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Reducing vulnerability to hydro-meteorological extremes in Africa. A qualitative assessment of national climate disaster management policies: Accounting for heterogeneity[☆]

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ABSTRACT

In Africa, hydro-meteorological disasters (HMDs) have hit with increasing frequency and magnitude in recent years, with detrimental impacts on local livelihoods.

African countries display a patchwork of national policies and institutional frameworks to address these rising HMDs.

This paper examines the heterogeneity that exists within Africa's institutional arrangements for climate-related disaster risk management, and introduces a three-partite policy classification that ranks each country as one of three disaster management policy types: the 'Unprepared Firefighters' (whose response to disasters is late, delayed and ineffective), the 'Prepared Firefighters' (for the most part effective disaster responders) and the 'Disaster Averters' (who experienced a paradigm shift and moved focus away from the hazard itself towards a reduction of the underlying risk factors that cause disasters). Through extensive data mining, interviews and qualitative country assessments, we map where African countries lie on this spectrum of effective climate-related disaster risk management.

We find that African countries lay at different levels on the spectrum of effective disaster risk management. Across Africa, countries display differential progress in achieving the Hyogo Framework for Action goals and great variation and heterogeneity exists from country to country, one that calls for a concomitant heterogeneity in aid programs and initiatives meant to support comprehensive disaster risk reduction and climate change adaptation (DRR-CCA) in Africa.

In closing, this paper suggests ways to support African countries' efforts towards effective disaster risk management and planning. It offers a qualitative method to continually assess developing countries' progress in achieving the Hyogo Framework for Action goals, one that straddles top-down country self-reporting and bottom-up civil society assessment.

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1. Introduction

African countries face a growing threat of hydro-meteorological disasters (HMDs). Droughts, floods, water-related epidemics, storms and cyclones are increasingly reducing opportunity and wrecking havoc in communities (United Nations Development Program (UNDP), 2008). Whether correlated with global anthropogenic climate change (Inter-Governmental Panel on Climate Change (IPCC), 2012), a result of higher exposure (for instance rising human densities in low elevation coastal zones in Africa; McGranahan et al., 2007), weaker safety nets and social protection (Devereux, 2002), or merely the outcome of better disaster

reporting by African countries, a significant rise in HMD numbers has been reported since the mid-1990s (Center for Research on the Epidemiology of Disasters (CRED), 2007; Dartmouth Flood Observatory, 2003 see Fig. 1).

Impacts of rising HMDs on local communities in Africa dependent on climate for their livelihood and sustenance are of particular concern.¹ Indeed, identified by the Inter-governmental Panel

¹ We follow here the definition of a disaster as the conjugation of a naturally driven hazard and human-induced vulnerability.

$$\text{Disaster} = \frac{\text{hazard} \times \text{vulnerability}}{\text{capacity}}$$

A disaster can thus be conceived of as a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses, which exceed the ability of the affected community or society to cope using its own resources. It results from the combination of hazards, conditions of vulnerability and insufficient capacity or measures to reduce the potential negative consequences of risk (United Nations International Strategy for Disaster Reduction, 2009).

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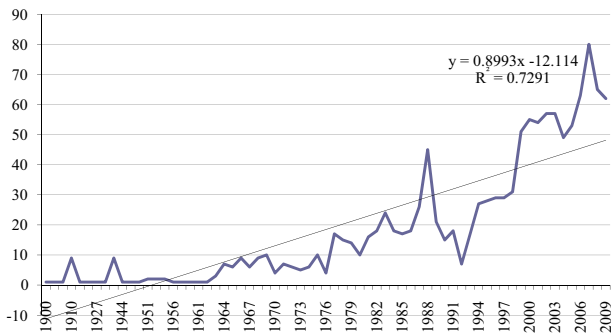


Fig. 1. Number of climate-related disasters reported in Africa since the 20th century: A sharp increase since the mid-1990s (source: author, based on EM-DAT data). Note: Are classified as climate-related disasters: floods, droughts, pest infestations, storms and cyclones.

on Climate Change as the second continent most vulnerable to climate change impacts in the world, immediately after polar zones (Inter-Governmental Panel on Climate Change (IPCC), 2007), Africa has an average 57% of its active population employed in the agricultural sector. Agriculture is predominantly rain-fed and highly sensitive to rainfall and temperature fluctuations, while only 6.8% of arable land is irrigated (Food and Agricultural Organization of the United Nations, 2009). Furthermore, increasing population densities in ill-planned settlements at the peripheries of Africa's urban centers – in Dakar, Lagos, Nairobi and Johannesburg – are directly exposed to the vagaries of changing rainfall patterns (Pelling and Wisner, 2009; Diagne, 2007). In this context, when HMDs strike, they generate human development setbacks with widespread social ramifications (Tall, 2010; Dai et al., 2004), jeopardizing progress towards achievement of the Millennium Development Goals in Africa (United Nations Development Program (UNDP), 2008/2007; World Bank, 2007, 2003). HMDs also generally force poor households to forfeit meager assets in the process of coping with disasters (World Development Report, 2003, Bryceson and Deborah, 2002).

In light of the far-reaching impacts of HMDs, multiple initiatives have mushroomed in recent years to reduce vulnerability to disasters in Africa. Beginning with the United Nations decade on Natural Disasters, these initiatives have urged a shift away from disaster response towards disaster preparedness and risk reduction, using available climate and weather forecasts as well as hazard monitoring tools, a new approach coined as effective disaster risk management (DRM). DRM has been strongly advocated as a means to render ex-ante disaster preparedness more effective, targeted and planned, and thwart the disastrous impacts of climate-related hazards on local communities (Hyogo Framework for Action, 2005).

DRM implementation across Africa however has been described as a stalled process (UNISDR, 2010). Save for well-documented cases such as Mozambique (see Lucio et al. in Hellmuth et al., 2007) where climate information and early warnings were used to avoid the worst of the 2001 floods, efforts to implement DRM appear haphazard across the continent. No systematic examination however exists of African countries' progress in implementing the Hyogo Framework for Action guidelines. Yet, to target efforts to improve use of DRM, it is important to assess and explain differences in its current application.

Which countries are more or less advanced along the process of meeting the Hyogo targets? Which countries in Africa have already adopted effective DRM policies, and are progressing towards their implementation?

The present paper aims to gain a robust understanding of how much African countries have already achieved in the process of moving up the effective DRM spectrum, a pre-requisite we purport to better service their needs, elaborate tailored programs that will support national efforts to achieve disaster risk reduction—climate change adaptation (DRR-CCA) and successfully implement DRM

policies at the national-level. Knowledge and data collection on the climate disaster management institutional frameworks and policy contexts of African countries remain generally quite poor.

Focusing on hydro-meteorological disasters (floods, droughts, pest invasions, storms and cyclones), we investigate the heterogeneity of climate disaster management policies in Africa. We introduce a three-tiered classification of African countries as: Unprepared Firefighters, Prepared Firefighters and Disaster Averters.

We find that African countries display substantially differential progress towards the achievement of Hyogo Framework for Action targets, one that reflects the different national policies, vulnerability profiles, institutional frameworks and political incentives in place to address rising climate-related disasters, and that they do not follow a unidirectional trajectory towards the implementation of DRM guidelines. On the spectrum towards effective disaster management, these lay at different levels. Some are akin to “Unprepared Firefighters” in their response to disasters, improvising and intervening only after calamities strike; while others are more similar to “Prepared Firefighters”, with preparedness plans adopted and rehearsed, and contingency plans in place to face all possible calamities; whereas a third, smaller group of countries in Africa are Disaster Averters, having experienced a paradigm shift in their approach to disasters, moving focus away from the hazard towards its underlying risk factors. Ultimately, there is a need to improve our understanding of how and why countries move from being “Unprepared Firefighters” (category 1 in our classification of African countries' climate disaster risk management policies), to “Prepared Firefighters” (category 2) and Disaster Averters (category 3).

2. Background

Disaster risk management (DRM) is an urgent priority to contain the impacts of major disasters and thwart their occurrence in Africa, and other highly disaster vulnerable regions of the world. Starting in the early 1990s with the launch of the United Nations Decade on Natural Disasters, paradigmatic change in disaster management theory shifted focus away from disaster response towards preparedness and risk reduction (Lechat, 1990). With the 2005 United Nations Conference on Disaster Reduction held in Kobe, Hyogo (Japan), immediately following the South Asian tsunami whose tragic impacts caught the world by surprise (Ramos and Piper, 2005), the value of disaster preparedness has been upheld as a golden standard, and the concept of effective disaster risk management (DRM) coined to embody this new approach.

The Hyogo Framework for Action (HFA), themed ‘Building the Resilience of Nations and Communities to Disasters’ and adopted by 168 countries at the Kobe World Conference for Disaster Reduction (United Nations, 2005), thus called on countries worldwide to begin managing Disaster risk, “anticipating, preparing for and monitoring disaster risks ex-ante [...] making disaster risk reduction (DRR) a priority, knowing the risks and taking action, building understanding and awareness, reducing risk, and being prepared and ready to act, with shared responsibilities for implementing DRR at all levels: state, regional and international organizations” (Declaration of the Hyogo Framework for Action, 2005). Its proposed public policy measures to render DRM a reality at the national-level include: development of disaster contingency plans, establishment of national disaster risk reduction platforms, adoption of national legislations clearly defining roles and responsibilities for disaster response and prevention at all levels of intervention, use of real-time data and knowledge for hazard monitoring and impacts prevention, establishment of functional early warning systems, elaboration of risk assessments for national and cross-border hazards, and innovation of disaster recovery funds and risk transfer mechanisms (for instance, weather index-based insurance schemes). Finally, the Kobe world Conference on Disaster Reduction gave birth to a new United Nations agency, the International Strategy

for Disaster Reduction (UN-ISDR) with the mandate of overseeing the application of Disaster Reduction at the national-level as well as progress towards meeting the Hyogo Framework for Action targets.

The mushrooming number of initiatives promoting DRM in Africa provides evidence for the evolving consensus around the urgency of disaster risk management as an instrument for climate-proofing development gains against rising climate disaster risks.²

Against which policy contexts are DRM-promotion programs implemented in Africa however? Which countries are more or less advanced along the process of meeting the Hyogo targets? Which countries have already adopted effective DRM policies, and are progressing towards their implementation? These remain critical questions. Previous assessment attempts have sought to answer these key questions and close the knowledge gap that exists when it comes to prevailing disaster management policies in Africa.

The most prominent of these attempts to date have been UN-ISDR's mid-term review of the Hyogo Framework for Action and the Global Network of Civil Society Organizations for Disaster Reduction (GNDR)'s 'Views from the Frontline' assessment.

In 2009, UN-ISDR launched a comprehensive reporting program calling on countries to self-rank their progress towards meeting the Hyogo goals, according to a list of five (5) priorities of Action (PfA) and twenty-two (22) indicators (HFA mid-term review, 2009). The midterm review of the Hyogo Framework for Action was devised however as a self-evaluation tool for countries to use as a planning aide, rather than an assessment of where countries effectively stand on the disaster risk management continuum (expert interview, June 2010).

In reaction to the shortcomings of UN-ISDR's self-reporting methodology, the Global Network of Civil Society Organizations for Disaster Reduction (GNDR), founded in 2005, pioneered a counter-assessment, from a bottom-up perspective, of national governments' progress worldwide towards implementing DRR policies. The GNDR assessment gave voice in the process to above 7000 people, 48 countries and 400 community-based organizations so that the latter may take part, too, in the assessment of their governments' disaster management policies (VFL, 2009; [Prevention web, 2009](#); [Wisner, 2010](#)).

2.1. The Hyogo Framework for Action (HFA) mid-term review

2.1.1. Background

Adopted at the United Nations Conference on Disaster Reduction held in Kobe, Hyogo, Japan, on 18–22 January 2005, the 'Hyogo Framework for Action 2005–2015' (HFA) is a strategic blueprint that guides national and international efforts to reduce vulnerabilities and risks induced by naturally occurring hazards. During its adoption, the Hyogo Framework stated that its implementation "will be appropriately reviewed" and requested UNISDR to "prepare periodic reviews on progress towards achieving [its] objectives and priorities" ([UNISDR, 2010](#)).

Thus was initiated the HFA mid-term review, with a timeline to make country-self reports available by January 2010. The mid-term review's main objective was to provide a critical analysis of HFA implementation over the first five years of its existence, with a view to inform its continued implementation through 2015. The Review also sought to provide initial thinking about any future international framework on disaster risk reduction that would follow beyond 2015 ([UNISDR, 2010](#)).

² For interesting examples see CARE's Adaption Learning Program ([Care, 2010](#)) and the World Bank's Pilot Program for Climate Resilience (PPCR [World Bank, 2009](#)). Also, [International Federation of the Red Cross and Red Crescent Societies \(IFRC\), 2009, 2010](#); [United Nations Development Program \(UNDP\), 2004](#); [Huq and Reid, 2004](#).

2.1.2. Methods

The review was coordinated by the UNISDR secretariat, responsible for seeking inputs from all the relevant stakeholders. A set of broad strategic questions, with relevant sub-questions, was formulated with a view to provide information about the extent to which the HFA had progressed in the respective countries since its inception ([UNISDR, 2010](#)).

In order to ensure the validity and reliability the qualitative process used for the mid-term review, ISDR sought different analytical tools to ensure a broad outreach to all stakeholders involved, allow for cross-validation of the findings ([UNISDR, 2010](#)) and, equally important, render the process eventually a true self-ranking tool for countries on their progress towards implementing the HFA (expert interview, June 2010). Questionnaires were then sent out to all HFA signatory countries requesting them to return their responses by end 2010. Each country was asked to rank itself on a series of five (5) Priorities for Action (PfA) and twenty-two (22) Indicators, on the following on scale of 1–5 (see Box 1).

Ultimately however, from Africa only twenty-four (24) countries' national questionnaires were returned.

2.1.3. Limitations and remaining questions

The HFA National Progress Reports provide a valuable goldmine of data on national frameworks, institutions and legislations in place in the various countries where respondents returned their questionnaires. However due to the inherent nature of self-reporting, biases were built into the country responses, linked to factors ranging from under and over-reporting, for various political reasons, or non-knowledgeable focal points mandated to fill out the reports. These factors limited the credibility of the country assessments. As highlighted by ISDR officials themselves, the HFA national progress reports and ensuing Global Assessment Report served as a self-measuring stick for governments on their path to self-implementation of the HFA framework, rather than an objective, rigorous assessment of this progress (expert interview, June 2010). In addition, many African desk official respondents single-handedly filled out the mid-term assessment questionnaire, instead of organizing an assessment workshop involving and drawing on the views of a large swath of their civil societies, as was originally requested in UNISDR mid-term review guidelines ([UNISDR, 2010](#)). Thus, many questions remain unanswered after the HFA mid-term review as to the extent of effective implementation of DRM policies in Africa.

2.2. Views from the frontline (VFL)

2.2.1. Background

In reaction to UNISDR's focus on government feedback in exclusion of civil society and grassroots voices in assessing the

Box 1—Indicators of progress: Measuring the reduction of disaster risks and implementation of the Hyogo Framework for Action. Source: [UNISDR, 2008](#).

5=Comprehensive achievement has been attained, with the commitment and capacities to sustain efforts at all levels.
 4=Substantial achievement has been attained but with some recognized deficiencies in commitment, financial resources or operational capacities.
 3=There is some commitment and capacities to achieving DRR but progress is not substantial.
 2=Achievements have been made but are relatively small or incomplete, and while improvements are planned, the commitment and capacities are limited.
 1=Achievements are minor and there are few signs of planning or forward action to improve the situation.

progress of national governments towards meeting HFA goals, the Global Network of Civil Society Organizations for Disaster Reduction (GNDR), shorthanded as the Global Network, conducted in 2009 the first independent study assessing progress undertaken at the local level in implementing the Hyogo Framework for Action. The GNDR identified in that study a significant gap between national and local level action. The report, entitled ‘Views from the frontline: A local perspective of progress towards implementation of the Hyogo Framework for Action’, was completed in June 2009 for presentation at the Second Session of the Global Platform for Disaster Risk Reduction.

National VFL research teams were established in forty-eight (48) target countries worldwide where progress towards HFA goals was assessed through survey questionnaires, targeting three categories of respondents: Local government officials, Civil Society Organizations and Community representatives/spokesmen, creating momentum from the ground-up for the establishment of a clear picture of the progress being made in implementing disaster reduction activities at the frontline (Global Network of Civil Society Organizations for Disaster Reduction (GNDR), 2009).

In Africa, nine (9) countries were specifically assessed: Benin, Burundi, Egypt, Madagascar, Nigeria, Senegal, South Africa, Swaziland and Uganda.

2.2.2. Methods

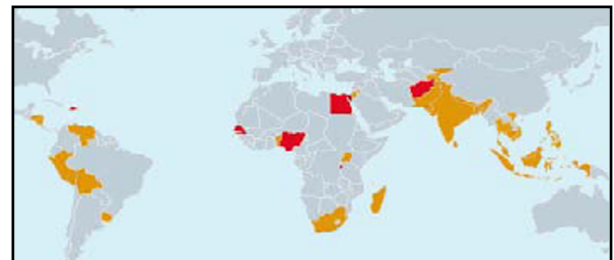
Frontline research mobilized and involved above 7000 respondents from 48 countries. Over 400 organizations based at local and national levels were delegated to conduct face-to-face interviews with a total of 5290 people, and two supporting studies with a focus on women and children garnered an additional 2035 views (GNDR, 2009).

The indicator matrix used for the assessment was modeled after the HFA mid-term review’s, based on five main Priorities For Action or ‘strategic areas’, with one additional set of cross-cutting issues (area 6; see Box 2).

The results of the VFL classification for Africa display the nine (9) countries surveyed, ranked from most advanced in implementing HFA recommendations (yellow on Fig. 2) to least (red on Fig. 2), with Uganda in the lead, followed by Swaziland, Madagascar, South Africa, then Benin, Burundi, Senegal, Egypt and finally Nigeria displaying the least amount of progress towards achieving the HFA targets (see Fig. 2). This classification by region points to Southern Africa as a regional leader in DRR, followed by Eastern Africa and West Africa at the tail end (see Figs. 2 and 3).

2.2.3. Limitations and remaining questions

Albeit instrumental in shedding light on the limitations of the HFA mid-term review and building momentum for a credible assessment of progress towards disaster reduction at the local level by calling for a larger inclusion of local and civil society voices, the VFL results and findings remain incomplete. First, because of the very small number of data points in each country; as such, they are methodologically non-robust to qualify for a nation-wide survey of views. In Swaziland’s VFL



Legend: Levels of progress on implementing HFA targets (African countries assessed):
 • RED: No progress at all (Senegal, Nigeria, Egypt and Burundi)
 • ORANGE: Too very limited extent (Benin, South Africa, Swaziland, Madagascar, Uganda)
 • YELLOW: Some activity but significant scope for improvement (no African country)

Fig. 2. Results of Views from the Frontline (VFL) Report classification. Source: GNDR, 2009.

Box 2–Views from the Frontline Report Indicators of progress: five main Priorities For Action modeled after the HFA Mid-term Assessment and a set of cross-cutting issues (area 6). Source: VFL, 2009.

<p>1. Governance</p> <ul style="list-style-type: none"> • Frameworks and structures • Planning • Financial resources • Financial resources (for partnerships) • Human resources <p>2. Risk assessment, monitoring and warning</p> <ul style="list-style-type: none"> • Disaster risk assessments • Early warning systems • Risk management systems <p>3. Knowledge and education</p> <ul style="list-style-type: none"> • Information management & exchange • Formal education (curriculum) • Formal education (training of teachers and materials) • Community training • Public awareness 	<ul style="list-style-type: none"> • Disaster response and recovery • Evacuation • Training drills and rehearsals • Financial reserves and aid • Coordination and information exchange <p>6. Cross-cutting issues</p> <ul style="list-style-type: none"> • Community participation and information • Actual and fair participation • Encouraging volunteers • Training activities • Gender • Gender (resources) • Cultural sensitivity (diversity) • Cultural sensitivity (traditional knowledge) • Cultural sensitivity (languages) 	<p>4. Underlying risk factors</p> <ul style="list-style-type: none"> • Environmental and natural resource management • Adaptation to climate change • Food security • Social protection • Economic protection • Poverty alleviation • Land use • Urban planning • Overall planning • Building codes and standards (with enforcement) • Protection of critical public facilities • Public–Private partnerships <p>5. Disaster preparedness and response</p> <ul style="list-style-type: none"> • Disaster preparedness capacities (future risks) • Disaster response planning • Disaster preparedness planning
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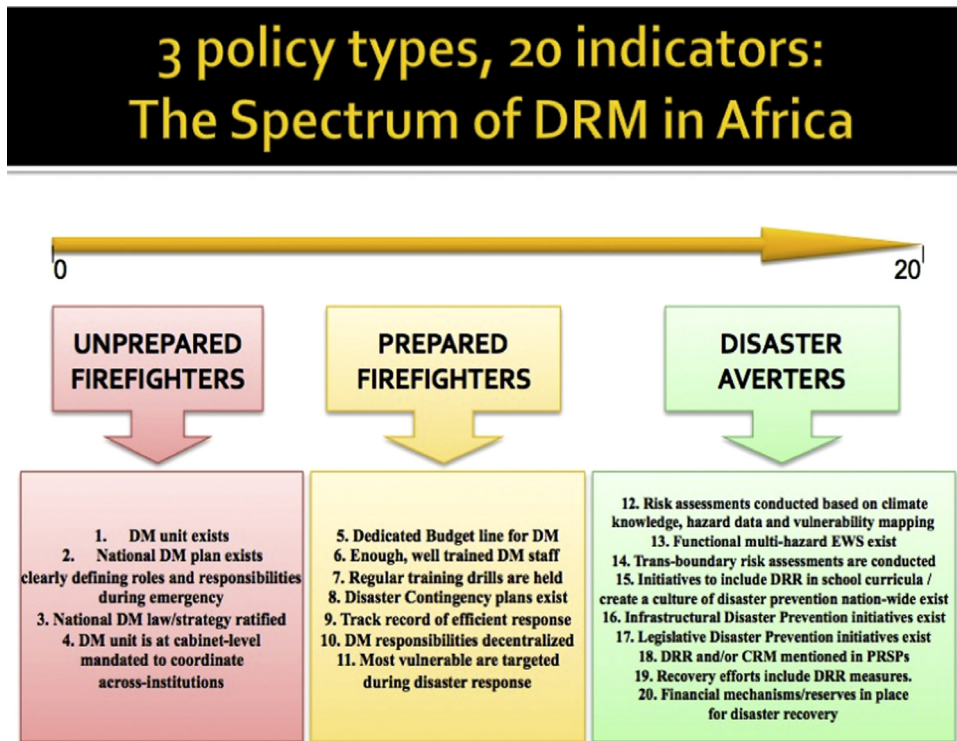


Fig. 3. The spectrum of disaster risk management (DRM) policies in Africa.
Source: Authors.

National Report for instance, only 170 individuals were interviewed—including 60 senior government officials knowledgeable in Disaster Risk Reduction, 60 leaders of Civil society Organizations and 50 community representatives-, while Nigeria's eight-page National VFL Report does not indicate the total number of respondents surveyed. In many regards, national VFL surveys reflect the capacities of the local actors delegated to conduct the surveys, as much as the HFA mid-term review reflects those of official government respondents.

In Africa, VFL results are tenuous, with only 5 national reports out of the 9 attaining a high confidence level from the part of surveying teams (expert interview, July 2010). Additionally, having surveyed only 9 out of 55 countries, national VFL reports do not help us to derive a concise cross-continental picture of progress towards effective disaster risk reduction. Despite instrumental in demonstrating some degree of intra-continental variation—with countries such as Benin, South Africa and Madagascar attaining higher HFA-implementation scores than for instance Senegal, Nigeria or Egypt—the VFL remains constrained in its scope, methods, and lack of systematic assessment of all countries on the continent.

This paper's classification, using different indicators and assessment methods, yielded results broadly different from those of the VFL process, for the same countries assessed in Africa.

2.2.4. Conclusion: Large knowledge gap for Africa

Appraisal of the two most prominent endeavors initiated to assess disaster management policies in Africa, the Hyogo Framework for Action (HFA) mid-term review and Views from the Frontline (VFL) Assessment, reveals that knowledge gaps remain wide. We still do not know which countries are most advanced and pro-active in their use of existing knowledge to prevent climate-related disasters and climate-proof their development gains in Africa, and which ones lag far behind and need intensive support to prop up, and in some cases even establish, their Disaster Management architecture.

Our present assessment of DRM policies across Africa, whose methodology and results we present in the following sections, circumvents the limitations of the above-named assessments and bases its appraisal on a more complete and unbiased dataset of Africa's public policies for climate disaster management, analyzed transparently and rigorously.

3. Methods

3.1. Approach

Our study qualitatively ranked Africa's fifty-five (55) countries, based on a tripartite classification of public policies in Disaster Management (DM) into three policy types: I–III. This classification was conducted according to indicators of ranked importance chosen on the basis of well-reasoned assumptions about what constitutes good, effective disaster risk management (DRM).

It is important to note that we made every effort not to select outcome-driven indicators (e.g.: number left dead under DM policy type I) or indicators based on data availability. Countries were ranked according to what we deemed to be factual, measurable indicators that reveal the national policies currently implemented to address climate-related disasters and their impacts.

Table 1 summarizes the attributes of countries with Policy types I–III, as follows:

- (1) Ex-post response only (the 'Unprepared Firefighters' policy): Countries in this category solely respond to disasters after they have occurred, mobilizing any personnel on duty and dispatching them to disaster sites. Emergency response is characterized by amateurism and improvisation, and there are no pre-established well-rehearsed procedures to follow.
- (2) Ex-post response+ ex-ante disaster preparedness (The 'Prepared Firefighters' policy): Countries in this category have shifted from response, to preparedness for disasters before

Table 1
Policy typology: Firefighters, Prepared Firefighters and Disaster Averters.

Policy indicators/ policy type	Policy Type I:	Policy Type II:	Policy Type III:
	Unprepared Firefighters Ex-post response ONLY	Prepared Firefighters Ex-post response + Ex-ante Preparedness for disasters	Disaster Averters Ex-post response + Ex-ante preparedness for disasters + Use of scientific knowledge to inform Disaster planning and prevention
INDICATORS:	<ul style="list-style-type: none"> – No mandated disaster management (DM) unit exists; or if it does: it does not effectively coordinate across government institutions to ensure good disaster response – No dedicated budget line for disaster – No rehearsed established procedures/responsibilities for disaster response – No national DM strategy in place outlining responsibilities for disaster response – No drills – Track record of bad, delayed and ineffective response (relief > 3days after disaster event) [Bad, delayed, ineffective responders] 	<ul style="list-style-type: none"> – National mandated disaster management (DM) unit exists – It has a budget/dedicated budget line; relief supplies in stock – DM unit is at cabinet level (directly under PM/President's office); effectively coordinates across institutions – Established procedures/responsibilities for disaster response exist – National DM strategy/law is in place, clearly outlines disaster response responsibilities – Disaster response drills are conducted – Contingency planning is a regular exercise – Track record of good response (1–3 days within disaster event) – No prevention or use of scientific knowledge/ climate information to anticipate climate-related disasters [Good responders] 	<ul style="list-style-type: none"> – All of type II policy indicators + – Use of scientific knowledge/climate information to anticipate disasters – Contingency planning informed by climate information – Functioning Early Warning Systems exist – Rigorous risk and vulnerability assessments/cartography are conducted to inform long-term risk-proofing and disaster prevention – Disaster prevention is mentioned in National PRSP and streamlined into development plans – Resources are allocated for disaster recovery/post disaster reconstruction (DRR included) [Disaster Averters]

they occur, so as to ensure more efficiency in disaster response and relief operations. As a result, countries in this policy category take no more than three (3) DAYS to deliver needed relief to disaster-affected citizens.

(3) The ‘Disaster Averters’ (combining effective disaster ex-post response, ex-ante preparedness AND Disaster Risk Reduction based on scientific information and climate risk management tools): Countries in this third category have shifted focus away from the disaster event itself, towards reducing the underlying risk factors that create disasters. They take HMDs seriously as a cross-cutting threat to national development, and invest in building the country’s resilience to disasters, managing disaster risk with all means at hand.

3.2. The spectrum of effective disaster risk management in Africa: In-depth review of indicators, data sources and classification methodology

Based on the above storyline of what constitutes an Unprepared Firefighter, a Prepared Firefighter and an effective Disaster Averter, we defined the three correspondent policy types (I–III) and a series of twenty (20) measurable indicators to proxy and reveal the existence or not of the attributes of each policy type, as well as capture the spectrum of disaster management measures practiced in Africa.

Our methodological framework overlaps in many regards with standard conceptual frameworks hypothesizing what constitutes effective disaster risk management. It is important to note that our present framework is not at antipodes with existing conceptual frameworks for disaster risk reduction (DRR), but rather inclusive of them. Contrasted with the World Meteorological Organization’s conceptual framework for disaster risk reduction (DRR) for



Fig. 4. Conceptual framework for effective disaster risk management at the national to local levels, derived from the Hyogo Framework Action (HFA). Source: World Meteorological Organization (WMO).

instance (Fig. 4), derived from the HFA strategic goals (UNISDR, 2010), we see that all proposed measures for DRR (Risk identification, Risk reduction and Risk transfer) are encapsulated in our Policy Type III of ‘Disaster Averters’—namely countries that effectively identify, reduce and transfer disaster risk, abiding by all the guidelines highlighted in the Hyogo Framework for Action.

Our first two policy types on the other hand – ‘Unprepared Firefighters’ and ‘Prepared Firefighters’ – would however simply fall under the category of Ineffective disaster risk management under standard HFA conceptual frameworks. For the purposes of our ranking of African countries, we amended the latter to introduce a tripartite demarcation in lieu of the binary one commonly used in standard DRR frameworks, in order to capture the full variation that one sees when analyzing African countries.

Indeed, the default baseline in Africa is that of ex-post disaster response (whether effective or not). Most countries in Africa do not have any of the disaster risk management measures called for by standard international DRR frameworks. We label these countries the 'Unprepared Firefighters' (policy Type I). Some have some elements: the Prepared Firefighters (policy type II), countries that are in practice quite effective disaster responders, building preparedness for disasters but not making use of existing scientific knowledge to inform their preparedness efforts. At the top end of our classification are African countries that bring in climate information and knowledge to reduce vulnerability to climate-related disasters and losses, making provisions for risk identification, financial protection, post-disaster risk reduction and Early Warning Systems; these countries are called the Disaster Averters. This maps into a sequential spectrum where some countries have very little in place by way of disaster risk management and others have much more in place; hence generating a continuum of disaster risk management (RM) effectiveness ranging from the most unprepared of firefighters (with a score of 0) to the effective Disaster Averter (score of 20). This constituted a more cogent way of analyzing African countries' disaster management policies for the purposes of our classification.

All of Africa's fifty-five (55) countries were then classified into our three Disaster Management (DM) policy types, according to twenty (20) indicators selected in accordance with our typology of disaster management policies, as displayed in Box 3. Each country was assessed against these twenty questions/indicators, and answers to each question were scored on a binary scale of 0–1, before being totaled to compute a final DM score for each country assessed.

3.2.1. Data sources

We used a wide range of data sources to derive an answer for each of our twenty (20) questions/indicators. Several data sources were identified to answers on each indicator, in an attempt to attain high confidence and robustness for each country surveyed.

The paucity of data on national disaster management is a notable fact about Africa; thus setting out to gather data for our selected indicators was a not an easy task. However, through qualitative data mining – expert interviews by email, phone and in-person and survey questionnaires emailed to all African Red Cross National societies – as well as national events analysis and use of existing country-level data from previous assessments (mainly the 2009 HFA mid-term reviews and 2010 VFL national progress reports), we gathered data for each country on indicators 1 through 20.

A total of 52 respondents were interviewed on the DM policies in place in their countries. Additionally fifty (50) news articles and sixty-six (66) official documents (government reports, declarations and legislations) were consulted, for a total of 108 data sources, to reach a final score on each indicator using a binary scoring–1 when indicator is met, 0 when not met.

Climate change adaptation experts gathered at the Africa Climate Change Collective Action forum held in Dar-es-Salaam, Tanzania from June 25–30th 2010, were administered an initial round of an expert questionnaire protocol in order to gather their views on their countries' use of scientific knowledge to inform national disaster preparedness plans. This led to our initial hypothesizing of the spectrum of DRM policies in Africa, and generated answers for indicators 12 and 13 (see [Annex A](#)).

In addition, Red Cross national disaster managers from Africa's 56 countries, best poised to characterize the practice of disaster management in their respective countries, as auxiliaries to the State and often the first to be on site in the advent of a disaster, were contacted with three key questions:

Box 3–20 indicators of DRM policies in Africa and data sources for each (Red indicators correspond to policy type I; Yellow indicators correspond to policy type II and Green indicators correspond to policy type III).

1. DM unit exists/there is an institutional basis for implementation of DRR–CCA. *Source: RC, PfA1+country events analysis*
2. National disaster response plan exists clearly defining roles and responsibilities during emergency. *Source: PfA1 (1) country events analysis+IFRC WPNS*
3. National disaster management law has been ratified, promulgating into law of the land the different roles and responsibilities for DM, legal backing for DM (year law was adopted). *Source: PfA1 (1) country events analysis+IFRC WPNS*
4. DM unit or platform is at cabinet-level/mandated to coordinate across-institutions. *Source: PfA 1 (4)*
5. DM unit has financial capacity: Budget line for DM in national budget/Dedicated and adequate resources for DM are available at all administrative levels. *Source: PfA5 (1); 2004 reports in preparation for WCDR*
6. DM unit with human capacity: enough staff? Well trained? *Source: PfA5 (1)*
7. National Disaster Preparedness Contingency plan is elaborated and regularly updated? *Source: PfA5 (2)*
8. Regular disaster response drills are held/DM responsibilities are well rehearsed at all levels of intervention (national to community). *Source: PfA5 (2)*
9. Track record of efficient response (government has strong ability to respond); relief provided within 2days of disaster occurrence. *Data source: RC*
10. DM responsibilities decentralized +adequate resources devolved to local level for DRR–CCA. *Source: PfA1 (3)*
11. Most vulnerable are targeted in disaster interventions. *Source: VFL indicator #6+HFA*
12. Risk assessments (national/local) conducted based on climate knowledge, hazard data and vulnerability mapping. *Source: PfA 2 (1)*
13. Functional multi-hazard EWS exist (with outreach to communities). *Source: PfA2 (3)*
14. Trans-boundary risk assessments conducted. *Source: PfA2 (4)*
15. Disaster Risks included in school curricula/relevant info on climate disasters is available nation-wide. *Source: PfA 3 (1,2,4)*
16. Infrastructural Disaster Prevention initiatives exist and are enforced: climate-proofing of infrastructure, cities. *Source: PfA 4*
17. Legislative Disaster Prevention initiatives exist and are enforced: building codes, bans on human settlement in risk zones, etc. *Source: PfA 4 (4)*
18. DRM is explicitly mentioned in PRSPs/national development strategy plans, impacts on development are right-fully seen. *Source: PfA4 (2+see perspectives futures); World Bank national PRSPs*
19. Recovery efforts include DRR measures and mechanisms to prevent future disasters. *Source: PfA 4 (5)*
20. Financial reserves for recovery exist/risk transfer mechanisms. *Source: PfA5 (3)*

Key to data sources: PfA=Priority for Action of the Hyogo Framework (triangulation of responses from HFA 2009 Mid-Term Reviews and Views from the Frontline 2010 assessment surveys, where available); International Federation of the Red Cross/Red Crescent (IFRC) WPNS=Well-Prepared National Societies Questionnaire (2009–2010); World Bank PRSP=Poverty Reduction Strategy Papers, 2010 or latest available; RC=Answers to survey questionnaire sent to all African Red Cross National Societies.

- (1) How long does the government generally take to respond to climate-related disasters? How many days before or after the Red Cross has it taken them in past disasters to get to affected sites?
- (2) How would you qualify your government's response to disasters: are they firefighters (their response is late, ineffective and delayed)? Are they Prepared Firefighters (effective disaster responders)? or rather do they have strategies in place to anticipate/prevent disasters using available scientific information (Disaster Averters)?
- (3) What institution is in charge of disaster management in your country? Is the Red Cross part of any national platform to better manage disasters?

Answers to these three questions served to inform indicators 1 through 11. This questionnaire was administered online, translated in French, English or Portuguese depending on the country's official language.

Moreover, reports of the International Federation of the Red Cross/Red Crescent National Societies (IFRC) Well-Prepared National Societies Questionnaire (2009–2010) were consulted to further confirm assessments of National Society disaster managers, and provide insights on indicators 2 and 3.

Finally, insights from HFA mid-term reviews, and their bottom-up counterpart, the VFL national assessment reports, were confronted in all the countries where they were available, providing information for African countries' progress in implementing HFA-recommended DRR measures—indicators 12 through 20. Moreover, when we concluded our scoring on each indicator, ordinary citizens, government disaster managers and civil society representatives from each country, whenever available, were asked to confirm the validity of our assessment of their national DRM policy indicator after indicator.

This wide array of data sources enabled us to conduct a thorough assessment and generate a complete cross-continental picture of the national DM policy currently in place in each country. We used at least two and up to five credible data sources for each country, confronted and triangulated to give a substantiated binary score on each of the 20 indicators, which in turn we totaled to compute an overall DM policy score for each country under review. When all of the data was collected on each indicator for the 56 countries under study, we were able to being classifying countries.

3.2.2. Classification method and weighing

To be classified as 'Unprepared firefighter', countries needed to qualify for indicators 1–4, in accordance with our storyline for what constitutes an 'Unprepared firefighter', and/or obtain a total score of 4 or below. 'Prepared Firefighters' had to qualify for indicators 5–11, and had an overall score of 11 or below. Finally to qualify as 'Disaster Averters' countries needed to have met indicators 11–20 and scored above 11 points.

Of the 20 indicators, we weighed four (4) more heavily than the others nonetheless. Indeed, in the process of classifying our countries according to their total policy score, we qualitatively weighed 4 indicators more heavily. These were the financial and human capacity of the nationally mandated disaster management unit (indicators 5 and 6) – scoring a 1 on these was a pre-requisite needed to qualify as a type II country ('Prepared Firefighters') – as well as the use of knowledge to conduct risk assessments and existence of effective early warning systems (indicators 12 and 13), pre-requisites needed to qualify as a type III country ('Disaster Averters').

Weighting was conducted by maintaining countries in one category, until they scored positively on one of the threshold indicators (5–6 and 12–13), which became de facto cut-off points to graduate to the next policy type. Scoring positively on indicators

5–6 was thus needed to move up to policy type II; similarly scoring positively on indicators 12–13 was a requisite to be moved up to category III. A country such as Djibouti for instance had a total DM policy score of 7—which ought to have immediately placed it among the Prepared Firefighters. However because it did not meet indicators 5–6 (its DM unit did not have the financial and human capacity to carry out its duties), it could not justifiably be deemed a Prepared Firefighter. As a result it was maintained in the Unprepared Firefighter category (red country).

When all countries under study were rigorously assessed, on each indicator out of the 20 selected, then classified according to their total DM policy score and then weighed according to whether or not they met the indicators of most importance, it became easy to generate a continental map of African countries by disaster management policy in place.

3.2.3. Note on confidence levels

Out of the total fifty-five (55) African countries assessed, thirty (30) countries were classified with high confidence (4 or more data credible sources were used to generate final country classification); thirteen (13) were with Medium confidence (3 credible data sources used); five (5) with Low confidence (1–2 credible data sources used) and seven (7) countries were unclassified because no credible data sources could be accessed from country (country at war, in crisis or otherwise inaccessible). [Table 2](#) summarizes confidence levels for each country classified.

Though relatively numerous, the countries classified with high-to-medium confidence (a total of 43) are the only African countries we can venture to make inferences about; the remaining twelve (12) need further research and data mining on to be able to yield conclusive insights about their national disaster management policies.

4. Results

Our cross-continental classification of countries by national climate-related disaster management policy type reveals that in Africa: thirty-three (33) countries are 'Unprepared Firefighters', nine (9) are 'Prepared Firefighters' and only six (6) countries qualify as 'Disaster Averters' (see [Figs. 5 and 6](#)). A total of forty-eight (48) African countries were assessed and classified, and seven (7) countries remained unclassified because we could not obtain sufficient data to credibly rank them, either because they were war-torn territories or countries just recovering from a crisis, for a total of fifty-five (55) African countries reviewed.

[Table 3](#) displays each country's point-based score on the twenty indicators of national disaster policy. It also details how each African country is preparing for climate-related disasters, and which countries have relatively more in place by way of disaster risk management frameworks and institutional arrangements.

[Fig. 6](#) displays that 62% of countries surveyed are Unprepared Firefighters, whereas 14% are Prepared Firefighters against 11% of Disaster Averters.

[Fig. 7](#) also underscores the high skew of the distribution towards countries on the left tail of the distribution. It describes the lognormal distribution of countries by their overall DM policy score, and displays that African countries span across the entire distribution, with scores from scores 0 to 17 with a peak frequency in the DM country score category of 3 to 5 points (upper tail of Unprepared Firefighters).

5. Discussion

The overwhelming red hue of [Fig. 6](#) confirms previous assessments of the quality of disaster management in Africa: the large

Table 2

Classification confidence levels for each African country classified (High confidence=4 or more credible data sources used as basis for classification; medium=2–3 data credible sources used; low=1–2 credible data sources used). A total of 30 countries were classified with high confidence; 13 countries with medium confidence; 5 with low confidence; 7 countries unclassified.

ID	Country name	Classification confidence level
1	Algeria	High
2	Botswana	High
3	Burkina Faso	High
4	Burundi	High
5	Cape Verde	High
6	Comores	High
7	Côte d'Ivoire	High
8	Djibouti	High
9	Ethiopia	High
10	Gabon	High
11	Gambia	High
12	Ghana	High
13	Kenya	High
14	Madagascar	High
15	Malawi	High
16	Mauritius	High
17	Morocco	High
18	Namibia	High
19	Nigeria	High
20	Senegal	High
21	Sierra Leone	High
22	Somalia	High
23	Somaliland	High
24	South Africa	High
25	Sudan	High
26	Swaziland	High
27	Mozambique	High
28	Niger	High
29	Benin	High
30	Cameroon	High
31	Angola	Medium
32	Congo-Brazza	Medium
33	DR Congo (Congo-Kinshasa)	Medium
34	Guinea	Medium
35	Lesotho	Medium
36	Liberia	Medium
37	Mali	Medium
38	Tanzania	Medium
39	Togo	Medium
40	Tunisia	Medium
41	Uganda	Medium
42	Zambia	Medium
43	Zimbabwe	Medium
44	Central African Republic	Low
45	Chad	Low
46	Egypt	Low
47	Mauritania	Low
48	Rwanda	Low
49	Equatorial Guinea	No data
50	Eritrea	No data
51	Guinea-Bissau	No data
52	Libya	No data
53	Western Sahrawi A.D. Rep.	No data
54	São Tomé and Príncipe	No data
55	Seychelles	No data

majority of countries are at the very lowest rungs on the spectrum of effective disaster risk management.

However, what our classification lays bare, Fig. 7 in particular, is that great variation exists nonetheless across Africa. African countries lay at different levels on the spectrum of effective disaster risk management. As Fig. 5 further demonstrates, a patchwork of climate disaster management national policies exists across Africa, and great variation and heterogeneity exists from country to country. Our results demonstrate this heterogeneity, and reveal where each country stands on 20 standard criteria developed to reveal progress towards effective disaster risk

management (DRM) and implementation of the goals of the Hyogo Framework for Action (HFA). For instance, the Congo or the Central African Republic – respectively ranked 48 and 47 in our Africa-wide country classification with an overall DM policy score of 0 – are countries that do not have as much as a standing Disaster Management unit, and cannot be assimilated to Mauritania, Swaziland or the Comoros, respectively ranked 17, 18 and 19th in our classification. Though all 'Unprepared Firefighters', the latter three countries are critically more advanced in the establishment of national disaster risk management frameworks and institutional arrangements to address climate-related disasters, even if these remain poorly funded and staffed. Albeit being overall at the very lowest levels of progress towards implementing HFA recommendations for disaster-resilient societies, African countries lie at very different levels in terms of their national commitments and efforts already endeavored towards DRR-CCA. Thus it would be a mistake to group them indiscriminately under one category, and apply similar policy prescriptions to them all.

Differing baselines ought to now inform differentiated DRR-CCA promotion measures in Africa. Indeed, from country to country contexts differ, and priorities for action consequently ought to differ to enable effective DRM implementation at the national-level. Furthermore, differential progress towards achieving HFA goals across the continent begs for custom-tailored programs designed to support African countries in the critical areas/criteria where their progress is still slow (see Table 3). Country-tailored and context-specific programs are critical to successfully support the reduction of vulnerability to disaster risk, towards the establishment of functional national early warning systems and effective climate disaster risk management policies across Africa.

Our second core finding is that we cannot explain the source of this heterogeneity in African national DM policies. The lognormal distribution of countries according to their DM national policy score suggests that the noted variation may be random, with multiplicative effects. A glance at Fig. 5 definitively overrules the hypothesis of geographic location, since the three types of DM policies put forth in this paper are spread across all four regions of the continent (North, South, West and East). Also a quick correlation between GDP/capita levels and countries' DM scores overturns the assumption that national capacity is the significant driver of the national DM policy a country will adopt. What factors then prompt countries to adopt the national policies that they do to confront rising HMDs? This will have to be the object of another study.

What remains sure is that DRM offers a concrete pathway to address HMDs in low-scoring countries, in a context where these are feared to rise as a result of an increasingly unpredictable climate system (Inter-Governmental Panel on Climate Change (IPCC), 2012; Stern and Easterly, 1999). The DRM approach offers a win-win pathway to address development imperatives while reducing the critical underlying vulnerability and risk factors that generate disasters, when climate hazards cannot be controlled (Patt et al., 2007). This will require significant institutional changes however, which will have to be supported by international funding.

5.1. Limitations

5.1.1. Classification, work in constant progress

The first limitation of our Africa-wide classification is its coverage only up until September 2010, date on which research and classification were completed. Thus our classification runs the risk of being outdated, every time a country adopts a new DRM legislation or revamps its disaster response infrastructure, passing from delayed to effective disaster response. In this sense,

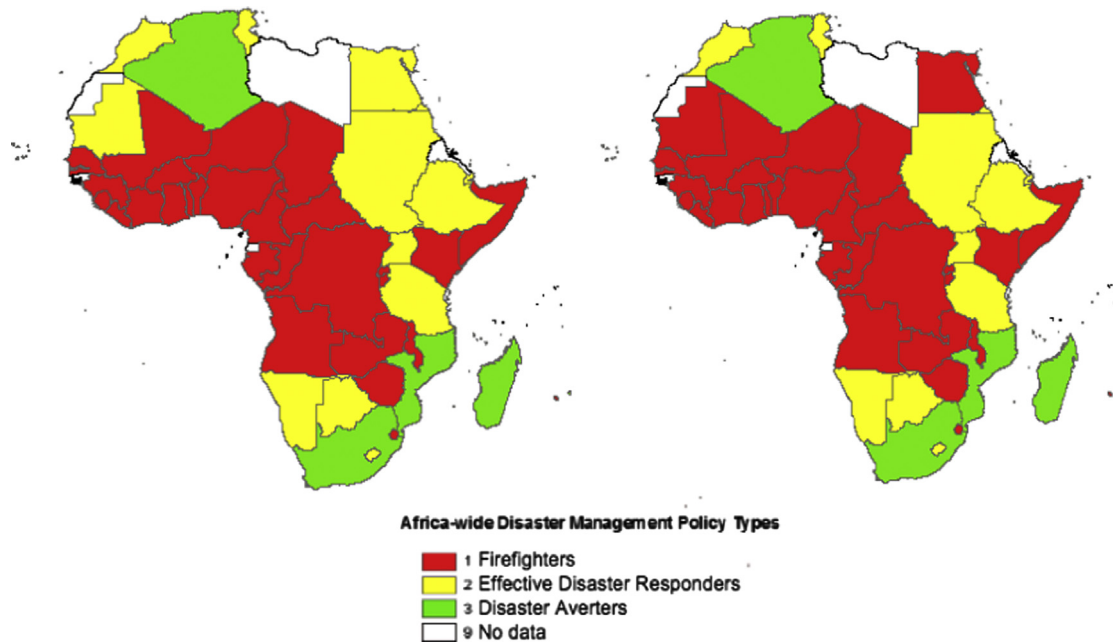


Fig. 5. The Patchwork of Disaster Management Policies across Africa (Left insert: un-weighted map; Right: weighted map).

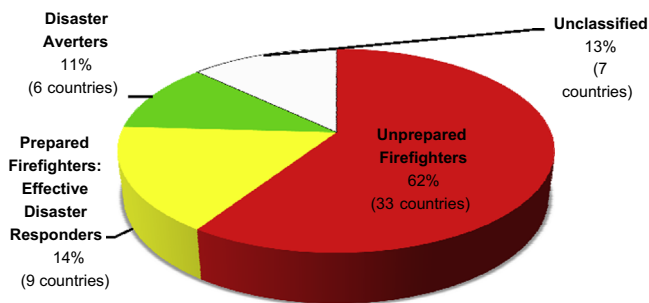


Fig. 6. Distribution of African countries by Disaster Management Policy Type.

classification is a work in constant progress, and our classification is no exception: it only provides an adequate depiction of climate-related disaster management policies across Africa only up until the point we stopped classifying.

In the short span between the end of our classification and submission of our manuscript alone, a new country was born in Africa, Southern Sudan, driving the number of countries to be assessed on the continent to 56. One additional country also adopted a new legislation on DRR, Tanzania, giving the country technically one more point in our point-based ranking, making it sit more comfortably among the Prepared Firefighters. Assessment being intrinsically a revolving exercise, our classification contains this major time coverage limitation.

Nonetheless, it remains that our assessment provides an adequate picture of the overall distribution and heterogeneity of policies to address climate-related disasters in Africa, one that is unlikely to change considerably over the next five years. Furthermore it offers an innovative qualitative method to assess progress towards DRR-CCA at the national and sub-national levels. This classification method can be built upon to integrate newer developments from each country and update the database, as well as extend the evaluation to other countries/regions not assessed, beyond the scope of this paper, enabling cross-country and cross-regional comparisons.

Indeed, the sequential spectrum of DRM put forth in this paper ensures that countries with the slowest progress towards achieving HFA goals and effectively managing disaster risk – many of Africa's countries – are not left out in classification, homogenized under the label of ineffective DRR, which current binary DRR paradigms label them as. Our three-partite continuum of disaster risk management effectiveness ranging from the most Unprepared Firefighters (with a score of 0) to the most effective Disaster Averter (score of 20) offers a mechanism to capture the full variation and patchwork of policies that one sees at the national level, and serves to demonstrate comparatively which countries have very little in place by way of disaster risk management and which others have much more in place. This constitutes a much more cogent way of analyzing developing countries' national disaster management policies, and enabling meaningful cross-country and cross-regional comparisons.

5.1.2. Note on confidence levels, data sources and shortages

A further limitation in the interpretation of our results is the reliance on HFA mid-term national progress reports and VFL national reports to generate insights for indicators 11–20 (indicators of DRR measures). Indeed for lack of other data sources, we resorted to the HFA (self-assessments) and VFL (bottom-up assessments). This unfortunately replicated the methodological flaws decried about these two reports, namely that they reflect the reporting biases of the government officials who responded to the self-assessment reports on the one hand in the case of the HFA mid-term reviews; and those of national organizations delegated to conduct survey work on the other in the case of VFL national reports. In addition, bottom-up perspectives were only gathered for nine countries evaluated in Africa by the VFL process. We tried to circumvent duplicating these two reports' flaws as much as possible however by confronting them against one other, to generate a balanced account of countries' progress towards implementing DRR measures, triangulating their respective data, as well as supplementing them with as many other qualitative assessments and informants' views as possible.

Table 3
Africa-wide country ranking by Disaster Management policy score (weighted) from most proactive Disaster Averters to least Prepared Firefighters in Africa.

Rank	Country name	Overall dm policy score	Final score (weighed)	Policy type	Policy type name
1	Mozambique	17	17	3	Disaster Averters
2	Algeria	16	16	3	Disaster Averters
3	Madagascar	15	15	3	Disaster Averters
4	South Africa	14	14	3	Disaster Averters
5	Mauritius	13	13	3	Disaster Averters
6	Cape Verde	12	12	3	Disaster Averters
7	Morocco	10	10	2	Prepared Firefighters
8	Sudan	9	9	2	Prepared Firefighters
9	Lesotho	9	9	2	Prepared Firefighters
10	Botswana	8	8	2	Prepared Firefighters
11	Tanzania	8	8	2	Prepared Firefighters
12	Uganda	8	8	2	Prepared Firefighters
13	Namibia	7	7	2	Prepared Firefighters
14	Tunisia	6	6	2	Prepared Firefighters
15	Ethiopia	6	6	2	Prepared Firefighters
16	Egypt	8	4	1	Unprepared Firefighters
17	Djibouti	7	4	1	Unprepared Firefighters
18	Mauritania	5	4	1	Unprepared Firefighters
19	Comores	5	4	1	Unprepared Firefighters
20	Swaziland	4	4	1	Unprepared Firefighters
21	Sierra Leone	4	4	1	Unprepared Firefighters
22	Senegal	4	4	1	Unprepared Firefighters
23	Malawi	4	4	1	Unprepared Firefighters
24	Liberia	4	4	1	Unprepared Firefighters
25	Gambia	4	4	1	Unprepared Firefighters
26	Zambia	3	3	1	Unprepared Firefighters
27	Rwanda	3	3	1	Unprepared Firefighters
28	Nigeria	3	3	1	Unprepared Firefighters
29	Mali	3	3	1	Unprepared Firefighters
30	Ghana	3	3	1	Unprepared Firefighters
31	Côte d'Ivoire	3	3	1	Unprepared Firefighters
32	Cameroon	3	3	1	Unprepared Firefighters
33	Burundi	3	3	1	Unprepared Firefighters
34	Angola	3	3	1	Unprepared Firefighters
35	Togo	2	2	1	Unprepared Firefighters
36	Kenya	2	2	1	Unprepared Firefighters
37	Guinea	2	2	1	Unprepared Firefighters
38	DR Congo	2	2	1	Unprepared Firefighters
39	Burkina Faso	2	2	1	Unprepared Firefighters
40	Benin	2	2	1	Unprepared Firefighters
41	Zimbabwe	1	1	1	Unprepared Firefighters
42	Somaliland	1	1	1	Unprepared Firefighters
43	Somalia	1	1	1	Unprepared Firefighters
44	Niger	1	1	1	Unprepared Firefighters
45	Gabon	1	1	1	Unprepared Firefighters
46	Chad	1	1	1	Unprepared Firefighters
47	Congo-Brazza	0	0	1	Unprepared Firefighters
48	Central African Republic	0	0	1	Unprepared Firefighters
0	Equatorial Guinea	–	–	–	Insufficient data
0	Eritrea	–	–	–	Insufficient data
0	Guinea-Bissau	–	–	–	Insufficient data
0	Libya	–	–	–	Insufficient data
0	Sahrawi Arab Democratic Republic	–	–	–	Insufficient data
0	São Tomé and Príncipe	–	–	–	Insufficient data
0	Seychelles	–	–	–	Insufficient data

^a Weighted score: Even though these countries have an overall policy score of 5 or above, they do not satisfy key indicators 5–6 (financial and human capacity to conduct DM duties); thus their weighted score keeps them as 'Unprepared Firefighters'.

Data access remains a major challenge for studies on Africa, and the qualitative assessment we have here presented shows a way forward to generate new meaningful insights and methodological frameworks for the continent by accessing key informants (e.g.: Red Cross disaster managers and civil society representatives following closely the evolution of disaster management policies in their countries), and confronting their different accounts of the national public policy in place in their countries with public documents and declarations.

Finally, a note on our chosen indicators and their respective weighting in the classification process of African countries is called for. Our 20 indicators were chosen in accordance with our storyline of what constitutes effective disaster management, a storyline compatible with mainstream Disaster Reduction frameworks currently subscribed to by African countries, most notably the Hyogo

Framework for Action and the World Meteorological Organization recommendations. When analyzing African countries however, converting this horizontal framework to the form of a continuum was important to be able to capture the variation existing among Africa's fifty-five (55) countries, often all uniformly classified as low progress countries towards implementing Hyogo recommendations, offering no way to rate African countries against each other.

By defining a spectrum with a baseline as not ineffective DRR, but rather the lowest progressing African countries so that it could be accounted for in our appraisal (countries whose score is 0), we enable a cross-country comparison of Africa's disaster management policies. One needs to be cautious however when interpreting our results to not mistake Mozambique (with a score of 17) as a perfect instance of effective DRR-CCA—which Mozambique is,

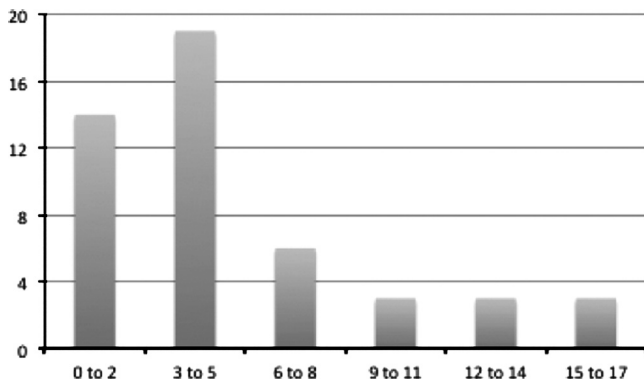


Fig. 7. Lognormal distribution of African countries by Disaster Management Policy Score (0 to 17).

compared to Equatorial Guinea for instance. However Mozambique still pales in comparison to other countries not on the continent that may have attained a perfect score of 20 and have higher levels of DRM achievement.

5.2. Future research needed on the assessment of Hyogo progress in developing regions

An area of future research to validly assess developing countries' national disaster management policies and DRM institutional architectures is data availability, the Achilles' heel of research in the developing world. This study, through extensive qualitative data mining and systematic outreach to key informants in each of Africa's fifty-five (55) countries, succeeded in obtaining an average of three data sources that informed answers for each country on 20 selected indicators against which we assessed the actual national CCA–DRR policy in place. The data used as proxy for these indicators was not perfect however, and there remain many ways to improve data collected for each indicator of progress. Data improvement is a large-scale and highly time consuming task, but one necessary to generate insights on the baselines countries are starting from, to inform the design of tailored DRR–CCA support programs targeted towards more climate disaster-resilient societies.

The road ahead for the disaster risk management research community striving to better understand and address Climate Change Adaptation and Disaster Risk Reduction needs at the macro-policy level in African countries is to address the data issues identified herein, and invest in making available more data sources and perfecting our assessment methods. Increased data sources reduce subjectivity in the assessment process, a necessary prerequisite to inform DRR–CCA support policies, effectively promote disaster public policy building in Africa and circumvent the trap of misinformed “mal-Adaptation” on a continent predicted to be the most vulnerable to the impacts of a changing climate, one that has already begun to experience rising climate-related disasters.

Finally, our study naturally begs the following questions of interest, now that we have an informed cross-continental classification of disaster management policy types in Africa. Which policy works best and best minimizes climate-related disaster losses? Is policy type a function of the country's GDP per capita level—are richer countries just better disaster responders and averters? Is it a result of disaster recurrence and severity? For instance, Africa's Disaster Averters appear to be clustered for the most part along the Indian Ocean western basin, along the cyclone track (see Fig. 6). What of Algeria then, an exception to that storyline? Is DM policy then a function of the country's regime type? Or rather, does being a war country or a stable country matter? Is there a correlation with a country's level of public good

provision or its location on the malaria belt? What factors induce a country to move from one policy group to another, and effectively make a country transition from policy type I–III?

Initial hypotheses emanating from our cross-continental survey of climate disaster managers across Africa (see Annex A) are as follows: the severity and recurrence of disasters; leadership (strong political commitment to making DRR a reality or appointment of dedicated, highly trained DM public officials to spearhead national DRR program); country size (Djibouti); age and maturity of country/its dedication to development endeavor; lack of funding/budgetary allocation to enable climate disaster preparedness; and finally extensive media coverage of disaster events.

These hypotheses have to be tested at country-level to test meaningful correlations; a task beyond the scope of the present paper. Accounting for the heterogeneity of the DM policies noted across Africa will have to be the topic for another research paper.

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Annex A. Expert Interviews Protocol

Questionnaire

Does your country engage in climate-informed disaster management to prevent weather-related disasters? What seems to be the reason why or why not?

Part 1: BACKGROUND INFORMATION

- 1.1 What is your name?
- 1.2 What is your gender? F M
- 1.3 What is your position/occupation?
- 1.4 What country do you have experience in on the continent of Africa (54 countries)? [All questions following will be based on the countries you identify hereby.]
- 1.5 What weather-related extreme events (EWEs) affect your country (or country(ies) you have experience in Africa)? (floods, droughts, cyclones, locust invasions, storms)
- 1.6 What is the frequency of these EWEs in your country? (or the country(ies) in Africa you have experience in?)
- 1.7 In your experience (personal/professional), have LOSSES risen as a result of these EWEs? Have they decreased/stayed the same? (I expect a comparison of before/now)
- 1.8 If yes, in your opinion, what explains this rise in losses? Is climate change playing a role?

PART 2: NATIONAL DISASTER MANAGEMENT POLICY IN PLACE

- 2.1 Does your country use climate information & weather forecasts for the prevention of weather-related disasters?
Y N
- 2.2 If YES, then:
 - 2.2.1 What institution (s) is responsible for providing the forecasts?

- 2.2.2 What types of forecasts are provided, in what form?
- 2.2.3 To whom is this information communicated, and how?
- 2.2.4 Are these forecasts useful in your opinion? Have they been helpful in preventing disasters in recent years?
- 2.2.5 What are the problems, if any?
- 2.2.6 What in your opinion were the reasons your government (as one of the few in Africa) began using these forecasts? [have Annex A handy; be explicit about hypothesized IVs]
- 2.2.7 Are there any other reasons that could explain why your country began to use forecasts?
- 2.2.8 Should other countries in Africa follow suit in your opinion?
- 2.3 If NO, then:
- 2.3.1 How does your government face EWEs? Is there a policy in place to address EWEs in your country? (or the country(ies) in Africa you have experience in?)
- 2.3.2 Can you give me more details about this policy? How does it work in practice? [have indicators of policy type list close by]
- 2.3.3 Is there an institution or agency responsible for EWEs/emergency management in your country?
- 2.3.4 What is the role of this institution/agency, as you understand it?
- 2.3.5 What are some recent actions undertaken by this institution/agency that you can recollect?
- 2.3.6 What, in your opinion, are the reasons why your country does not make use of climate information & weather forecasts for weather-related disasters prevention?
- 2.3.7 Are there any other reasons that could explain why your country does not use forecasts?

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