation processes.

While still in a relatively early stage, the NASPA process could hold the best potential yet for development of a national adaptation policy that integrates the assessments and broad goals of Nigeria's National Communications and civic-government initiatives over the last ten years into the government's policies and practice.

CHALLENGES IN THE NEXT FIVE YEARS

Current international, regional, and national responses show promising signs of identifying—and in some cases addressing—problem areas, though clearly significant gaps remain. Current adaptation strategies can be assessed for their impact in three key areas impacting security: food security, conflict contagion, and resource distribution.

Food Security

Government policies led by the Ministry of Agriculture and Water Resources have taken a comprehensive approach to bolstering the agricultural sector and, in particular, stabilizing food prices through the Guaranteed Minimum Price (GMP) program. The ministry reports that, from 2007 to 2009, it set aside \$65.2 million to stabilize food prices for 90 million 'food insecure' people in Nigeria, and allocated a total of \$2.9 billion in federal and state funds for its full range of programs to increase credit to small farmers, start new irrigation projects, build silos for adequate storage, and fund other investments as part of what it describes as efforts to fortify the 'value chain infrastructure.'²⁰

With 66% of the workforce employed in the agriculture sector and 65% of the population identified as ‘food insecure,’ per Agriculture Ministry calculations, efforts to stabilize food prices and food supplies have been critical to improving food security in the country.²¹ FEWS-NET trends over the last several years show improving food security for most of the country, with some continuing food insecurity in parts of the north.²² Maintaining this positive trend under increasingly strained natural resource conditions will be key to prevent climate hazards from becoming humanitarian emergencies.

Conflict Contagion

Whether conflict may be exacerbated by the effects of climate change, or simply occur in parallel to climate change and contribute to greater instability, there are two key conflict patterns to consider in analyzing the intersection of climate change adaptation and security in Nigeria. These include conflict during periods of national instability and the interaction of Nigerian conflicts with diffusive groups across the Sahel.

Conflict during National Instability – While the number of violent events has generally increased over time in Nigeria, the country sees high points around periods of national instability. Election periods are a particular example.²³ Interestingly, while elections consistently correlate with a spike in violent activity, the most violent actors during Nigerian election periods shift. The 2003 elections saw high rates of violence perpetrated on behalf of political parties, with minimal rebel involvement in violent events. In contrast, during the 2007 elections, there were high levels of intimidation by government and opposition figures but generally lower levels of active *violence* from these groups; it was rebel activity that was markedly higher during the 2007 election period (see Table 2).²⁴ This may be due to the inclusion of these political groups as major political players in the election. While the 2007 election was noted for high levels of intimidation among election contestants, it was the groups *not* included on the ballot that perpetrated most of the violence. If this trend continues, it may speak to an opportunity for greater political inclusion as a strategy for conflict management.

Table 2. Relative Shifts in Types of Violent Actor Events[‡]

Year [§]	Military	Rebel	Political Militia	Communal Militia	Riots	Violence against Civilians
<i>Average</i>	53	76	14	35	25	64
1997	51%	43%	43%	109%	64%	49%
1998	45%	29%	29%	108%	25%	41%
1999	55%	27%	57%	114%	64%	35%
2000	68%	49%	86%	125%	72%	60%
2001	47%	57%	50%	111%	20%	73%
2002	111%	105%	142%	77%	76%	116%
2003	91%	126%	257%	131%	68%	152%
2004	139%	81%	214%	200%	288%	151%
2005	111%	53%	171%	51%	380%	89%
2006	143%	108%	50%	60%	48%	76%
2007	94%	210%	85%	54%	24%	194%
2008	168%	249%	50%	23%	28%	148%
2009	185%	168%	64%	131%	164%	125%

Source: ACLED, 2010

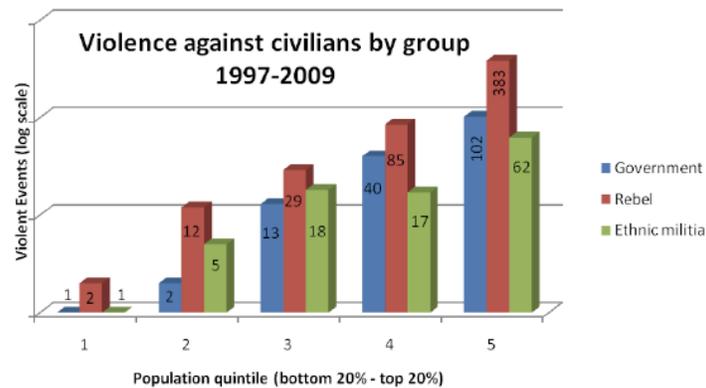
[‡] This reflects variation from the mean number over time.

[§] Political and economic events of note: A new constitution was adopted with the democratic transition in 1999. Nationwide elections took place in 1999, 2003, and 2007. Oil price shocks occurred from 2003 to 2009.

Across all types of violence and all types of perpetrators, it is civilians that bear the majority of the violence. This is a critical finding, as the degree to which civilians are caught up in violence may be the most important barrier to development in conflict-affected countries. This phenomenon thus must be adequately addressed in adaptation strategies if development is to be effective.

Overall, in Nigeria, it appears that people living in areas of all population sizes are most likely to be victims of rebel violence, compared to government violence and ethnic militia violence (see Figures 11 and 12). However, an interesting dynamic emerges looking at government violence and ethnic militia violence in the 2nd and 3rd population quintiles, compared to the 4th and 5th quintiles. In areas with low-middle and middle population sizes, ethnic conflict involving civilians is more prevalent than government violence involving civilians. In middle-high and high population areas, however, this relationship is reversed: ethnic militia violence now occurs at a lower rate than government violence. Thus, in areas with the largest population densities in Nigeria, the government is the greater perpetrator of violence against civilians than ethnic militias.²⁵

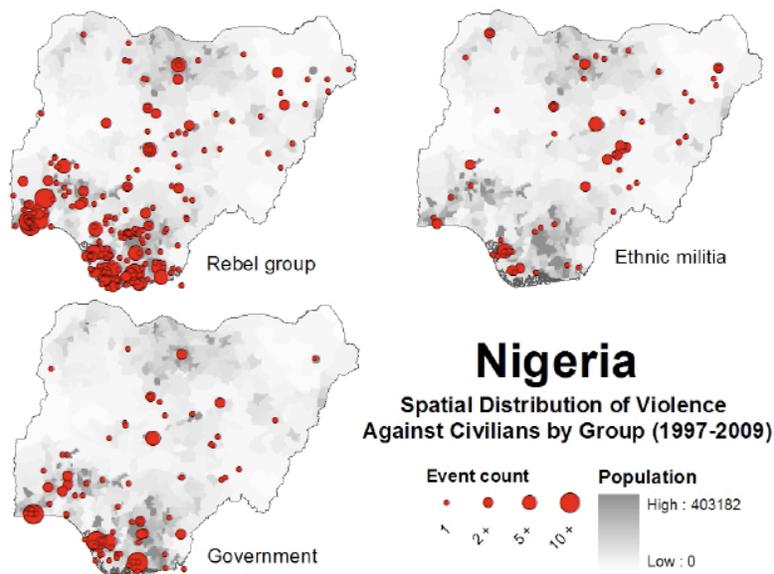
Figure 11.



*The vertical axis appears is a log scale for visualization. Because of this, note that the height of the bars relative to one another does not reflect the actual value that appears on each bar.

Source: ACLED, 2010

Figure 12.

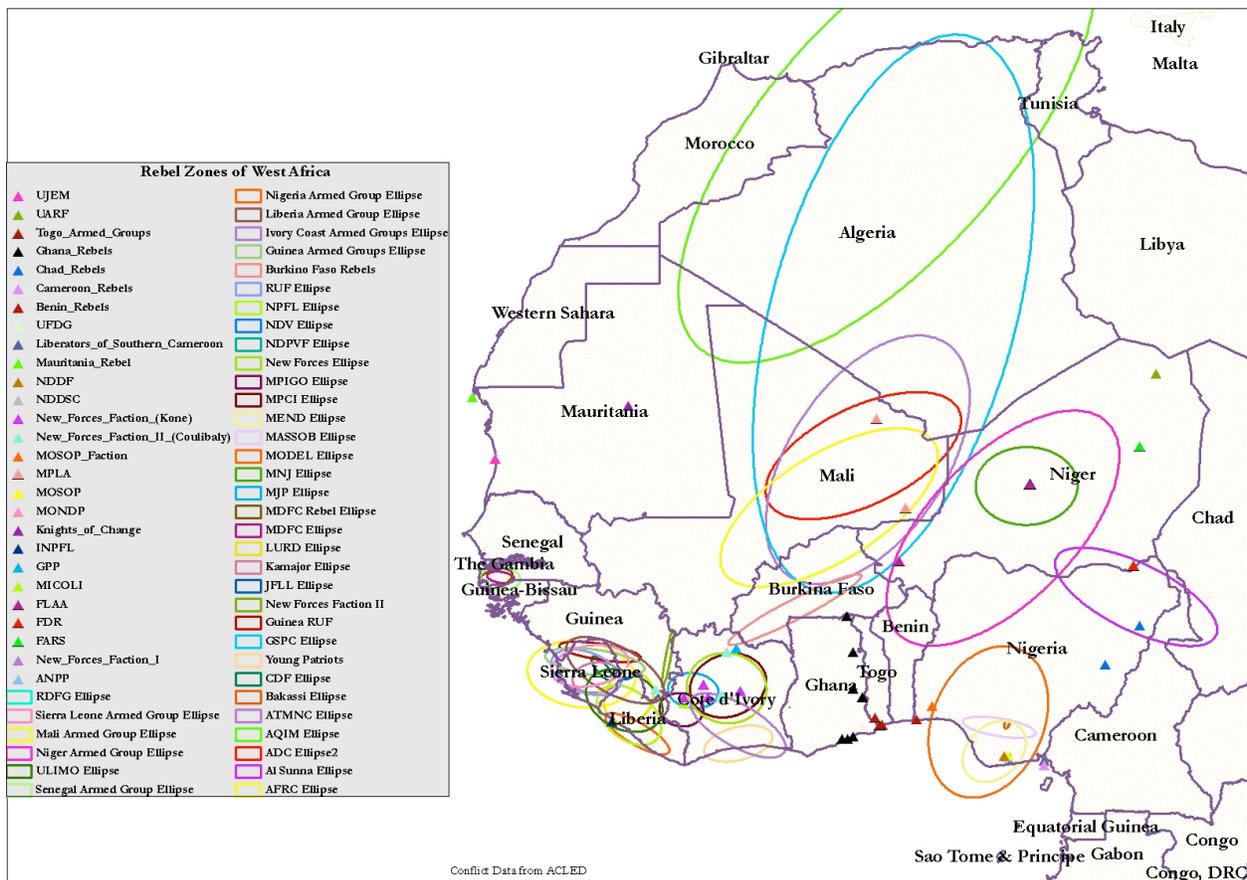


Source: ACLED, 2010

Intersection of Nigerian Conflicts with Diffusive Groups across the Sahel – Interactive and separate conflicts can be found across the western Sahel states. Importantly, each state has ‘home grown’ conflicts and conflict agendas that interact with the diffusive groups across the Sahel. Violence in recent years has increased in countries in the western Sahel due to both internal and diffusive threats, particularly rebel threats from northern Mali, southern Niger, and border regions in Algeria and Mauritania.²⁶

Recent conflicts in many developing countries often contain some element of cross-border activity. Extensions of conflicts beyond borders are common for many reasons including sanctuary, strategic attacks, and support from common ethnic populations. As shown in Figure 13, this is a particular concern for northern Nigeria, which is both more susceptible to climate change effects that could negatively impact livelihoods, and also within the sphere of influence of rebel groups from southern Niger.²⁷

Figure 13. Diffusion of Rebel Groups across the Western Sahel



The main pathway to disruption in northern Nigeria thus stems from the diffusion of related conflicts in neighboring countries and the political economy of drugs and weapons in the north that can sustain these groups within Nigeria. Such openings in regional instability or internal instability in Nigeria could allow multi-national rebel groups to broaden their base in Nigeria and the Western Sahel.

Resource Distribution

As reflected in Figure 2, there is a strong correlation between oil fields and high levels of overall violence, and these events occur in areas where Nigeria is expected to see among its most significant climate change impacts. The security implications are two-fold. First, 81% of Nigeria's total government revenue came from oil revenue in 2008.²⁸ State dependence on petroleum extraction in areas most vulnerable to climate hazards poses economic security considerations, with many petrol sites sitting one to two meters above sea level and thus acutely susceptible to coastal inundation.

Additionally, instances in recent years have shown that Nigeria's oil production can also be sensitive to social crises—events that could be triggered or exacerbated by the effects of climate change. High oil revenues, extreme poverty, ethnic conflict, and weak rule of law have historically converged in the Niger Delta region to produce actual and perceived unequal allocation of resources. Past instances of government allocation of public resources to ally power groups and regions have marginalized ethnic groups and spurred ongoing rebel movements in the oil field areas. If climate change leads to increased hardship and scarcity in this region that are not adequately addressed by development and adaptation efforts, the region could fall into similar historical patterns of ethnic conflict and violence.

Instability in oil producing areas that leads to decreased oil production could have a significant impact on the Nigerian budget, but also the international petroleum market. Past disruption in Nigeria's production has impacted international supplies and pricing—a repeat of which could affect the United States, with Nigeria currently serving as the fourth largest exporter of both crude and petrol to the United States.²⁹

UNINTENDED CONSEQUENCES OF ADAPTATION AND OPPORTUNITIES FOR BUILDING RESILIENCE

Given the particular challenges in Nigeria, several unintended consequences could arise from adaptation strategies as they are implemented today in Nigeria, namely in the absence of a national adaptation strategy.

Overly Narrow Adaptation Focus – Lacking a central coordinating body, Nigeria's Special Climate Change Unit of the Ministry of Environment has been the appointed focal point for the country's climate change efforts. Coordinating climate change policy from within the environment ministry, however, has hampered efforts to integrate adaptation into *all* aspects of government and, in effect, limited adaptation strategies to focus on the physical hazards of climate change. The limited adaptation strategies implemented in Nigeria have thus far not included sufficient focus on the security dimensions of climate change. However, sub-national vulnerability analysis indicates that governance and political violence are significant drivers of climate change vulnerability in Nigeria, and Nigerian conflict events have shown a general increase in violence over time. Failure to incorporate security considerations in a national adaptation strategy thus leave a range of potential conflict drivers unaddressed and poised to undermine adaptation efforts and internal stability in Nigeria.

There are several opportunities to redress Nigeria's narrow adaptation focus and build resilience in this area:

- The central opportunity for building resilience lies in supporting efforts underway to establish a national adaptation policy and a national cross-cutting institution to lead adaptation efforts in Nigeria.
- On the national level, Nigeria's adaptation strategy must include a specific, substantial focus on cross-sectoral issues like security and political violence. If the NASPA process moves forward

as planned, this could be a key entry point into the government's planning on these critical security issues. Specifically, conflict prevention measures should include a focus on conflict prevention in regions with historical incidence of conflict where tensions remain; areas with high ethnic militia, rebel, or government violence; areas under the influence of regional diffusive rebel groups; and areas where land is potentially contested between pastoralists and farmers. Conflict management and prevention strategies should also include approaches to ensure all key stakeholders are included in elections and other national processes that could serve as conflict flashpoints.

- On a regional level, new regional climate change initiatives adopted by ECOWAS and other organizations could be key in helping address the security implications of climate change since Nigeria's security challenges stem from both internal and regional instability factors. These regional initiatives currently focus mostly on addressing the physical effects of climate change. The challenge for the international community would be to ensure these organizations expand their climate change focus to address the broader security implications of climate change as well.

Marginalization of Cross-Sector Issues and Groups – Lacking a comprehensive national strategy, adaptation efforts in Nigeria have been led by individual ministries and have thus focused on the sectoral interests of each ministry. An exclusively sector-based approach can not only prevent the government not only from addressing cross-sectoral issues like security and migration, but also prevent it from meeting the needs of groups like women, youth, and ethnic communities that are affected by climate change in ways that transcend specific sectors.

Opportunities to build resilience beyond a sector-based approach could include the following:

- The national adaptation strategy must address the differential impacts of climate change on women and men. Many federal ministries report they are already undertaking measures to mainstream gender issues into their general activities or their climate change activities.³⁰ Ensuring adequate and complete gender mainstreaming in adaptation will require both technical support and benchmarking against specific indicators, such as those proposed by the Nigeria Climate Action Network for gender mainstreaming in climate change policy development.³¹
- The national adaptation strategy must address the differential impacts of climate change on youth and ethnic communities. The new Ministry of Niger Delta Affairs has already initiated consultation processes and capacity-building trainings targeting youth and vulnerable regions with high ethnic diversity. These initiatives could be supported and expanded in these states, and also used as a model for expansion in other regions nationwide.
- The membership of the National Climate Change Commission could be expanded to include the ministers responsible for women's affairs, youth, and the Niger Delta. This could help ensure that the interests of groups represented by these ministries are adequately addressed in national climate change policies, and that these ministries adequately integrate climate change considerations into their policies and practice.

Disproportionate Allocation of Resources – The lack of a cohesive, empirically based national strategy could also result in the disproportionate allocation of adaptation projects and other development resources. Disproportionate funding, and even intentional use of state resources to marginalize ethnic populations, has been an issue in the recent past in areas expected to be hit hardest by the effects of climate change. With ethnic tensions, conflict events, and poverty still prevalent in these regions, additional livelihood hardships resulting from climate change effects could stoke existing conflict tensions if adequate attention and resources are not devoted to address these changes. Furthermore, with this history and current tensions, avoiding even the perception of disproportionate allocation of resources will be critical.

Opportunities to forestall challenges over resource distribution and build resilience in this area could include the following:

- The creation of the Ministry of Niger Delta Affairs in 2008 presents an opportunity to forestall past patterns of unequal development and ethnic marginalization in the Niger Delta region. It is clear that, to avoid recurrent conflict patterns in this region, it will be critical to avoid actual or perceived cases of disproportionate allocation of adaptation aid and projects. With its capacity building and development initiatives already underway, this new ministry could be a key vehicle in working toward this challenge in a region particularly vulnerable to climate change hazards and conflict.
- Effective, transparent management of Nigeria's adaptation programs and aid flows must be a priority within the country's national adaptation strategy. Given Nigeria's substantial aid flows, falling transparency and corruption indicators, and history of politically motivated resource allocation, greater transparency in aid management could play a critical role in building public confidence in Nigeria's management of the country's adaptation efforts.³² Development Gateway's Aid Management Platform provides one such option to governments for transparent management of international aid flows.³³
- Better tracking of adaptation programs means better targeting of resources to address unmet needs. Efforts underway on the CCAPS program will categorize and geo-reference adaptation aid projects in Africa, thus allowing researchers and policymakers to layer maps with adaptation project locations and vulnerability indicators to assess if aid is allocated to areas of most need.

Several other unintended consequences could arise from the *process* through which Nigeria's national adaptation strategy is currently being developed.

Civil Society Dominance – With limited government capacity and lack of a cross-cutting government agency to lead climate change initiatives, Nigerian civil society has played a driving force in shepherding development of climate change policy in Nigeria. While active involvement of civic groups in policy development is key in promoting broad representation in the process, the degree to which the NASPA process has been organized—and documents generated—by civil society rather than policymakers could raise challenges in garnering the political buy-in to implement these policies. Furthermore, the same lack of capacity that has prevented Nigeria's government from being the dominant player in drafting national adaptation policies could also hamper efforts to implement these policies.

- Opportunities for building the government's capacity to implement a national adaptation strategy hinge on final creation of the National Climate Change Commission, or a similar body, and providing technical assistance and support to this body.

Lack of Government Transparency – The current lack of transparency in legislative and government activity makes broader public access to key climate change policies difficult. Such transparency issues are not unique to Nigeria. However, insofar as Nigeria is unique from many African nations in not having a publicly available NAPA guiding national climate change policy, Nigeria's lack of transparency in its internal governance can have a uniquely adverse effect on public inclusion in climate change adaptation in Nigeria.

- Opportunities for improving broad public access to, and participation in, Nigeria's adaptation process lie in increasing the national adaptation strategy's focus on these critical governance issues in addition to its focus on addressing the physical and security components of climate change vulnerability in Nigeria.

APPENDIX A

Additional Description of Methods for Vulnerability Assessment Model

The vulnerability assessment model discussed here consists of four baskets, or processes, addressing climate related hazards, population density, household and community resilience, and governance and political violence.

Climate Related Hazard Exposure: First, at a minimum, places must be physically exposed to climate related hazards. Indicators included in this basket represent *historic exposure to (1) floods, (2) wildfires, (3) droughts, (4) variable precipitation (which captures rainfall scarcity), and (5) cyclones, as well as one indicator of future vulnerability (6) low-elevation coastal zones.*

Population Density: Second, climate related hazards are a broader risk when they occur in places that have high population density. All else being equal, more densely populated areas that are highly exposed to climate related hazards will require more attention from decision-makers. This basket is represented by one indicator: *current population density.*

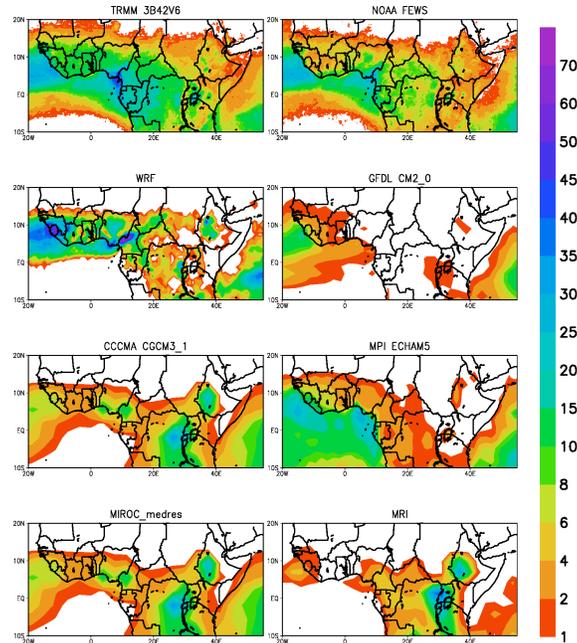
Household and Community Resilience: Third, the first line of defense for many people will be what resources they have at the household and community level to protect themselves from physical hazards and respond in the event of climate related emergencies like floods, droughts, or storms. Communities where many people are sick and have inadequate access to health care and basic amenities are likely to be less resilient than those that are healthier and have greater access to services. Where people are poorly educated, they may have fewer entrepreneurial skills to avoid those hazards or minimize their effects. This basket is thus represented by eight indicators, including *two education indicators (literacy rate, school enrollment), two health indicators (infant mortality, life expectancy), two daily necessities indicators (underweight children under 5, access to improved drinking water), and two access to healthcare indicators (per capita expenses on healthcare, numbers of nurses and midwives per capita).* The model includes sub-national data for infant mortality, underweight children, and access to improved water sources.

Governance and Political Violence: Fourth, weather emergencies frequently exceed the capacity of local communities' emergency services, requiring national level mobilization to save people from rising waters or from being trapped under rubble and to provide food, water, and shelter for people left homeless or otherwise affected by extreme weather events. As the world witnessed in Pakistan in July 2010, countries with poor or unstable governance are less able or even willing to provide such services. Autarkic countries like Myanmar cannot or will not count on external aid to help them in such circumstances. Inadequate government response can transform even small physical effects, like the modest drought in Somalia in the early 1990s, into major humanitarian disasters. Places with a history of violence may be more difficult to deliver services to and may have additional localized governance challenges. This basket is thus represented by six indicators, including *two indicators from the World Bank's Governance indicators (Government Effectiveness, Voice and Accountability), two indicators of Political Stability from Polity IV, one indicator of the degree of global integration from the KOF Index of Globalization, and one indicator of battles and violent attacks against civilians from ACLED.* The model includes sub-national data for the final indicator.

APPENDIX B

Present Day Validation for the WRF Model

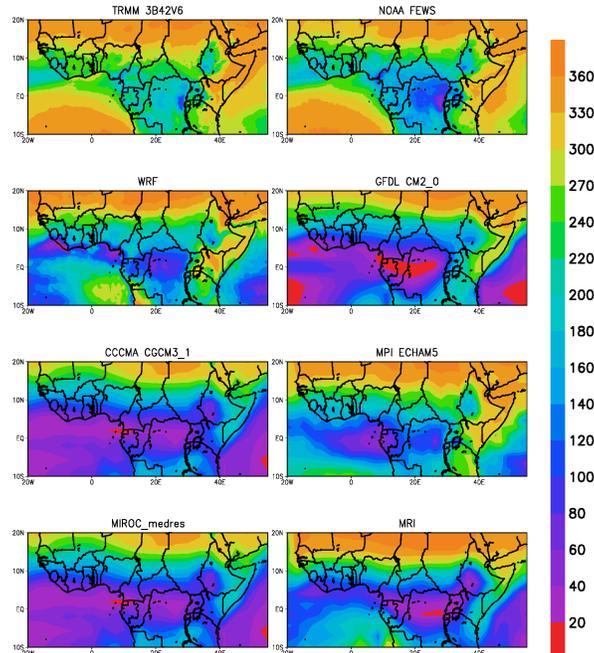
of days per year where the daily rainfall exceeds 25 mm/day



Produced by: Kerry H. Cook and Edward K. Vizy

While the AOGCMs can simulate the annual rainfall amounts, they have great difficulty simulating intense rainfall events. The 90-km resolution WRF is an improvement over the AOGCMs.

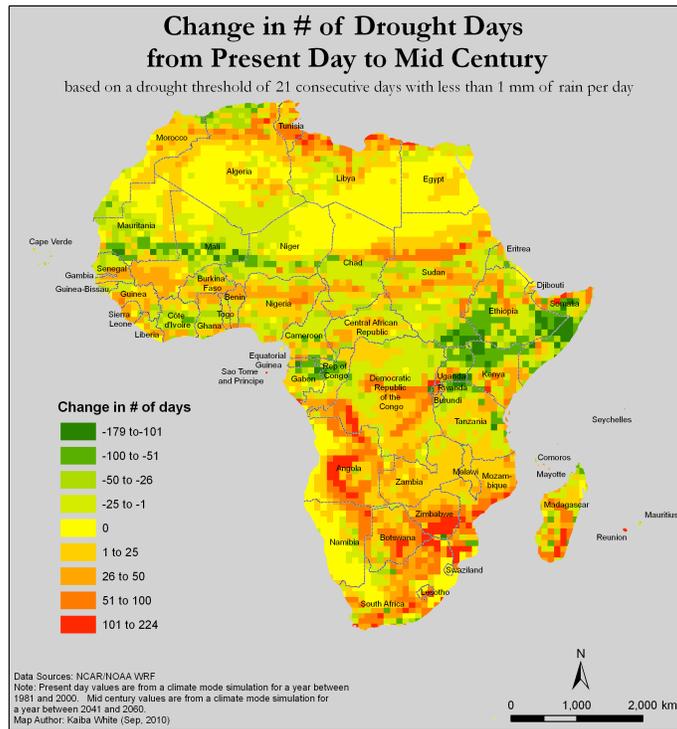
of days per year where the daily rainfall is less than 0.25 mm/day



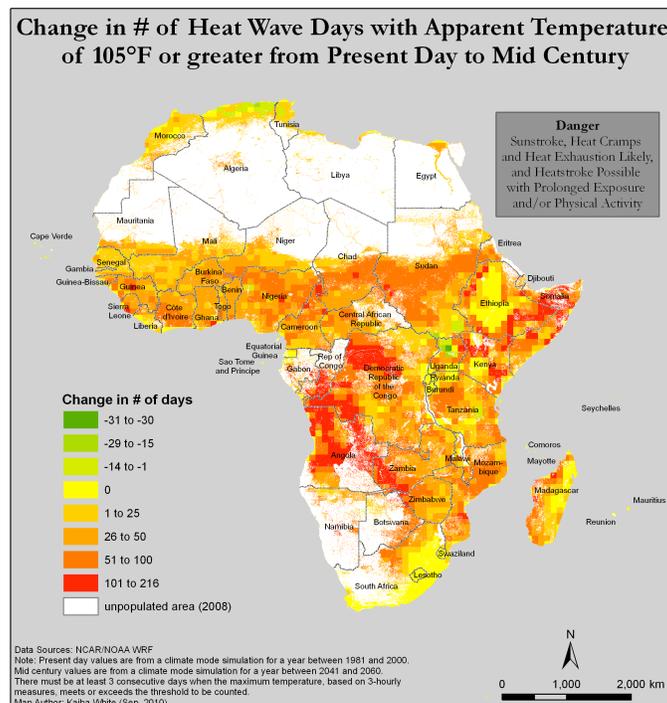
Produced by: Kerry H. Cook and Edward K. Vizy

In the AOGCMs, it rains almost every day in the tropics. The WRF offers some improvement.

Mid-Century Climate Projections, based on WRF



Produced by: Kerry H. Cook, Edward K. Vizy, Joshua W. Busby, Kaiba L. White



Produced by: Kerry H. Cook, Edward K. Vizy, Joshua W. Busby, Kaiba L. White

APPENDIX C

International Aid Projects for Adaptation in Nigeria

Using AidData's climate project identification methodology, CCAPS researchers used seven independent coding schemes to identify and categorize projects based on both narrow and broad definitions of adaptation. Below is the list of projects returned for each definition.

Narrowly Defined Adaptation Projects

A narrow definition of adaptation aid includes projects that directly respond to climate risks. These activities are undertaken only because of, and in response to, climate change. Under this definition, 13 adaptation projects were committed to Nigeria from 2005 to 2008, accounting for USD10 million. These projects are listed below. More detailed information on these projects is available at www.aiddata.org.

Source: AidData.org

Donor	Year	Project Title	Short Description	OECD CRS Purpose Name	Total Committed (USD 2000)
Canada	2006	BUILDING NG RESPONSE TO CLIMATE CHANGE	BUILDING NG RESPONSE TO CLIMATE CHANGE	Environmental education/training	3765170.884
United Kingdom	2007	Climate change in Africa: Building African Ownership	ENVIRONMENTAL POLICY AND ADMIN. MGMT	Environmental policy and admin. mgmt	29916.37851
United Kingdom	2007	Climate Change	BIO-DIVERSITY	Bio-diversity	2009.383423
		Evaluating the efficacy of Radio Drama as a means to strengthen the capa	EVALUATING THE EFFICACY OF RADIO DRAMA AS A MEANS TO STRENGTHEN THE CAPACITY OF SMALLHOLDER FARMERS TO ADAPT TO CLIMATE CHANGE	Agricultural extension	78312.25567
Canada	2007	Safe Water Access	WATER SUPPLY & SANIT. - LARGE SYST.	Water supply & sanit. - large syst.	14519.83969
United States	2007	Information and Communication Technologies for Meteorological Services		INFORMATION AND COMMUNICATION TECHNOLOGY	9928.769858
Korea	2007	Nigeria National Energy Development Project - Carbon		N/A	4874689.643
World Bank	2007				
Carbon Offset	2007				
		Enhancing capacity of regional institutions for integrated water resources management in shared water courses in SADC / Sub Sahara Africa	ENHANCING CAPACITY OF REGIONAL INSTITUTIONS FOR INTEGRATED WATER RESOURCES MANAGEMENT IN SHARED WATER COURSES IN SADC / SUB SAHARA AFRICA	Environmental education/training	7516.973131
Germany	2008	Enhancing capacity of regional institutions for integrated water resources management in shared water courses in SADC / Sub Sahara Africa	ENHANCING CAPACITY OF REGIONAL INSTITUTIONS FOR INTEGRATED WATER RESOURCES MANAGEMENT IN SHARED WATER COURSES IN SADC / SUB SAHARA AFRICA	Water resources policy/admin. mgmt	7516.973131
Germany	2008	Climate Change	CLIMATE CHANGE	Bio-diversity	8984.941651
United Kingdom	2008	INTERNATIONAL CONFERENCE ON CLIMATE CHANGE AND HUMAN SECURITY	INTERNATIONAL CONFERENCE ON CLIMATE CHANGE AND HUMAN SECURITY	Social/welfare services	10667.50176
Greece	2008	AFRICAN COOPERATION PLAN IN METEOROLOGY	AFRICAN COOPERATION PLAN IN METEOROLOGY	Government administration	92896.57355
Spain	2008	Integrated Mangrove Forest Management Initiative	INTEGRATED MANGROVE FOREST MANAGEMENT INITIATIVE	Forestry policy & admin. management	1291332.986
EC	2008				

Broadly Defined Adaptation Projects

A broad definition of adaptation aid assumes that any activity that makes people better off and more resilient overall will also serve to better prepare them to combat the effects of climate change. Under this definition, 84 adaptation projects were committed to Nigeria from 2005 to 2008, accounting for USD696 million. These projects are listed below. More detailed information on these projects is available at www.aiddata.org.

Source: AidData.org

Donor	Year	Project Title	Short Description	OECD CRS Purpose Name	Total Committed (USD 2000)
IDA	2005	Second National Urban Water Sector Reform Project	Water, sanitation and flood protection (Water supply): 91, Public Administration, Law, and Justice (Sub-national government administration): 5, Public Administration, Law, and Justice (Central government administration): 3, Health and other social services (Other social services): 1	WATER SUPPLY AND SANITATION	176,344,086.02
GEF	2005	Rural Electrification and Renewable Energy Development		N/A	881,720.43
Germany	2005	WINDENERGIENUTZUNG AFRIKA LI	WIND POWER	Wind power	127,918.50
Norway	2005	PREPARING FOR THE CLEAN DEVELOPMENT MECHANISM (CDM) IN NIGERIA	PREPARING FOR THE CLEAN DEVELOPMENT MECHANISM (CDM) IN NIGERIA	Environmental policy and admin. mgmt	68,441.68
UNDP	2005	Governance and Human Rights.	SECURITY SYSTEM MANAGEMENT AND REFORM	Security system management and reform	13,219.75
UNDP	2005	Establishment of the NNF (Phas	SECURITY SYSTEM MANAGEMENT AND REFORM	Security system management and reform	65,926.94
UNDP	2005	BAUCHI STATE-EFFECTIVE COMM ST	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	50,369.77
UNDP	2005	ENUGU STATE-EFFECTIVE COMM STR	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	44,570.95
UNDP	2005	KWARA-EFFECTIVE COMM. STRATEGY	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	39,311.14
UNDP	2005	ONDO STATE-EFFECTIVE COMM STRA	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	40,060.47
UNDP	2005	Support to Peace & Development	SECURITY SYSTEM MANAGEMENT AND REFORM	Security system management and reform	32,137.16
UNDP	2005	Support to IDPs in Bauchi, Na	SECURITY SYSTEM MANAGEMENT AND REFORM	Security system management and reform	51.25
UNDP	2005	AKWA IBOM -EFFECTIVE COMM STRA	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	22,284.06
UNDP	2005	LAGOS STATE-EFFECTIVE COMM. ST	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	818.41
UNDP	2005	RIVERS STATE-EFFECTIVE COMM ST	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	56,350.26
UNDP	2005	GOMBE STATE-EFFECTIVE COMMUNIC	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	58,114.23
World Bank Managed Trust Funds	2005	Niger Delta Socially Sustainable Development		N/A	214,258.06
IDA	2006	Lagos Metropolitan Development and Governance Project	Water, sanitation and flood protection (Solid waste management): 37, Water, sanitation and flood protection (Flood protection): 27, Public Administration, Law, and Justice (Sub-national government administration): 25, Health and other social services (Other social services): 11	Urban development and management	170,833,333.33
United Kingdom	2006	SUBNATIONAL INVESTMENT CLIMATE ASSESSMENTS	SUBNATIONAL INVESTMENT CLIMATE ASSESSMENTS	Trade policy and admin. management	10,531,683.23
United Kingdom	2006	NIGERIA GROWTH CHALLENGE FUND	NIGERIA GROWTH CHALLENGE FUND	Trade policy and admin. management	1,571,893.02
Ireland	2006	INF SOCIAL MITIGATION HIV/AIDS	INF SOCIAL MITIGATION HIV/AIDS	Social mitigation of hiv/aids	54,606.20
Canada	2006	BUILDING NG RESPONSE TO CLIMATE CHANGE	BUILDING NG RESPONSE TO CLIMATE CHANGE	Environmental education/training	3,765,170.88
UNDP	2006	GOMBE STATE-EFFECTIVE COMMUNIC	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	47,491.47
UNDP	2006	RIVERS STATE-EFFECTIVE COMM ST	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	48,557.24
UNDP	2006	ONDO STATE-EFFECTIVE COMM STRA	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	20,503.21
UNDP	2006	AKWA IBOM -EFFECTIVE COMM STRA	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	22,024.64
UNDP	2006	BAUCHI STATE-EFFECTIVE COMM ST	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	96,984.99
UNDP	2006	Establishment of the NNF (Phas	SECURITY SYSTEM MANAGEMENT AND REFORM	Security system management and reform	4,623.85
UNDP	2006	Support to Peace & Development	SECURITY SYSTEM MANAGEMENT AND REFORM	Security system management and reform	149,804.78
UNDP	2006	LAGOS STATE-EFFECTIVE COMM. ST	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	34,985.04
UNDP	2006	ENUGU STATE-EFFECTIVE COMM STR	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	39,111.68
UNDP	2006	Governance and Human Rights.	SECURITY SYSTEM MANAGEMENT AND REFORM	Security system management and reform	101,936.80
UNDP	2006	KWARA-EFFECTIVE COMM. STRATEGY	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	115,055.59
IDA	2007	Community-based Poverty Reduction Project Supplemental	Health and other social services (Other social services): 21, Transportation (Roads and highways): 21, Public Administration, Law, and Justice (General public administration sector): 20, Water, sanitation and flood protection (General water, sanitation and flood protection sector): 19, Education (Primary education): 19	General budget support	20,762,797.70
Germany	2007	Promoting Independent Media in Sub-Sahara Africa, Asia, and the Middle East	FREE FLOW OF INFORMATION	Free flow of information	4,566.98

Donor	Year	Project Title	Short Description	OECD CRS Purpose Name	Total Committed (USD 2000)
United Kingdom	2007	Climate change in Africa: Building African Ownership	ENVIRONMENTAL POLICY AND ADMIN. MGMT	Environmental policy and admin. mgmt	29,916.38
United Kingdom	2007	Climate Change	BIO-DIVERSITY	Bio-diversity	2,009.38
Greece	2007	LEGAL SUPPORT OF FOREIGNERS HIV PATIENTS	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	12,506.00
Canada	2007	Evaluating the efficacy of Radio Drama as a means to strengthen the capa	EVALUATING THE EFFICACY OF RADIO DRAMA AS A MEANS TO STRENGTHEN THE CAPACITY OF SMALLHOLDER FARMERS TO ADAPT TO CLIMATE CHANGE	Agricultural extension	78,312.26
United States	2007	Safe Water Access	WATER SUPPLY & SANIT. - LARGE SYST.	Water supply & sanit. - large syst.	14,519.84
United States	2007	National Endowment for Democracy Grant to Solidarity Center	EMPLOYMENT POLICY AND ADMIN. MGMT.	Employment policy and admin. mgmt.	377,603.87
United States	2007	Conflict Mitigation	CONFLICT MITIGATION	Civilian peace-building, conflict prevention and resolution	1,608,701.57
UNDP	2007	Governance and Human Rights.	SECURITY SYSTEM MANAGEMENT AND REFORM	Security system management and reform	121,364.85
UNDP	2007	Nat. Cap. for Conflict Mgt.	SECURITY SYSTEM MANAGEMENT AND REFORM	Security system management and reform	434,883.28
UNDP	2007	ENUGU STATE-EFFECTIVE COMM STR	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	47,087.38
UNDP	2007	GOMBE STATE-EFFECTIVE COMMUNIC	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	15,706.90
UNDP	2007	AKWA IBOM -EFFECTIVE COMM STRA	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	60,503.73
UNDP	2007	ONDO STATE-EFFECTIVE COMM STRA	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	82,095.26
UNDP	2007	LAGOS STATE-EFFECTIVE COMM. ST	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	3,861.12
UNDP	2007	KWARA-EFFECTIVE COMM. STRATEGY	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	23,168.20
UNDP	2007	RIVERS STATE-EFFECTIVE COMM ST	SOCIAL MITIGATION OF HIV/AIDS	Social mitigation of hiv/aids	151,937.65
Korea	2007	Information and Communication Technologies for Meteorological Services		INFORMATION AND COMMUNICATION TECHNOLOGY	9,928.77
World Bank	2007	Nigeria National Energy Development Project - Carbon		N/A	4,874,689.64
Carbon Offset	2007			N/A	66,284,675.03
AFDB	2008	Lekki Toll Road Project		N/A	
IDA	2008	Second Health Systems Development II - Additional Financing	Health and other social services (Health): 88, Public Administration, Law, and Justice (Sub-national government administration): 12	Basic health	71,982,276.14
IDA	2008	Community and Social Development Project	Health and other social services (Other social services): 30, Education (Primary education): 20, Transportation (Roads and highways): 20, Public Administration, Law, and Justice (General public administration sector): 20, Water, sanitation and flood protection (General water, sanitation and flood protection sector): 10	MULTI SECTOR AID	159,960,613.65
Germany	2008	Enhancing capacity of regional institutions for integrated water resources management in shared water courses in SADC / Sub Sahara Africa	ENHANCING CAPACITY OF REGIONAL INSTITUTIONS FOR INTEGRATED WATER RESOURCES MANAGEMENT IN SHARED WATER COURSES IN SADC / SUB SAHARA AFRICA	Environmental education/training	7,516.97
Germany	2008	Enhancing capacity of regional institutions for integrated water resources management in shared water courses in SADC / Sub Sahara Africa	ENHANCING CAPACITY OF REGIONAL INSTITUTIONS FOR INTEGRATED WATER RESOURCES MANAGEMENT IN SHARED WATER COURSES IN SADC / SUB SAHARA AFRICA	Water resources policy/admin. mgmt	7,516.97
Germany	2008	Statistical Information Systems for Sustainable Development in Sub-Sahara Africa	STATISTICAL INFORMATION SYSTEMS FOR SUSTAINABLE DEVELOPMENT IN SUB-SAHARA AFRICA	Statistical capacity building	171,261.46
Germany	2008	Capacity building and advocacy for sustainable development and community transformation	CAPACITY BUILDING AND ADVOCACY FOR SUSTAINABLE DEVELOPMENT AND COMMUNITY TRANSFORMATION	Strengthening civil society	657,562.02
United Kingdom	2008	Climate Change	CLIMATE CHANGE	Bio-diversity	8,984.94
Greece	2008	INTERNATIONAL CONFERENCE ON CLIMATE CHANGE AND HUMAN SECURITY	INTERNATIONAL CONFERENCE ON CLIMATE CHANGE AND HUMAN SECURITY	Social/welfare services	10,667.50
Spain	2008	AFRICAN COOPERATION PLAN IN METEOROLOGY	AFRICAN COOPERATION PLAN IN METEOROLOGY	Government administration	92,896.57
Spain	2008	IMPLEMENTATION OF A MACROPHYTIC PLANT SYSTEM FOR PRODUCTION OF DRINKING WATER ON THE NIGER RIVER	BASIC DRINKING WATER SUPPLY AND BASIC SANITATION	Basic drinking water supply and basic sanitation	17,304.26
United States	2008	Conflict Mitigation	CONFLICT MITIGATION	Civilian peace-building, conflict prevention and resolution	527,870.03
EC	2008	Integrated Mangrove Forest Management Initiative	INTEGRATED MANGROVE FOREST MANAGEMENT INITIATIVE	Forestry policy & admin. management	1,291,332.99
UNDP	2008	Governance and Human Rights.	GOVERNANCE AND HUMAN RIGHTS.	Security system management and reform	186,558.29
UNDP	2008	KANO STATE-EFFECTIVE COMM. STR	KANO STATE-EFFECTIVE COMM. STR	Social mitigation of hiv/aids	294.08
UNDP	2008	LAGOS STATE-EFFECTIVE COMM. ST	LAGOS STATE-EFFECTIVE COMM. ST	Social mitigation of hiv/aids	11,822.30
UNDP	2008	NIGER STATE-EFFECTIVE COMM STR	NIGER STATE-EFFECTIVE COMM STR	Social mitigation of hiv/aids	2,996.37
UNDP	2008	AKWA IBOM -EFFECTIVE COMM STRA	AKWA IBOM -EFFECTIVE COMM STRA	Social mitigation of hiv/aids	30,111.99
UNDP	2008	KWARA-EFFECTIVE COMM. STRATEGY	KWARA-EFFECTIVE COMM. STRATEGY	Social mitigation of hiv/aids	64,820.20
UNDP	2008	BAUCHI STATE-EFFECTIVE COMM ST	BAUCHI STATE-EFFECTIVE COMM ST	Social mitigation of hiv/aids	2,608.25
UNDP	2008	KOGI STATE-EFFECTIVE COMM STRA	KOGI STATE-EFFECTIVE COMM STRA	Social mitigation of hiv/aids	56,720.47
UNDP	2008	SOKOTO STATE-EFFECTIVE COMM ST	SOKOTO STATE-EFFECTIVE COMM ST	Social mitigation of hiv/aids	62,495.72
UNDP	2008	RIVERS STATE-EFFECTIVE COMM ST	RIVERS STATE-EFFECTIVE COMM ST	Social mitigation of hiv/aids	51,909.19
UNDP	2008	GOMBE STATE-EFFECTIVE COMMUNIC	GOMBE STATE-EFFECTIVE COMMUNIC	Social mitigation of hiv/aids	55,694.20
UNDP	2008	ONDO STATE-EFFECTIVE COMM STRA	ONDO STATE-EFFECTIVE COMM STRA	Social mitigation of hiv/aids	28,790.26
UNDP	2008	Rivers State Conflict Mgt & Pr	RIVERS STATE CONFLICT MGT & PR	Security system management and reform	23,220.67
UNDP	2008	SPONSORSHIP OF SEARCH FOR COMM	SPONSORSHIP OF SEARCH FOR COMM	Security system management and reform	127,968.49
UNDP	2008	NATIONAL CAPACITIES FOR CONFLI	NATIONAL CAPACITIES FOR CONFLI	Security system management and reform	84.80
UNDP	2008	Nat. Cap. for Conflict Mgt.	NAT. CAP. FOR CONFLICT MGT.	Security system management and reform	412,053.80
UNDP	2008	Effective communications strat	EFFECTIVE COMMUNICATIONS STRAT	Social mitigation of hiv/aids	517,813.32
UNDP	2008	CROSS RIVER -EFFECTIVE COMM ST	CROSS RIVER -EFFECTIVE COMM ST	Social mitigation of hiv/aids	7,780.92

ENDNOTES

¹ This section builds on previous research by Busby et al. See Joshua W. Busby, Todd G. Smith, Kaiba L. White, and Shawn M. Strange, *Locating Climate Insecurity: Where are the Most Vulnerable Places in Africa?* Austin: Robert S. Strauss Center for International Security and Law, 2010, http://ccaps.strausscenter.org/system/research_items/pdfs/19/original.pdf?1286296660.

² Each of these four baskets—physical exposure, population density, household and community resilience, and governance and political violence—is represented by indicators. In all but the population basket, multiple indicators have been selected to represent the basket. These particular indicators were selected based on review of the existing literature and with some statistical tests to eliminate indicators that were highly correlated. Indicators were also chosen with an eye towards identifying sub-national data sources for a continent where data availability is problematic. Within each basket, indicators are assigned weights and aggregated. The vulnerability categories are then classified into quintiles with the least vulnerable 20 percent represented by yellow colors and the most vulnerable 20 percent represented by the color red. These quintile classifications are relative to the rest of Africa, not the rest of the world. While all of Africa may be vulnerable to climate change, this model aims to identify which areas are more vulnerable than others and why.

³ The mid-century climate projections discussed in this section are based on projections conducted by Kerry Cook and Ned Vizio through a derivation of the NCAR/NOAA Weather Research and Forecasting (WRF) Model. Kerry Cook and Ned Vizio are based at the Jackson School of Geosciences at the University of Texas at Austin, and are collaborators on the Strauss Center's Climate Change and African Political Stability Program.

⁴ See also Marc Levy et al., *Assessment of Climate Change Impacts on Select US Security Interests*, Center for International Earth Science Information Network Working Paper. New York: Columbia University, July 2008, www.ciesin.columbia.edu/documents/Climate_Security_CIESIN_July_2008_v1_0.ed070208_000.pdf; and Linda J. Beck and E. Mark Pires, "West Africa I: Cote d'Ivoire, Nigeria, Senegal," in *Climate Change and National Security, A Country-Level Analysis*, ed. Daniel Moran. Washington: Georgetown University, Forthcoming, 302-310.

⁵ There is a lag of roughly 18 months in the most recently published figures on international development financing. 2008 is thus the most recent year for which data are complete for all donor activities. All figures for development aid are given in constant 2000 USD figures.

⁶ AidData is a collaborative effort of the College of William & Mary, Brigham Young University, and Development Gateway that seeks to capture the universe of development finance and foreign aid. AidData currently encompasses almost a million foreign aid projects between 1947 and the present from more than 87 donors. More information about AidData is available at www.aiddata.org.

⁷ Researchers at AidData used an iterative series of Naïve Bayesian categorization algorithms and human input to develop a comprehensive list of key terms that would pull potentially climate-oriented projects from AidData. This resulted in over four thousand projects to all of Africa between 2005 and 2008. All projects were double-coded by researchers on seven independent coding schemes. The seven schemes were drawn from previous research conducted by AidData on behalf of the United Kingdom's Department for International Development. The seven schemes draw from a variety of sources including the Organisation for Economic Co-operation and Development (OECD), the World Resources Institute, and text from the former U.S. Senate bill filed by Senators John Kerry and Joe Lieberman. Finally, senior researchers resolved any discrepancies between how researchers coded each project. For more information on the various coding schemes see: J. Timmons Roberts and Christian Peratsakis, *Measuring ODA for climate change: Comparing 19 categorizations of DjID's 2,226 FY2008-09 projects*, Unpublished research report submitted to the UK's Department of International Development, 2010.

⁸ African Ministers of Environment, *Nairobi Declaration on the African Process for Combating Climate Change*. Nairobi: United Nations Environmental Programme, May 29, 2009.

⁹ The study group included representatives from legislatures in Benin, Botswana, The Gambia, Ghana, Nigeria, Senegal, Tanzania, Uganda, and Zambia, and was organized as part of a longer-term effort led by the Commonwealth Parliamentary Association and the World Bank Institute. Commonwealth Parliamentary Association, *Recommendations of Study Group on the Role of Parliaments and Climate Change in Africa*. Abuja: Commonwealth Parliamentary Association and World Bank Institute, May 11-14, 2010.

¹⁰ ECOWAS' instructions for member states to identify a 'focal point' to implement the plan at the national level, and for the ECOWAS Commission to create a unit to manage implementation of the framework at the regional level, could provide some momentum for actualizing the tenets of the new framework. *Ministers Adopt Framework of Strategic Guidelines on the Reduction of Vulnerability and Adaptability to Climate Change in West Africa*. Accra: ECOWAS, March 19, 2010.

¹¹ Federal Republic of Nigeria. *Nigeria's First National Communication under the United Nations Framework Convention on Climate Change*. Abuja: Ministry of Environment of the Federal Republic of Nigeria, 2003, 11, <http://unfccc.int/resource/docs/natc/nignc1.pdf>.

¹² For example, the Ministry of Environment's Special Climate Change Unit (SCCU), the Ministry of Agriculture and Water Resources, the Energy Commission of Nigeria, and the Ministry of Niger Delta Affairs have all started initiatives at the national level to address climate change in their respective sectors, to varying degrees of intensity and success. The Ministry of Environment's Special Climate Change Unit has been charged with coordinating Nigeria's climate change work. At the state

level, the Climate Change Summit organized in Lagos for the last three years spurred action at the national level this year, with the Nigeria Governors Forum stating at the February 2011 Lagos summit that it will hold a nationwide conference on climate change this year. See Sayyadi Abba Ruma, *Investment Opportunities in Nigerian Agriculture*. Abuja: Ministry of Agriculture and Water Resources of the Federal Republic of Nigeria, 2009.; and “Governors’ Forum adopts climate change summit,” *Nigerian Tribune*, February 14, 2011.

¹³ The Inter-ministerial Committee on Climate Change is comprised of the Energy Commission of Nigeria, Ministry of Agriculture, Ministry of Finance, Ministry of Foreign Affairs, Ministry of Industry, Ministry of Justices, Ministry of Petroleum Resources, Ministry of Water Resources, National Electric Power Authority, National Planning Commission, Nigerian Meteorological Agency, and representatives from academia and non-governmental organizations.

¹⁴ The National Committee on Climate Change includes representatives from the private sector, academia, non-governmental organizations, Energy Commission of Nigeria, Ministry of Finance, Ministry of Foreign Affairs, Ministry of Petroleum Resources, National Planning Commission, and Nigeria Meteorological Agency.

¹⁵ The legislation harmonized and agreed between the House and Senate defines the ministries represented on the commission as those charged with responsibility for power, steel, petroleum resources, science and technology, environment, housing and urban development, water resources, agriculture and rural development, justice, aviation, foreign affairs, commerce, finance, and health. This harmonized legislation adopted by the House and Senate on November 4, 2010 and November 10, 2010, respectively, is the most recent version of the bill, though it is still not out officially for public circulation. *The Bill for An Act to Establish the National Climate Change Commission, Harmonization of the Bills (SB24) and (HB22)*. Abuja: National Assembly of the Federal Republic of Nigeria, 2010.

¹⁶ Ibid.

¹⁷ Nigeria informed the Global Environmental Facility (GEF) in 2010 that the approximate date for completion of its draft SNC is March 2011. Assistant Director of the Special Climate Change Unit reports as of March 3, 2011 that the draft SNC is being harmonized within the government and is soon to be discussed at a stakeholders meeting, per author email correspondence. For information on the status of Nigeria’s submission, as reported to the GEF, see <http://unfccc.int/resource/docs/2010/sbi/eng/inf10.pdf> and <http://unfccc.int/resource/docs/2010/cop16/eng/05.pdf>.

¹⁸ The NASPA process was initially envisioned as a four-stage process of research, sectoral strategy development, consolidated strategy development, and strategy integration into federal and state policies. Under the initial concept, the process was to be overseen by a central body with representatives from federal, state, and local government; civil society; academia; private industry; and international organizations. Five sectoral working groups planned to examine Nigeria’s needs and options for adaptation strategies in the fields of agriculture; infrastructure; natural resources; health and sanitation; and cross-sectoral issues like security, disasters, migration, rural and urban livelihoods, gender, youth, and finance. For more information on the general NASPA framework, see www.naspanigeria.org.

¹⁹ Building Nigeria’s Resilience to Climate Change (BNRCC), *Adapting to Climate Change Towards a National Adaptation Strategy and Plan of Action (NASPA): A Consultative Document*. Ibadan: BNRCC/NEST, Forthcoming.

²⁰ Sayyadi Abba Ruma, 10-20.

²¹ Ibid, 4.

²² See trends in FEWS-NET Food Security Outlook from March 2007 through June 2011, www.fews.net/pages/countryarchive.aspx?pid=500&gb=ng&l=en.

²³ In these cases, election periods include the six-month period surrounding the election.

²⁴ Clionadh Raleigh, Andrew Linke, Havard Hegre, and Joakim Karlsen, “Introducing ACLED-Armed Conflict Location and Event Data,” *Journal of Peace Research*, Vol. 47, No. 5, 1-10. To access ACLED data, go to www.acleddata.com.

²⁵ Ibid.

²⁶ Ibid.

²⁷ Ibid.

²⁸ 2008 is the most recent year for which actual data are available from the IMF. International Monetary Fund, *IMF Country Report No. 09/315*. Washington: International Monetary Fund, November 2009, 30.

²⁹ U.S. Energy Information Administration, *Crude Oil and Total Petroleum Imports in Top 15 Countries*. Washington: U.S. Energy Information Administration, February 25, 2011.

³⁰ Janice E. Olawoye, Obianuju Okoye, and Adeola Eleri, *Gender and Climate Change Toolkit For Policymakers and Programme Developers*. Abuja: International Centre for Energy, Environment and Development, September 2010, 35-36.

³¹ Ibid, 29.

³² Nigeria’s corruption ranking dropped to 134 out of 178 countries in 2010, down from 130 in 2009 and 121 in 2008. Transparency International, *Corruption Perceptions Index 2010*. Berlin: Transparency International, 2010.

³³ For more on Development Gateway's Aid Management Platform (AMP), see www.developmentgateway.org/programs/amp/aid-management-platform. For case studies on countries in West Africa using the AMP system, see www.developmentgateway.org/programs/amp/resources.