The State of **Natural Disasters** in Africa

WHITE PAPER

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African Risk Capacity

Sovereign Disaster Risk Solutions

A Specialized Agency of the African Union

Contents

Introduction

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The need for more robust disaster risk management strategies in Africa has never been more critical. Climate change is exerting a heavy toll on the continent, unleashing more frequent and severe weather events such as droughts and floods that exert a steep toll on human life. In the wake of these unforgiving disasters, lives are lost, livelihoods shattered, and communities upended. Amidst such adversity, disaster risk management has ascended the list of national priorities of many African governments, with efforts directed towards resilience building and adaptation.

Africa's journey to managing disasters and building resilience is gaining momentum, but there's much ground to cover. Climate change casts a long shadow and extreme weather events such as droughts and floods continue to disproportionately affect the most vulnerable communities. Yet, many countries on the continent aren't adequately equipped to respond effectively, increasing the vulnerability of many communities. This must change. It's essential to enhance disaster risk management in Africa amid the escalating impact of climate change.

A clear grasp of the current state of disaster risk management on the continent and an informed view of the opportunities and challenges is important in informing response strategies. The publication of this white paper marks an important step forward in our ambition to contribute to knowledge creation. This paper delves into the heart of climate response, arming the reader with valuable data and lucid insights to help navigate the dynamic landscape of disaster risk management in Africa.

In addition to being data-driven and evidence-based, the body of research put forward in this paper reflects a wide range of voices in the broader disaster risk management field. The paper aims to bridge borders, disciplines, and institutions, and integrates evidence and viewpoints from global sources, making it relevant to the African context and beyond. It highlights the unique challenges that Africa faces in mitigating the effects of extreme weather events.

With competing development priorities like education and healthcare, many countries lack sufficient resources to build robust disaster risk management strategies, hindering their preparedness to respond. From the findings of this research, the urgent need to enhance capacity-building efforts for risk reduction in Africa is evident.

This paper showcases the interventions that the African Risk Capacity (ARC) has put in place to ensure that African countries can plan, prepare and respond to natural disasters. Born from a strategic collaboration between the United Nations World Food Programme (UNWFP) and the African Union (AU), ARC is a Specialised Agency of the AU. The white paper traces our journey since being established in 2012 and our evolution through the years, including key milestones such as membership growth and the introduction of new products. It also showcases the unique features of the ARC offering such as the capacity building

programme, our proprietary Early Warning Systems (EWS) and our parametric risk insurance offering.

ARC's value proposition brings together four critical elements of preparedness for member states: capacity building, early warning, risk pooling, and risk transfer to create a pan-African climate response system. This offering aims to provide targeted responses in a timely, cost-effective, objective, and transparent manner.

ARC serves as an African-owned solution, contributing to resilience building and managing extreme climate risks and disease outbreaks on the continent. In this regard, ARC's main priority is to ensure that governments are capacitated to respond, giving them access to ARC's Early Warning Systems (EWS). It's simply unacceptable that only 40% of Africa is currently covered by EWS,

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and even those are compromised by quality issues. According to the United Nations Office for Disaster Risk Reduction, countries with substantial to comprehensive early warning systems coverage have one-eighth the disaster mortality of those with limited or no coverage, highlighting the significant benefits of investing in EWS in terms of saving lives.

The white paper seeks to ignite a conversation about disaster risk management in Africa in the age of climate change and promote a proactive approach to climate response. There is a clear need for continued collaboration between ARC and other stakeholders in the space, including financial institutions, AU member states, local and international development partners. As the timeless African proverb goes: if you want to go fast, go it alone, but if you want to go far, go with others.

Executive Summary

This white paper aims to build an understanding of the magnitude of the cost of weather-related natural disasters and the role of the African Risk Capacity (ARC) Group as an innovative solution provider. It uses existing statistics and original data to highlight the complex interplay between climate change and economic vulnerabilities as well as disease outbreaks. Importantly, it highlights the significance of gender mainstreaming in the disaster risk management landscape in ensuring an inclusive approach to response.

In the 29 African countries where statistics were available, 1,436 disaster events were recorded between 2000 and 2023. Notably, 66% of these events were associated with floods, 15.4% with storms, and 11.7% with droughts. Despite the relatively lower number of drought events over the 23-year period, the available data shows that droughts have the highest negative impact in terms of the number of people affected, as seen in Figure 4(a). For instance, in 2014, about 5 recorded drought events affected more than 25 million people, whereas 20 flood events only affected less than 1 million people. This historical outcome is one of the factors which underpins ARC's significant drought insurance risk coverage, which is driven by the necessity to mitigate the sizeable negative impact of drought events in AU member countries.

Across the four continental regions, Africa has experienced the third-highest number of weather-related natural disasters after Asia and the Americas. The distribution of disasters for 2023 was roughly the same, with floods accounting for 65% of recorded disasters while 22% were related to storms. These disasters claimed the lives of more than 17,000 people and affected another 10 million. Prolonged droughts are also becoming increasingly common in many parts of Africa, particularly in the arid and semi-arid regions of the continent, including Somalia, Ethiopia and Kenya, with severe consequences for agriculture, water supply, food security and general economic development.

- Tracking the occurrence of weather-related natural disasters since the year 2000, the worst-affected countries were South Africa, Mozambique and Madagascar in southern Africa; Nigeria in the west; and a band stretching north-eastwards from Angola to Ethiopia and Somalia in the Horn of Africa;
- The impact of heavy rainfall has been intensified by deforestation and inadequate land management practices;
- It is estimated that African governments have spent US$2.2 billion managing weather-related natural disasters in 2023, of which about 25% was spent in Libya. Munich Ré estimates that the continent's total direct economic loss from such events over the year was $8 billion. It is important to note that this paper does not directly and extensively determine other major economic losses such as agriculture losses, damage to property and infrastructure, job losses and disruption to business operations, and the productivity caused by weather-related natural disasters;
- Storm Daniel in Libya and Tropical Cyclone Freddy in Mozambique were two of the most severe events that occurred in Africa in 2023, which inflicted economic losses of $1.65 billion and $1.53 billion, respectively;
- Changing weather patterns promote the spread of waterborne diseases like cholera and insect-borne diseases like malaria, threatening the progress that has been made on reducing the incidence of epidemics since 2000.

In 2023, in Africa, Libya, Mauritius, Rwanda, Namibia, and Burundi spent the most on weather-related natural disasters, at just below 10% of their GDP. The rest of the countries

for which data is available spent less than 0.5% of their GDP on disaster risk management during the same period. This shows that the rising incidence and scale of weather-related natural disasters on the continent poses a significant risk for low-income economies with insufficient fiscal allocation. Such countries may have to rely more on international partners for relief and recovery, which can lead to increased sovereign risk and social and economic inequalities.

The disparities between the 29 countries are further shown in the per capita expenditure on natural disasters in 2023, with Libya spending the most at $75, Mauritius $62 and Burundi $24 – a high sum for low-income economies. All other countries spent less than $10 per capita.

While natural disasters are gender-neutral, their impacts also starkly reveal gender disparities and vulnerabilities, with women being disproportionately affected. This gendered impact is driven by resource constraints and structural factors that place women at greater risk. Social norms and restrictions prevalent in certain societies amplify the challenges faced by women, hindering their access to the critical information and resources necessary for effective disaster preparation, response, and coping mechanisms.

Only 40% of Africa is currently covered by Early Warning Systems, and even those are compromised by quality issues. Countries with substantial to comprehensive Early Warning Systems coverage have one-eighth the disaster mortality of those with limited or no coverage, highlighting the significant benefits of investing in EWS. The UN notes that EWS investments deliver a return of more than tenfold. Just 24 hours' notice of an impending hazardous event can cut the ensuing damage by 30%. Similarly, the Global Commission on Adaptation found that spending just $800 million on such systems in developing countries would avoid losses of $3

Only 40% of Africa is currently covered by Early Warning Systems, and even those are compromised by quality issues.

to $16 billion per year. Two initiatives have therefore been launched to greatly improve coverage as quickly as possible:

- Early Warnings for All is a global campaign to ensure everyone in the world is covered by early warning systems by 2027, with initial efforts focusing on least developed countries;
- The Africa Multi-Hazard Early Warning and Early Action System's objective is to coordinate government and donor investment in EWS to double African coverage to 80% of the continent.

Risk layering involves separating risks into layers to facilitate more efficient management and financing of risks. This process helps member countries identify high-probability, low-consequence events that can be managed through savings or contingency funds, while lower-probability, higher-consequence events can be transferred to insurance markets.

Recognising the need to mitigate the impact of disasters, the African Union (AU) established the African Risk Capacity in 2012 to help mitigate the impact of disasters. In 2014, ARC established its own insurance affiliate, ARC Ltd, with a mandate to offer African countries competitive pricing for sovereign insurance products through a pooled insurance model. The ARC Group's main goal is to strengthen the capacity of African governments to predict, quantify and respond to extreme weather events and provide Early Warning Systems to support decision-making.

With the launch of its Outbreaks and Epidemics (O&E) programme in December 2022, ARC moved beyond weather-related insurance. The O&E solution provides cover against Filoviruses, Ebola and Marburg virus disease, and meningococcal meningitis, pathogens that have affected 40 AU member states in the past. In addition, ARC has also introduced non-sovereign insurance to protect farmer communities, a growing solution.

It can be observed that African countries are increasingly focusing on reducing the risk of disasters, as evidenced by the increase in the number of countries participating in ARC's risk pools. In 2023, the insured value increased from $129 million to $186 million, and a large proportion of this risk cover is for drought. Despite facing affordability challenges, the number of insured countries has increased from four in 2014 to thirteen in 2022, and further jumped to twenty-four countries in 2023.

One of the key contributors to this growth has been the provision of premium support by donor organisations, and the participation of humanitarian actors in the ARC Replica programme, an initiative that allows humanitarian partners to take out insurance on behalf of a country. The Replica programme contributed 43% of the premium income in 2022, and 29% in 2023. Since 2014, ARC's impact has been growing. The organisation has paid out more than $125m to insured African countries in insurance payouts, which are used to provide support to vulnerable communities in line with pre-agreed contingency plans and Final Implementation Plans.

As the climate crisis grows, Africa is intensifying its climate efforts while ARC is also working to increase its reach and impact across the continent. This paper will contribute to knowledge development towards supporting decision-making.


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Chapter 1

Methodology

The primary objective of this analysis is to provide valuable insights into the estimated economic cost of weather-related natural disasters in Africa in 2023 and their historical frequency. Additionally, this analysis briefly sheds light on how natural disasters exacerbate gender inequality and increase vulnerability. Moreover, it evaluates the emerging patterns of epidemics and outbreaks against the backdrop of climate change. Finally, it provides an analysis of the state of disaster risk management (DRM) in Africa, primarily through the interventions of ARC and its stakeholders.

This analysis defines weather-related natural disasters[1] as extreme events and phenomena that are influenced or intensified by changes in the Earth's climate patterns. Human activities such as burning of fossil fuels, deforestation, and industrial processes are mainly responsible for these changes. These disasters can cause widespread damage, loss of life, and disruption of communities. They are often more severe or frequent due to changes in temperature, precipitation patterns, sea levels, and other climate-related factors.

Some common types of weather-related natural disasters include:

- Intense hurricanes, cyclones, typhoons;
- Increased flooding;
- Sea level rise;
- Droughts;
- Extreme weather events (e.g., intense storms, heavy rainfall, unusual weather patterns, etc.)
- Extreme heatwaves; and
- Wildfires[2].

It is important to note that while individual extreme events cannot be directly attributed to climate change, the overall trend of increasing frequency and severity aligns with the expected impacts of a changing climate. In addition, whilst examples of weather-related natural disasters have been provided above, it is vital to highlight that not all the aforementioned have been witnessed in Africa.

Data has been collected on the natural disasters in Africa that were related to weather in the year 2023. The information was gathered from EM-DAT, a global database managed by the Centre for Research on the Epidemiology of Disasters (CRED). EM-DAT is a comprehensive database that provides valuable insights into various aspects of disasters. The majority of data on epidemics and outbreaks was sourced from journal articles which cited information obtained from the World Health Organization.

To gather information on government spending, secondary research sources were used on all variables, including weather-disaster response, epidemics/outbreaks, healthcare expenditure, debt service, and other aspects. Various sources have been utilised to gather information, including news articles, the annual budget plans of countries, reports published by international organisations, Ministries of Finance and Environment, and Presidential announcements that were made in direct response to natural disasters that occurred in 2023.

With limited data being publicly available on government expenditure, where a particular country did not report the actual disaster response and recovery expenditure in 2023, for

weather-related natural disasters and epidemics/outbreaks, the government's 2023 budget allocations for disaster risk management plans have been used as a proxy.

In order to conduct a comprehensive analysis of disaster risk management, interviews were conducted with Africa Risk Capacity practitioners and stakeholders to evaluate the state of Africa's coordinated planning, preparation, and response to disaster risks.

The research process consisted of the following steps:

1. Data capturing of weather-related natural disaster events and timeline analysis by country:

- The EM-DAT database was used to analyse weather-related natural disasters that occurred in Africa from 2000 to 2023.

- In total, 29 African countries were recorded to have witnessed disasters in 2023. Supplementary data for the 29 African countries was collected through desktop research to capture any weather-related natural disasters not covered in the EM-DAT database. The list includes the type of disaster (e.g., floods, drought, storms), and the year in which the disaster event/s occurred (see annexure A).

2. Extensive secondary-based research was conducted on several sources in order to identify information and data regarding government expenditure on all aforementioned variables, including response to national disasters, healthcare expenditure, Gross Domestic Product and debt servicing. Sources used include news articles, countries' annual budget plans, reports published by international organisations, Ministries of Finance, Ministries of Environment as well as Presidential announcements made in direct response to the natural disasters of 2023.

3. Weather-related natural disaster case studies by country:

- A case study analysis of the 29 African countries was conducted. The analysis provides a brief description of weather-related disasters experienced by each country in 2023. Where possible, a rough estimate of the cost of the particular disaster analysed in the case study is also provided. Additionally, this section includes information on any epidemic or outbreak experienced by the country, as well as an analysis of the total 2023 government expenditure on weather-related disaster response, or annual budget plans for disaster preparedness (see Appendix 1).

4. Data synthesis and analysis:

- Data collection, analysis and aggregation: All relevant data from aforementioned sources was collected and currency values converted to US$ for standardised analysis were used. A consolidated dataset with information for all 29 African countries was created and the total expenditure of all 29 African countries on average across all variables (i.e., weather disaster response or weather disaster preparedness, healthcare, education, debt servicing) calculated. Per capita values were calculated by dividing the expenditure (actual / budgeted) by a country's estimated total population, obtained from Worldometer. Spending as a percentage of GDP was calculated by expressing the expenditure (actual / budget) on natural disasters as a percentage of a country's GDP. GDP data was obtained from the World Bank. (See annexure A.)

29

African countries in total were recorded to have witnessed disasters in 2023.

Research challenges and limitations

Governments' disclosure of weather-related natural disaster response and recovery expenditure is limited, and what is included in these amounts differs in each country. This can lead to potential inconsistencies in the estimates and a lack of comprehensive insight into government expenditure. Additionally, there is a possibility that the EM-DAT database has not captured some minor local-based weather-related natural disasters, and data for specific countries may not be properly administered. The insights drawn from this analysis may be biased by recorded versus unrecorded data in relation to disaster events.

Finally, this report – as previously mentioned – focused on the 2023 government expenditure on natural disaster response and recovery (weather-related and epidemic/outbreak) and where data was not available, it focused on the government's annual budget plans for natural disaster management in 2023. The reported figures do not encompass socio-economic losses, including indirect and prolonged economic repercussions like environmental degradation, agricultural and population declines, and infrastructure damage. Due to their long-term nature, these economic impacts remain unclear at present.

1. It's important to note that the distinction between climate-related and weather-related natural disasters is not always clear-cut. As opposed to climate-related natural disasters which are long-term and systemic, weather-related disasters are more immediate and short-term events driven by atmospheric conditions. However, there is often an interconnection between short-term weather events and long-term climate patterns. For example, climate change can influence the frequency and intensity of certain weather events, blurring the lines between the two categories.

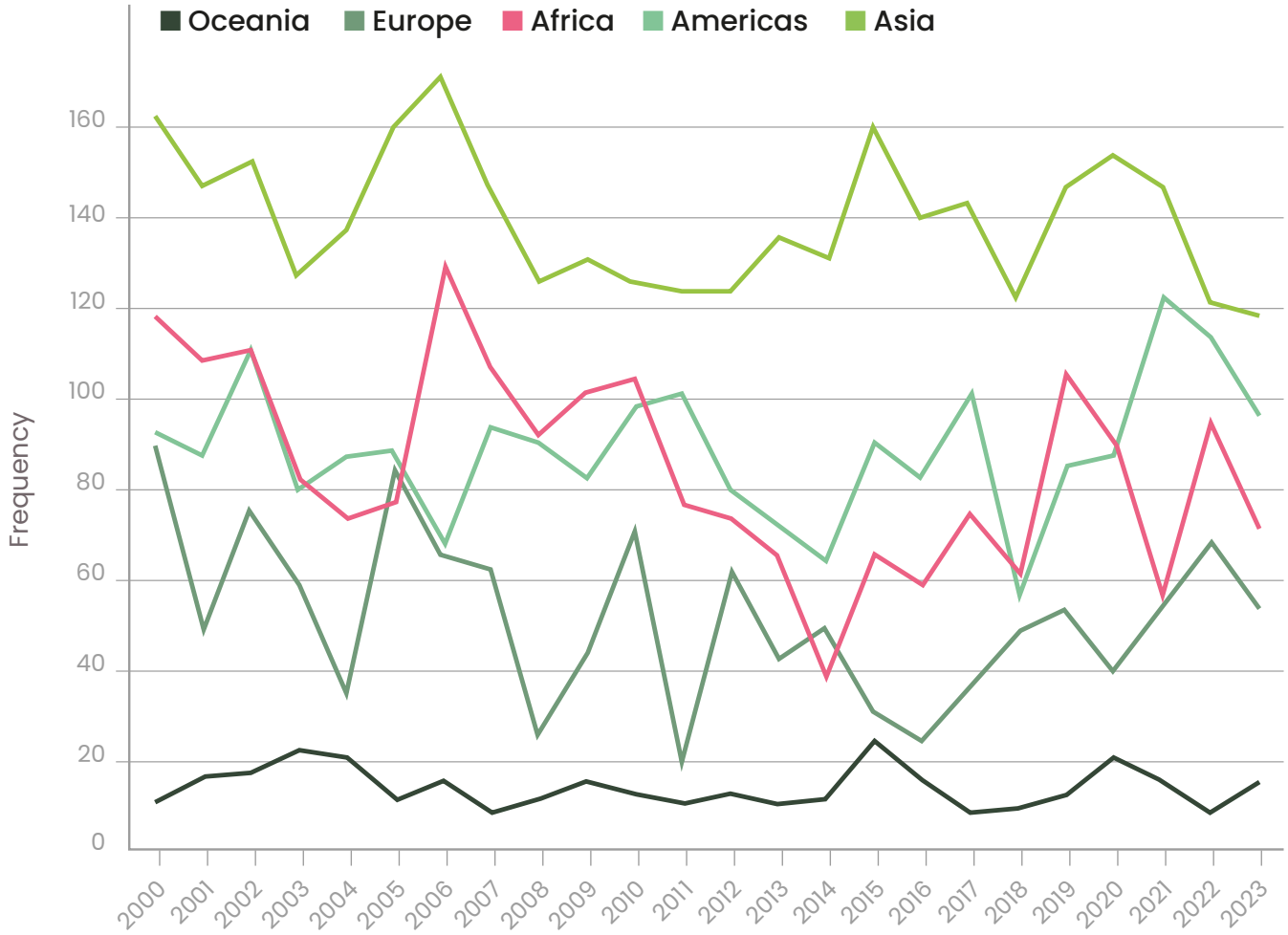
2. Whilst wildfires are not directly attributed to climate change, changes in climate patterns, for example higher temperatures, prolonged droughts, and changes in vegetation can create conditions conducive to more frequent and severe wildfires, therefore creating fire risks in various regions.

The State of Natural Disasters in Africa

Weather-Related Natural Disasters in Africa: A Growing Concern

Climate change, which is primarily caused by human activities such as deforestation, industrialisation, and the burning of fossil fuels, is causing significant alterations in weather patterns globally. This is leading to an increase in the frequency and intensity of extreme weather events in Africa and other parts of the world.[3] Africa is one of the most vulnerable continents to the effects of climate change due to its limited adaptation and resilience-building capacities. Many countries in the region are already struggling with poverty, inadequate infrastructure, and limited resources,[4] compounding the threat. These factors make the consequences of climate change particularly severe in Africa.

Figure 1: Number of Weather-related Natural Disasters in Africa vs Rest of World (2000-2023)



In the last 23 years, the African continent has been experiencing a cyclical trend in the frequency and intensity of weather-related natural disasters, as shown in Figures 1 and 2. The Central, Eastern and Southern parts of Africa have the most recorded disasters over this period, together with Nigeria, as seen in Figure 4(b). In the last decade, there has been a significant rise in the occurrence of natural disasters, with the number increasing steadily from a low of 32 in 2014 to 56 in 2023, with floods being the main cause. This trend can be attributed to heavy rainfall, worsened by deforestation and inadequate land management practices. Other disasters include storms and droughts. Overall, the African continent has experienced the third highest number of weather-related disasters across the four continental regions, as shown in Figure 1. Notably, compared to Africa, the Americas and Europe experienced a higher growth rate of natural disasters in later periods.

The estimated government expenditure on managing these weather-related natural disasters across 29 African countries studied in this paper was US$2.2 billion in 2023; about 25% of this estimate was attributable to Libya's government expenditure, which is equivalent to just below 1% of its GDP. The second largest contributor is Burundi at 15%, which is equivalent to an extreme level of just below 10% of its GDP. According to Munich Re, Africa's total (adjusted) direct economic loss is $8 billion.[5] It is further estimated that the disasters caused 17,507 fatalities and affected 10 million people, as reported in the EM-DAT database. The cost implications of the escalating trend of weather-related disasters pose significant challenges to sustainable development efforts and exacerbate existing economic vulnerabilities in the region.

Figure 2: Frequency of Weather-related Natural Disasters in Africa (2000-2023)

Figure 1 demonstrates that the frequency of weather-related natural disasters declined globally between 2000 and 2023, except for the Americas, which experienced a slight increase. During this period, Asia had the highest percentage of weather-related disasters (36.9%), followed by the Americas (23.5%), Africa (22.4%), Europe (13.6%), and Oceania (3.6%). From 2015 to 2022, Asia and Oceania witnessed a reduction in the frequency of disaster events while Africa, the Americas, and Europe experienced an increase. Europe had the largest increase (127%), followed by Africa (46%) and the Americas.

In 2023, there were 56 weather-related disaster events recorded across Africa. These were recorded from 29 countries studied in this paper, as shown in Figure 3. It is worth noting that about two-thirds of these countries are ARC member states (AU member states that have signed the ARC Establishment Treaty, giving them access to the ARC mechanism).

3. Africa's high dependency on climate-related activities such as rain-fed agriculture, forestry and fisheries, combined with its inadequate infrastructure and low adaptive capacity make the continent extremely vulnerable to climate change and weather-related natural disasters; African Development Bank, "Climate Change in Africa", 2019, accessed https://www.afdb.org/en/cop25/climate-change-africa ; World Meteorological Organisation, "Africa suffered disproportionately from climate change", 2023, accessed, https://wmo.int/media/news/africa-suffers-disproportionately-from-climate-change

4. According to the ND-GAIN country index, which assesses a country's vulnerability to climate change and its readiness to improve resilience, 9 countries out of the 10 (as well as 35 out of the 50) most vulnerable and least resilient countries are located in Africa. https://gain.nd.edu/our-work/country-index/rankings/

5. Munich Re, "Record thunderstorms losses and deadly earthquakes: the natural disasters of 2023", 2024, https://www.munichre.com/en/company/media-relations/media-information-and-corporate-news/media-information/2024/natural-disaster-figures-2023.html

Figure 3: African Countries with Disaster Events Recorded in the EM-DAT Database (2000 - 2023)*

* Labelled countries are those with recorded natural disasters.

Data from the global EM-DAT database[6] of recorded disaster events from 2000 to 2023 across Africa reveals that 1,436 events occurred across these 23 years. Notably, 66% of these events were associated with floods, 15.4% with storms, and 11.7% with droughts. In relation to the dominance of floods, heavy rainfall, often exacerbated by deforestation and poor land management practices has led to widespread inundation of communities, displacement of populations, destruction of homes and infrastructure, and loss of lives. Despite the relatively lower number of drought events over the 23-year period, the available data shows that droughts have the highest negative impact in terms of the number of people affected, as seen in Figure 4(a). For instance, in 2014, about 5 drought events affected more than 25 million people, whereas 20 flood events only impacted under 1 million people.

6. The International Disaster Database, Centre for Research on the Epidemiology of Disasters, https://www.emdat.be/

Figure 4: Types of Weather-Related Natural Disasters in Africa (2020-2023)

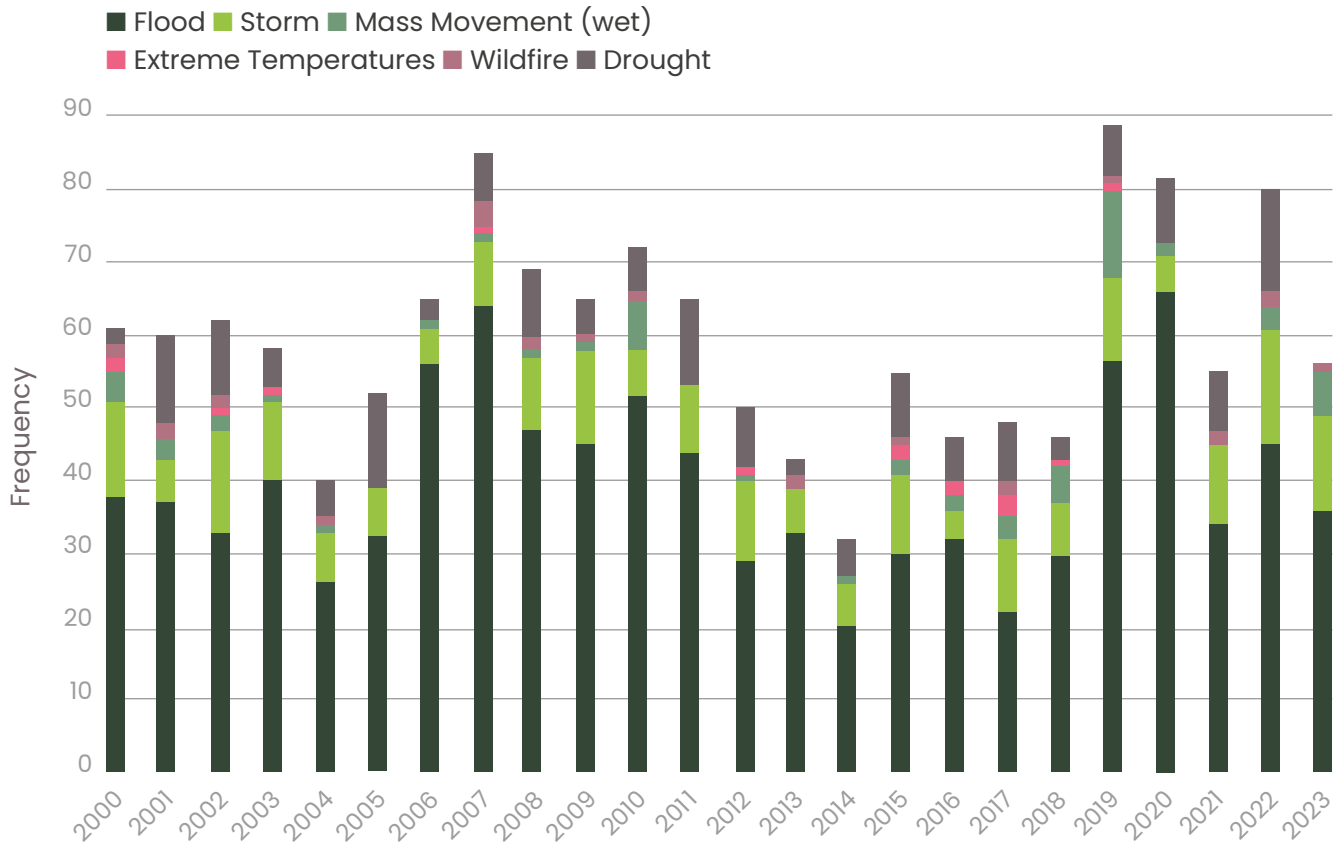


Figure 4(a): Number of People Affected Based on the Type of Weather-Related Natural Disaster

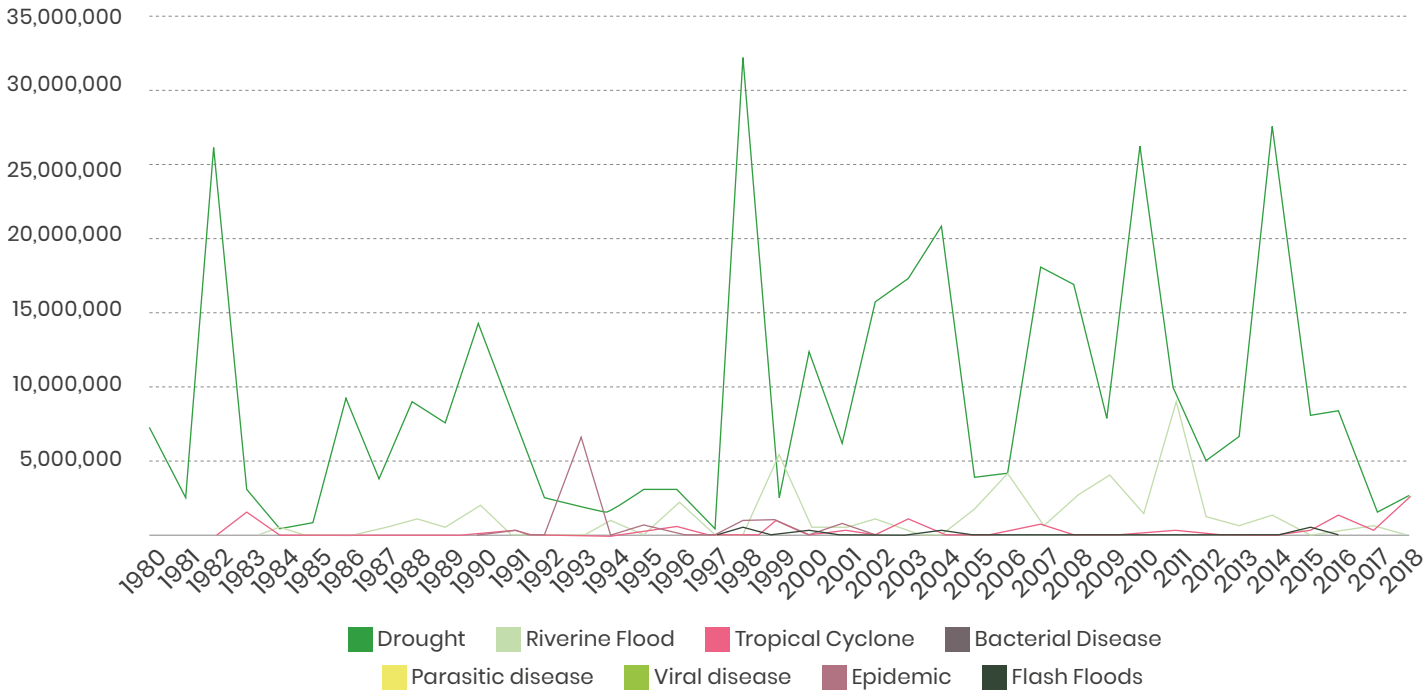
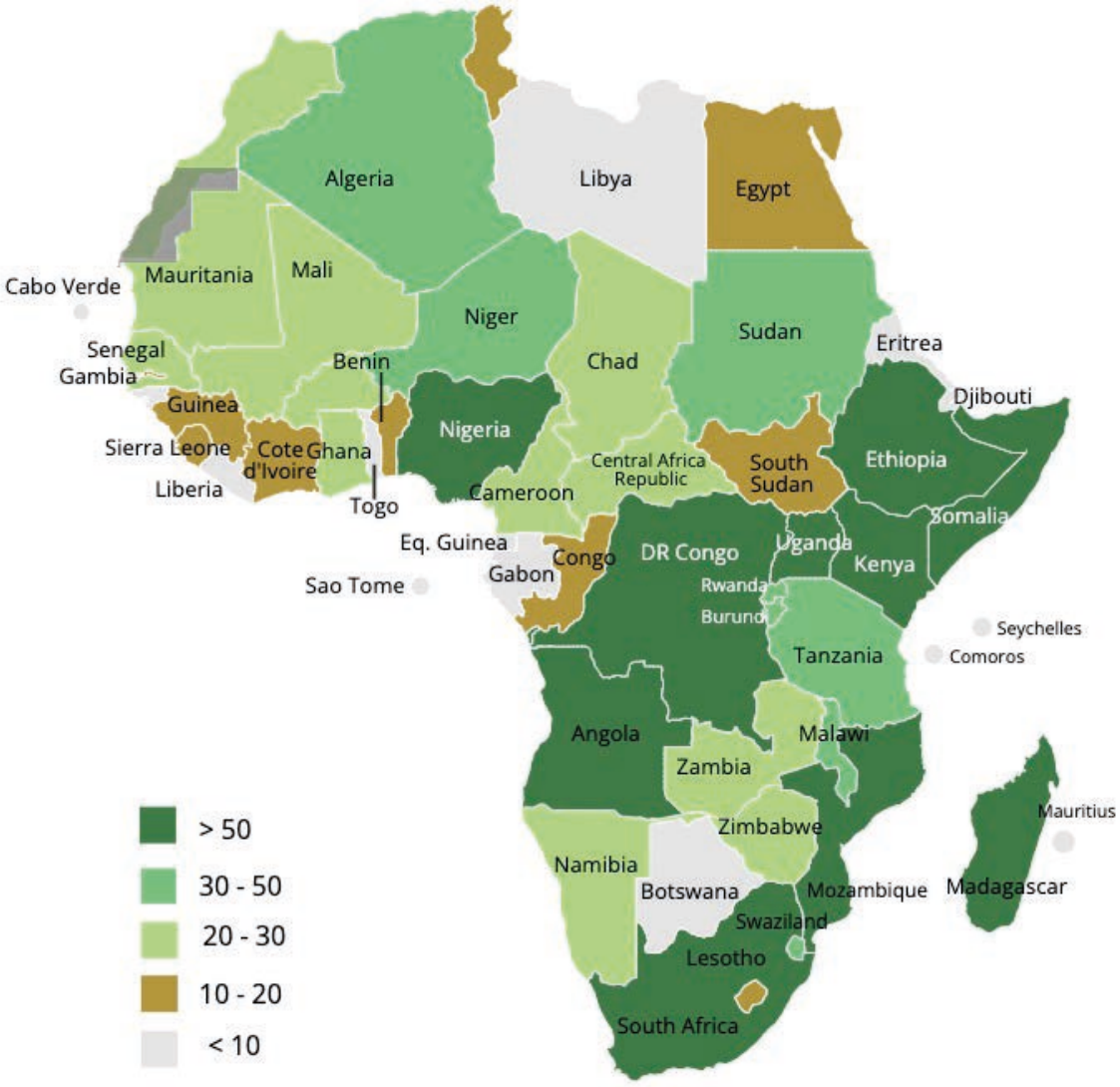


Figure 4(b): Weather-Related Natural Disasters in Africa by Country between 2000-2003

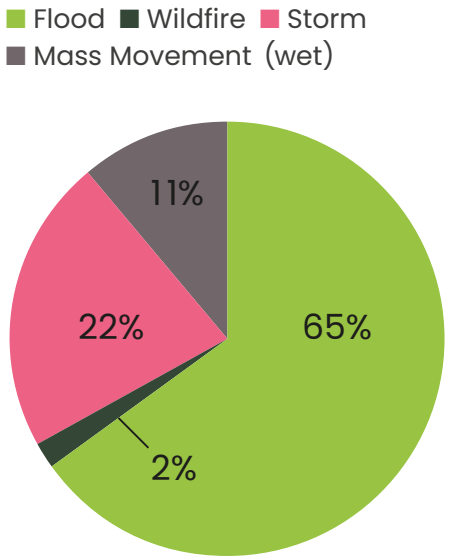


In 2023, as represented in Figure 5 in particular, floods emerged as the most prevalent type of weather-related natural disaster in Africa, accounting for 36 out of the 55 recorded disasters (65%)[7]. The next significant threat following floods was storms, with data indicating a notable increase in the frequency and severity of tropical cyclones and other severe storms across the African continent, particularly in coastal areas.

Specifically, out of the 55 weather disaster events recorded in Africa in 2023, 12 were attributed to storms (22%), while as previously shown, when examining the longer time period from 2000 to 2023, the data indicates that out of the 1,436 disaster events, 221 were a result of severe storms (15%) (see Figure 4). This trend underscores the growing threat posed by extreme weather events, which not only exacerbate existing vulnerabilities but also amplify the risks faced by coastal communities and the threat to critical infrastructure.

Notably, prolonged droughts are also becoming increasingly common in many parts of Africa, particularly in the arid and semi-arid regions of the continent. These droughts, attributed to shifts in rainfall patterns and rising temperatures, have severe consequences for agriculture, water supply, food security and the region's economy as a whole. Countries in the Horn of Africa such as Somalia, Ethiopia, and Kenya, have been recurrently affected by droughts, leading to widespread famine, malnutrition, and humanitarian crises. While the EM-DAT database did not record any drought events for the continent in 2023, the data for the period from 2000 to 2023 shows 168 (12%) of the 1,436 weather disaster events were attributable to droughts (see Figure 4).

Figure 5: Types of Weather-Related Natural Disasters in Africa (2023)



The impact of weather-related natural disasters on gender disparity

While natural disasters are gender-neutral, their impacts starkly reveal gender disparities and vulnerabilities, with women disproportionately affected. The research underscores that in the wake of disaster, women and children face a higher likelihood of mortality than men.[8,9] This gendered impact is driven by resource constraints and structural factors that place women at greater risk.[10, 11] Social norms and restrictions prevalent in certain societies amplify the challenges faced by women, hindering their access to the critical information and resources necessary for effective disaster preparation, response, and coping mechanisms. Economic disparities further compound vulnerabilities, especially for women employed in the agriculture or informal sectors.[12] In the aftermath of disasters, women confront heightened risks of sexual harassment, exploitation, and domestic abuse. Below is a case study where Malawian women were disproportionately impacted by Cyclone Freddy in 2023.

Notably, prolonged droughts are also becoming increasingly common in many parts of Africa, particularly in the arid and semi-arid regions of the continent.

Case Study: Tropical Cyclone Freddy's Disproportionate Impact on Women in Malawi

In March 2023, Tropical Cyclone Freddy slammed Malawi, leaving 659,000 individuals displaced, with women in poverty disproportionately affected. Women in displacement camps reported cases of sexual harassment and worries of gender-based violence. The cyclone's devastation, wiping out crops and farmlands, amplifies the burden on women, who constitute 65% of smallholder farmers in Malawi. Additionally, women shoulder the heavier load of unpaid care work and household responsibilities, accentuated during climate-related emergencies.

7. There is a possibility of additional minor weather disaster events occurring that may not have been documented in the EM-DATA database.
8. International Union for Conservation of Nature. "Disaster and Gender Statistics". n.d, https://www.unisdr.org/files/48152_disasterandgenderstatistics.pdf
9. Eric Neumayer, Thomas Plümper, "The Gendered Nature of Natural Disasters: The Impact of Catastrophic Events on the Gender Gap in Life Expectancy, 1981–2002". Annals of the Association of American Geographers, 2007, accessed, https://www.tandfonline.com/doi/epdf/10.1111/j.1467-8306.2007.00563.x?needAccess=true
10. World Bank, "Gender Dynamics of Disaster Risk and Resilience", 2021, accessed, https://www.worldbank.org/en/topic/disasterriskmanagement/publication/gender-dynamics-of-disaster-risk-and-resilience
11. UN Office for Disaster Risk Reduction, "Gender and Natural Disasters", 2001, accessed, https://www.eird.org/deslizamientos/pdf/eng/doc13972/doc13972.pdf
12. United Nations Women, "Accelerating action for gender responsive disaster risk reduction", 2023, accessed, https://www.unwomen.org/en/news-stories/feature-story/2023/06/accelerating-action-for-gender-responsive-disaster-risk-reduction

The cost of weather-related natural disasters in Africa

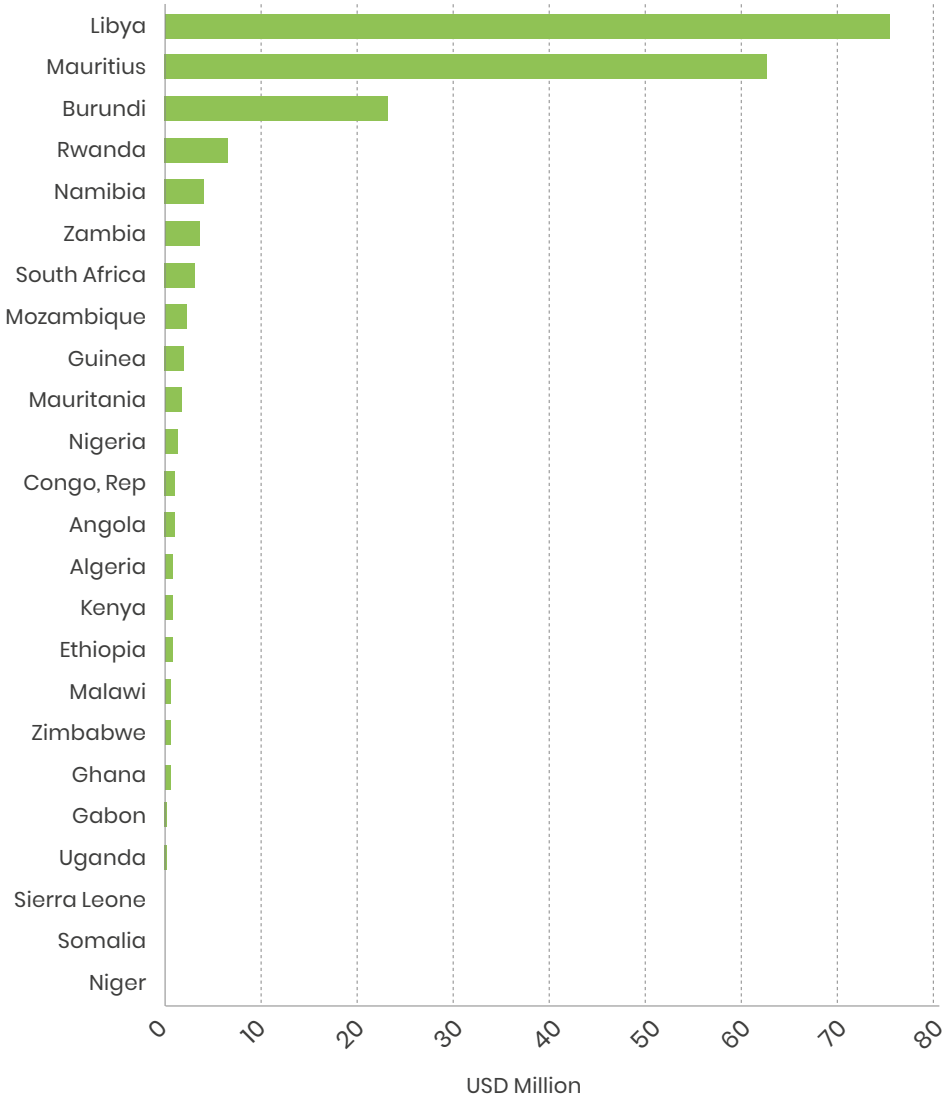
The economic loss from natural disasters generally includes damage to agriculture, property, infrastructure, and job losses due to business disruption, as well as government expenditure response mechanisms and loss of lives. This paper focuses on the government's actual and budgeted response and recovery expenditure to weather-related natural disasters in 2023.

Research on government expenditure and the annual budget plans of 29 African countries for the year 2023 revealed that they collectively spent $2.2 billion on weather-related disasters. Figure 10 depicts that the actual government expenditure was about $1.3 billion while the expenditure based on budgets amounted to an estimated $0.9 billion. Libya was the largest contributor to actual expenditure on recovery and reconstruction; see annexure B for the comprehensive case study. According to data from the EM-DAT database, natural disasters in these 29 countries resulted in the tragic loss of 17,507 lives and affected 10 million people.

To provide context and indicate the scale of the economic cost of natural disasters, Munich Re, a leading reinsurer globally, has estimated that the total economic loss from weather-related natural disasters in Africa, including direct losses, was $8 billion in 2023. Two of the most severe events that occurred in Africa in 2023 were Storm Daniel ($1.65 billion)[13] in Libya and Tropical Cyclone Freddy ($1.53 billion) in Mozambique, which together resulted in an economic loss of $3.18 billion and caused significant fatalities and destruction.[14]

The chart in Figure 6 depicts a comparison of expenditure on disaster events across African countries in 2023, where data is available. On average, each country spent $93 million on weather-related disaster events in 2023, and the median expenditure is about $40 million. The median

Figure 6: Total Amount Spent on Weather-related Natural Disasters in 2023 (in absolute value terms)[15]



Research on government expenditure and the annual budget plans of 29 African countries for the year 2023 revealed that they collectively spent $2.2 billion on weather-related disasters.

Figure 7: Weather-Related Disaster Expenditure (actual) in 2023

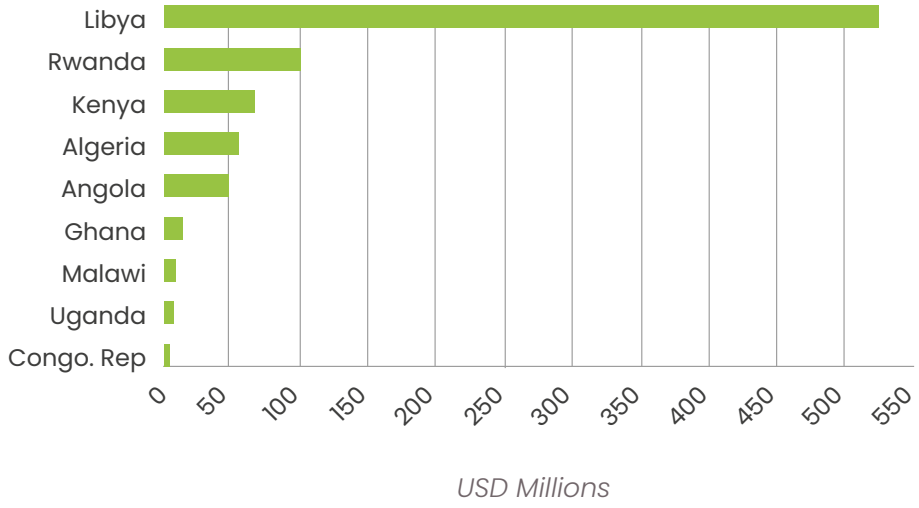
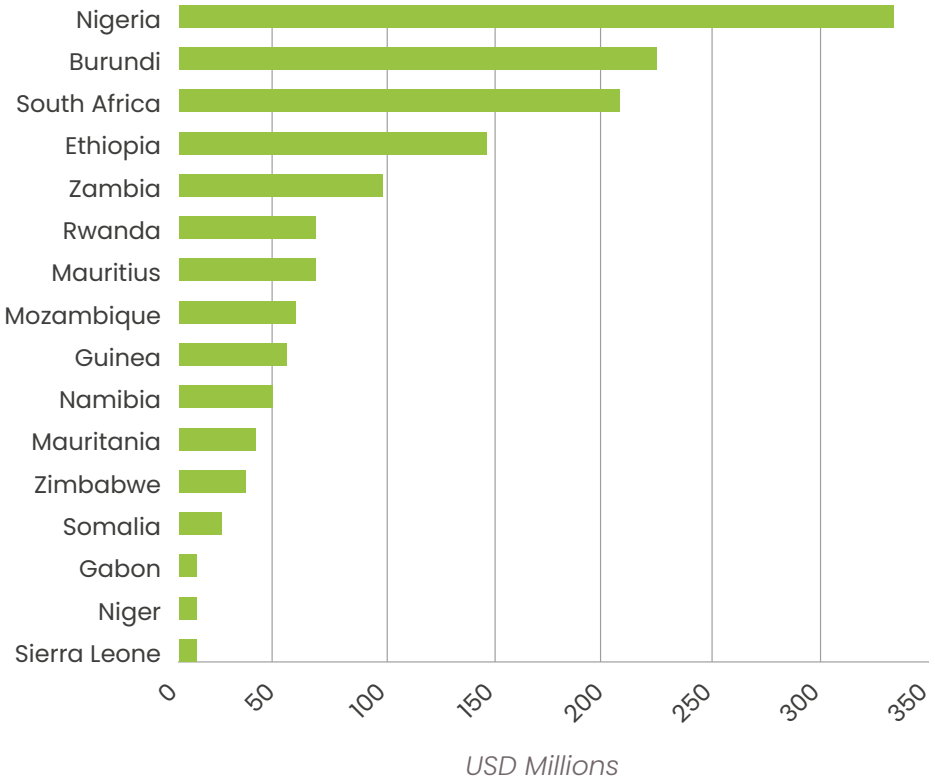


Figure 8: Weather-Related Disaster Expenditure (budget) in 2023



Amount spent by each government per se and do not include any financial support provided by international partners and humanitarian organisations.

13. World Bank, "Joint World Bank, EU, UN Report Assesses Damages Caused by Catastrophic Flooding in Libya", 2024, accessed, https://www.worldbank.org/en/news/press-release/2024/01/24/joint-world-bank-eu-un-report-assesses-damages-caused-by-catastrophic-flooding-in-libya

14. World Bank, "World Bank Mobilizes $150 Million to Help Mozambique Recover from Cyclone Freddy", 2023. Accessed, https://www.worldbank.org/en/news/press-release/2023/05/24/world-bank-mobilizes-150-million-to-help-afe-mozambique-recover-from-cyclone-freddy

15. With limited data being publicly available on government expenditure, where a particular country did not report the actual expenditure to address the effects of the 2023 weather-related natural disaster, then the government's 2023 budget allocations for disaster risk management plans has been used as a proxy. In addition, figures provided refer exclusively to the amount spent by each government per se and do not include any financial support provided by international partners and humanitarian organisations.

Government spending on natural disaster risk management, including response and recovery expenditure as a percentage of GDP.

for budgeted expenditure is even lower at $30 million. At one end of the spectrum there is Libya, which spent more than half a billion dollars on disaster events in 2023, and at the other is Sierra Leone, which spent less than $1 million to address disaster events in 2023. This difference in the scale of events and fiscal capacity among African states is a key determinant.

Figure 9 partially depicts the economic impact of weather-related natural disasters in various African countries. It illustrates government spending on natural disaster risk management, including response and recovery expenditure as a percentage of GDP. In 2023, Burundi had the highest percentage of spending on disaster events, which accounted for 10% of its GDP. Libya, Rwanda and Mauritius followed with their spending being above 0.5% of GDP, however, the rest of the countries for which data is available spent less than 0.5% of their GDP on disaster risk management during the same period. The implications of these disparities depend on the scale of weather-related natural disasters and the size of the economies which in turn determine the fiscal capacity of each African country to plan for disaster events and reduce exposure to economic losses that increase social vulnerabilities in each economy. Overall, this indicates that as the incidence and scale of weather-related natural disasters continue to rise on the continent, low-income economies with insufficient fiscal allocation face the risk of increased reliance on international partners for relief and recovery, increasing the country's sovereign risk and prolonging economic inequalities.

Figure 9: Amount Spent on Weather-related Natural Disasters in 2023 (Percentage of GDP)

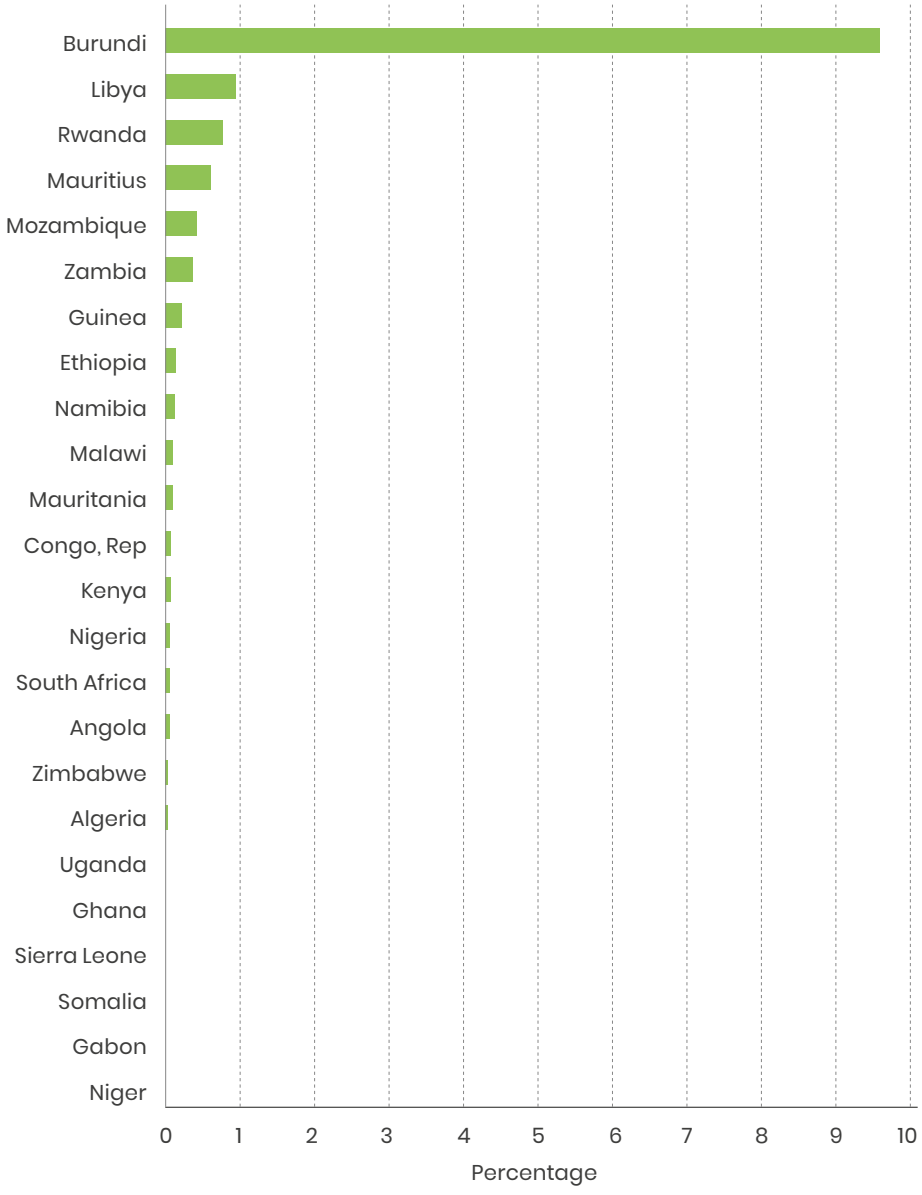
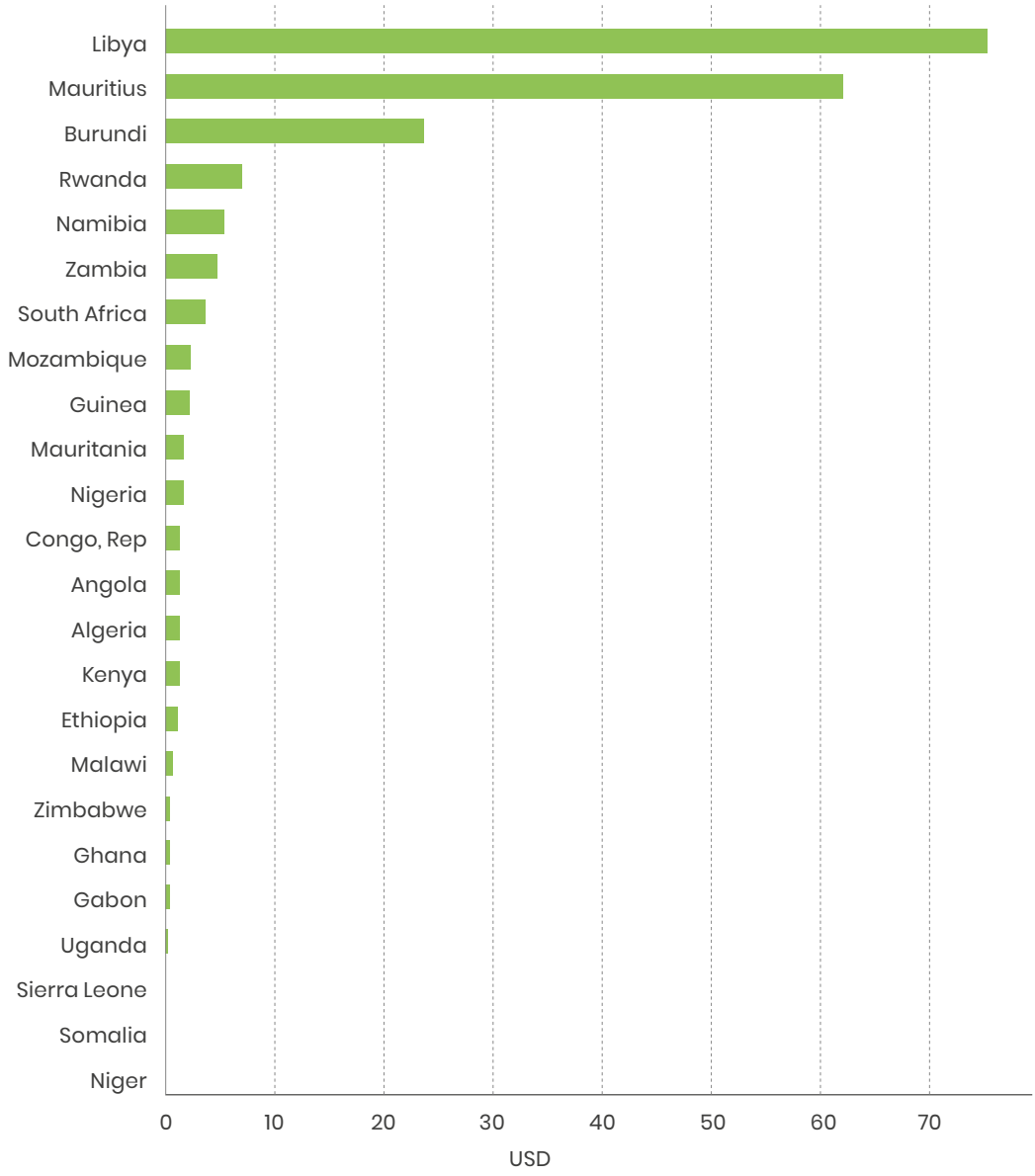


Figure 10: Amount Spent on Weather-related Natural Disasters in 2023 (Per Capita)



In 2023, Burundi had the highest percentage of spending on disaster events, which accounted for 10% of its GDP.

As seen in Figure 10, a similar picture emerges when we consider per capita expenditure on natural disasters in 2023. On average, each country had a per capita expenditure of $8.26 on weather-related disasters in 2023. Libya spent the most with $75, followed by Mauritius ($62) and Burundi ($24), while all other countries spent less than $10 per capita on disaster events in 2023.

The implications of the current trajectory of weather-related natural disasters in Africa

From the above, using government expenditure and GDP as a proxy to assess the scale of the impact of weather-related natural disasters in Africa can potentially provide valuable insights into how such disasters can increase sovereign risk and exacerbate economic inequality. Extensive research on past natural disasters in the region highlights a significant negative impact on economic growth, agricultural productivity, and industrial value-addition.[16, 17] The International Finance Corporation's findings indicate that between 1990 and 2019, droughts and floods decreased Africa's GDP by an average of about 0.7% and 0.4% respectively.[18] Such events not only divert resources from essential services but also impede progress in poverty eradication, food security, public health and infrastructure development.[19] Moreover, they exacerbate existing inequalities and vulnerabilities, disproportionately affecting marginalised communities, women, and children, who face greater challenges in accessing resources for disaster preparation and coping.[20, 21]

With this in mind, African governments face a critical imperative to allocate greater financial resources toward proactive measures for mitigating the impact of such disasters. Firstly, enhancing investment in early warning systems and disaster preparedness infrastructure is paramount. This includes bolstering meteorological monitoring capabilities, establishing robust communication networks for disseminating alerts, and constructing resilient infrastructure to withstand extreme weather events. Secondly, allocating funds towards community-based disaster risk reduction initiatives can empower local populations to actively participate in disaster preparedness and response efforts. By investing in training programmes, community drills, and resource allocation for vulnerable communities, governments can foster resilience at the grassroots level and minimise the human and economic toll of weather disasters. Additionally, recognising the disproportionate impact on women and children, it is crucial to integrate gender-inclusive approaches into disaster management. Policies should address the specific vulnerabilities faced by women, guaranteeing their equitable access to resources, information, and support during and after disasters. This includes ensuring the active participation of women in decision-making processes related to disaster preparedness, response, and recovery, and establishing safe spaces for women, children, and vulnerable populations in evacuation centres. Specific attention should be paid to reproductive health services for pregnant women and nursing mothers.

Furthermore, prioritising climate adaptation and resilience-building strategies within national development agendas is essential. African governments should integrate climate risk assessments into policy formulation processes across all sectors, ensuring that development plans account for the escalating threat of weather-related disasters. Moreover, incentivising private sector investment in climate-resilient infrastructure through policy frameworks, tax incentives, and public-private partnerships can unlock additional funding streams for proactive disaster risk management efforts. By adopting a comprehensive approach that combines early warning systems, community engagement, and climate adaptation measures, African governments can strengthen their resilience to weather disasters, safeguarding the well-being of their citizens while mitigating any risks that may be hindering economic growth and sustainable development.

Aside from African countries however, given the cross-risk and climate change being the impetus behind natural disasters, the international community also bears a significant responsibility in assisting the world's most vulnerable continent in coping with such catastrophic natural disasters.

Additionally, international and humanitarian organisations can also offer vital support to the countries of Africa through several strategies. Firstly, they can prioritise allocating more funding and resources specifically for climate adaptation and disaster resilience projects in Africa. This includes increasing overall funding levels and directing a larger proportion of existing funds towards climate-related initiatives. Additionally, ensuring that funds are disbursed with urgency, efficiency and effectiveness to projects that have the greatest impact on building resilience in African communities is crucial. Furthermore, providing targeted capacity-building support and technical assistance to African governments and local communities is essential. This includes designing and implementing training programmes for disaster management personnel that incorporate gender-sensitive approaches. The improvement of early warning systems should take into consideration the unique needs and vulnerabilities of women and marginalised groups, ensuring that alerts and communication methods are accessible to all. Facilitating knowledge-sharing and best practices exchange among different stakeholders should explicitly include gender perspectives, promoting the active involvement of women in decision-making processes related to disaster preparedness, response, and recovery.

Taking all the aforementioned into account, it is evident that the impacts of weather-related natural disasters in African countries mean there is an urgent need for

a multifaceted and coordinated response in which both African governments and international partners play an important role. Failure to take proactive action risks perpetuating cycles of vulnerability and hindering progress towards sustainable development in the region. It is imperative that African governments, together with regional and international partners, prioritise disaster risk management and resilience and invest in building a more resilient and prosperous future – not only for the African region but for the entire world, as any impacts on the African continent will eventually have domino effects on global economic stability too.

The following chapter will investigate the occurrence of epidemics and outbreaks that frequently arise in the context of weather-related natural disasters. This will be followed by an examination of the interventions and strategic actions taken by African countries to enhance resilience to weather-related natural disasters, epidemics, and outbreaks. The aim is to mitigate the impact of the increasing frequency and cost of disasters on African economies.

International and humanitarian organisations can also offer vital support to the countries of Africa.

16. Kwame Adjei-Mantey, Frank Adusah-Poku, "Natural disasters and economic growth in Africa". Munich Personal RePEc Archive, 2019, accessed, https://mpra.ub.uni-muenchen.de/95588/4/MPRA_paper_95588.pdf

17. Muhiya Lukamba, "Natural disasters in African countries: what can we learn about them?". The Journal for Transdisciplinary Research in Southern Africa, 2010, accessed, https://www.researchgate.net/publication/48180314_Natural_disasters_in_African_countries_what_can_we_learn_about_them

18. Mounir Bari and Sebastein Dessus, "Adapting to Natural Disasters in Africa", International Finance Corporation, 2022, access, https://www.ifc.org/content/dam/ifc/doc/2023/working-paper-adapting-to-natural-disasters-in-africa.pdf

19. White et al., "Disaster risk reduction: a development concern: A scoping study on links between disaster risk reduction, poverty and development", UK Department of International Development, n.d, accessed, https://www.preventionweb.net/files/1070_drrscopingstudy.pdf

20. Alley Biniarz, "How Natural Disasters Disproportionately Affect Vulnerable Communities", Environment 911, 2021, accessed, https://www.environment911.org/How-Natural-Disasters-Disproportionately-Affect-Vulnerable-Communities

21. World Bank, "Gender Dynamics of Disaster Risk and Resilience", 2021, accessed, https://www.worldbank.org/en/topic/disasterriskmanagement/publication/gender-dynamics-of-disaster-risk-and-resilience

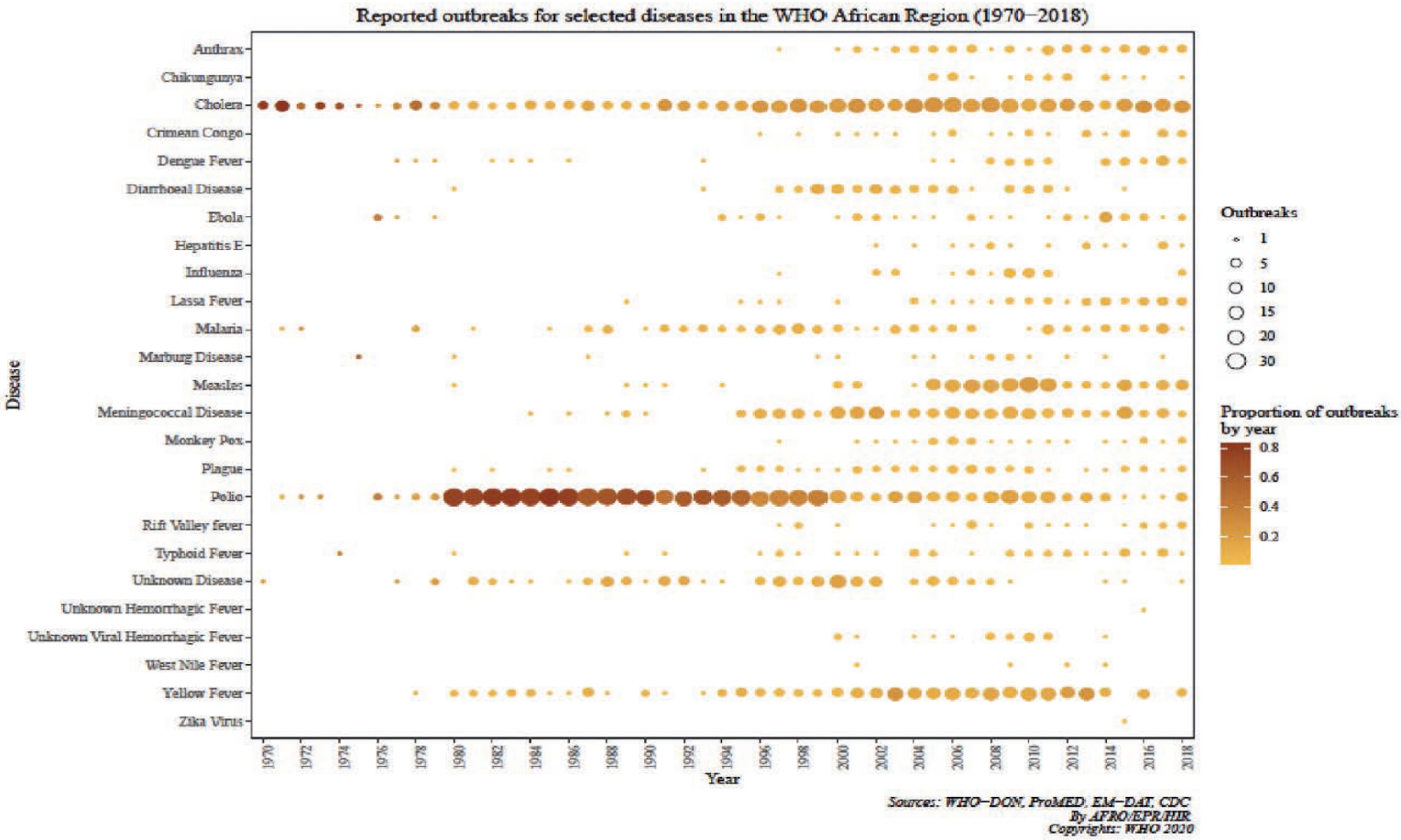
Brief Overview of Disease Outbreaks and Epidemics

According to the World Health Organization, between 2001 and 2022, Africa reported 1,843 substantiated public health events. Often, these emergencies – which can be triggered by outbreaks of infectious diseases like Ebola, cholera, measles, yellow fever, meningitis, COVID-19 and monkeypox – severely impact vulnerable populations, strain fragile healthcare systems, disrupt essential health services, and threaten economies. There has been a sharp increase in zoonotic pathogen outbreaks such as monkeypox and Ebola viruses across the continent. From 2012 to 2022, zoonotic disease outbreaks in the region rose by 63% compared to 2001-2011.[22] Data from WHO and Centers for Disease Control and Prevention (CDC) shows that between 1976 and 2019, a total of 34 Ebola Virus Disease (EVD) outbreaks have resulted in 34,356 cases and caused 14,823 deaths in 11 Sub-Saharan African countries.[23]

According to the World Health Organization (WHO), approximately 60% of human infectious diseases and about 75% of emerging infectious diseases are zoonotic in origin. These statistics highlight the significant role animals play in transmitting diseases to humans. Zoonotic diseases can be transmitted through direct contact with animals, contaminated food or water consumption, or via vectors such as mosquitoes and ticks.[24]

Further historical analysis of 25 selected outbreaks (and epidemics) by the WHO, as seen in Figure 11, demonstrates a cyclical or a mixed trend of outbreak incidences across the African region – comprised of 47 countries under the purview of the WHO Regional office for Africa, examined between 1970 and 2018. About 45% of the countries experienced at least one outbreak annually from 2016 to 2018. The primary data source for reported outbreaks was WHO, contributing 56.47% of the collected data. Additional data sources included the Emergency Events Database (EM-DAT), which supplied 23.94% of

Figure 11: Reported outbreaks of selected 25 diseases in the WHO African Region from 1970 to 2018



the collected data; the Program for Monitoring Emerging Diseases (ProMed), which contributed 15.05% of the data; and the US Centers for Disease Control and Prevention website, providing 1.40% of the data. The top five epidemics were cholera, measles, viral haemorrhagic diseases, malaria, and meningitis. The examination focused on analysing the spatial and temporal distribution of these outbreaks.[25]

In Figure 11, circle sizes reflect the number of disease outbreaks between 1970 and 2018 for the WHO Africa region. One of the significant findings is the dominance of cholera and poliomyelitis as the most frequently reported outbreaks over the years (also shown in Table 1). These diseases exhibit both the highest numbers of outbreaks and the largest proportions relative to the total reported cases. Yellow fever outbreaks, while consistent, have a comparatively smaller impact. Other diseases overshadow yellow fever in terms of frequency and severity. Several studied diseases present intermittent outbreaks. These include: malaria (since 1986), plague (since 1994), meningococcal disease (since 1995), anthrax (since 1999) and chikungunya (since 2005). Other frequently reported outbreaks have occurred in the case of dengue fever, diarrhoeal diseases, Ebola virus disease (EVD), and Lassa fever.

Cholera, measles, EVD and malaria remain the leading drivers of overall morbidity and mortality in Africa. EVD has historically occurred more sporadically during the 1970–2018 period, but with a

22. "In Africa, 63% jump in diseases spread from animals to people seen in last decade", World Health Organisation Africa, 2022, accessed, https://www.afro.who.int/news/africa-63-jump-diseases-spread-animals-people-seen-last-decade

23. Rugarabamu et al., "Forty-two years of responding to Ebola virus outbreaks in Sub-Saharan Africa: a review", 2022, accessed, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7061886/pdf/bmjgh-2019-001955.pdf

24. "Zoonotic disea se: emerging public health threats in the Region", World Health Organisation, n.d, https://www.emro.who.int/about-who/rc61/zoonotic-diseases.html

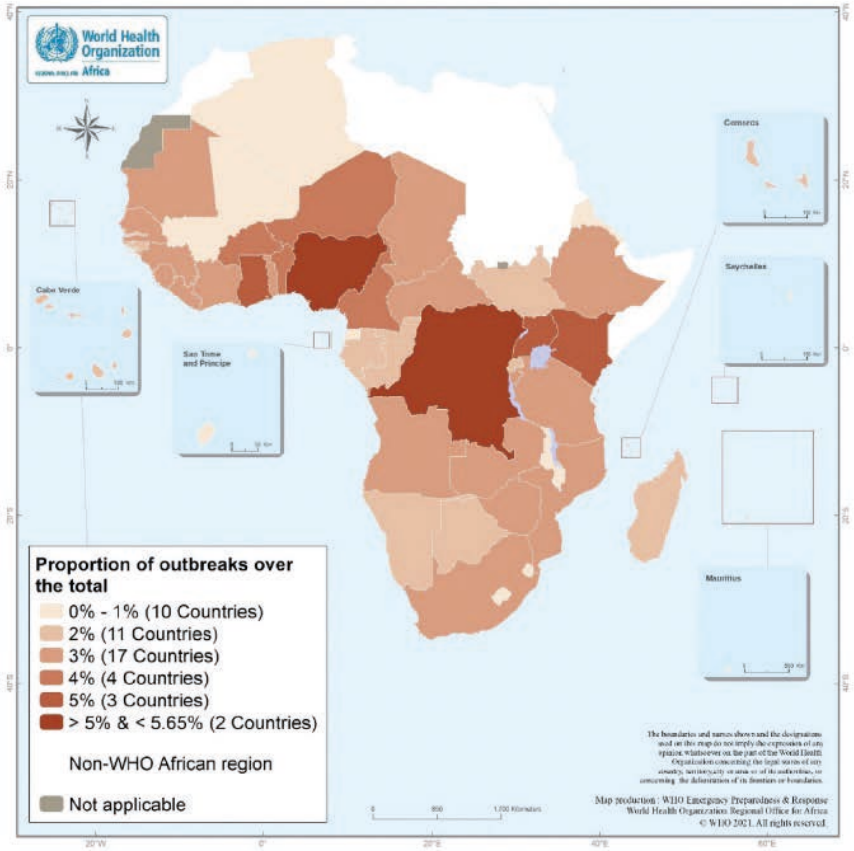
25. Ngom et al., "Five decades of infectious diseases outbreaks in the African region (1970-2018) a geographic snapshot", Social Sciences & Humanities Open, 2023, accessed,https://www.sciencedirect.com/science/article/pii/S2590291123002309

more acute public health impact in a shorter time-frame. "Considering the recent outbreaks in DRC and West Africa (2018–2021), EVD is also a good example of deadly disease outbreaks that are becoming more frequent in the region," note the authors of the report.

There were sporadic meningitis disease outbreaks from 1984 to 1995. Since then, cases of outbreaks have been constant. An increase in the number of reported outbreaks is observed for the periods 2002, 2008, 2010, and for the year 2015. Thirty-one (31) countries reported meningococcal disease outbreaks. These include Niger, Burkina Faso, and Benin, which reported the highest number of meningococcal disease outbreaks (14 for each country), closely followed by Ghana and Chad, with 13 outbreaks each. Chad is the only country that reported two outbreaks during the same year (2008).

Meningitis, Ebola and Marburg are diseases that ARC covers through its parametric insurance

Figure 12: Total outbreaks of 25 selected diseases in the WHO African Region from 1970 to 2018[26]



The climate crisis is a health crisis

Experts argue that there is a growing link between climate change and the high prevalence of infectious diseases such as Ebola and meningitis in Africa. Research indicates that over half of all infectious diseases are made worse by climate change. This is according to a 2022 review published in Nature Climate Change which shows that of 375 infectious diseases studied, 218 (58%) were worsened by climate change.[27]

"The climate crisis is a health crisis," according to WHO Director-General Dr Tedros Ghebreyesus. "Climate change is already impacting health in many ways, through more frequent and extreme weather events, more disease outbreaks, and more mental health issues," he notes.[28]

Climate change is reshaping the landscape of infectious diseases, particularly in regions like Africa where warmer temperatures facilitate the expansion of mosquito populations and other disease-carrying insects and animals. "Warmer temperatures help disease-carrying insects such as mosquitoes to breed faster, and flood waters provide new breeding grounds," elaborates Robert Agyarko, the lead adviser on outbreaks and epidemics at ARC.

A study looking at the connection between climate change and Ebola outbreaks found that climate change may affect the ecology and behaviour of bats, which act as reservoir hosts for the Ebola virus. It can lead to changes in bats' migration patterns, potentially leading to more Ebola outbreaks over time. Similarly, food insecurity as a result of floods, droughts and other climate-related natural disasters can modify human behaviour by prompting more people to look for alternative food sources such as bushmeat. Infections can occur while hunting or consuming bushmeat.[29]

Agyarko argues that the increasing frequency of extreme weather events such as droughts and floods heightens the risk of zoonotic infections, including vector-borne, and water-borne disease outbreaks. This growing threat challenges African public health systems and underscores the necessity of incorporating climate considerations into disease prevention and management strategies.[30]

While countries in the Global South contribute less than 10% of greenhouse gas emissions, they are likely to suffer the largest health impacts from climate change, according to a report on climate change and epidemics released by WHO, Ministry of Health Mozambique and the Centre of Epidemic Response and Innovation (CERI). "Not only are these countries more at risk of climate disasters and harm, but they also have less adaptive capacity and preparedness to respond to these threats, making them highly vulnerable," say the authors of the report.[31]

Table 1: Number of Disease Outbreaks (1976-2018)

Selected diseases	Number of outbreaks	Reporting period
Poliomyelitis	752	1971–2018
Cholera	479	1970–2018
Yellow fever	240	1978–2018
Unknown disease	115	1970–2018
Malaria	94	1971–2018
Diarrhoeal disease	60	1980–2018
Anthrax	58	1997–2018
Plague	52	1980–2018
Ebola	45	1976–2018
Lassa fever	43	1989–2018
Dengue fever	39	1977–2018
Typhoid fever	37	1977–2018

Selected diseases	Number of outbreaks	Reporting period
Crimean-Congo haemorrhagic fever	28	1996–2018
Monkey pox	27	1997–2018
Influenza	26	1997–2018
Rift Valley fever	24	1997–2018
Chikungunya	21	2005–2018
Unknown viral haemorrhagic fever	20	2000–2018
Marburg disease	16	1975–2018
West Nile fever	4	2001–2018
Unknown haemorrhagic fever	1	2017–2018
Zika virus	1	2015

programme for outbreaks and epidemics. There were no reported Marburg outbreaks between 1988 and 1998, but cases picked up at the turn of the new millennium, intensifying between 2006 and 2018.

Figure 12 shows the distribution of outbreaks per country during the 1970 to 2018 period. The highest number of reported outbreaks appeared in DRC, with 144 outbreaks representing 5.35% of all outbreaks in the region. DRC was followed by Nigeria with 134 reported outbreaks (4.98%), Uganda with 106 (3.94%), Kenya with 105 (3.90%), and Ghana with 101 (3.75%). Algeria (10 outbreaks), Mauritius (7), Seychelles (6), Lesotho (5), Equatorial Guinea (5) and São Tomé and Príncipe (3) reported the lowest number of outbreaks during the period of the study. Interestingly, the spread of outbreaks in Figure 12 is similar to the spread of weather-related natural disasters in the continent.

DRC and Nigeria consistently grapple with disease outbreaks and their track record reveals a high frequency of health emergencies. The two countries should therefore be prioritised for public health actions. These nations exhibit concentrated outbreak hot spots and the same areas typically witness repeated health crises. There's also the population risk; given both countries have optimistic demographic projections, this puts a significantly high number of people at risk.

26. Proportion is a percentage for each country, calculated using the total number of outbreaks per country against the total number of outbreaks in the region for the selected period.

27. Mora et al, "Over half of known human pathogenic diseases can be aggravated by climate change", Nature Climate Change, 2022, accessed, https://www.nature.com/articles/s41558-022-01426-1

28. "Donors making a difference: Climate change and its impact on health", World Health Organisation, 2022, accessed https://www.who.int/news-room/feature-stories/detail/donors-making-a-difference--climate-change-and-its-impact-on-health#:~:text=He%20explained%20that%20bats%20and,into%20closer%20contact%20with%20humansnb

29. Kassie, Roger and Bourgarel, "Climate Change and Ebola Outbreaks: Are they connected?", Conference paper - French Agricultural Research Centre for International Development, 2015, accessed, https://www.researchgate.net/publication/279849982_Climate_Change_and_Ebola_Outbreaks_Are_they_connected#:~:text=Human%20contamination%20by%20Ebola%20virus,and%20by%20influencing%20their%20movements

30 Robert Agyarko, "Africa's climate-health crisis needs swift and decisive action", Devex, 2023, accessed, https://www.devex.com/news/opinion-africa-s-climate-health-crisis-needs-swift-and-decisive-action-106801

31. CLIMADE Consortium, "Summary for Policymakers: COP28. In: Climate Change and Epide accessed, https://climade.health/wp-content/uploads/2023/11/CLIMADE_COP28Report.pdf

Chapter 4

Response Mechanisms to Weather-Related Disaster Events and Disease Outbreaks

The complex interplay between climate change and economic vulnerabilities poses a serious challenge for disaster risk management (DRM) in Africa. To build resilience and ensure sustainable development, risk reduction and adaptation must be mainstreamed into development planning. The African Union (AU) leads the way in integrating disaster risk reduction and climate change adaptation into development planning across the continent.

The AU's DRM efforts follow the Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR), which was endorsed by 187 member states at the 3rd UN World Conference for Disaster Risk Reduction (WCDRR) in March 2015 in Sendai, Japan. The Plan of Action (PoA) is the AU's strategic plan for implementing the Sendai Framework in Africa. It guides and directs actions by all at the continental, regional, national and sub-national/local levels in Africa to prevent and reduce the risk of disasters for resilience in line with the Sendai Framework.

The ARC response: Towards resilience building

In 2012, the African Risk Capacity (ARC) Agency was founded as a Specialised Agency of the African Union to help the member states to better plan, prepare and respond to climate-related disasters and disease outbreaks. ARC Insurance Company Limited (ARC Ltd), the financial affiliate of the Group, was founded in 2014 to provide risk transfer services by interacting with the insurance market. The Group's value proposition brings together four critical elements of preparedness for member states: capacity building, early warning, risk pooling and risk transfer.

The ARC product portfolio

ARC has been working to provide a diversified product offering developed to meet the specific demands of AU member states. Efforts to continuously improve existing products and add new ones to enable a customised offering are ongoing. The organisation now boasts a product portfolio that responds to the most common threats in Africa, with solutions for drought, tropical cyclone, flood and Outbreaks and Epidemics, as well as Micro and Meso insurance (see Table 2 overleaf).

Table 2: The ARC product portfolio

Product	Details
Agricultural Drought	• Launched in 2014 • The ARC Drought product is its flagship product • The Drought Index uses the Africa RiskView, ARC's early warning tool. • Africa RiskView uses the Water Requirements Satisfaction Index (WRSI) – an operational Crop Model originally developed by the United Nations Food and Agriculture Organization and used widely by many early warning institutions • The WRSI is used as a meaningful indicator of how a shortage of rainfall may impact crop yields and the availability of pasture
Rangeland Drought	• Launched in 2020 • Designed for pastoralists in ARC member states • Also managed through the Africa RiskView
Anticipatory Drought product	• Launched in 2023 ,in collaboration with the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) • The insurance pays out earlier than the traditional product • Piloted in Malawi and Zambia
Tropical Cyclone Model	• Launched in 2020 • Designed for the South West Indian Ocean (SWIO) countries (Madagascar, Mozambique, and Comoros) • The model estimates damage related to the hazards of winds and storm surges • The TC Model is based on a stochastic database generated from historical events over 1500 years using storm tracks and intensity produced by the US Joint Typhoon Warning Centre • Combines characteristics of cyclone events hazard with exposure and vulnerability data to model the population affected and the economic losses
Flood Model	• Currently, the work to include excess rainfall-induced flooding as one of the hazards in the tropical cyclone model is underway • Launched in 2023 • Model based on global streamflow forecasts to monitor daily 10-day forecast • Enables monitoring of daily flood extents and depth • Information used to model inundation characteristics (flood extent and flood depth) and estimated impacts of flood (people affected and economic losses) • In the initial phase, the model was designed for six countries - Malawi, Mozambique, Madagascar, Ghana, Togo, and Côte d'Ivoire • Work underway to incorporate product improvement feedback from the technical review and expand the Flood Model's coverage to an additional ten countries
Outbreaks and Epidemics	• Launched in 2022 • Born in the wake of the devastating 2014-2016 West African Ebola crisis on request by member states and African Ministers of Finance • The objective of this product is to support countries to respond faster to such catastrophes • Senegal being the first country to take up a policy for Filovirus (Ebola and Marburg virus diseases) and Meningitis • Work underway to expand solution to other countries
Non-sovereign insurance	• Covers smallholder farmers • Offering is growing steadily and will be expanded to include other produce

Working with member states: The ARC programme

The ARC capacity building programme is designed to prepare African governments for effective disaster risk management through the introduction of tools and processes that enhance a multidisciplinary response by governments. The objective of the programme is to prepare governments to manage disaster events and enable them to make informed decisions regarding transferring the country's weather risks to ARC.

Summary of the ARC mechanism

By signing a Memorandum of Understanding with the ARC, governments commit to the ARC capacity building programme. Through this programme, experts from key government departments organised into a Technical Working Group (TWG) undergo training and have to complete milestones in risk modelling, contingency planning and risk transfer – all critical to understanding parametric insurance and enabling the country to make informed decisions on insurance uptake.

The final product of the in-country training and customisation process is a country risk profile that quantifies the impact and frequency of natural hazards faced by the country in the past and the likely impact of future events based on current exposure and vulnerability. The risk profile enables the country to determine the relevance and appropriateness of using various risk management tools to manage the risk of the specific hazard. It is also used as a basis for risk transfer to insurance markets through ARC Ltd if the country decides to adopt such a risk management strategy. The customised risk profile within the ARC risk modelling platform, Africa RiskView, also enables the ARC member states to monitor a given agricultural season, thus providing an early warning function.

Contingency planning: In order to take out insurance from ARC Ltd, a country must develop a contingency plan outlining the use of any ARC Ltd insurance payout in case of a disaster. With advisory support from ARC, the country develops an operations plan that will guide response in the event of a disaster. ARC works with in-country technical experts in emergency response and social protection to explore existing contingency funding mechanisms and response activities to complement an ARC payout towards the scaling-up of existing social protection programmes. These plans must go through independent reviews by experts in contingency planning and humanitarian response, as well as the Peer Review Committee of the ARC Board, to assess their feasibility before the ARC Governing Board approves them.

According to Papazoumana Diarra, Head of Contingency Planning at ARC, the contingency planning process plays an instrumental role in enhancing member states' ability to anticipate disasters and respond to them in a timely and efficient manner. "The goal is to ensure an early and fast response so that a disaster does not escalate into a crisis where communities are forced to migrate or sell productive assets to cope."

The contingency planning process at ARC involves two steps: these are the Operations Plan and the Final Implementation Plan (FIP) as follows:

- **Operations Plan:** Developed before the start of the insurance season, this plan identifies the optimal use of funds from an ARC pay-out and is typically informed by the member state's existing national risk management structure and the needs of potential beneficiaries. It ensures that communities get back to normal as fast as possible after a disaster strikes. The operations plan also allows governments to make evidence-based decisions, with a clear understanding of the financial resources available to them in case of a disaster, and the types of post-disaster activities required to save lives and livelihoods.
- **Final Implementation Plan (FIP):** Submitted by the government when a pay-out is imminent, the FIP outlines in greater detail how the ARC pay-out will be deployed based on the specific circumstances of the disaster and in line with the commitments made in the operations plan. It ensures that necessary help is delivered to communities in need in a timely fashion.

Both plans are developed collaboratively with national governments and in-country experts who form part of a Technical Working Group that is spearheaded by ARC. This alignment and collaborative spirit between ARC and member states ensures effective disaster risk management and helps save lives and protect livelihoods.

Diarra notes that, when preparing the operations plans, the technical working groups not only select early response activities that offer immediate relief, but also those that can enhance the resilience of affected communities after the initial wave of assistance. "We're equally keen on early recovery after a disaster, so we focus on interventions that can help beneficiaries in the affected communities get back to their normal lives as soon as possible."

Crucially, ARC ensures that it monitors and evaluates outcomes after a payout is made. "This is done to see if the operational plan was properly implemented and to uncover important learnings to improve disaster risk management systems," notes Diarra. In this regard, ARC's capacity building work with governments is guided by two key principles: the gradual development of government capacity and fostering government ownership of planning and response.

"The goal is to ensure an early and fast response so that a disaster does not escalate into a crisis where communities are forced to migrate or sell their assets to cope."

Africa RiskView: ARC's Early Warning System tool for anticipating and responding to climate risks

Early Warning Systems (EWS) play a crucial role in managing and reducing the risks associated with natural disasters. These systems monitor and predict hazards such as floods and droughts, aiming to reduce the risks associated with them. Leveraging established communication networks, effective EWS give people the knowledge and skills they need to prepare and vital warning time to protect themselves when a disaster is forecast. By acting before a hazard hits, the impact of disasters can be reduced, and most crucially, lives can be saved. Despite EWS being a significant factor in disaster risk reduction, only 40% of Africa is currently covered by such systems, and even those are compromised by quality issues.

Africa RiskView, ARC's technical engine, allows for the monitoring of seasons and the estimation of the impact of disaster events in terms of numbers of people affected and the associated response costs. It uses satellite-based rainfall data and other information to estimate the number of people affected by droughts and other disasters, and the resources needed to assist them. These estimates are used to determine the premiums and payouts of ARC's insurance policies.

According to Biniam Tadesse, ARC's Acting Research and Development Director, one of the key advantages of the Africa RiskView is that the model is customisable and adaptable to each country's unique context: "The model is adaptable to the context of each country that we work with. When we go to a specific country, we take in-country data, and work with experts from different government ministries and agencies through a Technical Working Group."

ARC's Africa RiskView is related to other early warning systems in Africa in several ways. It uses data from other early warning systems such as the Famine Early Warning Systems Network (FEWS NET), the Integrated Food Security Phase Classification (IPC), and the Global Information and Early Warning System (GIEWS), to validate and calibrate its estimates. It also complements other early warning systems by providing information on the potential number of people affected and the associated response costs, which can help governments and humanitarian actors plan and budget for interventions.

Tadesse explains that Africa RiskView puts control and ownership of the disaster risk management process squarely in the hands of African governments. "We use the model for countries to access a sovereign insurance product. It is only when the countries agree that the model is satisfactory that we proceed to the next step in terms of availing insurance cover."

According to Tadesse, some of the benefits that African countries can derive from utilising the Africa RiskView software include:

- **Timeliness:** Africa RiskView allows for the early detection and prediction of disaster events, and triggers payouts within two to four weeks of an event, enabling a faster and more predictable response.
- **Accuracy:** Africa RiskView uses reliable and objective data and methods to estimate the impact of disaster events, reducing uncertainty and disputes.
- **Transparency:** Africa RiskView provides clear and consistent information and communication on disaster risks and response costs, enhancing trust and accountability among stakeholders.
- **Innovation:** Africa RiskView supports the development and implementation of innovative financing mechanisms, such as insurance and contingency funds, that leverage the power of risk pooling and risk transfer.

In terms of the challenges faced in scaling up Africa RiskView, Tadesse notes that more funding is needed to sustain the pace of innovation in view of how rapidly climate risks are evolving and compounding on the continent. While the model is fairly accurate, he notes that ARC continues to explore options to improve the quality of data. Ongoing partnerships between ARC and research institutions and universities around the world have been critical in addressing some of these challenges experienced, he notes.

Beyond supporting ARC, Africa RiskView has broader applications. It can help target early food security assessments in specific geographic areas, assist with contingency planning and emergency preparedness, and improve understanding of the drivers and causes of food insecurity. Additionally, it guides planning and investment decisions aimed at enhancing agricultural productivity or market development while supporting micro-insurance programmes.

In an interview with Ibrahima Cheikh Diong, Director General of ARC, the discussion revolved around the quality of data in early warning systems and what is lacking in the African context.

Diong explained: "If you look at, for example, droughts, we get our data from third parties, and If there are any data errors, we suffer the consequences because we don't control what they give us and the reliability of what they give us.

"It would be ideal to have an Africa data innovation centre where African research institutions can combine with global institutions to build a platform where data is actually captured, monitored and updated, so that we can provide reliable data.

"Credible data is so critical to decision-making and must be mainstreamed. The second challenge is technology. How do we make sure that despite the challenges of technological infrastructure on the continent, relevant ministries and stakeholders have access to the right technologies to make their work more efficient? They must have access to data with a click of a button, and modelling systems to support response."

Disaster risk transfer through ARC Ltd.

ARC Ltd., the insurance affiliate of the ARC Group, carries out commercial insurance functions of risk pooling and risk transfer in accordance with national regulations for parametric weather insurance in Bermuda (where it is located until such time that an equally favourable legal and regulatory regime exists in an AU member state). By transferring the burden of natural disaster risks away from governments and their populations, ARC Ltd. facilitates a more deliberated response approach to disasters. The organisation provides parametric insurance services to AU member states and farmer organisations, employing innovative financing mechanisms to pool disaster-related risk across Africa and transfer it to international risk markets. In so doing, ARC Ltd. helps reduce the financial impact on economically vulnerable nations, improves the continent's response to climate-related disasters and contributes to resilience building and, ultimately, to food security.

Parametric insurance uses satellite data (Early Warning Systems) to predict and estimate the impact of a disaster beforehand. It determines the compensation (in the form of an insurance payout) when a disaster happens. Unlike traditional insurance, which depends on detailed assessments and claims processing, parametric insurance offers immediate emergency relief. A payout is triggered after a disaster event based on predefined parameters such as rainfall levels. This speedy response enables affected countries to access funds quickly for recovery and relief efforts, which are implemented in accordance with the contingency and response plan developed by the Technical Working Group ahead of an agricultural season.

"Credible data is so critical to decision-making and must be mainstreamed."

The historical performance of ARC Ltd.'s parametric insurance premium income and payouts to insured member countries, correlates with natural disaster trends in the last decade. This performance history provides a pragmatic view of ARC Ltd.'s role and Africa's response to climate-change-induced events.

Figures 13 and 14 reveal that African countries are increasingly focused on reducing the risk of disasters in their respective economies. ARC Ltd. has seen significant growth in its 10-year premium income, from under $17 million in 2014 to $56.8 million in 2023. During the same period, the insured value has risen from $129 million to $186 million. Notably, a large proportion of risk cover is for droughts. Despite facing

affordability challenges, the number of insured countries has increased from four in 2014 to thirteen in 2022, and further jumped to twenty-four countries in 2023. One of the key contributors to this growth has been the increased funding of country premiums by donor organisations or through the Replica programme. These organisations contributed about 43% of the premiums in 2022, which decreased to around 29% in 2023.

The increase in premium income suggests that more countries are joining the risk pools to manage disaster risks by including premium costs in their budget allocations, rather than relying on aid assistance only. This could be due to the benefits observed by countries that have received payouts and utilised ARC's risk management capacity-building tools.

There were more payouts in the 2021/22 period compared to other seasons. ARC Ltd.'s 2022 Annual Report details the disbursement of $60 million for 14 payouts – the highest amount ever paid in a single year. The payouts were as follows: (i) Malawi received $14.2 million for drought; (ii) Zambia received $5.3 million for drought; (iii) Mauritania received $1.14 million for drought; (iv) Mali received $7.1 million for drought; (v) Madagascar received $797,049 for drought and $10.7 million for tropical cyclones.

Since 2014, ARC has paid out more than $125 million, but this figure is set to increase in the coming years due to the addition of new products to cover floods and outbreaks and epidemics. Malawi is an example of the value of such coverage. The country spent $13 million on disaster management expenditure in 2023, but had it not obtained insurance for drought, it would have had to raise debt or other sources of funding for its response and recovery expenditure that year. This would have negatively affected its economy.

Figure 13: ARC LTD. 10-Year Annual Premium Income and Payouts

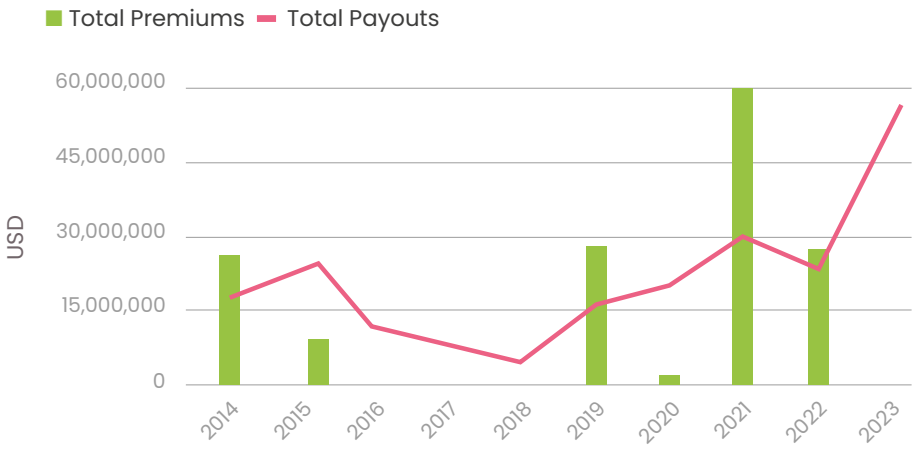
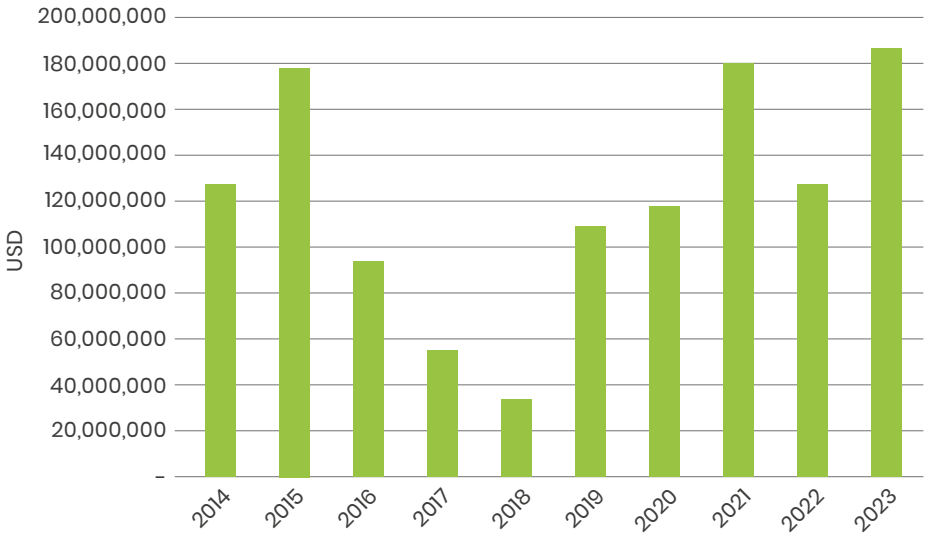


Figure 14: Total Insured Value



Replica programme: scaling up protection with the help of development partners

The humanitarian sector plays a critical role in disaster risk management and financing. Recognising this, ARC has been expanding the Replica programme to bring more development partners on board and benefit more countries. The programme offers a unique opportunity for humanitarian agencies to procure an insurance policy on behalf of a country. By matching the policies of African countries, humanitarian actors can also receive payouts in the event of a disaster and use these to complement governments' response plans. Through the Replica programme, not only can more people benefit from timely and predictable funds but more lives and livelihoods can be saved.

Having humanitarian partners on board also increases the scale of interventions in-country. Present partners of the Replica programme are the United Nations World Food Programme (WFP), START Network and the UN Refugee Agency, UNHCR.

Since its launch, the Replica programme has demonstrated its value in enhancing Africa's resilience to climate shocks by increasing the value of cover in countries.

Demystifying parametric insurance

Parametric (or index-based) insurance solutions are a type of insurance that covers the probability of a predefined event happening instead of indemnifying actual loss incurred. The insurance cover is triggered if pre-defined event parameters are met or exceeded, measured by an objective parameter or index.

Parametric insurance is different from traditional insurance, which pays out based on the actual losses incurred. Traditional insurance requires a loss assessment and investigation, which can take time and result in disputes. Parametric insurance, on the other hand, can offer faster and more predictable payouts, as the trigger event can be easily verified by data from trusted sources such as weather stations or satellites.

Parametric insurance typically covers risks that are hard to model or insure by traditional means, such as natural catastrophes, weather events, market indices, crop yield, or power outages. These risks can have devastating impacts on individuals, businesses, and communities, but they are often difficult to quantify or predict.

Some notable differences between parametric and traditional insurance solutions include those shown in Table 3.

The global parametric insurance market was valued at $12.2 billion in 2022, according to Allied Market Research, and is projected to reach $29.1 billion by 2032.[32] This represents a compounded annual growth rate (CAGR) of 9.2% from 2022 to 2032 – signalling the growing interest in parametric insurance solutions.

Lesley Ndlovu, ARC Ltd. CEO, confirms this interest. "ARC Ltd. has emerged as the largest and most dominant parametric insurance player in Africa. The work that we are doing is cutting edge and we are reaching tens of millions of people," he says. "Although there has been a growing interest from the international community in disaster risk insurance, the challenge in Africa is to make it more accessible and mainstream. This trend is shifting as governments intensify their efforts to manage the impact of climate change," he continued.

He gives the example of Madagascar, which set the pace as an early adopter. It was the first African country to take up ARC Ltd.'s parametric tropical cyclone insurance, and after the devastating Tropical Cyclone Batsirai in 2022, ARC Ltd. paid a claim of $10.7 million.

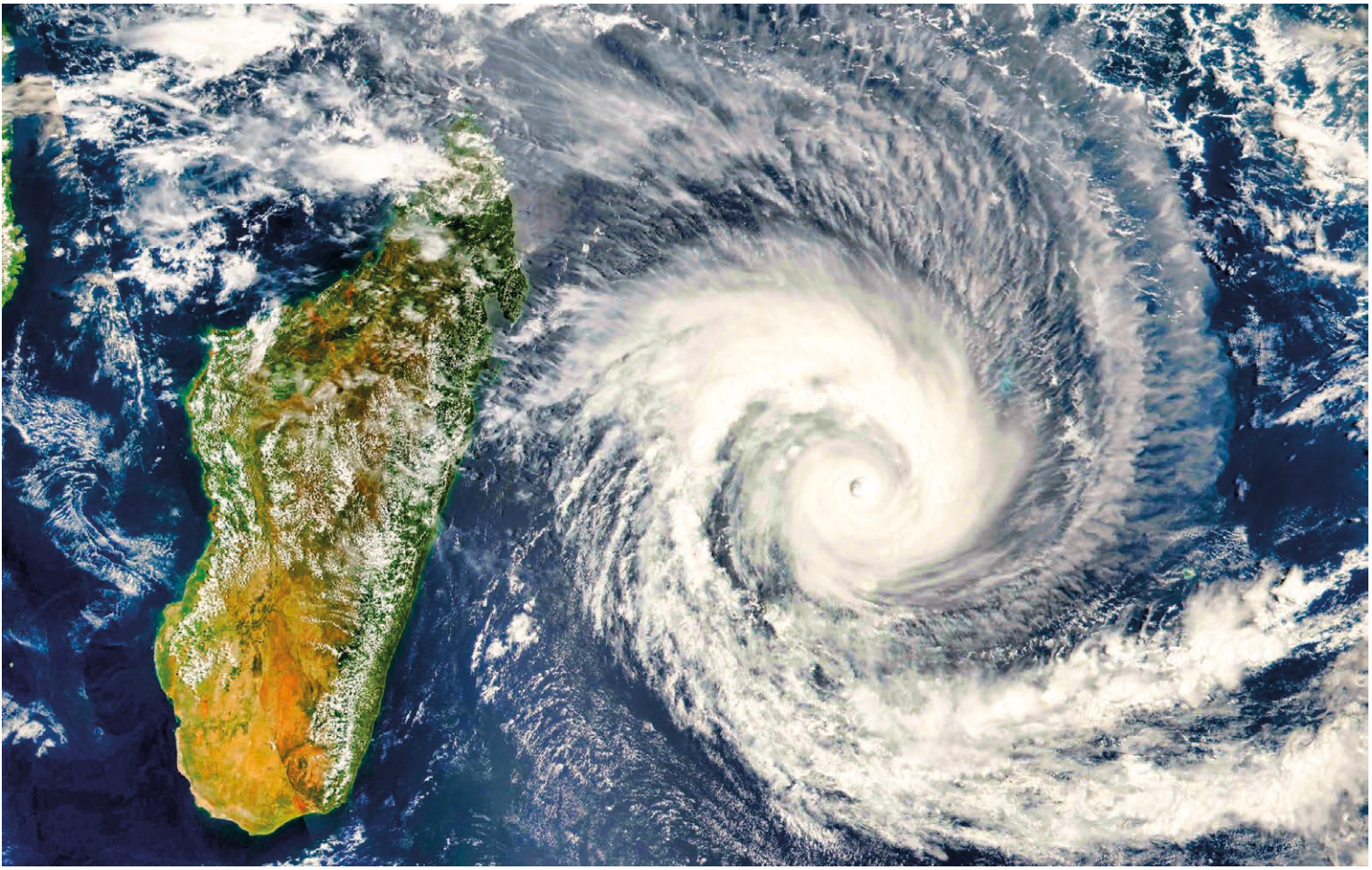
"Madagascar's foresight saved countless lives as it was able to use the funds to direct emergency aid quickly and efficiently to the most critical areas," says Ndlovu.

Madagascar had previously signed up for drought cover, and in July 2020, following a payout, early interventions included nutritional support for 2,000 children under five and water supply for 84,000 households. Following the failure of the 2021/2022 agricultural season, the Government of Malawi

Table 3: Differences between parametric insurance and traditional insurance solutions

	Traditional insurance	Parametric solutions
Trigger	Loss or damage to physical asset	Event occurrence exceeding parametric threshold
Recovery	Reimbursement of actual loss	Pre-arranged payment structure
Claims process	Complex, based on loss adjustments, can be slow	Transparent, based on index, quick settlement in a few days or weeks
Term	Usually annual; some multi-year	Single or multi-year; up to 5 years
Structure	Standard product and contract wordings; some customisation	Customised product with high flexibility

Source: Swiss Re Institute



Parametric insurance can offer faster and more predictable payouts, as the trigger event can be easily verified by data from trusted sources such as weather stations or satellites.

received a payout of $14.2 million to help the country recover from the impact of drought. With a total payout of close to $25 million for just two claims, Madagascar and Malawi are proof of concept.

Ndlovu advises: "Insurance is not the only solution and complements other efforts very well. Countries that face the risk of drought should also be investing in irrigation systems to reduce the impact of rainfall deficits. Similarly, investments in better drainage systems and seawalls to address the impact of flooding are necessary to reduce some of the risk of this threat. In this regard, the role of insurance is to cover the risks that cannot be addressed by investment in adaptation."

32. Parametric Insurance market size, Data Horizon Research, accessed, https://datahorizzonresearch.com/parametric-insurance-market-2549

Advancing gender mainstreaming in disaster risk management

Gender mainstreaming is a priority for ARC, and this section outlines the concrete steps taken to achieve equality within ARC programmes. Despite progress, cultural and societal factors continue to perpetuate gender inequalities. The text sheds light on these persistent challenges.

Gender mainstreaming in disaster risk management (DRM) is a strategic approach that ensures gender perspectives are integrated into all aspects of DRM policies, programmes, and practices. It recognises that disasters have gender dimensions and that addressing underlying gender inequalities is essential for effective risk reduction.

Gender mainstreaming is crucial in the African context because it enables a gender-sensitive culture of insurance as well as other DRM financing mechanisms, including social protection programmes. ARC has chosen to adopt a mainstreaming approach to ensure that gender issues are systematically integrated into its operations. This includes building the capacity of partners to integrate gender in DRM processes by supporting member states in conducting targeted gender analyses using ARC's gender audit methodology. Recommendations and priority actions proposed in the audit report are taken into consideration during Africa RiskView customisation and contingency planning processes. Additionally, ARC engages in sustained policy dialogue and advocacy for a gender-sensitive culture of insurance and other DRM financing mechanisms.

According to Boroto Ntakobajira, Gender Expert at ARC, sustained advocacy is needed to achieve gender mainstreaming because some of the challenges stem from the underlying social and cultural forces at play in some parts of the continent. He notes that societal norms can impact women's ability to respond to natural disasters in a timely and appropriate manner. "If we talk about flooding, where people need to swim to safety for example, you find that in many of our communities, swimming is not a skill that women are encouraged to learn. In some regions, women's clothing limits their ability to move."

Ntakobajira also offers the example of some women not being allowed to leave the house without a male companion or getting only limited access to mobile phones, radios and other forms of modern communication. These factors can lead to delays in women getting access to information on imminent natural disasters, cutting them off from life-saving early warning systems. It can also limit access to much-needed financial assistance, particularly with the advent of mobile money in many parts of the continent.

Despite the challenges, Ntakobajira says there are signs of progress as community leaders, including traditional chiefs and religious figures at the grassroots, are increasingly open to new ideas, largely because of training. ARC also benefits from global partnerships to promote gender mainstreaming, and in this regard, it has partnership agreements with organisations such as UN Women, FAO and the International Finance Corporation.

The African Union's Agenda 2063 affirms that climate-resilient communities and economies are a key element of the continental vision for an integrated, prosperous and peaceful Africa.

Africa's response: Africa 2063 and the UN's SDG agenda

The African Union's Agenda 2063 affirms that climate-resilient communities and economies are a key element of the continental vision for an integrated, prosperous and peaceful Africa, driven by its own citizens, representing a dynamic force in the international arena. The African Union Climate Change and Resilient Development Strategy and Action Plan (2022-2032) supports the achievement of this vision by establishing principles, priorities and action areas for enhanced climate cooperation and long-term, climate-resilient development.

The African Union has urged its member states to prioritise adaptation and resilience strategies in response to the climate crisis, highlighting the potential benefits of these actions for carbon storage and emissions reduction. "Adaptation and disaster risk reduction could include reforesting hill slopes to prevent landslides from increased rains, revegetating riverine areas to prevent silt and flooding or wetland restoration to act as carbon sinks and to absorb floodwaters. These adaptation solutions present significant opportunities for carbon storage and avoided emissions, as well as ecosystem protection and

restoration," states the African Union Climate Change and Resilient Development Strategy and Action Plan, 2022-2023.

Countries with substantial to comprehensive early warning system coverage have one-eighth the disaster mortality of those with limited or no coverage.

To address this gap, the UN Secretary-General launched a global initiative called Early Warnings for All in November 2022 at the COP27 meeting in Sharm El-Sheikh. The initiative aims to ensure that everyone on Earth is protected by early warnings by 2027.

The benefits of investing in EWS are significant. The UN notes that EWS investments deliver a return of more than tenfold. Just 24 hours' notice of an impending hazardous event can cut the ensuing damage by 30%. Similarly, the Global Commission on Adaptation found that spending just $800 million on such systems in developing countries would avoid losses of $3 to $16 billion per year.

To achieve this goal, UN Secretary-General António Guterres convened an Advisory Panel which includes leaders from UN agencies, multilateral development banks, humanitarian organisations, civil society, insurance companies, and IT companies. Their aim is to inject more political, technological, and financial clout to ensure that Early Warnings for All becomes a reality everywhere. Coordinated action will initially focus on 30 particularly at-risk countries, including small island developing states and least developed countries.

The initiative emphasises a multi-hazard approach, addressing several hazards that may occur alone or simultaneously. As climate change leads to more frequent and extreme weather events, investment in early warning systems targeting multiple hazards is more urgent than ever.

In recent years, Africa has effectively linked early warning systems to anticipatory action, allowing early intervention before or soon after the initial shock. This approach saves lives, protects assets, and preserves dignity.

To further enhance early warning capabilities in Africa, the Africa Multi-Hazard Early Warning and Early Action System (AMHEWAS), an innovative programme developed by the African Union Commission (AUC) with the support of the United Nations Development Programme (UNDP) and other development partners was established. The framework provides comprehensive guidance for implementing early warnings and action on natural hazards and also interfaces with systems monitoring conflict, health disasters, and observatories for other man-made hazards. It aims to enhance the continent's capacity to anticipate, prepare for, and respond to climate and disaster risks, by providing reliable and comprehensive information and financing, and is a significant step towards achieving the goals of the Sendai Framework for Disaster Risk Reduction 2015-2030. The framework provides comprehensive and strategic guidance for a seven-year programme to implement early warnings and early action on natural hazards, with interfaces to systems monitoring conflict, health disasters, and observatories for other man-made hazards.

The AMHEWAS framework consists of four pillars: (i) Data and Information; (ii) Analysis and Forecasting; (iii) Early Warning and Communication and (iv): Early Action and Financing. It has the potential to make a significant impact on the resilience and development of Africa, by reducing the human and economic losses caused by climate and disaster risks, and by enhancing the effectiveness and efficiency of emergency response.

Chapter 5

The Disaster Risk Management Ecosystem in Africa: Trends and Outlook

This chapter highlights the collaborative approach that the African Risk Capacity (ARC) has adopted in executing its mandate, working closely with donor partners and development banks to facilitate member states' access to premium financing. The voices of experts in disaster risk management, including Ibrahima Cheikh Diong, ARC Group Director General and Leslie Ndlovu, the CEO of ARC Ltd, resonate throughout these pages. Diong emphasises the need for African governments to assume greater responsibility for disaster risk management and to include parametric insurance in their budgets. The section concludes with an excerpt from an insightful Q&A interview featuring Diong. He articulates his vision for disaster risk management in Africa and underscores the pivotal role of ARC and its stakeholders in turning that vision into reality.

The collective responsibility to tackle climate-induced disasters

The African Risk Capacity (ARC) recognises that effective disaster risk management in Africa demands collective effort. Successfully navigating the complexities that come with anticipating and responding to natural disasters amid the escalating impacts of climate change in Africa is not a solo act – many stakeholders are involved in different stages of the process. Among the key players collaborating with ARC in this critical arena are a constellation of stakeholders spanning international development agencies, multilateral lenders, financial and technical institutions, regional and national governments.

By engaging with these diverse stakeholders, ARC ensures a holistic approach to disaster risk management and financing, which contributes to the growth and development of the broader ecosystem on the continent. Let's broadly explore the main roles that major stakeholder group plays in driving ARC's mission forward:

- **International development organisations:** These organisations bring expertise, funding, and a global perspective. Their support is instrumental in enabling and shaping effective disaster risk reduction strategies.

- **Multilateral lenders and financial institutions:** Armed with risk assessment tools and financial acumen, these entities contribute to ARC's mission by ensuring that finance flows to where it is needed most and that countries can access sovereign risk insurance products that would otherwise be out of reach in terms of pricing. Their involvement bridges the gap between policy and practical implementation.

- **Local governments:** Grounded in the context and realities of their communities, local governments play a critical role. Their insights inform targeted interventions and ensure that disaster management efforts resonate at the grassroots level through well-structured contingency plans. Their involvement also ensures that, ultimately, disaster risk management is driven by African governments and African institutions for the full benefit of the most vulnerable populations.

In addition, ARC has a tiered membership structure that includes AU member states that have signed the ARC Establishment Treaty, as well as the UK's Foreign, Commonwealth & Development Office (FCDO) and Germany's Federal Ministry for Economic Cooperation and Development that have been pivotal capital contributors to ARC Ltd since inception. These availed $50 million and $48 million respectively as seed capital, provided through interest-free loans and repayable over 20 years.

The UK and Germany are also premium funding partners. Along with other development partners, they assist member states in procuring risk insurance coverage from ARC through subsidies and other premium financing tools. ARC's other premium funding partners include the African Development Bank, the UN World Food Programme, the Swiss Agency for Development and Cooperation, USAID, the International Fund for Agricultural Development, the Start Network, and France and Canada, which both participate through their respective agencies.

"Our mandate is to protect the most vulnerable people through our interventions, and we have to be innovative in ensuring that our programmes are available to all."

Many African countries face budgetary limitations, making it challenging to allocate substantial funds for disaster risk management and innovative finance tools like parametric insurance. According to Ibrahima Cheikh Diong, ARC Group Director General, governments in Africa are sometimes reluctant to pay a premium towards a risk that may or may not happen due to pressure from competing priorities – such as education and healthcare. That is why premium funding is key.

"Africa faces many competing needs, and governments have to make a decision to allocate resources to other important areas such as education, infrastructure development, healthcare, etc. So, it's extremely difficult to convince governments to anticipate something that may or may not happen," he says.

In its engagements with international development organisations, ARC has been actively advocating for increased premium funding as this will make policies more affordable for countries with vulnerable populations. "Our mandate is to protect the most vulnerable people through our interventions, and we have to be innovative in ensuring that our programmes are available to all. By engaging and bringing in partners to provide subsidies, we're at least able to make policies more affordable to countries."

Emphasising the role of partners, Ndlovu, CEO of ARC Ltd, says: "Development partners are key to the matrix of solutions in the insurance field. We work with development partners along three dimensions. The first one is that our insurance programmes are subsidised in one way or the other by development partners. This lowers the price point of insurance and means that more countries are able to participate. Our approach to smart premium subsidies is to ensure that they are multi-year, and they require a commitment by the country so that it's not entirely free money and we avoid the moral hazard that comes from that."

ARC also has a big programme with the African Development Bank that hosts the Multi-Donor Trust Fund. This is the primary vehicle through which ARC disperses insurance premium smart subsidies.

"The second avenue where we work with development partners is around the origination of products. Developing new products in the insurance market is extremely expensive so if there is a partner that's willing to pay for the development of the product, it

Developing new products in the insurance market is extremely expensive so if there is a partner that's willing to pay for the development of the product, it means that we can get to market much faster and create solutions that are relevant to the needs of the country.

means that we can get to market much faster and create solutions that are relevant to the needs of the country.

"The third arena is around the capitalisation of the insurance facility. As an insurance company, the amount of risk we can take is a function of how much capital we have. As we grow, we must retain more underwriting risk, making capital important."

As an illustration, the African Development Bank (AfDB) has established the Africa Disaster Risk Financing (ADRFi) programme in partnership with ARC to support regional member countries by covering their insurance premiums. ADRFi aims to make premium subsidies sustainable, enabling access to subsidy and concessional funding through the AfDB. Other international donors, including the UK's Foreign, Commonwealth & Development Office and the Swiss Agency for Development and Cooperation, also support ADRFi, which has benefitted several African countries, including The Gambia, Zimbabwe, Mauritania, Niger, Sudan, Madagascar and Malawi.

While addressing delegates at the launch of the African Climate Risk Insurance Facility for Adaptation during COP 28, Dr Akinwumi Adesina, President of the African Development Fund, noted that the facility has supported 15 countries with about $100 million to pay for their insurance premiums. This has protected 1.5 million people with sovereign risk insurance. "The African Risk Capacity has been the key partner on this for the African Development Bank and they are doing a great job. When droughts hit Malawi, it received a payout of $14 million to support farmers from the Africa Risk Capacity. When droughts and tropical cyclones hit Madagascar over three years, it received $15 million from African Risk Capacity to cover payouts for losses incurred by farmers," he noted.

Although ARC welcomes the financial support of donors and other development partners, its advocacy efforts are predominantly focused on persuading African governments to prioritise disaster risk financing and include their participation in the ARC programme within their budgets. In this regard, Ibrahima Cheikh Diong says: "We need to demonstrate to the rest of the world that we are at the forefront of Africa's disaster risk management, and when we get additional resources, we can actually direct them to where we need them the most."

"We invite the entire ecosystem to join hands and support the ARC Group in advancing the agenda of disaster finance and climate risk insurance on the continent."

Malte Marek, Senior Portfolio Manager at KfW, concurs with this view. He argues that, even though premium subsidies are available, ARC should "advocate for sovereigns to take charge of insuring themselves against disaster risk and building their capacity on the continent. It is crucial to continue supporting this idea rather than abandoning it."

Partners such as the African Development Bank have been playing a key role in helping ARC secure the political support of leaders and policymakers on the continent. "We invite the entire ecosystem to join hands and support the ARC Group in advancing the agenda of disaster finance and climate risk insurance on the continent. Our goal is to make this a well-understood reality, with comprehensive buy-in from political level to the grassroots level," remarks Donald Singue Sanko, who heads up the Africa Disaster Risk Financing Programme at the African Development Bank.

According to Linda Tiemoko, Head of Government Services for West and Central Africa at ARC, donor partners are key in building confidence in the brand. They help bring an added validation of what ARC does and the capacity ARC has to offer. "They are supporting ARC, funding ARC, and speaking about ARC. This has made it easier for us to engage governments constructively and increase coverage for the most vulnerable."

She notes that ARC's compelling track record with member states that qualify for payouts is its strongest selling point. "Trust is a very important factor. Governments look at who you are and what you've done. Our experience with other member states speaks loud and clear for us whenever we engage a new government."

As a pointer to its growing influence with African governments, ARC recently signed up new member states, bringing its membership to 39 countries. Diong contends that ARC is able to appeal to new countries because "we use evidence of impact when we engage new countries by showcasing the benefits of participating in the ARC programme. And that is stepping in the right direction. I think countries are embracing our own institutions through this evidence-based advocacy."

Koffi Konin, Head of Government Services for East and Southern Africa, is excited by the feverish pace at which ARC's membership has grown in the past five years, particularly in the region of Africa that he oversees. "When I joined ARC in 2017, our membership was largely concentrated in West Africa but today we have a large and growing base in East and Southern Africa, with many countries taking multiple policies at once." He believes that, even though there are many agencies independently working in disaster risk management and financing in Africa, the focus should be on collaboration and not competition.

Looking ahead, three factors are likely to fuel the continued growth of ARC and contribute to increased reach and impact.

Firstly, ARC enjoys strong and growing support from African governments. As a Specialised Agency of the African Union, ARC enjoys full support from the African Union Secretariat. This backing extends to political support, which opens doors within African governments and secures buy-in from decision-makers and senior officials. The increasing alignment of African governments with ARC's mission enhances its effectiveness and reach.

Secondly, there is increased recognition of the indispensable role played by Early Warning Systems (EWS) in saving lives. African countries are increasingly acknowledging the importance of utilising these systems to enhance preparedness and improve resilience. By investing in early warning mechanisms, nations can better respond to natural disasters and other crises, ultimately safeguarding their citizens. In this regard, Tiemoko notes that Africa RiskView is one of the most trusted early warning systems in the region. "It has undergone technical reviews and validations and is one of the most accurate and refined tools that you can find," she says.

Finally, ARC's innovative spirit – demonstrated by the recent introduction of new products such as the Outbreaks and Epidemics programme – will help it appeal to more governments looking to stay ahead of the curve and protect the most vulnerable from emerging threats.

Robert Agyarko, who leads the programme, is optimistic about its prospects and believes that more African governments will adopt a proactive approach to anticipating and responding to outbreaks. This shift in mindset is crucial, given the direct and indirect impact of infectious diseases on communities and the need to contain the indirect impact through early warning and early response.

When it comes to the 2014–2016 Ebola outbreak in West Africa, for example, he notes that there were over 11,000 deaths out of 28,000 infections. "The statistic that is often left out is that there were an additional more than 10,0000 deaths as a result of lack of access to treatment for HIV/AIDS, tuberculosis and malaria. So, you have the direct impact of the disease itself, then you have the secondary effects, because health systems are challenged, nurses and doctors are busy. The crisis was estimated to have cost more than $2 billion in lost GDP for affected countries."

Agyarko argues that being able to draw policymakers' attention to the indirect impacts of epidemics should fuel more interest in the product.

Agyarko argues that being able to draw policymakers' attention to the indirect impacts of epidemics should fuel more interest in the product. "We are looking at the number of countries beyond Senegal. We have a project with the Gates Foundation exploring expansion of the product to other countries, and much progress has been made towards building the capacities of select countries in the ECOWAS region."

"Through the ARC programme, we are transferring skills and empowering member states to do the work themselves, thereby ensuring sustainable capabilities in the long run."

In an interview, Diong (*left*), the Director General, shared his views on the future partnership with African governments in constructing climate-resilient economies. When asked if there has been any improvement in governments' disaster response compared to four years ago, he provided this perspective:

"I've seen different changes in the right direction. One of the things I've noticed quite often at the AU Summit is that Heads of States of countries that benefit from ARC are our biggest advocates. I've seen the presidents of Malawi, Senegal, Zambia take the floor at the AU Summit and confirm the benefits of ARC in their respective countries. They have advocated for the empowerment of Africa's own development institutions and the need to give them more resources, more visibility and more support. Recently, we also welcomed four new member states - Ethiopia, Cameroon, Cape Verde, and South Sudan.

"There is also increasing collaboration between the Ministers of Finance and other technical ministries, confirming the value addition of mobilising additional resources to support the response to disasters - and that is also a step in the right direction.

"Another key development that I see has been the evolution of the ARC Technical Working Groups comprised of different players in disaster management to carry out technical workstreams of the ARC programme (risk profiling, customisation and contingency planning, etc.). The Technical Working Groups have grown and can be functional, even in the absence of ARC.

"Through the ARC programme, we are transferring skills and empowering member states to do the work themselves, thereby ensuring sustainable capabilities in the long run. It is our goal to ensure that governments increasingly take a proactive approach to disaster risk management in the face of a growing climate crisis."

Conclusion

This white paper has assessed the current impact of weather-related natural disasters on Africa, highlighted responses by various organisations to them, and outlined ARC's efforts to strengthen resilience to such crises across the continent. While individual extreme events cannot be directly attributed to climate change, the overall trend of increasing frequency and severity aligns with the expected impacts of a changing climate.

Climate change is a global rather than African challenge, but it will have a greater impact on Africa than on any other region. ARC estimates that there are about 700 million Africans whose lives and livelihoods are threatened by the increasing frequency and severity of weather-related natural disasters. Failing to adequately address the growing impact of disasters will exact a huge social, human and economic toll, undermining progress towards sustainable development on the continent.

While African governments are urged to take the lead in promoting disaster risk management approaches that take into account the impact of climate change on the continent, there's a shared duty to collectively address disasters as a global community. This is especially pertinent given the diverse array of stakeholders actively engaged in disaster risk management in Africa. Consequently, ARC aims to foster cooperation among African states and act as a channel for funding from the global community to support African initiatives. This includes enhancing south-south collaboration and securing partner funding for parametric insurance.

Coordinating various stakeholders

Global support from multinational development banks and other international organisations is needed to help the continent that's most vulnerable to catastrophic natural disasters. International development organisations can bring funding and global expertise, while multilateral financial institutions have the financial acumen and tested risk assessment tools that can be leveraged to enable African governments to access sophisticated risk insurance products that may otherwise be too expensive.

At the national level, climate adaptation and resilience-building strategies need to be built into national development agendas. Private sector investment in

climate-resilient infrastructure must also be encouraged through policy frameworks, tax incentives and public-private partnerships. Additionally, African governments need to make use of the technology and the financial structures that exist to take greater responsibility for disaster risk management by promoting the adoption and use of early warning systems, and by including parametric insurance in their budgets.

Finally, funding community-based disaster risk reduction initiatives can empower local populations to actively participate in disaster preparedness and response efforts, reducing the human and economic toll of weather disasters on the ground. Some sections of the population are likely to be more severely affected by disasters than others, including women, children, the elderly, people living with disabilities, agricultural workers and those employed in the informal sector. Special attention needs to be paid to these groups to mitigate the disproportionate impact of disasters on them.

Driving up early warning adoption

In the short term, ARC aims to double coverage to 80% of the continent, while using as much local data and as many local experts as possible to produce local solutions to local challenges. While global and continental initiatives are important, local knowledge is vital in providing tailored solutions that correspond to the situation on the ground. Early warning system (EWS) data is currently supplied by non-African organisations, but in the long term, ARC is advocating for the creation of an African data centre with the support of global IT companies that can provide the most accurate and comprehensive data.

Governments often hesitate to secure insurance against climate-related disasters due to competing demands on their scarce fiscal resources. However, ARC is actively encouraging African nations to consider such policies due to the benefits they offer. These include cost reductions through risk pooling, strategic partnerships, and expedited payouts.

ARC Ltd's insurance programmes are subsidised in various ways by development partners on a multi-year basis. As major seed funders of ARC, the UK and Germany help African governments secure risk insurance coverage from ARC Ltd through subsidies and other premium financing tools. Development partners also provide technical support in developing new insurance products.

To ensure that the ARC Ltd payout is used effectively, ARC requires participating governments to prepare a contingency document outlining how funds from the insurance payouts will be utilised to protect the most vulnerable populations if the insured risk were triggered.

Parametric insurance, which is promoted and offered by ARC through its subsidiary ARC Ltd stands out as an ideal solution for nations highly vulnerable to natural disasters. Its adoption is on the rise among African, Asian, and Latin American countries. The market is witnessing an expansion with more platforms and products being marketed or licensed to established insurers for parametric solutions. The spectrum of risks covered continues to broaden, and insurers are incorporating parametric insurance into their broader risk management strategies to bolster protection. Customisation of policies is becoming more feasible, while some insurers are leveraging sophisticated data analytics and blockchain technology to refine trigger mechanisms and improve risk assessment processes.

Tackling growing threats

As climate change intensifies, the frequency and severity of disasters is likely to increase, putting more strain on ARC's capital base and leading to a likely increase in the price of premiums. However, this pressure on premiums should be partly offset by greater diversification in the ARC's product portfolio and expansion of its member-base. Increasing the number of countries and risks covered should also create economies of scale and lower costs for individual countries. Moreover, ARC recognises that insurance should not replace adaptation efforts but complement them, with for example more irrigation needed to cope with increasingly erratic rainfall and more seawalls needed to counter flood risks.

ARC is on a mission to build disaster risk management capacity while covering as many weather-related disaster risks, and epidemics as possible across all African Union member states. Given the success of parametric insurance to date in providing rapid funding to cushion victims of drought, ARC is keen to extend it into other areas. The 2014-16 Ebola outbreak prompted ARC to look to provide policies against epidemics. The crisis was estimated to have cost more than US$2 billion in lost GDP for the countries affected and caused 11,000 deaths from Ebola, plus another 10,000 as a result of lack of access to treatment for HIV/AIDS, tuberculosis and malaria.

The Outbreaks and Epidemics (O&E) programme was launched by ARC in December 2022, covering African governments against outbreaks of cholera, Lassa fever and Meningococcal meningitis. In the case of confirmed epidemics, ARC processes payouts to the participating government within two or three days. These payouts help governments fund measures to prevent diseases from spreading within the affected country and beyond its borders, limiting the impact to neighbouring states.

Outlook

ARC's approach combines early warning systems, contingency planning, and insurance mechanisms to build resilience and enhance preparations across Africa, replacing the previous

reactive approach of responding after a natural disaster like a drought or flood has already hit. ARC's strategy demonstrates that Africa is at the forefront of dealing with disaster risk management and that it uses financial resources effectively when they are made available. This should help secure increased support from donor governments, humanitarian groups and international financial organisations.

ARC's membership was originally concentrated in West Africa but now includes countries in other regions, with Ethiopia, Cameroon, Cape Verde and South Sudan the most recent new members. This

The Outbreaks and Epidemics (O&E) product was launched by the ARC Group in December 2022 covering African governments against outbreaks and epidemics of Ebola, Marburg and Meningitis.

underlines the growing awareness in Africa about the different benefits of its capacity building and parametric insurance offering. ARC's continued growth will be fuelled by strong and growing support from African governments and increased recognition of the role played by Africa RiskView and other EWS in enhancing preparedness and improving resilience to safeguard citizens. The launch of new products to cover a wider set of risks should also continue to strengthen its appeal among African governments and development partners actively working to advance effective disaster risk reduction strategies in Africa.

References

African Development Bank Group	"Climate Change in Africa", 2019, accessed, https://www.afdb.org/en/cop25/climate-change-africa
Adjei-Mantey, Kwame and Adusah-Poku, Frank	"Natural disasters and economic growth in Africa", Munich Personal RePEc Archive, 2019, accessed, https://mpra.ub.uni-muenchen.de/95588/4/MPRA_paper_95588.pdf
Agyarko, Robert	"Africa's climate-health crisis needs swift and decisive action", Devex, 2023, accessed, https://www.devex.com/news/opinion-africa-s-climate-health-crisis-needs-swift-and-decisive-action-106801
Bari, Mounir and Dessus, Sebastien	"Adapting to Natural Disasters in Africa", International Finance Corporation, 2022, access, https://www.ifc.org/content/dam/ifc/doc/2023/working-paper-adapting-to-natural-disasters-in-africa.pdf
Biniarz, Alley	"How Natural Disasters Disproportionately Affect Vulnerable Communities", Environment 911, 2021, accessed, https://www.environment911.org/How-Natural-Disasters-Disproportionately-Affect-Vulnerable-Communities
Carey, Tara	"Cyclone Freddy has put Women & Girls in Malawi at Greater Risk of Sexual Abuse & Exploitation", Relief Web, 2023, accessed https://reliefweb.int/report/malawi/cyclone-freddy-has-put-women-girls-malawi-greater-risk-sexual-abuse-exploitation
CLIMADE Consortium	"Summary for Policymakers: COP28." In: Climate Change and Epidemics 2023. CLIMADE Consortium report, 2023, accessed, https://climade.health/wp-content/uploads/2023/11/CLIMADE_COP28Report.pdf
International Union for Conservation of Nature	"Disaster and Gender Statistics". n.d, https://www.unisdr.org/files/48152_disasterandgenderstatistics.pdf
Lukamba, Muhiya	"Natural disasters in African countries: what can we learn about them?". *The Journal for Transdisciplinary Research in Southern Africa*, 2010, accessed, https://www.researchgate.net/publication/48180314_Natural_disasters_in_African_countries_what_can_we_learn_about_them
Kassie, Daouda, Bourgarel, Mathieu and Roger, François	"Climate Change and Ebola Outbreaks: Are they connected?", Conference paper - French Agricultural Research Centre for International Development, 2015, accessed, https://www.researchgate.net/publication/279849982_Climate_Change_and_Ebola_Outbreaks_Are_they_connected
Mora, Camilo et al.	"Over half of known human pathogenic diseases can be aggravated by climate change", *Nature Climate Change*, 2022, accessed, https://www.nature.com/articles/s41558-022-01426-1
Munich Re	"Record thunderstorms losses and deadly earthquakes: the natural disasters of 2023", 2024, accessed, https://www.munichre.com/en/company/media-relations/media-information-and-corporate-news/media-information/2024/natural-disaster-figures-2023.html
Rugarabamu, Sima et al.	"Forty-two years of responding to Ebola virus outbreaks in Sub-Saharan Africa: a review", *BMJ Global Health*, 2022, accessed, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7061886/pdf/bmjgh-2019-001955.pdf
White, Philip et al.	"Disaster risk reduction: a development concern: A scoping study on links between disaster risk reduction, poverty and development", UK Department of International Development, n.d, accessed, https://www.preventionweb.net/files/1070_drrscopingstudy.pdf
World Health Organization	"Donors making a difference: Climate change and its impact on health", 2022, accessed, https://www.who.int/news-room/feature-stories/detail/donors-making-a-difference--climate-change-and-its-impact-on-health
World Bank	"Gender Dynamics of Disaster Risk and Resilience", 2021, accessed, https://www.worldbank.org/en/topic/disasterriskmanagement/publication/gender-dynamics-of-disaster-risk-and-resilience
World Health Organization, Africa	"In Africa, 63% jump in diseases spread from animals to people seen in last decade", 2022, accessed, https://www.afro.who.int/news/africa-63-jump-diseases-spread-animals-people-seen-last-decade
World Bank	"Joint World Bank, EU, UN Report Assesses Damages Caused by Catastrophic Flooding in Libya", 2024, accessed, https://www.worldbank.org/en/news/press-release/2024/01/24/joint-world-bank-eu-un-report-assesses-damages-caused-by-catastrophic-flooding-in-libya
World Bank	"World Bank Mobilizes $150 Million to Help Mozambique Recover from Cyclone Freddy", 2023, accessed, https://www.worldbank.org/en/news/press-release/2023/05/24/world-bank-mobilizes-150-million-to-help-afe-mozambique-recover-from-cyclone-freddy
World Meteorological Organisation	"Africa suffered disproportionately from climate change", 2023, accessed, https://wmo.int/media/news/africa-suffers-disproportionately-from-climate-change
UN Office for Disaster Risk Reduction	"Early warnings for all of Africa", 2022, accessed, https://www.undrr.org/news/early-warnings-all-africa "Gender and Natural Disasters", 2001, accessed, https://www.eird.org/deslizamientos/pdf/eng/doc13972/doc13972.pdf
United Nations Women	"Accelerating action for gender responsive disaster risk reduction", 2023, accessed, https://www.unwomen.org/en/news-stories/feature-story/2023/06/accelerating-action-for-gender-responsive-disaster-risk-reduction

Annexures A and B

WEATHER-RELATED NATURAL DISASTERS BY COUNTRY IN 2023 (A); and NATURAL DISASTER CASE STUDIES BY COUNTRY (B)

Available on request from ARC.

Appendices

Appendix 1: Breakdown of the 29 African Countries' Government Expenditure / Budget Allocations in Key Sectors

Country	Weather-Related Disaster Expenditure / Budget Allocation (2023) (US$ million)	Weather-Related Disaster Expenditure / Budget Allocation (% of GDP) (2023) (US$ million)	Per Capita Weather-Related Disaster Expenditure / Budget Allocation (2023) (US$ million)	Notes
Algeria[A]	57.5	0.03%	1.24	According to data the Algerian government paid out $57.5 million on average in 2023.
Angola[A]	50.0	0.06%	1.32	In 2023 only, it was estimated that the government spent $50 million to address the impacts of climate-related natural disasters that occurred in the country. The average annual loss from such natural disasters is estimated to be $100 million per sector (e.g., for agriculture, housing etc.).
Burundi[B]	324.0	9.59%	23.84	Following the deadly floods in 2023, the government of Burundi pledged to allocate $324 million to construct dikes for containment of river overflows. This amount did not include cover for the other damage caused by natural disasters in the year, such as to property and infrastructure. Burundi's Humanitarian Response Plan in 2023 estimated $194 million as being needed to respond to the humanitarian emergency caused by weather disasters.
Cameroon	N/A	N/A	N/A	No data is publicly available regarding government expenditure on 2023 disasters.
Central African Republic[B]	N/A (see Notes column)	N/A	N/A	While no data is publicly available regarding government expenditure on 2023 disasters, according to IOM, CAR required $36 million to finance its humanitarian response budget, which also covers climate-related natural disasters. (Other data provided are as of 2022.)
Democratic Republic of the Congo[B]	N/A (see Notes column)	N/A	N/A	The only information publicly available highlights that the government spent $300k on emergency relief for victims of the May 2023 floods.
Congo, Rep[A]	8.3	N/A	1.33	In addition to the $8.3 million, the government alongside humanitarian agencies developed a response plan with a budget of $26 million. It remains unclear what percentage of the $26 million was covered by the government.
Ethiopia[B]	150.0	0.14%	1.16	In 2023, Ethiopia allocated $150 million for its National Disaster Risk Management Commission (NDRMC), tasked with handling the government's emergency responses to disasters.
Gabon[B]	0.9	0.01%	0.36	In 2023, the government of Gabon allocated a budget for disaster prevention and management totalling $866,696 (XAF 527.5 million).
Ghana[A]	14.4	0.02%	0.41	Based on available information, the government of Ghana had to earmark at least $14.4 million (GHS172 million) in total for emergency relief and reconstruction, just for the October floods. According to the United Nations Office for Disaster Risk Reduction (UNDRR), Ghana suffers an annual economic loss of $200 million due to floods and droughts.
Guinea[B]	30.7	0.22%	2.11	$30.7 million refers to the budget that was allocated by the government to the Ministry of Environment and Sustainable Development, whose mandate includes weather-disaster preparation, reduction and response.

Country	Weather-Related Disaster Expenditure / Budget Allocation (2023) (US$ million)	Weather-Related Disaster Expenditure / Budget Allocation (% of GDP) (2023) (US$ million)	Per Capita Weather-Related Disaster Expenditure / Budget Allocation (2023) (US$ million)	Notes
Kenya[A]	69.8	0.07%	1.24	In addition to the government's contribution ($69.8 million), international humanitarian partners launched the Kenya Drought Response Plan 2023. The Plan raised $361.5 million (80% of the targeted $451.8 million) to provide assistance in health, education, food security, nutrition, shelter, WASH etc, to the population severely affected by the drought.
Libya[A]	525.0	0.95%	75.39	According to available information, the government of Libya (GNU) spent $525 million on emergency relief and reconstruction after Storm Daniel while an additional $2 billion was budgeted from the Government of National Stability.
Madagascar[B]	N/A (see Notes column)	N/A	N/A	Madagascar faces cyclonic activity nearly every year, resulting in an average annual direct loss of $87 million. While publicly available data does not reveal the specifics of government fund allocation for tropical cyclones, the country has invested by paying insurance premiums of $3.5 million (with the AfDB's support) to mitigate the impact of these recurring natural disasters. In May 2023, the government of Madagascar received $1.2 million in an insurance payout from African Risk Capacity (ARC).
Malawi[A]	13.0	0.11%	0.61	The Malawian government dedicated $1.5 million to recovery efforts following Tropical Cyclone Freddy in 2023. Government expenditure, however, on environmental and climate change disaster management averages on an annual basis around $13 million.
Mauritania[B]	8.0	0.10%	1.60	While the specific data on government expenditure related to the 2023 flooding in Mauritania is not available, research reveals that in the government's 2023 budgetary plans, $8 million (MUR343,747,917) was allocated to the Ministry of Environment and Sustainability, which is responsible for covering the costs of all natural disasters.
Mauritius[B]	81.0	0.61%	62.21	While data regarding the government's expenditure on the 2023 weather disaster is not available, presumably because the costs are not significant, information from the 2023 annual budgetary plans reveals that the Mauritius government earmarked $81 million (MUR3.8 billion) for the National Flood Management Programme, aimed at implementing an efficient drainage system in identified flood-prone areas.
Mozambique[B]	80.0	0.41%	2.29	While no data is available with regards to the government's total spending on weather-related natural disasters in 2023, available information suggests that the government mobilised $80 million to address the impacts of Cyclone Freddy while the World Bank mobilised an additional $450 million in total to address the impacts and invest in climate-resilient infrastructure.
Namibia[B]	14.1	0.12%		While data on the government's spending to address the 2023 natural disasters is not available, the Namibian government distributed around $3.76 million (N$72 million) in relief assistance to its flood-affected communities. Another $46.62 million (N$892.4 million) was planned to be used in a drought relief programme effective from 2023 to 2024, although the National Emergency Disaster Fund had a shortfall and turned out to have only $10.45 million (N$200 million) available for the programme. This implies that a total expenditure of $14.21 million was allocated to the impacts of the 2023 weather disasters.
Niger[B]	0.7	0.005%	0.02	While data on the expenditure of the Niger government on climate-related disasters in 2023 could not be readily accessed, the government's projected expenditure on disaster management for 2023 was about $716,000.
Nigeria[B]	351.0	0.07%	1.53	Nigeria's federal government in 2023 allocated $321 million (N462 billion) to the Ecological Fund, which is responsible for responding to natural disasters in the country. In addition, $60 million was allocated to the Ministry of Environment, of which $30.4 million was earmarked for erosion and flood control. Therefore, total allocation by the federal government in 2023 was $351.4 million.
Rwanda[A]	100.0	0.77%	6.94	The government of Rwanda estimated $415 million as total recovery costs for this disaster, including costs for rebuilding public infrastructure. However, the government was only able to commit approximately $100 million.
Sierra Leone[B]	0.7	0.01%	0.08	In 2023, the government of Sierra Leone allocated approximately $658,000 (SLL15 million) to the National Disaster Management Agency with $18,000 (SLL 10 million) earmarked for the National Emergency Relief Fund.
Somalia[B]	1.0	0.01%	0.05	While there is no information available regarding the government's spending on weather-induced disasters in 2023, the country's national mid-year budgetary plan for the year indicates that the government's actual allocation to the Somali Disaster and Humanitarian Management Agency was $1.48 million (as of June 2023), despite the initial allocation of $5.31 million.
South Africa[B]	226.3	0.06%	3.71	In 2023, the South African government allocated approximately $226.3 million to natural disaster relief.

Country	Weather-Related Disaster Expenditure / Budget Allocation (2023) (US$ million)	Weather-Related Disaster Expenditure / Budget Allocation (% of GDP) (2023) (US$ million)	Per Capita Weather-Related Disaster Expenditure / Budget Allocation (2023) (US$ million)	Notes
United Republic of Tanzania[B]	N/A (see Notes column)	N/A	N/A	While there is no data on how much the government spent to address the impacts of the 2023 disaster events and there is no consistency in the government's annual spending, according to estimates from 2000-2019, the government of Tanzania spends approximately $1.08 million on an annual basis to respond to weather-related disasters.
Uganda[A]	10.5	0.02%	0.21	In 2023, the government of Uganda spent at least $10.45 million in response to natural disasters. This sum was the government's contribution to the national El-Nino response plan. The UN's FAO estimates the annual cost of flooding in Uganda at about $62 million.
Zambia[B]	100.0	0.38%	4.73	According to GIZ estimates, the average government expenditure on weather-related disasters including droughts, floods and damage to crops in Zambia is around $100 million.
Zimbabwe[B]	7.3	0.03%	0.43	While there is no information available regarding the government's spending on weather-induced disasters in 2023, in the 2022 national budget, the government allocated $7.3 million (ZWL 825 million) to disaster risk management.
Total	**2224**	**0.58%**	**8.26**	

'A' refers to actual expenditure, and 'B' refers to budgeted expenditure.

Algeria – https://www.atlas-mag.net/en/category/pays/algerie/natural-catastrophes-the-algerian-state-pays-out-1725-million-usd-in-compensation

Angola – http://www.indiaenvironmentportal.org.in/files/file/Angola%20Country%20Climate%20and%20Development%20Report.pdf

Burundi – https://reliefweb.int/report/burundi/burundi-besoins-et-plan-de-reponse-humanitaire-2023-mars-2023

Congo – https://reliefweb.int/report/congo/floods-republic-congo-congo-brazzaville-public-health-situation-analysis-phsa-date-06-february-2024

Ethiopia – https://www.undrr.org/media/77152/download?startDownload=true

Gabon – https://www.dgbfip.com/public/uploads/documentation/Rapport/LOI%20de%20FINANCE%202024.pdf

Ghana – https://www.preventionweb.net/news/ghana-loses-us-200-million-annually-due-floods-and-droughts

Guinea – https://mbudget.gov.gn/wp-content/uploads/LFI-2023.pdf

Kenya – https://www.unocha.org/publications/report/kenya/kenya-drought-response-dashboard-january-june-2023

Libya – https://www.bbc.co.uk/news/live/world-africa-66691046/page/6

Madagascar – https://www.gfdrr.org/sites/default/files/madagascar.pdf

Malawi – https://www.finance.gov.mw/index.php/our-documents/budget-statements

Mauritania – https://www.elibrary.imf.org/view/journals/002/2023/444/article-A001-en.xml

Mauritius – https://mof.govmu.org/Documents/budget2022_23/2022_23budgetspeech_english.pdf

Mozambique – https://360mozambique.com/business/infrastructures/cyclone-freddy-government-announces-80m-for-infrastructure-rehabilitation/

Namibia – https://economist.com.na/77183/community-and-culture/n72-million-relief-assistance-for-flood-affected-victims/

Niger – http://www.finances.gouv.ne/index.php/budget-1/rapports-annuels-de-performance-rap-2/dppd-2023-2025/file/897-ministere-de-l-action-humanitaire-et-de-la-gestion-des-catastrophes?start=15

Nigeria – https://www.icirnigeria.org/fg-budgets-n43-7bn-for-erosion-and-flood-control-plans-to-mitigate-effects-in-2023/

Rwanda – https://www.minecofin.gov.rw/news-detail/frw-51858-billion-needed-to-recover-from-impact-of-recent-floods-and-landslides

Sierra Leone – https://mofsl.gov.sl/wp-content/uploads/2022/11/Fiscal-Year-2023-Budget-for-Sierra-Leone..pdf

Somalia – https://reliefweb.int/report/somalia/somalia-humanitarian-fund-allocation-dashboard-20-june-2023

South Africa – https://www.treasury.gov.za/documents/national%20budget/2023/ene/FullENE.pdf

Tanzania – https://eprints.whiterose.ac.uk/172603/7/What%20Do%20Weather%20Disasters%20Cost%20An%20Analysis%20of%20Weather%20Impacts%20in%20Tanzania.pdf

Uganda – https://www.youtube.com/watch?v=fpmm_6FH5ug

Zambia – https://www.unicef.org/esa/media/12571/file/UNICEF-Zambia-Budget-Brief-Health-2023.pdf

Zimbabwe – https://zimcodd.org/wp-content/uploads/2022/02/ZIMCODD-Weekly-Review-01.02.2022.pdf

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