

## Shocks and Politics: The Political Economy of Natural Disasters in Africa

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**Abstract:** Recent theoretical literature has highlighted the likely importance of economic and political incentives in shaping responses to the threat of natural shocks, and thus the likelihood of natural disasters in general. Yet little has been done to evaluate the empirical relevance of these theoretical perspectives in those parts of the world most prone to disasters, such as Africa, where millions of individuals are at risk from floods, droughts, and related shocks that threaten their lives and material well-being. In this paper, we provide qualitative evidence to test the relevance of strategic political considerations in decisions made over how to prepare for and respond to natural shocks on the African continent. Drawing on a new case material from ten countries, we evaluate the role of perceived risk, economic conditions, electoral politics, political development, and moral hazard in defining the ways in which politicians allocate, or fail to allocate, resources in light of anticipated natural shocks. In doing so, we provide the first comprehensive political economy analysis of natural disaster policy across a range of countries and offer a new empirical perspective on the ways in which political elites attempt to manage emergency situations, or the threat thereof.

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## Shocks and Politics: The Political Economy of Natural Disasters in Africa

Natural shocks, such as floods, drought, earthquakes, and tropical cyclones, present a clear policy challenge for national governments: how does a country prepare for the often unexpected? Recent literature has developed a range of theoretical explanations for observed variation in the ways in which governments do, and do not, prepare for and respond to natural disasters. An important focus of this work is the political and economic factors influencing policy-making, recognizing that “the incentives faced by human actors can affect the prevention, mitigation, and damage of natural disasters” (Cohen and Werker 2008: 795). These efforts have helped to increase attention to the behavior of political actors in shaping the outcome of otherwise “natural” events.

While research to date has broadened our theoretical expectations about the behavior of state elites with regard to natural shocks, a key current limitation is the lack of empirical testing to evaluate which of these hypothetical explanations provides the greatest leverage for explaining particular policy outcomes. While authors such as Cohen and Werker (2008) present some case evidence and summary statistics, theirs is largely a theoretical effort. Similarly, Keefer, Neumayer and Plumper (2011) present an evaluation of one type of natural hazard, earthquakes, while Raschky and Schwindt (2009) and Healy and Malhotra (2009) each test a particular hypothesis. All of these efforts provide important contributions, but they also leave substantial room for developing a comprehensive empirical understanding of the dynamics shaping disaster policies.

This paper begins to fill this empirical gap in research on the political economy of natural disasters by examining the nature of policy making in ten African countries. We take a wide-ranging perspective and use a qualitative paired-case study design to evaluate in detail the range

of potential arguments for explaining variation in national policies for disaster preparedness and response. In doing so, we are able to provide evidence both for and against a number of theoretical hypotheses while also offering a more nuanced perspective on the ways in which the hypothetically important characteristics of states interact to affect policy choices and institutional robustness. This has important implications for our understanding of the relationship between national governments and international aid agencies in the face of natural shocks. Both domestic and international actors need to know which kinds of precursor conditions must be supported in order for risk-reducing institutions to be able to thrive in a challenging new century. Are resources and attention best spent: building up the institutional bureaucracy in disaster management directly, supporting the personal and financial commitments of political leaders to facing natural hazards in a structured way, or contributing to the improvement of underlying economic and political realities that can be assumed to generate good disaster institutions spontaneously? The answer depends on how strong and predictable the connections between these levels of causation really are in practice.

To preview, we evaluate hypotheses related to the perceived risk of natural hazards, economic conditions, democracy and electoral conditions, political development, and “moral hazard.” While we find general empirical support for the majority of the most popular and common-sense versions of these arguments, we also encounter glaring exceptions to nearly every “rule.” This suggests that even for the more robust hypotheses, important causal factors can be strongly influenced by relatively subtle differences in political and economic characteristics. By contrast, we find considerable evidence against the claim that “governments underinvest in disaster prevention when they know that they will be bailed out in the event of a disaster” (Cohen and Werker 2008: 797), or that moral hazard plays a role in national decisions regarding

whether or not to invest in disaster preparedness. This finding has important policy implications, as the previous literature emphasizing this argument has suggested that international aid agencies and non-governmental organizations should modify, if not limit, their activities with regard to natural shocks so as to moderate any unanticipated outcomes in domestic policy.<sup>1</sup> Instead, our findings suggest a more positive outcome, that current international practices are more likely to be complementary to national government strategies than supplementary.<sup>2</sup>

In the following sections, we briefly review the existing literature on variations in national preparedness and response strategies, emphasizing, where possible, the existing empirical evidence. We then present our research design and discuss the findings for each primary hypothesis across the set of countries. We conclude with a discussion of policy implications as well as the limitations of this research and opportunities for further research.

## Background and Existing Hypotheses

This project approaches the question of natural disaster preparedness and response primarily from the perspective of national governments and attempts to address the potential causes of government decisions regarding investment, broadly understood, in countries' abilities to reduce the risk of, prepare for, and respond to disasters. While quite broad in its aims, our goals set aside more than they attempt to achieve, including, for example, the decision making of international aid agencies, local non-governmental organizations, and more generally the dynamics of post-disaster recovery. Instead, we seek, first, to gain some traction in

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<sup>1</sup> This argument is related to the "Samaritan's dilemma: the inability to deny help following a disaster to those who have not taken sufficient prevention measures" (World Bank and United Nations 2010: 10).

<sup>2</sup> There is some evidence that international actors are already taking into account the risks of moral hazard, by conditioning preparedness aid on the participation of national governments.

understanding the policies, or lack thereof, themselves and second, the effects of these policies on the actual capacity of the state to deal with the threat of natural hazards.

This perspective, while reasonably narrow, still runs up against the constraints of a highly complex area of analysis. In order to gauge the quality of government capacities to prepare for and respond to natural shocks, we must at least attempt to have some sense of both the outcomes of natural shocks and hypotheses on the causal chain leading to those outcomes. We have chosen to frame our analysis such that national policies, and the implementation of those policies, are the primary dependent variables of the study, but this comes with the assumption that these variables have some independent effect on the outcomes of natural shocks. This is a complex and often problematic assumption for two main reasons. First, explanatory models of disaster outcomes often rely on a long causal network of lower-order factors, many of which – such as electoral conflict, population dispersion, and climactic patterns – are themselves very complex, poorly understood empirically, and often subject to stochastic shocks in any given real-world situation. Second, researchers can all too easily conflate one kind of concept (such as “outcome” in terms of disaster deaths) with a logically related one (such as “outcome” in terms of how much money was invested in preparedness and response), making comparisons within and across seemingly similar research initiatives quite difficult.

Our goal here is to begin to test more rigorously the relationships between potential explanatory variables, while keeping in mind the need for caution in dealing with a diverse set of natural shocks. For example, it is quite likely that the relationship between preparedness spending and mortality reduction varies wildly depending on the type and intensity of the hazard confronted. This should dissuade us from using one as a simple proxy of the other in most circumstances, and we discuss below in more detail the many difficulties associated with

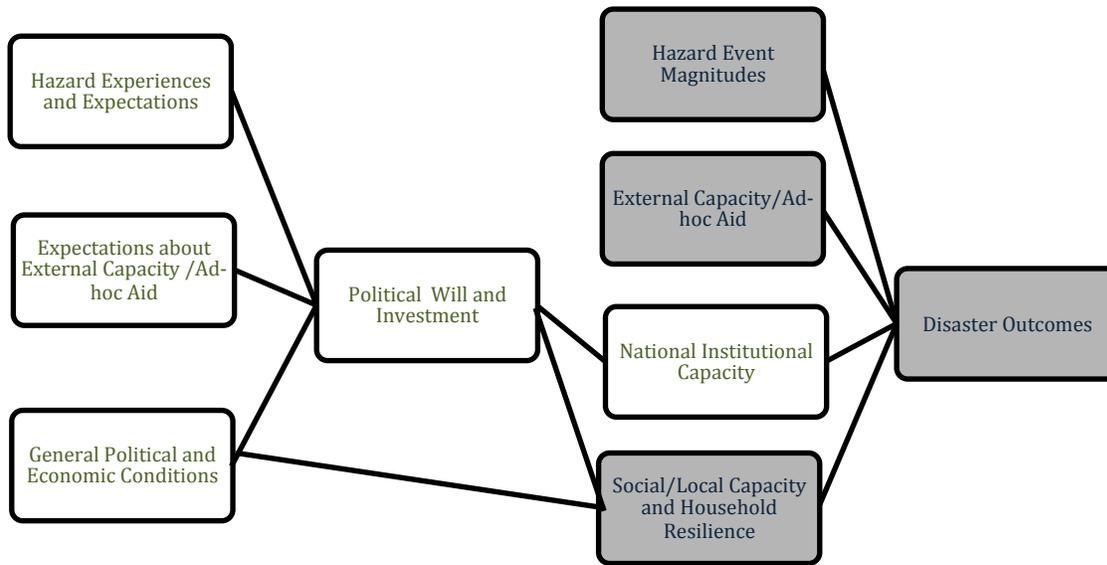
empirical data on natural hazards and their outcomes. For current purposes, we attempt to communicate as clearly as possible the boundaries of consideration for our research, keeping in mind that the variables involved can have complex relationships that are difficult to parse in any single research initiative.

Figure 1 illustrates the main factors considered in this study within a local “neighborhood” of relationships that are relevant to disaster risk. The boxes in white are our main topics of study, while those in gray are closely related areas outside the focus of our research. We review and pursue some of the most prominent hypotheses concerning how selected factors affect a government’s political will to invest in disaster outcome mitigation, as manifest in the commitment of money, skilled personnel, and political capital to dealing with the problem. We also examine how selected bureaucratic and institutional factors mediate between that investment input and the subsequent perceived capacity of national institutions to carry out those functions they are funded to perform.

Our conceptualization of “national institutional capacity” includes the effectiveness of both pre-hazard risk reduction programs and post-hazard response and recovery programs. Logically, there is no clear separation between the two: investing in a levee to hold back flood waters, investing in boats to be ready to ferry stranded victims, or investing in employees who train to disburse ad-hoc recovery aid funds is economically the same act. In addition, our research tends to find that the pre-event preparedness and risk reduction institution is also the body that is charged with disaster response. However, from the standpoint of international, and some domestic, actors, these activities are differentiated, with greater attention at the international level in recent years placed on risk reduction, rather than preparedness or response. That said, domestic actors are still more likely to focus on preparedness and, in particular,

response and there can be a very wide gap in both public and government views on preparation and response, as we discuss below.

Figure 1: Selected Proximate Factors in Disaster Outcomes and Research Focus



The existing literature highlights a large number of hypotheses to explain variation in the degree to which national governments prepare for and respond to natural shocks. Here, we provide a review of the key arguments proposed to date and tested in this research initiative.<sup>3</sup>

A key factor for states’ disaster policies is likely to be the overall perceived risk of future hazards. In countries hard hit by disasters in the past, previous experience with international aid and the difficulties of dealing with diverse sources of assistance have often helped incubate policies to improve local disaster preparedness activities (instead of increasing the likelihood of reliance on external support) (see, e.g., NTS 2010, International Environment and Disaster Management Laboratory et. al. 2010, EDI 2010, and National Disaster Management Commission

<sup>3</sup> While this research initiative considered more than 40 individual hypotheses discussed in the literature, we present here the findings only for the most general and prominent arguments.

(Liberia) and UNDP 2010). The literature on this topic tends to emphasize the *formalization* of national knowledge about expected future hazards as the key parameter in that knowledge having an impact on investment decisions.

Economic arguments also predominate in much of the literature, with the typical expectation that wealthier governments will spend more on prevention (Cohen and Werker 2008; Keefer 2009, Neumayar, and Plumper 2011). However, authors differ on the logic underlying this argument, with some emphasizing economies of scale while, with regard to earthquakes, Keefer et al. posit that “the opportunity costs of expenditures to limit earthquake mortality are higher in poor countries, so that rich countries should respond more strongly than poor countries to higher earthquake propensity” (Keefer et al. 2011: 1531). Other literature highlights the potential negative feedback effects from increasingly devastating disasters, which can threaten the productivity of wealthy countries or regions within countries while weighing down on poor economies and further dampening their ability to invest (World Bank Sustainable Development Department 2009: xviii).

The nature of the political system is also expected to play a role, and analysts have become increasingly cognizant that disaster and disaster-related policies are directly linked to political incentives, which can differ dramatically across countries. As Keefer notes, “government incentives to provide the public policies needed to mitigate disaster risk and damage across vary countries; institutions and politics are the sources of those incentives” (Keefer 2009: 1). A range of factors, however, can affect the nature of political incentives. While authors such as Kahn (2005) posit that democracy, in general, is associated with fewer deaths from natural disasters, Keefer (2009) argues that democracy, or electoral competition, alone is

insufficient for explaining variation in disaster outcomes.<sup>4</sup> Instead, Keefer, Neumayer, and Plumper (2011) suggest that institutionalization of the party system can boost the propensity of governments to prepare for natural shocks, in particular earthquakes, by increasing the demand for public goods provision. Specifically, “in countries where citizens or members of the ruling party can more easily sanction leaders for poor performance, leaders should respond more quickly to higher earthquake propensity” (Keefer et al. 2011: 1531; see also Keefer 2009 and World Bank and United Nations 2010: 8). This characteristic, which can arise in both democratic and nondemocratic regimes, is argued to be even more relevant for policy outcomes than electoral competition on its own.

Electoral conditions may also shape the distribution of spending, both in terms of preparedness and response. Cohen and Werker argue that governments may target spending to favor “regions that are politically aligned with the party in power” (Cohen and Werker 2008: 797). Here, politicians in democratic environments may be more affected by “electoral myopia,” in that they invest only in expectation of the next election, rather than for long-term preparedness. Authoritarian regimes may thus be more likely to invest in overall, rather than targeted, preparedness.

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<sup>4</sup> An underlying assumption in this debate is that the direct route between democratic state-building and institutional investment in risk reduction is what is important in determining whether the electoral structure affects disaster outcomes. A persistent complication is the possibility of an alternate route to outcome effects from the same source: that healthy electoral democracy may be empowering civil society, local government autonomy, and stronger community participation. These could lead to more favorable disaster outcomes either indirectly through institutional advocacy or directly by producing communities and households less in need of national aid in an emergency. A substantial body of literature focuses on this latter “social capacity” path to better disaster outcomes (e.g., Kusumasari et. al. 2010 and UNISDR 2010). While we consider this alternative hypothesis in the broader project, the results are not included here for sake of space.

A related issue may arise with regard to funding for disaster response. Garrett and Sobel (2003) and Healy and Malhotra (2009) find evidence of targeting to particular electoral constituencies in the wake of disasters in the United States. The timing of elections can also play a role, with Cole et al. (2009) showing that governments in India were more likely to spend generously on disaster relief during election years, when they could more directly benefit from citizens' appreciation of their efforts.

The expectation of future natural shocks may also interact with electoral conditions to affect policy. Spending on disaster preparedness is often difficult to translate into electoral benefits: "Building codes, early warning systems, disaster relief planning and floodplain management are all difficult for citizens to observe. Even if individuals can observe them, they cannot easily assess the contribution they make until a disaster occurs" (Keefer 2009: 8). The same opacity is a problem for both researchers and citizens: even where prevention spending can be identified in a budget, project quality and effectiveness can remain very difficult to assess after a hazard event has taken place. As a result, and because it is easier to evaluate the quality of spending on response, multiple authors highlight that voters are more likely to reward response spending than spending on preparedness and mitigation (Healy and Malhotra 2009; Keefer 2009). However, as natural shocks become more frequent, citizens may become less likely to punish politicians for the preparedness activities that then reduce the chances of a negative electoral response when a shock does occur (Keefer 2009).

Political development may also play a role. In particular, factors such as the degree of development in the bureaucracy and the presence of corruption in government operations may shape the quality of programs put into place to prepare for or mitigate the effects of natural shocks. With regard to corruption, the willingness of bureaucrats and politicians to skim funds

from programs intended to support preparedness and response as well as to accept bribes from individuals and companies attempting to affect regulations or avoid their enforcement can limit the quality of policies put into place. In the case of earthquakes, Escaleras et al. (2007) argue that this is a key factor in the enforcement, or lack thereof, of building codes.

Political development more generally concerns the degree to which the bureaucracy is meritocratic and insulated from political whims in the implementation of policy. As Evans and Rauch (1999) have shown, the “Weberianness” of a bureaucracy, or the extent to which government agencies use meritocratic recruitment and offer predictable career paths, can be linked to policy outcomes such as economic growth. We may then expect that more “Weberian” bureaucracies will also be better able to promote other policy outcomes, such as those related to disaster preparedness. Similarly, the degree to which bureaucrats are insulated from political interference may also affect their ability to implement new policy initiatives (Geddes 1994; Haggard 1997). There is a certain tension in this line of argument with the proposal, discussed above, that electoral incentives will drive higher commitments to disaster risk projects because they *do* politicize government action in this arena, whereas it would otherwise be ignored by officials. Here, on the other hand, a Weberian bureaucracy is proposed to drive better disaster risk reduction because it is *autonomous* of political interference (breaking the electoral incentives causal chain) but at the same time effective in lobbying the political authority for its own professional vision and securing the funds and authority needed to see it through. These lines of logic are not necessarily irreconcilable, but their relationship with each other and their association with general trends in what is termed political development – consisting of both more electoral competition and more Weberian bureaucracies – will tend to make for a complex analysis. Corrêa d’Almeida and Klingner (2008) and Roberts (2006) offer insightful studies of

the interaction between public criticism and what is termed “bureaucratic autonomy” in the history of the Federal Emergency Management Agency in the United States, which has experienced dramatic shifts in both its political standing and institutional authority in the past two decades.

Another key argument in the literature draws on the idea of moral hazard to posit that, “governments underinvest in disaster prevention when they know that they will be bailed out in the event of disaster” (Cohen and Werker 2008: 797). Keefer argues that, “Aid has two potential and offsetting effects. One is to loosen budget constraints that prevent countries from investing in ex ante disaster risk reduction.... However, past aid is a signal to countries of the amount of aid that they can receive in the event of a disaster...and countries substitute post-disaster relief for pre-disaster risk reduction” (Keefer 2009: 21). Raschky and Schwindt provide an empirical test of the hypothesis in the case of earthquakes, storms, and floods. They find evidence to support predominance of a negative aid effect in the case of storms, but the results are ambiguous for floods and earthquakes (Raschky and Schwindt 2009). These findings suggest both that we should be cautious in overestimating the negative effects of aid and that there is reason to consider the type of natural shock when evaluating the incentives for investing in preparation and mitigation. The inverse of this hypothesis, that countries not expecting to receive international support in the event of a disaster, will be more likely than others, all else equal, to invest in preparedness, is in some cases referred to as the “pariah” state hypothesis (Cohen and Werker 2008).

Based on review of this and related literatures, we developed a set of general hypotheses to be tested within the context of the project. In each case, there were multiple sub-hypotheses, but for the sake of brevity only the primary hypotheses are presented here. The hypotheses may

in some cases contradict each other and we leave the reconciliation of these contradictions to the empirical analysis.

- 1) Perceived risk: If governments perceive that the risk of a natural hazard is high, then they will invest more in preparedness.
- 2) Economic strength: If a country has greater economic resources overall, then it will spend more on disaster preparedness
- 3) Electoral incentives: If a government perceives disaster preparedness to be electorally beneficial, then it will spend more on preparedness.
- 4) Political development: If a government is more developed in terms of the quality of politicians and the quality and independence of bureaucrats, then it will prepare better for natural hazards.
- 5) Moral hazard: If governments anticipate that other organizations will spend on preparedness or response, then they will spend less on preparedness.

This presentation of the hypotheses belies to an extent the potential for interactions between hypotheses. In the discussion below, in addition to evaluating each hypothesis on its own, we identify the key areas in which the empirical analysis highlights important relationships between the various mechanisms identified in the hypotheses.

### Research Strategy

The findings presented here are based on primary and secondary research conducted on ten African states. The research design utilized a paired comparison model, in which each country was evaluated in conjunction with one other neighboring country. The principal goal was to establish comparisons in which two countries face as similar a set of natural hazards as possible, and often the same specific hazard, so as to improve our ability to compare the responses of national and local governments to similar hazard profiles.

At the same time, the selection of countries attempted to include the range of natural hazards typical to the Africa, including drought, floods, and tropical storms or cyclones, and to incorporate countries from across the continent. The resulting country pairs cover all of Africa's sub-Saharan regions.<sup>5</sup> The paired country cases are: Senegal and the Gambia, Ghana and Togo, Ethiopia and Kenya, Malawi and Mozambique, and Zambia and Zimbabwe.

This study represents the most comprehensive attempt that we know of to examine the determinants of variation in disaster policies within Africa from a first-hand qualitative perspective. While the findings are to an extent particular to the experiences and types of hazards common in the African context, the conclusions should be more generally relevant to understanding political decision making with regard to disasters elsewhere, especially in other developing countries.

What this design does not do is resolve an inherent problem of small-N research, which is the presence of many potentially independent variables and an insufficient number of cases with which to test sufficiently each potential cause of variation. While one could liken this design to a variant on a most similar systems approach, we have in practice only attempted to control on the type of hazards, not any other characteristics of the paired countries, thus limiting the similarity to a most similar style study. What the design does allow for is the expression of expert narrative opinion from within the national, international, NGO, and "public street" environments on the ground about what is causing national political commitment, resource investment, or institutional effectiveness. To provide the broadest possible set of perspectives, we utilized a snowball sampling approach that began with multiple initial starting points and resulted in a wide range of

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<sup>5</sup> The selection of cases was to a degree constrained by limitations on the countries to which students were allowed by the University of Texas at Austin administration to travel for conducting fieldwork.

respondents, including politicians, bureaucrats, non-governmental organization representatives, academics, and individual citizens.

The qualitative, comparative case design was chosen in large part due to the fundamental limitations of quantitative modeling related to natural hazards, which are worth considering in detail here. As recently noted, “there are no universal standards for archiving environmental parameters for defining hazards and related data. Data exchange, hazard analysis, and hazard mapping thus become difficult,” (World Bank and United Nations 2010: 3) not to mention analyzing the correlates of natural shock outcomes. Lack of broad-coverage data availability is only one symptom of a larger set of deeper conceptual problems plaguing quantitative inference as to the causes of different disaster outcomes (where outcomes are deaths, economic damage, etc.).

Foremost among these problems is the inability to sufficiently standardize scales for the magnitude of a shock that is being used to measure hazard input. Great strides have notably been made on standardizing ground-level accelerations during earthquakes and even integrating some of this data with basic knowledge about people and structures experiencing the shaking (Jaiswal and Wald 2010). But this is the exception rather than the rule and is made possible by the unique features of seismic events themselves. Researchers are still far from being able to express a shock in generic units of “potential death” or “potential damage.” And even when hazard types are taken one at a time, the proxy variables used to describe their magnitude are often highly questionable. Rainfall totals are often very indirect indicators of the pressure placed on human lives and livelihoods by flood or drought, where the real effects may be hundreds of miles away from the meteorological anomaly and heavily mediated by market conditions and the loss of income. Cyclone intensity is sometimes given as a single measure of wind speed (e.g., Rashcky

and Schwindt 2009), but even for cyclones in the developed world, the destructive power of winds is known to be at least geometrically related to wind speed (National Weather Service 2012); wind speeds would ideally need to be summed over the land that they are actually impacting, and wind itself is frequently not even the major determinant of cyclone losses, depending on the geography of the landfall.

Analysts may be tempted to use disaster deaths or damage cost as a proxy for hazard magnitude, but this would be recursive, even when considered for a country over a large number of years. To regress disaster deaths on disaster deaths, even if the model included other proxy variables for institutional capacity, would destroy the ability of a model to infer either the effect of institutional capacity on deaths or any trends in a country's capacity over time. Ultimately, there seems to be no escape from the need to use physical science data to standardize magnitudes of hazard inputs, and the ability to effectively do this has not yet arrived in the field.

It is also worth noting how difficult it can be to find standardized magnitude data for these disaster *outcomes* themselves. The Center for Research on the Epidemiology of Disasters, the most widely-cited source for all-hazards historic disaster data, relies on a wide variety of published and official accounts for damage value and persons killed, affected, displaced, etc. by a natural shock (CRED 2009). Other hazard-specific databases, such as the Global Active Archive of Large Flood Events (Brakenridge 2012) and the U.S. Geological Survey's Prompt Assessment of Global Earthquakes for Response (Jaiswal and Wald 2010) rely on proprietary sources and must apply their own cutoff criteria for when a death or other impact is considered "caused" by a flood, presumably often depending on reports that are not standardized. Even where sources are diverse, they are subject to serious concerns about reporting bias, where countries with less pervasive media coverage, less international attention, or less capable

government bodies may tend to show fewer events or a broader spread of estimates of outcomes than they would otherwise. Improvements in reporting coverage over time also make comparisons between outcomes of recent shocks and those of just a few decades ago highly problematic.

The potential problem of reporting bias is joined by other difficulties in standardization to eat away quickly at the useful degrees of freedom in comparative quantitative analysis of disaster events between countries or country-years. The number of events of a given hazard type in a given country-year tend to be so small that more and more disparate data drawn from circumstances that may not be comparable must be included to support an inferential conclusion. In order to mitigate this issue, researchers are faced with either (a) including a large number of proxy control variables in a model that may not adequately capture the political and historical nuances of a state's experiences or (b) resigning themselves to a random- or fixed-effects approach that concedes that disaster events are very difficult to compare across countries, time periods, and hazard types. Because the input magnitudes of hazards have generally not been well-standardized, the possibility that one country tends to experience events that have a much higher potential for destruction than another country also always looms large in such analysis, especially in the former case.

The role of national, disaster-specific institutional capacity on the outcome of shocks is also tremendously challenging to distinguish quantitatively from a number of other factors that are logically associated with both higher institutional capacity and better disaster outcomes. These include a range of general development factors including household wealth, economic diversification, private infrastructure quality, strong international partnerships. The use of many of these factors as control variables is problematic because in some circumstances they are truly

complimentary to explaining disaster outcomes, and in others they may dilute the significance of more relevant variables through multicollinearity.

Given this range of difficulties with quantitative research on natural hazards and their effects, we have opted instead for the complications of qualitative research. Our approach is also one that is appropriate to preliminary empirical research, in that we attempted to evaluate a wide range of hypotheses, rather than one primary hypothesis. Because the theoretical literature highlights a large number of potential explanatory variables, without providing clear justification for privileging any particular hypothesis over the others, an inclusive approach seemed most appropriate for this stage of discovery. We utilized semi-structured interviews that focused discussions with respondents on data collection to test these hypotheses but allowed for flexibility across individual cases.

Fifteen research associates, graduate students at the Lyndon B. Johnson School of Public Affairs, conducted the fieldwork for the project and interviewed more than 125 individuals to gather information on specific policies related to disaster preparedness and perspectives on these policies. The research team also, where possible, collected primary government data on disaster spending, natural hazards, and related policies, as well as secondary data from media, NGO, and academic reports. All of this information was combined to produce comparative studies of disaster policy experiences in each paired case as well as an overall comparative analysis. The findings presented here represent a summary of these materials, to be reported in greater detail in a forthcoming report.

## Evaluating Natural Disaster Capacity and Investment

In order to conduct our analyses, it was necessary to establish a framework for evaluating government capacity to reduce the risks of, prepare for, and respond to natural disasters and investment in this capacity. The Hyogo Framework for Action, established at the World Conference for Disaster Reduction in 2005, serves as an important starting point to structure our analytical work. This framework outlines a set of five overall priorities for countries to shape policies for disaster risk reduction, including effective preparedness and response policies, over the period 2005-15. Given the timing of our research in the middle of this implementation period, the Priorities for Action offer a good baseline for evaluating the progress of countries in this area against an international standard. In addition, initial reports for many African countries provided important secondary data to inform our interviews in the field.

Evaluating investment in disaster policy specifically is a difficult task, as acknowledged by much of the previous literature. Many studies, such as Rashky and Schwindt (2009), resort to using disaster outcomes such as deaths and damage as proxies for investment. In reporting economic returns for disaster risk reduction projects, Vordzorgbe relies on World Bank-funded projects as Africa examples and noted that “research on...the costs and benefit of DRR interventions has been limited” (Vordzorgbe 2006: 15). While many countries have established specific departments or ministries to oversee disaster-related activities, and the funding for these agencies can in the best cases be determined through public government accounts, the majority of spending that contributes to disaster preparedness activities is likely to go through the budgets of other departments related to building codes and enforcement, education, health, infrastructure, and agriculture. But a lack of budget transparency in many states is still a hurdle. An even larger and more permanent challenge in this type of analysis is the role of dual-use investment,

especially in infrastructure, that may not be formally predicated on disaster risk but nevertheless form the backbone of a country's ability to cope. Transport networks, sanitation works, economic diversification projects, and local government block grants are all big-ticket items that one might expect to be strong components of disaster resilience but may not formally form part of a disaster risk reduction budget or strategy. As a result, an understanding of the relevant spending in these areas must often be estimated through imprecise discussions with actors involved in disaster-related activities, both state and non-state. Our focus has been on those explicit, dedicated channels of investment whose predominant focus is risk reduction. We have done whatever possible to evaluate both explicit funding for disaster-related policies and associated budget items that may contribute to the overall capacity of the state to manage natural hazards. We also tried to leverage understanding of investment disparities within countries: while the total value of overall investment may be difficult to quantify, interviewees were also prompted to discuss the locations and sectors in the country that were the main focus of attention, gaining insight into institutional priorities and motivations.

## Findings

In this section, we consider each of the primary hypotheses in the context of the ten countries considered in the project, offering specific evidence to support or refute key elements of each argument.<sup>6</sup> To provide context, Table 1 highlights the hydrometeorological threats faced by each country, while Table 2 summarizes the team's assessment of the progress made by each

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<sup>6</sup> Here, the evidence is presented and summarized by hypothesis, rather than organized by country. In related and forthcoming work, the case material will be presented holistically and in substantially greater detail in the form of country case studies.

country on priorities of the Hyogo Framework, relative to the other countries included in the study.

Table 1 - Hydrometeorological Hazard Summary

	<i>Flood</i>	<i>Cyclone</i>	<i>Drought</i>
<i>Ethiopia</i>	Low/Moderate	Minimal	Severe
<i>Kenya</i>	Low/Moderate	Minimal	Severe
<i>Gambia</i>	High	Minimal	Low
<i>Senegal</i>	High	Minimal	High
<i>Ghana</i>	High	Minimal	Moderate
<i>Togo</i>	High	Minimal	Low
<i>Zambia</i>	Moderate	Low	Moderate
<i>Zimbabwe</i>	Moderate	Low	Moderate
<i>Malawi</i>	Severe	Moderate	Moderate/High
<i>Mozambique</i>	Severe	Severe	Moderate
<u>Scale</u> Minimal Low Moderate High Severe	<u>Source</u> Scoring of project case reports, supplemented by Global Risk Data Platform and PreventionWeb		

Table 2 – Country Capacity Scores

	<b>Hyogo Priorities Capacity Scores (Hybrid)</b>				
	<i>H1: Political Priority</i>	<i>H2: Assessment/Monitoring</i>	<i>H3: Culture of Safety</i>	<i>H4: Risk Reduction</i>	<i>H5: Response Preparedness</i>
<i>Ethiopia</i>	4.3	4.3	2.7	3.7	3.3
<i>Kenya</i>	3.0	4.0	3.4	2.6	2.3
<i>Gambia</i>	4.0	2.0	2.8	1.9	2.4
<i>Senegal</i>	3.5	2.8	3.2	2.0	3.1
<i>Ghana</i>	3.3	3.2	2.9	1.9	3.4
<i>Togo</i>	2.5	1.3	2.3	1.1	1.7
<i>Zambia</i>	4.3	3.3	2.8	2.1	3.3
<i>Zimbabwe</i>	2.1	3.0	4.1	1.8	3.0
<i>Malawi*</i>	3.4	3.5	3.4	3.4	3.2
<i>Scale:</i> 1 to 5, with higher scores implying greater progress on a given goal. National institutional capacity scores are <b>relative to other case study countries</b> .		<i>Source:</i> Case study teams’ deliberations after country visits and report drafting produced subscores for each main Hyogo priority on elements specified by the Hyogo Protocol pursuant to that priority. Separate deliberations designated capacity in each main priority area as “weak, moderate, or strong.” The two types of evaluations were then averaged, with the 1-5 scoring average weighted 2x and the categorical designation weighted 1x, using weak=1, moderate=3, and strong=5. For Malawi, only subscore averages were used: no categorical capacity designations (weak/medium/strong) were generated.			

Table 3 summarizes the findings of the ten case studies across all of the major hypotheses considered here. A “+” sign in a cell indicates that the evidence from that country largely supports a given hypothesis, either in its stated form or in the reverse. For example, in the case of economic strength, a + may indicate either that the country is reasonably well-endowed economically and it is investing in disaster preparedness activities, or that it is relatively poor and it is not investing in these areas. A “-” sign indicates evidence against a given hypothesis. Throughout the discussion and in the conclusion of the section, we consider a number of ways in

which the mechanisms underlying each hypothesis interact with each other, recognizing that the dynamics of policy making are considerably more complex than can be understood through a single hypothetical argument.

	Ethiopia	Kenya	Gambia	Senegal	Malawi	Mozambique	Ghana	Togo	Zambia	Zimbabwe
Perceived Risk	+	-	+	+	+	+	+	-	+	+
Economic Strength	-	-	+	+	+	+	+	+	+	+
Electoral Incentives	-	+	+	+	+	+	+	+	+	+
Political Development	+	+	+	+	+	-	+	+	+	+
Moral Hazard	-	+	-	-	-	-	-	-	-	+

### Perceived Risk

The perhaps strongest case can be made for hypotheses emphasizing a relationship between the perceived risk of a natural hazard occurring and the likelihood that a government will institute policies to respond to these hazards and invest in disaster-related activities, as we will show through review of the cases considered here. At the same time, the specific activities of governments and the ways in which they are engaging with other actors to implement disaster policies cannot be fully explained through resort simply to an analysis of perceived risk. It is through our investigation of the other established hypotheses in the literature that we will begin to develop a more comprehensive understanding of the diverse choices being made by African governments in the face of natural hazards.

The most dramatic cases of perceived risk are perhaps Ethiopia and Mozambique. Prior to the millennium, Mozambique had faced somewhat regular annual flooding, but it was not until the dramatic floods of 2000 that the extreme threat of this hazard became clear. The deaths of more than 800 people and the difficulties faced by both the national government and international actors in responding to the floods contributed to make hydrometeorological hazards a key priority for the national government. Since 2000, and in light of continued annual floods since then, Mozambique has developed a focused disaster management agency, and the interviewees contacted for this project confirmed that the risk of severe flooding has helped to ensure that this body receives clear support from the central government. In Ethiopia, interviewees also linked the long history of droughts and expectation that droughts will continue in the future with the national government's efforts to invest in its preparedness and response capacity.

In Zambia, the threat of regular – but slow onset – hazards such as floods and droughts has been linked to a consistent level of attention to natural hazards over the last two decades. The government's efforts have become more sophisticated since 1994, when initial disaster management policies were put into place, and were revamped substantially in 2010, but in general disaster management efforts have been a consistent part of government policy and have been incorporated into overall development efforts. The Gambia, a country flanking the Gambia river, also faces the persistent threat of natural hazards, in this case flooding. While the government has invested minimal financial capital in disaster preparedness, as discussed below, it has made a concerted effort to develop a disaster management agency that is tasked with developing and implementing relevant policies, and the Vice President heads this organization, underscoring high-level government commitment. This example places some pressure on the

idea that political commitment and financial commitment will always go hand in hand; however, it is still possible that a strong organizational foundation could pave the way for future concrete investment.

In the neighboring country of Senegal, the government also seems to have increased its attention to natural hazards in light of expectations that these threats, particularly from sea-level rise and flooding, will increase in frequency and magnitude in the future. Our interviews suggest that representatives of the government are well aware of these risks, and external actors frequently noted that recent increases in the prevalence of flooding had been closely followed by an uptick in the government's attention to natural hazards.<sup>7</sup> At the same time, the investments made by the Senegalese government often seem ad hoc and focused on response rather than constituting a comprehensive, proactive plan. We consider some potential explanations for this discrepancy in the discussion below.

Ghana is a case in which persistent historical flooding has been met with a recent increase in the severity of floods. This shift in the degree to which natural hazards threaten the local population seems to have instigated a shift in policy within the national government. While the state had previously been seen as highly reactive and not focused on improving the country's preparedness for natural shocks, approximately half of our interviewees noted a recent shift toward policies attempting to develop a more proactive stance toward disasters. One interviewee recounted specifically that NADMO, the disaster management agency, "is largely perceived to be a reactive agency that dedicates few resources towards prevention. Yet in the past two years,

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<sup>7</sup> Personal interviews (separate), multilateral donor support specialist and bilateral donor associate director. December 13, 2011.

due to the increased frequency and severity of hazards, NADMO is working to change their approach and their image.”<sup>8</sup>

The cases that offer little evidence in favor of the validity of the hazard perception hypothesis are Togo and Kenya. In Togo, natural shocks have typically been less frequent than in many of the other countries considered here, offering a potential explanation for the lack of attention to these issues in national policy. However, since severe floods in 2007, flooding has become much more common to the extent that interviewees acknowledged a need for a comprehensive disaster management agenda. Yet such an agenda has yet to take shape. For Kenya, the most dangerous type of hazard historically is drought, which has been a threat on a regular basis for many years. It was not until the drought of 2011 that the national government implemented a revised drought management plan that has been pushed by non-state actors for at least several years. The introduction of the policy in the wake of a particularly destructive drought, but one that followed on years of similar occurrences, suggests that it was the result of factors other than simply perceived risk, including those considered below.

### Economic Strength

In general, the evidence from our case studies supports an argument stressing the importance of strong economic conditions for investments in disaster preparedness and response capacity. Unfortunately, the bulk of the evidence highlights the difficulty faced by African states to investing in disaster-related policy initiatives due to their weak economic positions. Countries including Ghana, the Gambia, Malawi, Senegal, Zambia, Zimbabwe, and, especially, Togo, have invested relatively low levels of their own capital in preparedness activities. Non-state actors

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<sup>8</sup> Personal interview, representative from a Western donor agency.

often dominate natural hazard-related spending in these countries, where it occurs. National governments themselves tend to have minimal flexibility to spend their limited resources in an area such as disaster preparedness, where the benefits are often difficult to measure and appear at an unpredictable time in the future. As we discuss below in consideration of the moral hazard hypothesis, this does not imply that all of these countries are doing nothing with regard to the risks of natural hazards, indeed they are often making important policy strides with the support of external actors, but they are most likely doing less than would be feasible with stronger economies.

Two countries that highlight weaknesses in the economics argument are Kenya and Ethiopia. On one hand, Kenya, despite the highest GDP per capita in its region, has invested very few of its own resources in preparedness activities for natural disasters; the Kenyan state relies primarily on external parties for disaster preparedness and response. On the other hand, Ethiopia, a relatively poorer state, has made a much stronger commitment to investing its own resources in efforts to reduce the threat of natural hazards. In these cases, we must look to factors other than economics to explain the outcomes of natural disaster policies.

Even within economic considerations, examining only national GDP, or even the tax base, can hide important factors in government consideration of the value of investment. In Zambia, we found substantial concentration of risk reduction investments in the Copperbelt region, which is the center of the country's mining export economy and a key source of future resources for development. This is a reminder that it is not only immediate human vulnerability but also the protection of key economic development assets that can drive government disaster investment strategy.

## Electoral Incentives

The relevance of democracy and electoral incentives to policy making in the face of natural hazards has been an important focus of recent work in this area and has helped to shed important light on the political dynamics potentially affecting the lives and livelihoods of individuals living in disaster-prone regions. In particular, this work has helped to highlight the potential negative effects of electoral incentives on disaster policy, as voters are more likely to reward costly and post-hoc disaster response activities than more cost-effective investments in preparedness (Healy and Malhotra 2009). Additionally, recent research has emphasized the importance of accountability, enabled through transparent elections and/or highly institutionalized and responsive party systems, for ensuring that politicians respond in effective ways to acknowledged natural threats (Keefer et al. 2011).<sup>9</sup>

Ghana, one of the most democratic countries in our study, provides evidence to support the argument that electoral incentives often encourage governments to spend more on disaster response activities than on preparedness. The Ghanaian public perceives the national disaster management body to be a source of relief and supplies in the wake of natural disasters (World Bank “Indicators” 2012) and has responded positively to these actions. However, when the agency has attempted to engage in risk reduction through moving of at risk populations to less vulnerable parts of the country, the result has been clashes between citizens and the government

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<sup>9</sup> This implicitly raises the issue of culture as a mediator between disaster suffering and electoral pressure. The extent to which ordinary citizens will hold the government responsible for the outcome of a “natural” disaster may vary widely given fairly nuanced differences in history and society. In the Gambia, individuals affected by floods did not necessarily view the government as accountable for the damages to their homes and property, whereas in Senegal there was significant diversity in public opinions about the role for the government in managing disasters. While we attempt to account for these variations where possible, public opinion on natural disasters is on its own a significant area that requires further research across countries.

and the return of many individuals to their original home areas.<sup>10</sup> While the government is attempting to moderate public antipathy toward preparedness activities through recent media campaigns, if voters continue to privilege response actions over preparedness, this is likely to reduce the incentives for the state to pursue similar actions in the future.

Senegal, another relatively democratic country by African standards, provides additional support for the argument that disaster response activities are perceived to provide greater electoral benefits than disaster preparedness. The Senegalese government is more likely to invest directly in response and often does so in the wake of public outcry about a current flooding situation. In contrast, in those areas where there is little media attention to floods, such as in the slum areas of Dakar, floodwater often remains present for months at a time with no government assistance.

The Senegalese case also provides support for a secondary hypothesis on the relationship between disaster-related government investments and electoral incentives. Multiple interviewees noted the politically motivated allocation of disaster relief funds to sub-national regions aligned with the central government. During the municipal elections of 2009, opposition parties overtook the national ruling party to take control of a substantial number of local governments. Subsequent to the elections, the national government decentralized responsibility for flood management; a move that many newly-elected leaders felt was an attempt to shift responsibility for a delicate area to the opposition (Freedom House 2011; Zartman 2011) Then, in the effort to act on their new responsibilities, many local governments held by the opposition, such as that of Saint-Louis, the “most flooded” city in the world, found it difficult to acquire substantial

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<sup>10</sup> Personal interview, officer in the Ghanaian Armed Forces.

resources from the central government.<sup>11</sup> This provides the strongest evidence across the cases of a country in which the importance of natural disasters to the voting public is manipulated by the national government for political advantage.

Mozambique presents an interesting case in which electoral incentives seem to play an important role in the behavior of the government, despite the success of the FRELIMO-controlled government in maintaining a largely one-party state at the national level. Since the extreme flooding of 2000, the national government has made a clear and largely effective effort to improve the country's preparedness for natural disasters. Multiple interviewees noted that there is a sense within the ruling party that, despite their control over the government, if there were another disaster on the scale of that in 2000, then this would put FRELIMO at a significant risk electorally. The fear of this disaster-induced electoral threat has then contributed to the clear investment the government has made in its natural disaster management agency, the INGC, and in developing strong relationships with non-state actors to facilitate implementation of its policy goals. Also, perhaps because past experience has highlighted to both the government and the public the important contribution that preparedness can make in reducing the effects of hydrometeorological hazards, the national policy on natural hazards includes a more substantial set of preparedness components, such as educational programs in communities and schools as well as pre-stocked supply posts in vulnerable areas, than is observed in many other African states.

In Zambia, the most obvious expression of electoral relevance in terms of natural hazards was in the previous presidential election, in which the ruling party used its experiences responding to recent disasters in an attempt to discount the expertise and planning abilities of the

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<sup>11</sup> Personal interview, international organization representative, January 6, 2012.

opposition candidate. The ruling Vice President Kunda on multiple occasions criticized the candidate Michael Sata and his Patriotic Front party for having no vision for the country while highlighting his own government's efforts to build infrastructure and institute agricultural policies that would protect the country in times of crisis (*Times of Zambia* 2011; *Africa News* 2010). While these comments do not imply a direct electoral cause for disaster-related investments, they highlight the government's perception that these issues are of relevance to the voting public. That said, the ruling party lost the 2011 election for the first time in Zambia's independent history, and it is yet to be seen how the now more competitive environment may be shaping the new administration's approach to natural hazards.

Countries with more authoritarian regimes, such as Togo, the Gambia, and Zimbabwe, are also among the most limited in their investments in disaster preparedness and response, which is consistent with the electoral hypothesis, though it might not be strong evidence for the hypothesis *per se*, as these are also some of the poorest countries in our sample, as noted above. Togo does not have an electorally competitive political system or an institutionalized party system that would allow for accountability within the state. The Gnassingbe family has controlled the government for more than 45 years and only in the most recent election of 2010 was there successful multiparty participation that was perceived by the public as a step toward democracy (United Nations 2010). Thus, the lack of substantial investment in preparedness and response is aligned with this electoral environment, as would be predicted by the electoral hypotheses: even if citizens were to demand increased attention to natural hazards, there are few to no electoral levers for them to pull to increase the chances that the government would prioritize these issues. In the Gambia, interviewees noted that voters see regular flooding as a

natural phenomenon and do not seem to attribute responsibility to the government.<sup>12 13</sup> While Zimbabwe seems to have invested relatively more in preparedness and response than Togo and Gambia, there is no evidence that this is due to electoral conditions and in fact the relatively new coalition government, marking a nominal increase in the country's level of democracy, has been associated with no clear policy improvements regarding natural hazards.

### Political Development

In general, countries with higher levels of political development—more Weberian bureaucracies, less political interference in the bureaucracy, and lower levels of corruption—are expected to have stronger programs to prepare for and respond to natural shocks. Overall, our findings suggest that this is the case and, perhaps even more importantly, that low levels of political development can reduce the chances for implementation of quality disaster management programs even where other factors that should encourage such programs are in place.

Kenya is perhaps the most striking case in which low levels of political development have contributed to the minimal effort exerted by the government to respond to the challenges it faces from natural hazards. The bureaucracy is highly politicized and the cases in which there seem to have been some successes in disaster management, such as with regard to droughts, are attributed to the involvement of agencies led by high-ranking politicians.<sup>14</sup> In most cases, however, the bureaucracy is seen to have been only a minimal contributor and reactive to natural hazards, at best, with non-governmental organizations playing a more predominant role in disaster-related activities. This said, it is worth noting that the funds provided by international and non-state agencies to disaster preparedness and response programs are seen to reach their

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<sup>12</sup> Interview with western aid organization professional. In person. December 19, 2011. Banjul, The Gambia.

<sup>13</sup> Interview with international donor organization professional. In person. December 22, 2011. Banjul, The Gambia

<sup>14</sup> Personal interview, interviewee not disclosed.

targeted ends, despite perceptions of high corruption levels within the Kenyan state. In this regard, it is perhaps helpful that the bureaucracy is less involved in these efforts, and thus less able to extract rents from the programs that are in place.

Similarly in Togo, the development of the bureaucracy is very low and corruption levels are quite high, according to the Country Policy and Institutional Assessment scores of the African Development Bank from 2009.<sup>15</sup> In Togo, however, the quality of the bureaucracy seems to be less of an issue than the lack of funding for disaster-related issues in general. As one interviewee noted, there is little corruption in the disaster management arena because there is no funding from which administrators could skim.<sup>16</sup> In neighboring Ghana, while the bureaucracy is in general more developed than that of Togo, high levels of corruption are seen to have impeded implementation and, in particular, enforcement of disaster preparedness efforts to date. Representatives of the national disaster management agency noted the difficulties they experience when attempting to deal with district-level planning agencies and government building officials, both of whom are seen to be willing to take bribes that make enforcement of disaster risk reduction measures such as building codes extremely difficult.<sup>17</sup>

In contrast to these cases, the Ethiopian bureaucracy was found to be reasonably well-developed and able to implement disaster preparedness activities well and without substantial interference from politicians.<sup>18</sup> Additionally, despite scoring poorly on international indicators of corruption (Transparency International), a number of interviewees expressed the belief that the

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<sup>15</sup> Scale of 0 to 100, 100 being the most transparent and the least corrupt. The average score for African countries is 50. 2011 Ibrahim Index of African Countries, [http://www.moibrahimfoundation.org/en/media/get/20111009\\_2011-West-Africa.pdf](http://www.moibrahimfoundation.org/en/media/get/20111009_2011-West-Africa.pdf). Accessed February 29, 2012.

<sup>16</sup> Interview with Climate Change Specialist at an international organization, 16 December 2011, Lomé, Togo.

<sup>17</sup> Interview with a representative from NADMO.

<sup>18</sup> Personal interview, interviewee identity confidential.

bureaucracy was relatively uncorrupt and that skimming of resources intended for natural hazard-related programs was not a substantial problem in the country.<sup>19</sup> In multiple ways, then, Ethiopia's bureaucracy seems better prepared to deal with natural hazards than that of Kenya, Togo, and Ghana. The commitment of Ethiopian government institutions to taking ownership of disaster-related projects does, however, come packaged with the reality that the Ethiopian authorities seek to exercise much greater control over foreign and other non-government actors within the country. This could be read as an example of an aspect of *limited* political development – authoritarian tendencies and suspicion of outside entities – has actually contributed to the formation of a very proactive role for the bureaucracy in managing resources.

Zambia presents a middle ground in which the bureaucracy has become more developed over the last two decades and is seen to be developing successively greater capacity to prepare for and manage disasters. At the same time, the main agency for dealing with natural shocks, the DMMU, sits directly under the Vice President and is thus not insulated from political maneuvering. As evidence of this, one government official noted that the agency feels pressure to spend its limited resources on visible disaster risk management projects, such as infrastructure, despite the fact that its main priority is to complete a set of district level vulnerability assessments.<sup>20</sup> This highlights a link between the nature of electoral incentives and the nature of political development in shaping disaster policy outcomes.

A related observation can be made for Mozambique, which offers the strongest evidence against a political development hypothesis. The Mozambican bureaucracy is tightly linked to the ruling party and interviewees noted that it was difficult, if not impossible, to acquire a

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<sup>19</sup> Personal interview, interviewee identity confidential.

<sup>20</sup> Interview with Zambian government official.

bureaucratic post without being a member of FRELIMO.<sup>21</sup> Yet the national disaster management agency, INGC, is seen to be a well-run organization that has led the country's dramatic improvement in disaster preparedness and response. This is not to say that political interests are irrelevant to INGC's operations. Rather, it is more likely that it is the importance of high quality disaster management to the Mozambican state, as noted above in discussion of electoral conditions, that enables the agency to function well in an otherwise relatively underdeveloped bureaucratic environment. If the national government did not see this issue as a political priority, it is unlikely that Mozambique's bureaucracy would have the capacity to pursue disaster management of its own accord.

#### Moral Hazard

For the majority of the countries considered here, our findings suggest that the moral hazard hypothesis provides little explanatory value for understanding the behavior of state elites with regard to disaster preparedness and response activities. In Ethiopia, a country that has received substantial international aid in response to natural disasters in the past, the receipt of aid has not minimized government investment in preparedness and response activities and, in contrast, seems to have increased the national government's desire to invest in ways that minimize its dependence on external actors. The government is actively investing in preparedness activities in response to the threat of future droughts and targeting a reduction in its reliance on international food aid, with the goal of independence from international support in this area within the next decade. Similarly in Mozambique, past experience with substantial international intervention during the floods of 2000 helped to instigate activity within the

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<sup>21</sup> Personal interview, university professor, Maputo, Mozambique, January 20, 2012.

national government to insure both that the country would not face such devastating natural disasters in the future and that the government would not be reliant on external actors in responding to hydrometeorological hazards.

In Ghana, despite a clear increase in international funding over the last decade (from \$800 million to \$1.6 billion), the government has developed a national contingency plan (in partnership with the UNDP) and allocated \$500 million to disaster response. Alongside substantial investments from international actors in the area of disaster preparedness, the Ghanaian state is contributing its own human and financial resources to develop preparedness strategies. At the same time, the national disaster management agency (NADMO) is seen to require substantial additional funds to fulfill its goals, and Ghana, unlike Ethiopia and Mozambique, seems far from attempting to make itself independent in the arena of natural disasters.

The government of Zambia has relied heavily on international assistance for the majority of its time as an independent country, suggesting that it might be a likely case in which the moral hazard hypothesis would hold weight. This is somewhat difficult to evaluate, because the emergence of a clear disaster management body in the country occurred in parallel with the Hyogo framework and a decline in the relative amount of international aid received. However, there is no reason to assume, nor did our interviews reveal, an expectation that the country would not receive support in the wake of a natural disaster. Thus, the efforts to launch a dedicated disaster management body and to use this body to coordinate the activities of donor and NGO activities in the realms of preparedness and response suggest a commitment to issues of disaster preparedness that goes beyond simple reliance on non-state actors.

Malawi provides an even more striking case against a moral hazard argument. The government adopted a disaster preparedness plan as far back as 1991 and has continued to develop its capacity to deal with natural hazards over the subsequent decades. Currently, the majority of funding for disaster management and disaster risk reduction programs is from external sources, but the Malawian government also contributes to these efforts and is seen to play an important role in the overall shaping of disaster-related policy.

In the case of Senegal, the evidence suggests an interaction of moral hazard and electoral effects. With regard to disaster preparedness, the government has invested very little relative to international actors such as the World Bank, which contributed \$15 million for an Integrated Marine and Coastal Resources Management Project, and relative to the government's own investments in large scale public projects such as the African Renaissance Monument. At the same time, the national government has reasonably strong record of responding in the wake of natural shocks, such as the flooding that occurred in 2008 (GFDRR 2009) for which the state allocated \$13 million for recovery. This is less surprising in light of the relevance electoral considerations seem to have in Senegal, as noted above. Because citizens are more likely to respond positively to disaster response spending, rather than disaster preparedness (Healy and Malhotra 2009; Cole, Healy, and Werker 2009), the Senegalese government has incentives to allocate its spending on response activities, particularly given the willingness of international actors to invest in preparedness activities.

Kenya provides some of the strongest evidence in support of the moral hazard hypothesis. The country receives substantial international aid, \$3.5 billion overall in 2009, and natural disasters play an important role in perpetuating this assistance. In particular, our research shows both that the national government invests very little in its own preparedness and response

activities and that the presence of aid for people living in arid regions of the country reduces the incentives for these individuals to adapt and move away from otherwise unlivable areas. The emphasis of international actors on rural, drought-prone areas is also in contrast to the lack of attention to the need for improved disaster mitigation and preparedness strategies for urban areas, which are at risk due to overpopulation, weak infrastructure, and constraints on access to necessary resources. Neither the international community nor the national government is placing an emphasis on reducing risks in urban areas, despite the majority of our interviewees noting the high vulnerability in these areas.

The fact that Kenya is such a focus, and home base, for international organizations may contribute both to the perception that moral hazard is a problem and the actual relevance of the dynamic. However, it seems that other characteristics of Kenya's institutional structure are interacting with the strong presence of aid organizations to magnify this problem. In particular, the lack of bureaucratic capacity within the country has led the government to rely on external actors in many areas of service provision, not only in the arena of natural disasters (Brass 2012). This implies that an important strategy for reducing the relevance of moral hazard may be to focus on improving the development of state institutions in general, so as to increase the capacity of national and local governments to take on responsibilities otherwise adopted by international and local non-state actors. One complicating issue in the Kenyan case is the large number of refugees from neighboring states who comprise some of the most vulnerable people in the country. One might argue that it is more appropriate for international organizations to reduce the risks for this population, in which case the Kenyan government's underinvestment could be considered less deserving of a "moral hazard" label. This argument cannot account, however, for

the clear lack of attention by the government to disaster risks in urban areas and rural parts of the country less affected by immigration from the north.

Zimbabwe also provides evidence to support a moral hazard hypothesis. Despite its status as a largely pariah state, given sanctions on aid into the country, Zimbabwe has continued to receive substantial external support, largely through funding of non-governmental organizations. Food aid, in particular, is seen to have enabled farmers to continue to grow maize, even if their crops are only profitable every four to six years, thus reducing the incentives to adapt to more sustainable crops. In general, donors and NGOs often noted that they felt the Zimbabwean government perceived their support as a substitute for state funding, rather than a complement. Thus, the government still expects external support and invests less of its own resources in response to potential natural hazards as a result.

For the Gambia, the reverse of the moral hazard hypothesis, or the “pariah” hypothesis, seems to hold weight. Here, many government officials reported that they did not expect to receive substantial aid, particularly relative to the surrounding country of Senegal. While some aid was received from the United Nations Development Program to support the creation of the National Disaster Management Agency, this agency has continued to receive funding, if only small amounts, subsequent to the completion of the UNDP’s participation. In contrast, in Togo, we find little evidence to support the pariah hypothesis. Togo has been considered an “aid orphan” (Utz 2010) since the early 1990s, when electoral irregularities and human rights violations caused international donors to withdraw aid support from the country. While aid has increased in the last five years, the government continues not to expect to receive substantial assistance in the form of aid. In the wake of substantial increases in flooding since 2007, however, the government has invested little to no money in disaster preparedness and response.

Thus, the expectation that the state will not receive support during a disaster has not led to increased investment in preparedness and response.

The overall evidence from this set of countries suggests that the relevance of the moral hazard hypothesis is limited, at best, and that other characteristics of national environments are relevant for determining the extent to which national governments will be at risk of succumbing to this dynamic.

## Conclusion

Disasters by definition overwhelm the immediate ability of human beings to absorb a shock and move on as before. They have always been known to be chaotic in the popular meaning of the term, disrupting orderly human systems and instilling a fear and desperation that can upend normal patterns of understanding. But are they also destined to be chaotic in the mathematical sense? Are the outcomes of natural shocks ruled more by the broad sweep of structures, well captured by an explicit political and economic narrative? Or are lives and livelihoods ultimately at the mercy of differences in initial conditions that are so small, so variant between disasters, and so subtly hidden among mountains of plausible explanations that researchers have little hope of pinning them down and proposing policy intervention?

Quantitative products that give a comprehensive view of the important control variables – natural hazard magnitude and end-state human consequences – are still in their relative infancy, and we lack the precision that we will ultimately need in order to perform predictive and inferential modeling that is good enough to justify serious counter-intuitive commitments of resources. Even when these arrive, it will require a heroic effort of science to disentangle

variables that are reinforcing, canceling, or switching each other on or off in innumerable and intricate ways.

But we do know that in times of natural disruption, wealthy societies with advanced disaster risk reduction and management capacity draw not only on individual reserves but also on pooled resources of expertise, material, and authority. The structure of these pooled resources is determined by political will and funding and explained in a political and institutional narrative. Regardless of whether central institutions that reduce risks and act as pooled emergency resources have the same impact in developing nations as they do in developed ones, it is clear that central capacity is a vital part of understanding disaster. Capturing that political and institutional process from as many perspectives as possible provides much-needed insight, even if we may not at this time assign it a numerical value in terms of how many lives are saved when institutions advance.

Indeed, what is most compelling from this qualitative perspective is that national institutions are emerging from clear structural foundations. Better institutional capacity is not merely something that appears to be *accompanying* development via myriad hidden and chaotic processes. Rather, institutions are being built up according to a visible and explicit political narrative that can be readily identified and coherently critiqued by stakeholders on the ground. In each country, we have demonstrated that it is also possible to identify large-scale precursor conditions that are seen to have been relevant in giving rise to the current situation. These are not perfectly consistent *across* borders, giving us a hint that subtle, more chaotic factors may always continue to hound the predictive aspirations of this field. But they do *tend* toward agreement with the common sense of established hypotheses in the research literature. And where they do not, we have found not mystery but clear alternative explanations rooted in the recent history of those

states and articulated by local actors. This is a heartening sign that, as future researchers dig deeper, we will encounter clearer understandings and better predictions rather than simply micro-level historical contingencies being writ large in outcomes through a chaotic process.

This research fits into the larger pursuit of good predictors of disaster vulnerability, which is becoming ever more urgent as international actors struggle with the allocation of resources to offset climate-change-related risks. It explicitly targets institutional capacity at a national policy and bureaucratic level. It does so while recognizing that there are numerous and inter-linked causal chains between country conditions and disaster outcomes that lead not just through national institutions but through households, international aid actors, higher-level constitutional structures, and the whims of Mother Nature. Our work here is an important reminder that political stability and capacity are not passive outcomes of a process that begins with a new pattern of natural hazards; rather, they are intimately wrapped up in every step of the causal process, holding their long-term future in their own hands.

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