SIERRA LEONE

Crisis and Disaster Risk Finance Diagnostic

Disaster Risk Financing & Insurance Program

SUPPORTED BY WORLD BANK GROUP

Global Risk Financing Facility

Supporting Early Action to Climate Shocks, Disasters, and Crises

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Abbreviations

ARC	African Risk Capacity
CAT-DDO	Catastrophe Deferred Drawdown Option
CERC	Contingent Emergency Response Component
DALA	Damage and Loss Assessment
DFID	Department for International Development (UK)
DMD	Disaster Management Department
DRF	Disaster Risk Financing
EM-DAT	Emergency Events Database
EWS	Early Warning Systems
GDP	Gross Domestic Product
GoSL	Government of Sierra Leone
IDA	International Development Association
MDA	Ministries, Departments, and Agencies
MDTF	Multi-donor Trust Fund
NDMA	National Disaster Management Agency
non-EIR	Non-extractive Industries Revenue
NPDRR	National Platform for Disaster Risk Reduction
NSSG	National Strategic Situation Group
ONS	Office of National Security
SLICOM	Sierra Leone Insurance Commission
SOP	Standard Operating Procedure

Executive Summary

Sierra Leone remains vulnerable to the financial impacts from a variety of disaster-related shocks and crises, including large annual floods, epidemics like Ebola, and man-made hazards such as severe fires.

As a country, Sierra Leone is very reliant on ex post assistance for response and recovery. For instance, in the aftermath of the Ebola outbreak, over US$700 million was received in financial assistance from development and humanitarian partners. Whether in the aftermath of regular flood events or large flood and landslide events such as those in 2017, the country remains dependent on aid from international partners. But despite regular donor inflows for disaster response, Sierra Leone remains without a robust system for tracking use of donor funds. Given this long-standing support from donors, the lack of well-developed systems for response, and the vast competing development challenges that must be managed with a fiscally constrained budget, Sierra Leone's shift toward proactive financial planning will take time.

Sierra Leone has been establishing institutional structures to improve its management of disasters. The Parliament recently enacted the National Disaster Management Agency (NDMA) Act of 2020. It outlines the entire institutional architecture to manage disasters and similar emergencies, from the chiefdom to the national level. The act also details the need to establish the NDMA, including a functioning board to govern it. The act clearly delineates the functions of the NDMA, as well as the roles for the agency's chiefdom, regional, and district offices. To be able to effectively respond to disasters, the country needs to invest much more in proactive risk management and build its capacity for emergency preparedness and response.

In 2020, the country decided to take the first step toward systematically planning for financial impacts from future disasters. The Ministry of Finance requested that the World Bank undertake a crisis and disaster risk finance diagnostic. The result is this report, which aims to (i) assess the impacts of past events; (ii) assess the current approach for financing such events; (iii) estimate the resource gap based on losses from historical events and the resources available to manage those losses; and (iv) propose options for creating a set of instruments linked to delivery channels as a means of moving toward more proactive financial planning.

While undertaking this analysis, the World Bank team encountered challenges related to the scarce availability of data on historical crises and disasters, particularly concerning government expenditures. The team therefore expanded its approach and used humanitarian data to estimate potential losses from past events, determine average response

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costs, and extrapolate government expenditures for years where such information was not available. The necessity of this approach highlights the need for better tracking of expenditures. Robust historical data on post-disaster costs are essential for designing any financial solution the government may choose to establish.

At present, the country does not have any pre-arranged financial instruments in place. It also lacks any data-driven decision-making process for how and when the use of disaster-related funds should be triggered, and it further lacks adequate systems to trigger emergency funds quickly and securely, and to ensure necessary fiduciary safeguards are in place for use of these funds. The only budgetary instrument available to the government is the Contingencies Fund in Section 36 of the Public Financial Management Act of 2016. This fund is not to exceed 2 percent (equivalent to US$11 million or Le 113 billion) of non-extractive industries revenues presented in the main estimates of the financial year. However, this is insufficient to cover the costs of most historical disasters for which data are available. In this context, to reduce reliance on post-humanitarian finance, countries typically create different instruments that can respond to shocks of varying magnitudes.

Sierra Leone does have experience enabling post-disaster emergency cash transfers to affected populations through social protection systems. For instance, in the past decade, the country utilized such a mechanism three times: first, to respond to the Ebola outbreak in 2014–2015; second, to respond to the 2017 mudslides and floods; and most recently to respond to the COVID-19 pandemic. However, in each case, the systems were adjusted following the particular disaster event. Developing systematic shock-responsive systems linked to pre-arranged finance would offer quicker and more efficient government responses.

This diagnostic presents a few recommendations for the government's consideration, specifically on how to strengthen financial planning to manage future shocks and crises:

• **Post-disaster expenditure tracking:** The availability of robust data on historical losses and expenditures is fundamental to making sound financial planning decisions. The government should strengthen its public financial management systems, particularly by more robustly tracking post-disaster budget expenditures on an annual basis. In most countries, this effort is led by the ministry of finance. Tracking such expenditures would allow the government to make informed decisions about how to manage these costs; it would also help the government determine which risks to hold on its balance sheets and which to transfer to international markets.

• **Trigger mechanisms:** Currently, the country does not have a very robust process for triggering a declaration of disaster. There is also little evidence of rules for what constitutes eligible expenditures following disasters. The government could review the existing structure for triggering a disaster and develop a more robust process for formulating objective decision-making criteria. Rules could also be developed for pre-identifying eligible expenditures, pre-negotiating contracts, and auditing the use of funds.

• **Pre-arranged finance:** Based on the diagnostic, the country can consider how to move toward more strategically planning its finances to manage disaster shocks. This effort could include setting priorities for the kinds of instruments the government can prioritize for development and criteria for when such instruments would be used. Based on these policy priorities, the government could then seek to establish budget mobilization and execution systems to protect the relevant stakeholders from the impacts of shocks. For example, this could include the following actions:

  - *Establishing a dedicated contingency fund* for disasters to provide timely resources in response to recurrent natural disasters
  - Securing a contingent line of finance, such as a World Bank Catastrophe Deferred Drawdown Option (CAT-DDO), that could complement the Contingencies Fund and be triggered for slightly more severe events
  - *Purchasing market-based instruments* over time, such as an insurance policy, which could be structured to provide additional funding when the costs of responding to a disaster exceed the amount in the Contingencies Fund and contingent line of credit

• **Pre-identified disbursement channels:** The country has used social protection mechanisms to deliver post-disaster assistance on three occasions. In each scenario, systems were developed on an ad hoc basis after the event. Given that the country has already seen the value of using safety nets as post-disaster delivery channels, the government may wish to consider building longer-term systems linked to pre-arranged finance and using modern digital payment systems. Such systems could then be activated to respond to disasters. This approach would also help in coordinating the post-disaster flow of funds, thereby reducing delays in delivering assistance.

The analysis in this report offers two proposed financial strategies, based in part on assumptions that helped to generate relevant data (given the scarcity of existing data). The strategies should therefore be viewed only as a tool to advance dialogue in the country so that Sierra Leone can develop its own risk financing strategy. By itself, the analysis in this report cannot justify the size of instruments that are being proposed as part of the government's financial planning toolkit. Rather, the recommendations should be viewed as indicative and as intended to prompt thinking about how to prioritize the instruments the country would like to develop following technical work on the prioritized instrument(s). Developing any instrument would require more in-depth technical and financial modeling as well as establishing associated systems and delivery channels.

Introduction and Rationale

In February 2020, the Ministry of Finance of Sierra Leone asked the World Bank to conduct a diagnostic study and provide recommendations for advancing financial planning for disasters and crises in the country. The World Bank reviewed the cost of responding to natural disasters and health emergencies in Sierra Leone, as well as the current strategies of the Government of Sierra Leone (GoSL) for financing them. It also reviewed the country's legal and institutional frameworks and its existing financing mechanisms.

This review is the result of desk research and multiple consultations with government agencies and development and humanitarian partners. It also relies on data from (i) the Emergency Events Database (EM-DAT): International Disaster Database, which reports on the impacts of major disasters and health shocks; (ii) Post-Disaster Needs Assessments detailing disaster impacts; and (iii) data provided by the Ministry of Finance. The report lays out the current state of disaster risk financing (DRF) in the country, and it presents recommendations for ways in which the country could pre-arrange finance for its post-disaster response.

Sierra Leone ranks 182 of 189 countries and territories on the Human Development Index (UNDP 2020). A child born in Sierra Leone today is likely to be three times as productive when she is 18 if she has access to adequate health care and education. The World Bank's (2020) Human Capital Index shows that a child born in Sierra Leone has lower chances of surviving until the age of five, worse test scores in school, and poorer health outcomes and survival in adulthood as compared to a child born in an average low-income country or other country in Sub-Saharan Africa.

Sierra Leone has been hit by several shocks that have affected its socioeconomic fabric. The decade-long civil war displaced more than 2 million people and deeply impacted the country's economic and social development. In 2014, Sierra Leone was severely affected by twin shocks, the Ebola outbreak and the downturn in international prices of iron ore, one of its main exports. This caused the economy to contract by more than 20 percent, sending the country and its 7.1 million inhabitants into economic and social turmoil (World Bank 2017). Since then, the economy has faced challenges emanating the mudslides and floods in 2017 and the recent outbreak of the COVID-19 pandemic. From 2016 to 2019, economic growth averaged 4.6 percent, supported mainly by growth in the agricultural, mining, and services sectors. The outbreak of the COVID-19 pandemic is expected to have an adverse impact on growth over the medium term.

Sierra Leone's macroeconomic situation remains challenging despite the bold and courageous policy measures taken by the government. The country has experienced macroeconomic stress and fiscal imbalances in the recent past. Between the Ebola outbreak and the onset of the COVID-19 pandemic (2014–2020), the budget deficit averaged 5.7 percent. In the same period, domestic revenue mobilization averaged 12.7 percent of gross domestic product

(GDP), with an estimated tax gap of 4.5 percent of GDP. Since 2019, Sierra Leone has been ranked at a high risk of debt distress. The country's medium-term national development plan for 2019–2023 prioritizes productivity-raising structural reforms (under the economic diversification cluster) as well as improved cross-sector resource allocation through investments in physical and human capital. However, economic growth contracted by 2 percent in 2020, as the COVID-19 pandemic led to a contraction in the services and industrial sectors following global supply chain disruptions, suspension of international travel, lockdowns, and the closure of land borders. GDP per capita fell by 4 percent in 2020, reversing some of the recent gains in poverty reduction. Non-farm households dependent upon private sector income (whether through self-employment or salary) disproportionately saw incomes drop across the board during the height of the pandemic. The poverty rate jumped from 40.6 percent in 2019 to 43.5 percent in 2020, primarily affecting urban households (Sierra Leone Authorities and World Bank estimates).

Vulnerability to Natural Disasters and Health Shocks

Sierra Leone is prone to natural disasters in the form of floods, droughts, and landslides—all of which could be exacerbated by climate change. The country is ranked in the 85th percentile in terms of vulnerability to climate change[1]. Floods are the most common natural hazard in Sierra Leone. Flooding typically happens every year between July and September when rainfall is at its heaviest. The consequences of flooding have been exacerbated by the combination of population increases and land scarcity, which has caused people to increasingly settle in flood-prone areas. Parts of Bo, Freetown, and Pujehun experience annual flooding during the rainy season (INTEGEMS 2017). Although flooding occurs annually, the extent of flooding and the numbers of people affected vary from year to year. Among recent years, both 2015 and 2017 were notable for the large number of people affected: approximately 14,000 people were affected by flooding in 2015, and 6,000 by the combined mudslide and flooding of 2017.

According to the Damage and Loss Assessment (DALA) conducted by the World Bank in August 2017, the country's exposure to natural disasters is likely to worsen in the coming years, given Sierra Leone's low level of development and its limited capacity to cope with extreme events (World Bank 2017). These risks also increase the food insecurity of vulnerable households.

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[1] Notre Dame Global Adaption Index, https://gain.nd.edu/our-work/country-index/.

The damages from natural disasters in Sierra Leone may also be compounded by socioeconomic and environmental factors. Forty percent of Sierra Leone's population lives in urban areas, and the majority live in illegal slums that are poorly constructed, thus increasing their exposure to natural disasters. Floods increase the spread of waterborne diseases such as cholera. Droughts likewise increase the spread of infectious diseases such as cholera, as well as typhoid and gastroenteritis, because the limited availability of water leads to the sharing of polluted water sources. Landslides are comparatively less frequently, but they can be devastating. Some 89 percent of the recorded landslide events have taken place in the Western Area, with the remainder occurring in the Bombali and Port Loko districts. The worst disaster on record was the 2017 mudslide affecting the Regent area of Freetown, which also coincided with severe flooding in other parts of the city[2].

Epidemics have been one of the deadliest hazards in Sierra Leone. Health shocks are responsible for 83 percent of the total number of deaths due to disasters (the definition of disaster excludes conflicts) (INTEGEMS 2017). Epidemics killed an estimated 5,100 people and affected around 28,500 between 1980 and 2017 (INTEGEMS 2017).

Occurrence of Natural Disasters

Sierra Leone is prone to a variety of perils, such as epidemics, floods, landslides, storms, and wildfires. According to the EM-DAT database, Sierra Leone has experienced 30 natural disaster events in the last 25 years; 10 of these were floods, which were mainly caused by torrential or heavy rainfall[3]. Figure 1 shows the incidence of natural disasters from 1996 to 2020. The magnitude of damage caused by flooding can be very profound; during this period, 32,000 residents on average were affected per incident[4]. The torrential rains in 2015 led to serious flooding that damaged homes and properties in Freetown, resulting in a major disruption to the 24,000 people living in the area. Although less common than floods, landslides and mudslides can be just as devastating and hazardous. They are partially caused by prolonged heavy rainfall that results in soil saturation. There have been two mudslides in Sierra Leone over the last 25 years. The more recent one occurred in 2017 and, in combination with flooding, affected 1000s of people in Freetown.

Figure 2 presents the number of disasters and the average number of people affected by each of the different disasters since 1996[5]. Sierra Leone is classified as a high-risk country for wildfires, with weather conditions that create a 50 percent likelihood of wildfire ignition, especially from January to March (the dry season) each year. Wildfire outbreak in Sierra Lone has had ecological, economic, and health impacts on people and the environment over the years. Over the last decade wildfire occurrence in Sierra Leone has skyrocketed (Fayiah, Xavier, and Tulcan 2021). A massive wildfire occurred in 2013, which affected several villages in the Northern and Southern Provinces, destroying 280 houses, leaving 450 families homeless, and affecting 2,300 people (Reliefweb 2013).

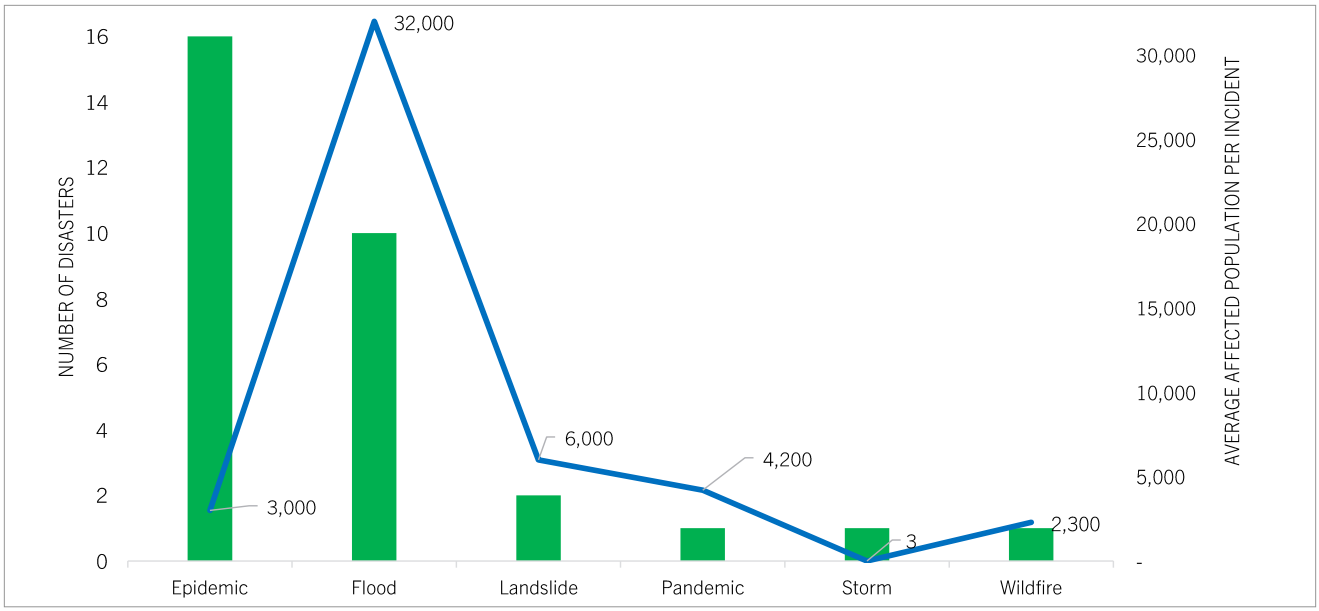
[2] Of the 1,141 people killed or missing in the August 2017 landslide and floods, a total of 808 were lost in the Regent area (World Bank 2017).

[3] Data are from EM-DAT: The International Disaster Database, https://public.emdat.be/.

[4] According to the EM-DAT database, "affected" people are those who require immediate assistance during an emergency situation—that is, people having basic survival needs such as for food, water, shelter, sanitation, and immediate medical assistance. Affected people may also include displaced or evacuated people.

[5] The EM-DAT data before 1996 are sparse, which suggests that the data record was probably not as comprehensive for those years. The danger of including data before 1996 is that they may distort the analysis. Hence, the start date of the data is 1996.

Figure 1: Natural Disasters in Sierra Leone, 1996–2020



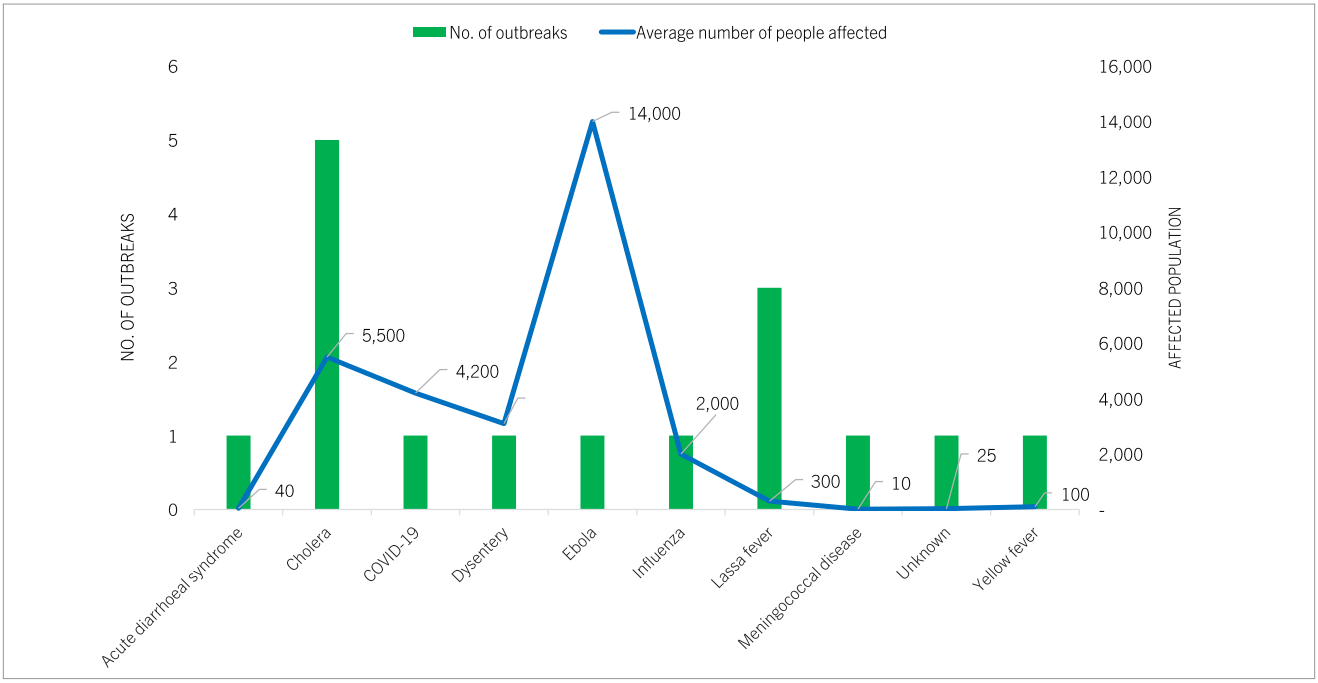
Source: EM-DAT: The International Disaster Database, https://public.emdat.be/.

Occurrence of Health Shocks

Epidemics are one of the major disasters that frequently impact Sierra Leone, which has had 16 epidemic outbreaks over the last 25 years. Figure 2 shows the frequency and impact of epidemic events from 1996 to 2020. Epidemics were caused by both viral and bacterial outbreaks and have included Ebola, cholera, Lassa fever, yellow fever, acute diarrheal syndrome, meningococcal disease, dysentery, and influenza. Among these diseases, Ebola is undoubtedly one of the most severe. About 14,000 people in Sierra Leone were impacted by Ebola, which had a death rate of almost 30 percent. The Ebola epidemic put the society, economy, and health care system under tremendous stress. Other diseases have also affected a significant number of people. For example, cholera outbreaks — which occurred an average of five times over the last 25 years — affected 5,500 people per incident. Although cholera is not as lethal as Ebola, the cholera outbreak in 2012 affected 23,000 people in the Western Area of Sierra Leone.

Credit: Photo by Dominic Chavez from World Bank Flickr

Figure 2: Frequency and Impact of Epidemic Events, 1996–2020



Source: World Bank calculations based on data from EM-DAT: The International Disaster Database, https://public.emdat.be/.

Institutional and Policy Framework for Risk Management and Response

In 2002, the National Security and Central Intelligence Act was enacted. Part V of the act established the Office of National Security (ONS), and Section 18 (1) (iv) makes the coordinator of the ONS responsible for managing national emergencies, including both natural and man-made disasters. A Disaster Management Department (DMD) was also established within the ONS.

In 2004, the ONS operationalized the DMD and gave it the central responsibility of coordinating the management of national emergencies. To promote the management of natural and man-made disasters, the ONS has a mission to develop a highly proficient mechanism for preventing, mitigating, monitoring, recovering from, and responding to disasters in a timely manner. The coordination of disaster management is done at various levels through multi-sectoral platforms aimed at addressing the underlying issues of disaster preparedness, prevention, mitigation, response, rehabilitation, and recovery.

The main strategic objective of the ONS is disaster risk management, which includes a few key elements: integration of disaster risk management into development efforts, improved identification and assessment of disaster risks, and the preparation of a National Disaster Management Plan (NDMP), which would contribute to enhanced human security. Each element is explained in more detail below.

The ONS aims to ensure the integration of disaster risk management into sustainable development programs and policies, thereby ensuring a holistic approach to disaster management.

It also aims to improve the identification, assessment, monitoring, and early warning of risks. Early Warning Systems (EWS) are a vital element of Sierra Leone's strategy to reduce risks, specifically those risks arising from the many

hazards that communities contend with, notably weather- and climate-induced hazards, hydrological hazards, and health-related hazards. The EWS are part of the frontline defense against loss of life and potential loss of hard-earned development gains[6].

Finally, the ONS seeks to improve effectiveness of response through stronger disaster preparedness. The ONS-DMD has developed fundamental documents that support an effective and efficient national disaster management system. These include the National Disaster Preparedness and Response Plan; the Sierra Leone Disaster Management Policy; and a multi-hazard risk assessment of major urban areas of Sierra Leone. The National Disaster Preparedness and Response Plan covers disaster prevention as well as preparedness and response. It addresses many of the challenges facing EWS, which relate to coordination, roles and responsibilities at the various levels, and the need for adequate capacity and resources to support the system. These may be understood as challenges of governance of the system. There are also technical challenges related to the use of appropriate technology and data sharing by the key participating agencies and departments. Examples include weaknesses in key components of the EWS, such as the lack of accessible and user-friendly data that would enable at-risk populations to act. EWS considerations should be mainstreamed into the various strategies, laws, and policies for disaster risk management, as well as into economic plans and programs, climate change adaptation, sustainable development, and efforts to promote resilience.

The ONS receives information from early warning programs. This allows the ONS to partner with various stakeholders involved in delivery of the end-to-end early warning system, including the Sierra Leone Meteorological Agency in the Ministry of Transport and Aviation, whose well-developed warning and forecasting system is a prerequisite to a robust EWS; the Ministry of Water Resources; and the Environmental Protection Agency. Information also flows from the community to the national level—i.e., the ministries, departments, and agencies (MDAs), the Provincial Security Coordinator (PROSEC), the District Security Coordinator (DISEC), and the Chiefdom Security Coordinator (CHISEC)—and from communities to community committees and humanitarian agencies such as the Sierra Leone Red Cross.

The ONS established 16 District Disaster Management Committees across the country. In view of the decentralization process, the District Councils are given the responsibility of providing leadership. They are charged with the responsibility of leveraging local resources as an initial response to a disaster before the intervention of the central government. In reality, capacity at the district level is low, and resourcing for response remains scarce. The District Disaster Management Committees therefore work in tandem with the ONS and are developing a response capacity according to a nationally agreed set of standard operating procedures (SOPs) for each partner agency at the time of a disaster. This collection of SOPs covers the activities related to the occurrence of the hazard, as well as the development and implementation of disaster management plans for the provinces, districts, and local authorities.

There are no objective or data-driven triggers for the country to declare a state of disaster. Thus post-disaster financial support is also mobilized on the basis of disaster declarations as opposed to objective triggers. Disasters are categorized according to three levels:

- **Level one** refers to a minor disaster. This includes any disaster that is likely to be within the response capabilities of the local government, the community, and the stakeholders working within the affected community. In this case, there is only a minimal need for national assistance.
- **Level two** refers to a major disaster. This includes any disaster that would likely exceed local capabilities and require a broad range of national assistance.
- **Level three** refers to an extreme disaster. This includes any disaster that would require massive national assistance, including military involvement and support through outside (or international) intervention.

[6] According to the United Nations Office for Disaster Risk Reduction, an EWS is "an integrated system of hazard monitoring, forecasting and prediction, disaster risk assessment, communication and preparedness activities systems and processes, that enables individuals, communities, governments, businesses, and others to take timely action to reduce disaster risks in advance of hazardous events . . . Failure in one component . . . could lead to the failure of the system." United Nations Office for Disaster Risk Reduction, "Terminology: Early Warning System," United Nations Office for Disaster Risk Reduction, https://www.undrr.org/terminology/early-warning-system.

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According to the recently developed National Disaster Preparedness Plan (2021), which is pending official adoption and institutionalization, districts are responsible for responding to level one disasters, whereas the national government is responsible for level two and level three disasters. Except for the criteria outlined above, there is no further guidance on how and when a level two or three disaster might be declared. In this context, there is currently limited devolved funding available at the district level, which limits districts' response capabilities (Sandford and others 2019).

The National Platform for Disaster Risk Reduction (NPDRR) is the fulfillment of an international requirement by the United Nations Office for Disaster Risk Reduction. It is the highest disaster-related policy-making body, and it is chaired by the vice president. The NPDRR has primary responsibility for coordinating and managing national disasters. It is supported by the regional, district, and chiefdom disaster management committees.

The next in the chain of command is the National Strategic Situation Group (NSSG). It is composed of a director general, the permanent secretaries of the MDAs, the country directors of representatives of the United Nations specialized agencies, and nongovernmental organizations. The NSSG receives reports from the national situation room (which brings together personnel from the MDAs based on their skill sets), provides recommendations to the NPDRR, and issues directives as to the kind of operations to be undertaken during an emergency. The national situation room is itself an important element in the chain of command in the management of disasters. It is activated based on the levels of threat, as stated in the National Standard Response Guideline. It has the responsibility for strategizing and coordinating responses. For this reason, it operates continuously when the country is in an emergency, and it reports to the NSSG.

The Parliament recently enacted the National Disaster Management Agency Act of 2020. It outlines the entire institutional architecture to manage disasters and similar emergencies from the national to the chiefdom level. The act also articulates the need to establish the National Disaster Management Agency, with a functioning board to govern it. The act clearly delineates the functions of the NDMA, as well as the roles for the regional, district, and chiefdom offices of the agency. In addition, the act establishes the National Platform for Disaster Risk Reduction, which has the primary responsibility for coordination and management of national disasters. The NPDRR includes the Regional Disaster Management Committee; the District Disaster Management Committees; and the Chiefdom Disaster Reduction Management Committee.

The act details the conditions under which the president may declare a state of emergency in accordance with Section 39 of the Constitution of Sierra Leone of 1991 (Act No. 6 of 1991). The act also provides for the establishment of the National Disaster Management Fund, which will receive the following contributions: (i) funds appropriated for the NDMA by the Parliament; (ii) grants, donations, and other voluntary contributions to the fund; and (iii) other funds that may in any manner become lawfully payable to the agency.

The Insurance Market and Regulations

The Sierra Leonean insurance industry is underdeveloped and inadequately supervised. There are eight insurance companies and six brokers operating in the country. The compulsory classes of insurance include motor third-party liability insurance, professional indemnity for brokers, medical professionals' insurance, and employers' liability insurance (MarketResearch.com 2020). Sierra Leone's insurance industry increased at a compounded annual growth rate of 17.1 percent. It is primarily supported by the life insurance segment, which grew at a compounded annual growth rate of 49.5 percent (Businesswire.com 2013).

The industry is facing a number of challenges, such as a low penetration rate compared to peers in the subregion; premiums as a percentage of GDP are less than 1 percent[7], with very few agricultural and livestock insurance products, rising unemployment rates within the country, and inadequate infrastructure for insurance operation. Another major concern is a weak regulatory framework, which needs to be more focused and coherent and brought into line with international best practice.

In 2011, the growth of the country's mining industry, which required a large labor force, drove the growth of the country's overall economy. This in turn helped to boost the demand for insurance products, particularly employer liability insurance[8]. The Sierra Leone Insurance Commission (SLICOM) was established by the Insurance Act of 2000 and inaugurated in 2013. It is responsible for the supervision, monitoring, and licensing of insurance companies, brokers, loss adjusters, and agents in the country. However, it has limited resources and capacities to fulfill its mandate[9], suffering from a shortage of professional staff and inadequate training, manuals, analytical tools, and technology. An established meteorological network, which is required to monitor the unstable weather conditions to facilitate the operations of weather and agricultural insurance, is not available. Furthermore, the industry does not provide the SLICOM with adequate data on its financial condition.

The insurance market in Sierra Leone is regulated by the new Insurance Act of 2016, which aims to strengthen the SLICOM's role. SLICOM in 2018 worked with farmers engaged in subsistence farming to establish cash crop cooperatives and provided training in processing to ensure cash crops become competitive for export. It worked in collaboration with the Sierra Leone Insurance Association to research the fundamental principles of agricultural insurance management. In the education sector, SLICOM engaged the Ministry of Education and the West African Examination Council (WAEC) to include insurance in the curriculum of senior secondary schools in Sierra Leone, but more still needs to be done to further improve the insurance market's condition and penetration level.

[7] Premiums as a percentage of GDP came to 0.37 percent in 2016. Africa Re, "Sierra Leone Country Dashboard," https://www.africa-re.com/dashboards/SL.

[8] Actuarial Post, "The Insurance Industry in Sierra Leone Digs Deep for Growth," https://www.actuarialpost.co.uk/article/the-insurance-industry-in-sierra-leone-digs-deep-for-growth-4696.html.

[9] Ibid.

Response Costs for Natural Disasters and Health Shocks

Response costs for natural disasters and health shocks refer to housing and building reconstruction costs and emergency relief, including food aid to alleviate food insecurity, shelter for emergency accommodation, etc., after a disaster. In the case of slow-onset events like epidemics and pandemics such as COVID-19, government expenditure includes spending on behavioral management, case management, operational coordination, isolation/quarantine facilities, surveillance, and testing.

Historical information concerning response costs is fundamental to making financial planning decisions. In the case of Sierra Leone, the country started tracking post-disaster government expenditures only five years ago. However, these numbers do not provide an accurate picture of post-disaster response costs because the government bears only a small portion of the actual costs. A large portion of post-disaster expenditures is in fact borne by humanitarian or development partners, who may direct some of their funds as budget support through government systems, and some of it through other instruments.

Where accurate information is not available, statistical simulation can help to estimate the frequency and severity of disasters, particularly for large-scale events, and in this way provide estimates of associated costs. Large-scale events may or may not have occurred in the time frame for which historical data are available. This is because natural disasters of high intensities—for example, a destructive storm that has occurred only once in the last 25 years—are infrequent by nature. Statistical simulations can help to identify patterns, determine how frequently these extreme events might occur, and estimate the response costs for some of the extreme events. Financial mechanisms can then be designed to enhance the country's financial preparedness to disasters based on the study of different scenarios.

Sierra Leone's cost of response for disasters was estimated based on a combination of three components: (i) humanitarian assistance funding based on United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA) data on humanitarian aid contributions, (ii) GoSL's contribution to historical disasters, and (iii) funding from private donors. More details are available in Annex 1 and 2.

Among the three components, humanitarian assistance data are most comprehensive and complete, with data available from 2010 and comprising a 10-year data set from 2010 to 2019.

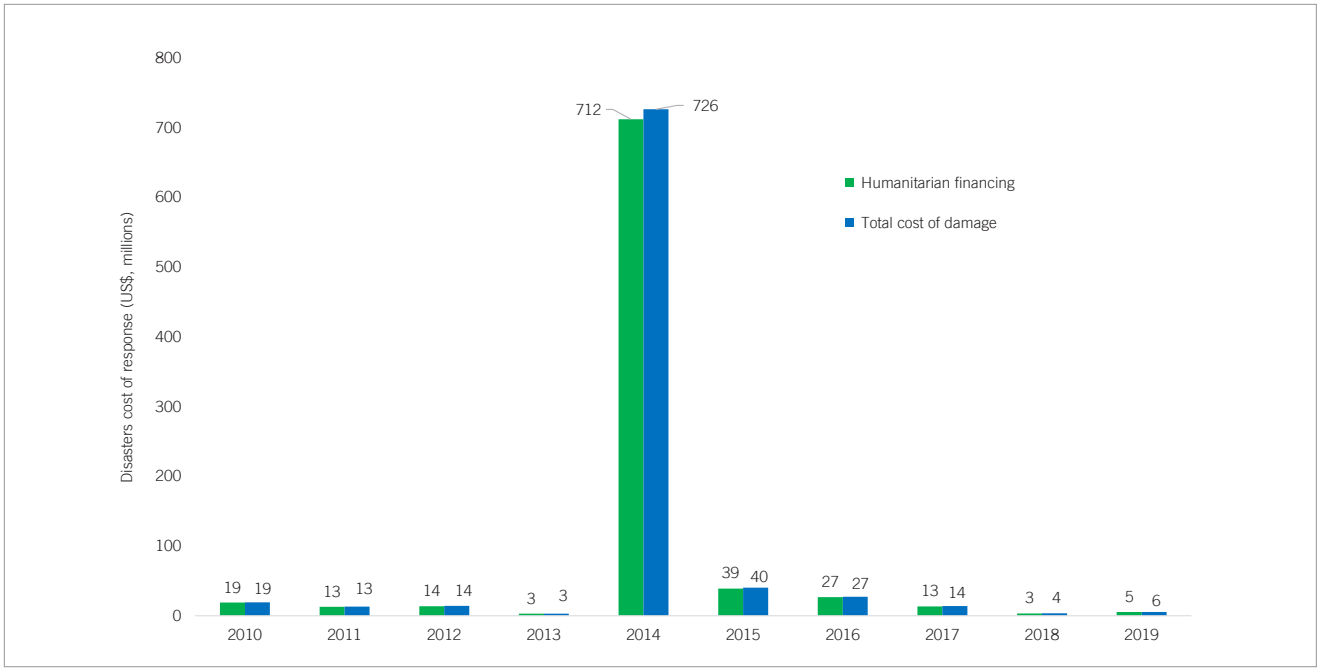
The second component, GoSL's post-disaster expenditure, is available only since 2015. To estimate government expenditure prior to 2015, i.e., for 2010–2014, it is assumed that the disaster-related cost is about US$13 per person, as verified by the country's National Commission for Social Action and Ministry of Finance and based on government's historical disaster-related expenditure between 2015 and 2020. Multiplying the estimated US$13 disaster cost per person by the disaster-affected population (based on EM-DAT data) provides the needed information for a 10-year data set for the second component.

Private donor subsidies, the third component for estimating the disaster-related expenditure, is a relatively smaller component and is estimated to be 2 percent of total disaster response costs. This percentage estimate is derived from Sierra Leone's COVID-19 pandemic expenditure report (annex 1C), which calculates the proportion of donor subsidies contributed by the private sector for expenditure related to COVID-19 pandemic response cost. Adding all three components together gives the total disaster-related response cost per each historical year for Sierra Leone. Detailed calculations and assumptions can be found in annex 4.

For the period 2010–2019, all historical, annual response costs calculated ranged from US$3 million to US$40 million (Le 30.7 billion to Le 400 billion). In 2014, however, the Ebola outbreak triggered a response cost of US$726 million (Le 7,600 billion), which is many times greater than the annual response costs for other years where data are available and is therefore an outlier. During the epidemic, Sierra Leone received strong support from many humanitarian partners and governments from around the globe. Of the documented information available, the United Kingdom's Department for International Development (DFID) (now the Foreign, Commonwealth & Development Office [FCDO]) contributed

almost 50 percent of all humanitarian aid received, and the United States Agency for International Development (USAID) contributed almost 25 percent. Figure 3 presents the estimated annual costs of disaster response in Sierra Leone from 2010 to 2019[10]

Figure 3: Estimated Cost of Responses to Disasters, 2010–2019 (US$, millions)



Source: World Bank calculations based on data from Ministry of Finance and UN OCHA Financial Tracking Service, https://fts.unocha.org/.

From the available data—and for the purpose of this analysis—the response costs associated with the 2014 Ebola outbreak do not fall in the same category as those associated with other disasters. Therefore, they are not included in the analysis. This approach is taken because, based on the information available for the last 25 years, no other historical disaster caused the same level of fatalities or response costs as the Ebola outbreak. Furthermore, the humanitarian assistance received for this event far exceeds what has been historically documented. Thus, including this event would skew the strategies for Sierra Leone to include instruments such as insurance at attachment points that are far from realistic for the country context.

Disaster-related costs have been estimated based on the three categories of available data corresponding to the three components listed above: (i) humanitarian; (ii) GoSL; and (iii) private. Each category has been estimated separately based on a different data set. It is important to note the limitations of this estimation, which are largely due to constraints on data related to disaster losses in Sierra Leone.

As stated previously, government expenditures for historical disasters are available only from 2015. Therefore, prior to 2015, expenditures are estimated based on the government's disaster-related cost per person[11] between 2015

[10] Data exclude preliminary government expenditures on the COVID-19 pandemic in 2020, as data corresponding to the humanitarian financing proportion are not available.

[11] The disaster-related cost per person of US$13 is estimated based on data provided by the Ministry of Finance. The 2017 mudslide resulted in the highest cost per person, at US$28. It should be noted that this cost refers to funding provided by the GoSL only. Thus, it excludes humanitarian funding and private donor support.

and 2019[12], where such data are available. The analysis would be better validated if government expenditures for disasters prior to 2015 were available, particularly for government spending on the 2014 Ebola outbreak (due to the rarity and severity of the event). Enhanced data quality could further improve the quality of the analysis, particularly if disaster costs incorporating all private and public donor contributions for each historical event were available. Detailed information for government packages is available only for a select set of events — for example, for the government benefits package offered to the affected population as part of the response to the 2017 mudslide (see annex 3 for details about the social support package).

Nonetheless, it is reasonable to assume that the overall impact of including government expenditure to the disaster response cost would be relatively small given that government expenditures on the total disaster-related restoration costs have been consistent at around 1 percent over the last five years. Furthermore, the historical values of response costs are typically not sufficient to accurately estimate losses or damages caused by future disasters. However, they offer an indicative value in terms of the resources that disaster responses require[13].

Probabilistic distributions[14] are then tailored to the data set of Sierra Leone's disaster-related costs. Using Monte Carlo simulations,[15] the average annual cost to GoSL of disaster responses was estimated at US$20 million (Le 205 billion); very severe events (with a 1 percent probability of occurrence) could exceed US$69 million (Le 707 billion). These estimates are not specific to a particular type of disaster. Rather, they are applicable to any shocks that impose large fiscal and financial costs on the government. It was estimated that the highest annual response cost, US$45 million (Le 461 billion), could occur every 15 years on average (figure 4). It was also estimated that events incurring response costs of US$14 million (Le 143 billion)—for example, the landslide in 2017 — have a 50 percent chance of occurrence in any single year, meaning they could occur as often as once every other year.

Credit: Photo by Annie Spratt from Unsplash

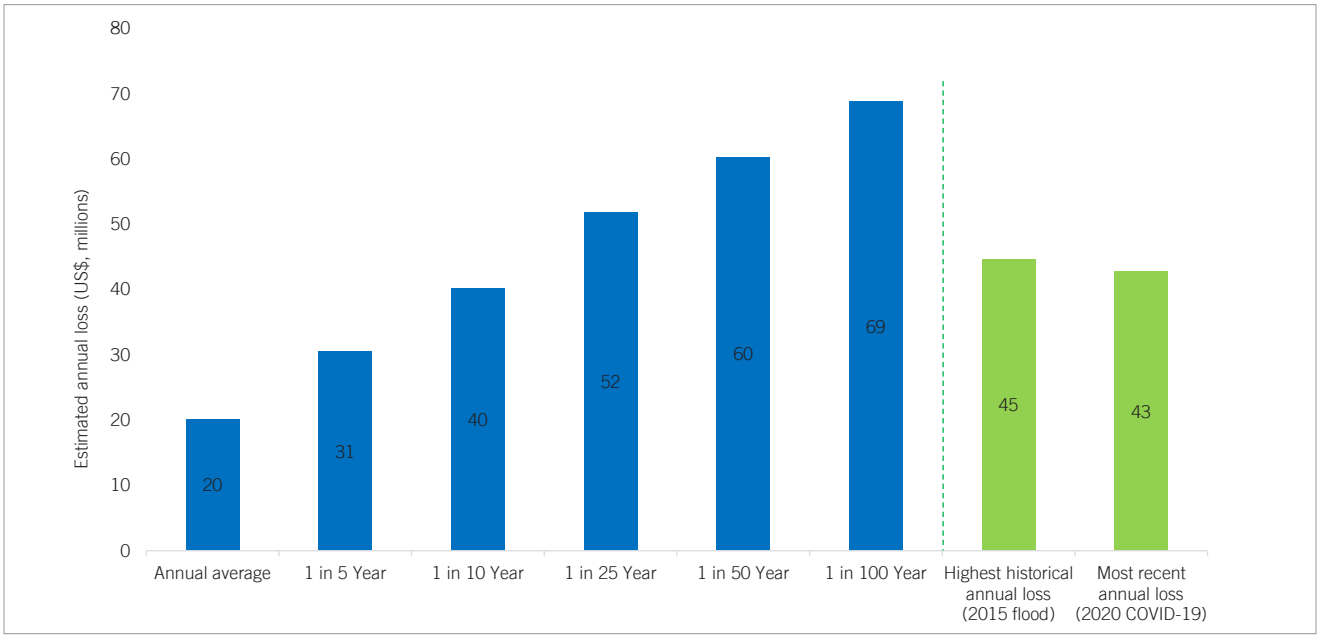
[12] Consistent and reliable expenditure data on government response to natural disasters from 2015 to 2019 are available. However, only a preliminary estimate of 2020 COVID-19 government expenditure is available. These COVID-19-related data are collected and presented differently. Therefore, the 2020 data are omitted for the purpose of the calculation. Government expenditures on total disaster-related restoration costs have been consistent at around 1 percent over the last five years, so the 1 percent ratio will be used to estimate government expenditures for the back years for consistency purposes.

[13] Response costs are revised to allow for changes in Sierra Leone's population, as response costs may increase or decrease according to population trends.

[14] Six distributions—lognormal, gamma, Pareto, beta, Weibull, and Fréchet—are considered. These are based on their appropriateness of fit. The gamma distribution was chosen as it provides the best fit for the empirical data.

[15] Monte Carlo simulation is a mathematical technique used to estimate the possible outcomes of an uncertain event. In the context of the diagnostic, it is used to assess the impact of disasters in Sierra Leone.

Figure 4: Estimated Average Losses and Annual Potential Losses of Disasters (US$)



Source: World Bank calculations based on data from Ministry of Finance and UN OCHA Financial Tracking Service, https://fts.unocha.org/.

Note: For very severe events (1-in-5 to 1-in-100-year events), it is estimated that the government will be responsible for emergency relief. Public asset reconstruction costs for such events could range between US$31 million and US$69 million (Le 317 billion to Le 707 billion). A 1-in-5-year event is expected to equal or exceed the magnitude of an event that occurs once every five years. A 1-in-100-year event is expected to equal or exceed the magnitude of an event that occurs once every 100 years.

Ex Ante Risk Financing Instruments and Pre-identified Delivery Channels

Humanitarian aid from public and private donors in response to disasters can be unpredictable and uncertain. Discretionary finance leads to fragmented response and encourages underinvestment in risk reduction and preparedness. Timely disbursement and efficient use of funding is paramount after a disaster, and delay in disaster assistance can increase the cost of recovery. The shift in focus to provide protection instead of relief, and the use of financial incentives to encourage parties to own and finance their share up front, are keys to enhance certainty and enable prompt response to disaster. The international humanitarian system should act as a backup when plans fail, but should not be the first line of defense in disaster response (Clarke and Dercon 2016).

Following disasters, governments have a range of options for financing disaster-related needs. However, raising sufficient funding once a disaster has occurred can take time and be unpredictable. To access finance for urgent needs after a disaster, governments often rely on reallocating the government budget. They also appeal for international donor assistance and arrange for emergency credit. Ex ante DRF instruments can help governments respond to different types of disasters in a timely manner. There are several instruments that can be used for this purpose, such as contingency funds, contingency finance, contingency lines of credit, post-disaster loans, and risk transfer instruments.

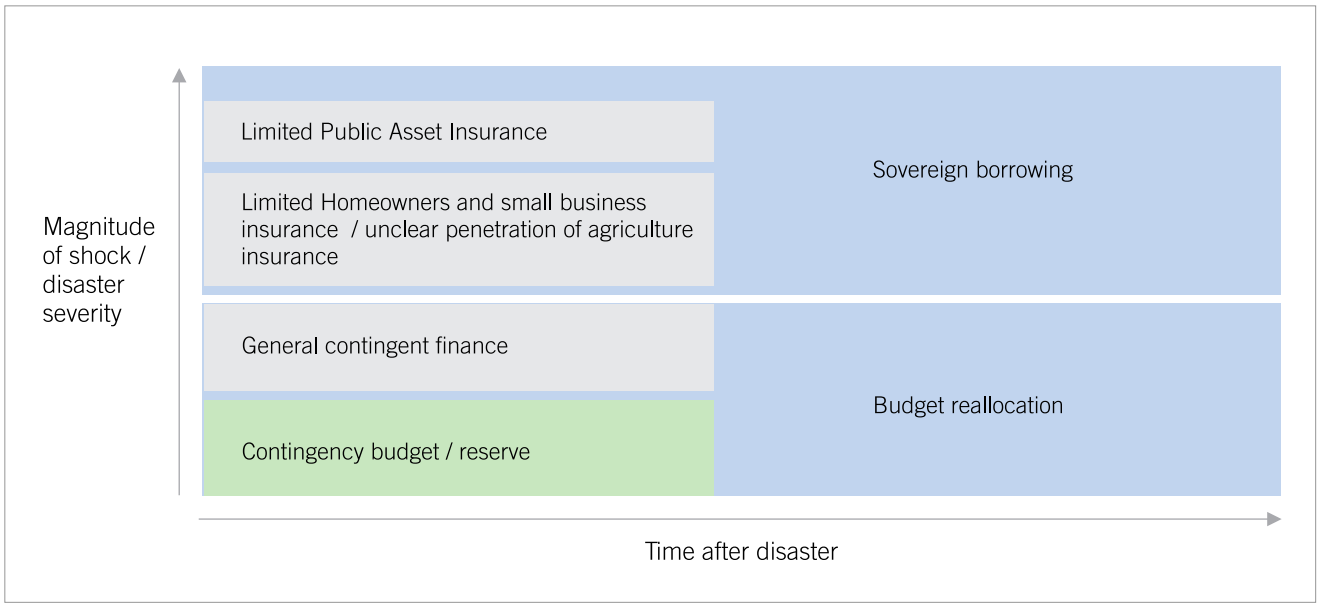
While pre-arranging finance is key, linking finance to ways and means that enable funding to reach those in need of this support is also fundamental. Too often, countries receive financial assistance following emergencies but are unable to rapidly disburse funds because of bottlenecks. Such issues delay access to much-needed assistance for

those most affected by shocks and crises. Therefore, pre-identifying delivery channels for how funds will flow is critical for financial planning for future shocks and emergencies.

The timing of finance is critical to ensure speedy recovery following disasters. Certain instruments are better designed to meet the immediate need for emergency cash soon after disasters occur, that is, when quick liquidity is essential. This need could be met through a contingency reserve or contingency finance (credit or grant). Budget reallocation, which diverts funds away from public services and ongoing public projects, is a common solution for government seeking to finance disaster response. Reallocations may be time-consuming to arrange, however. In addition, reallocations are typically from operations and maintenance budgets and can be very costly for development. For example, a reallocation from the health care budget to disaster response can reduce public expenditure on health infrastructure or a health wage bill, and may ultimately leave hospitals without electricity or supplies for long periods of time.

For medium-term recovery, including reconstruction and restoration of public assets, larger amounts of funding are needed. Risk transfer instruments, including insurance, are usually more appropriate to cover events of greater magnitude that occur less frequently. One of the main advantages of a pre-arranged ex ante financial instrument like insurance is that payouts are triggered upon pre-defined events, thus facilitating quick disbursement. On the other hand, sovereign borrowing—especially foreign currency external borrowing—can take months to arrange, leading to delayed response and greater human and economic costs. It can also be quite costly if interest rates are high in a post-disaster environment. Figure 5 presents the types of DRF instruments available and their usual application.

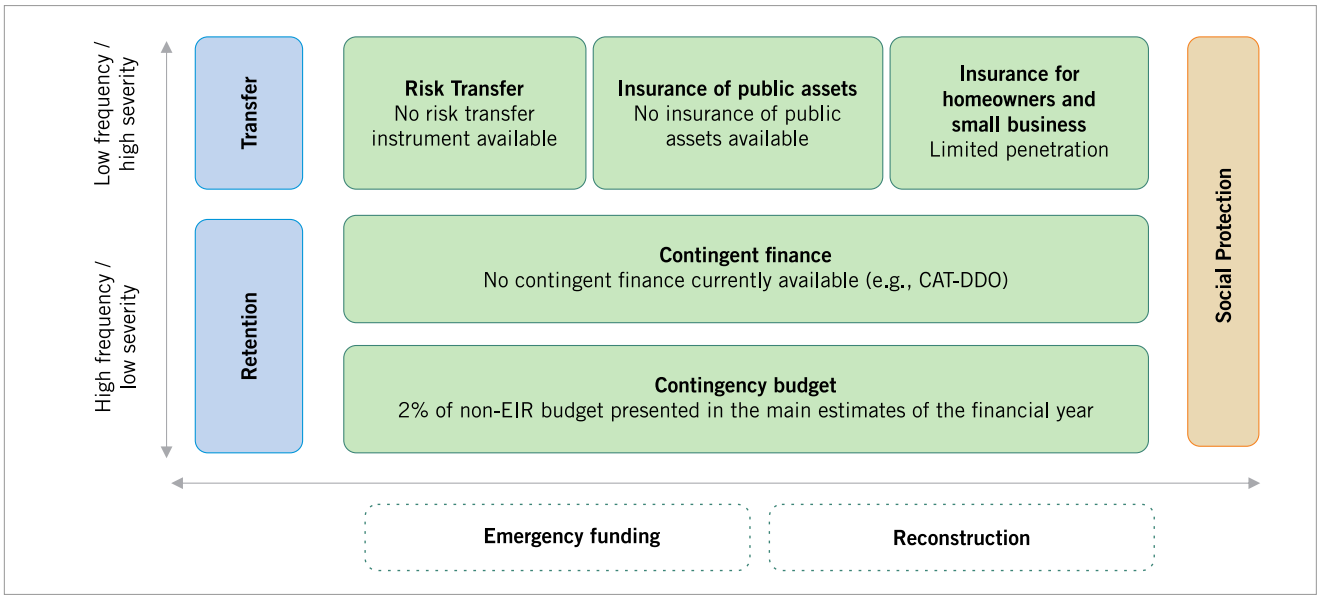
Figure 5: Overview of DRF Instruments



Source: World Bank.
Note: Green shading = ex ante budgetary source of funding available in Sierra Leone; gray shading = ex ante budgetary source of funding with limited or no availability in Sierra Leone; blue shading = ex post source of funding.

At present, Sierra Leone does not have significant resources set aside for responding to disaster events. The absence of a financial reserve makes the country heavily reliant on ex post financing. Figure 6 provides a snapshot of Sierra Leone's current state of pre-arranged finance. In the section below, instruments are further detailed to illustrate their current and potential role in response to events of different magnitudes and frequencies in the country.

Figure 6: Ex Ante Disaster Risk Financing Instruments and Delivery Channels



Source: World Bank 2014.
Note: CAT-DDO = Catastrophe Deferred Drawdown Option; EIR = extractive industries revenue.

Contingency Funds

The existing budgetary instruments for financing post-disaster expenditures are not explicitly stated in the government's accounts. However, there are annual budgetary allocations made to the ONS, including a contingencies allocation.

The only budgetary instrument available to the government is the Contingencies Fund, which was established in conjunction with Section 36 of the Public Financial Management Act of 2016. Allocations are not to exceed 2 percent of non-extractive industries revenue (non-EIR) as presented in the main estimates of a given financial year.

Generally, contingency funds are used to cover the needs associated with high-frequency, low-intensity events. Contingency funds require governments to set aside funds that could otherwise be spent on development projects. Given this high opportunity cost, governments typically have contingency funds of moderate size to cover the costs of responding to events that are frequent but not very severe.

In Sierra Leone, under Section 114, Subsection (2), paragraph (c) of the Constitution, the president may issue a warrant only when the aggregate amount of the expenditures authorized by warrants during a financial year does not exceed 1 percent of the non-EIR as presented in the main estimates of the financial year. The state budget may include an unallocated budget to be set aside in the consolidated fund to meet an unspecified need or purpose, provided that the amount of the unallocated expenditures does not exceed 1 percent of the non-EIR as presented in the main estimates of the financial year.

A 2 percent share of non-EIR is equivalent to US$11 million (Le 113 billion).. However, this amount is still insufficient to cover the costs of most historical disasters for which data are available. Given that resources are not sufficient or earmarked for disasters, EIRs are typically inadequate to fund post-disaster response costs—even more so if the government faces any concurrent or compounding shocks.

Contingent Lines of Finance

Contingency lines of finance can be pre-arranged in countries in the form of grants or credits or a combination of both. Contingent credit is a form of ex post emergency loan that governments can obtain following a disaster. Although significant resources can be mobilized through emergency loans, they can take a long time to negotiate and can contribute to an already high debt ratio[16]. Furthermore, interest rates might be higher during a crisis than in normal times (since macroeconomic conditions deteriorate in a crisis), and borrowers might have more limited negotiating power.

Establishing ex ante contingency lines of credit in advance enables governments to access finance at competitive borrowing rates. Funds would then be immediately available after a disaster to meet emergency needs. Contingent lines of finance, such as the World Bank Development Policy Loan with Catastrophe Deferred Drawdown Option (CAT-DDO), offer governments access to significant financial resources, such as budget support in the event of an emergency. In most cases, a CAT-DDO disburses funds based on the declaration of a state of emergency due to disaster, including cyclones, floods, health crises such as COVID-19, and so on.

Countries are eligible for a CAT-DDO if they are in the process of preparing or already have a disaster risk management framework and if an appropriate macroeconomic framework is in place. The CAT-DDO has a country limit of US$250 million or 0.5 percent of GDP, whichever is lower. International Development Association (IDA) clients with limits below US$20 million may request a CAT-DDO of up to US$20 million (World Bank Treasury 2018). This can be offered as credit, grant, or a combination of both.

Sierra Leone currently does not have any contingent lines of finance to meet disaster-related needs. Given that 0.5 percent of GDP in Sierra Leone would be about US$19.7 million (Le 202 billion), the maximum amount of CAT-DDO that Sierra Leone could obtain would be US$20 million (Le 205 billion).

The country also has a growing portfolio of projects that include funded and unfunded Contingent Emergency Response Components (CERCs) within World Bank projects; the CERCs can be quickly activated to draw upon uncommitted project resources for emergency needs. Sierra Leone currently has at least five active CERCs in its portfolio.

Credit: Photo by Bunting Kargbo from Unsplash

[16] According to the World Bank's Sierra Leone report, the total public debt was estimated to decline to 72.9 percent of GDP in 2021 although the country remains at "high risk" of debt distress for both external and overall public debt. https://www.worldbank.org/en/country/sierraleone/overview#:~:text=Total%20public%20debt%20is%20estimated,stock%20of%20arrears%20into%20debt.

Sovereign Insurance

Sovereign disaster risk insurance can provide countries with rapid access to liquidity in the event of severe disasters. These are events that do not happen often but can cause massive damage to the society when they occur. Insurance solutions are not appropriate for smaller and more frequent events.

This financing mechanism enables ministries of finance to transfer part of the financial burden of disaster response to the private sector through an insurance contract. When such a contract is in place and a sufficiently large insured event (such as a flood or a landslide) occurs, a payout is triggered under the insurance contract. It is then paid to the ministry of finance as budget support.

Sovereign risk pools are also emerging as useful mechanisms to support countries in accessing cost-effective risk transfer solutions. The African Risk Capacity (ARC) is a sovereign risk pool that offers governments parametric insurance with triggers based on satellite weather surveillance. It provides a maximum coverage of US$30 million (Le 307 billion) per country per season for drought events that occur with a frequency of once in five years or less[17]. The Extreme Climate Facility (XCF), arranged by the ARC, is structured to pay out at the end of five years if there has been a significant increase in extreme weather events compared to a baseline period[18].

Satellite imagery can be useful for monitoring near-real time disaster events, e.g., flood or drought for which parametric trigger can be designed to approximate the occurrence of disaster events that led to insurable loss. As opposed to indemnity cover, which compensates a policyholder's loss by reimbursing the cost of repair and restoration and so requires damage assessment by loss adjusters, index-based parametric insurance is triggered by an objective measure of the event. The trigger that determines the payout on a parametric policy can take a number of forms, but must fulfill three criteria: it must be (i) an independent measure (i.e., measurement that does not depend on another variable for the same subject), (ii) objectively measurable immediately after the disaster (i.e., measurement is reliable, quantifiable and accessible after disaster), and (iii) correlated with the actual losses (i.e., measurement is connected or has a mutual relationship with the event). In practice, many triggers for disaster parametric policies are related to measures of event intensity. For example, a parametric insurance policy for hurricanes might provide a set dollar amount whenever wind speeds exceed a certain level in a particular location. The three key benefits of parametric insurance are faster payouts, flexibility, and the ability to provide coverage for difficult-to-model losses.

At present, Sierra Leone does not have sovereign disaster risk insurance in place. However, the ARC's Outbreak and Epidemic (O&E) Insurance Programme was created in the aftermath of the 2014 Ebola crisis, and offers some support in the event of a health shock. One lesson of the Ebola outbreak in West Africa was that in addition to weaknesses in health systems, slow unpredictable funding was a major factor contributing to the inability of Sierra Leone to rapidly respond to the initial outbreaks. Learning from this experience, the ARC established an early warning and response surveillance platform to address all health emergencies in a timely and effective manner, thereby supporting public health emergency preparedness and response.

Shock-Responsive Safety Nets

A growing body of evidence shows that safety nets (including cash transfers) can be part of an effective shock response. They can be used as a delivery channel when shocks have an economic impact on households or individuals, and/or when cash is an effective means of providing people with access to services or goods to meet multiple needs (Bowen and others 2020). Programs can be expanded to accommodate new beneficiaries, or they can be used to increase transfers to existing beneficiaries; they can also adjust implementation modalities to ensure their continued function during a crisis. In addition, new programs can be developed using existing safety net infrastructure, or to ensure consistency with ongoing program targeting criteria or benefit levels.

[17] African Risk Capacity, "How the African Risk Capacity Works," https://www.arc.int/how-arc-works.

[18] African Risk Capacity, "Extreme Climate Facility," https://www.arc.int/extreme-climate-facility.

In Sierra Leone, safety nets have proved effective in channeling post-emergency assistance in three instances: (i) during the Ebola outbreak, (ii) during the 2017 landslide and floods, and (iii) during the COVID-19 pandemic. In the case of Ebola and the landslide/floods, the systems that were designed emerged after the events. Humanitarian assistance from various partners was eventually funneled through these systems. In the case of the COVID-19 pandemic, however, the GoSL had already pre-arranged US$4 million (Le 41 billion) in contingent finance for emergency cash transfers as part of a World Bank project. These funds were released within three months—as soon as the systems were ready to respond to the emergency.

The Bank of Sierra Leone has made significant progress since 2009 in modernizing the payment system. To complete the digital payment system, it is working to establish the retail payment switch—the missing element in the system—so that money can be transferred between bank accounts and mobile wallets. This ability will allow funding to be sent from a bank account to beneficiaries who have a mobile wallet, even if they don't have a bank account. This is especially important for beneficiaries based in areas that are not serviced by banks or in areas not serviced by mobile money agents or ATMs. The national retail payment switch creates a common platform through which beneficiaries who have only a mobile wallet automatically have access to the wider payment system and receive digital funding efficiently in an affordable, convenient, fast, seamless, and secure way. This capability can be particularly useful during a disaster, when access to financial institutions can be limited; it makes access to funding available to those affected, alleviating food insecurity and speeding up recovery. The connection between the Bank of Sierra Leone's electronic funds transfer system and Ministry of Finance Integrated Financial Management Information System helps to speed up the back-end process, including transfers from the Ministry of Finance to the Bank of Sierra Leone, which in turn pays beneficiaries (World Bank. 2018).

There is a need to systematically plan an enabling shock response through safety nets both by building systems and by pre-arranging finance for emergency cash transfers via the modernized digital payment system, thus ensuring adequate links between systems and finance is key to ensure funds can smoothly flow through safety net channels and reach the beneficiaries securely in a timely manner. In addition, the system needs to be able to quickly verify the identities of beneficiaries and to confirm their mobile wallet or banking details, which are required to ensure that digital payments can be made promptly and correctly to those affected.

Standing Contracts and Emergency Procurement

As part of emergency response, the government may need to provide emergency relief goods and equipment. Procurement can take time that a government may not have in a crisis, so it is best to prepare in advance the list of items that may be needed, and to pre-screen and short-list potential suppliers for rapid provision of emergency supplies and services. Framework agreements can also be an important tool for rapid procurement in emergency situations. A framework agreement is an agreement with one or more firms that establishes the terms and conditions governing any contract awarded during the term of the agreement. It is established for the fast and efficient procurement of anticipated goods, works, or non-consulting services as and when needed, over a specified period. It does not commit either party to procure or supply. A multi-supplier framework agreement allows a client to select from a number of firms, helping to ensure that each procurement represents best value for money.

Comparing Potential Disaster Risk Financing Approaches for Sierra Leone

The Government of Sierra Leone faces a significant funding gap to manage shocks and crises. If the GoSL's response to disaster events in 2019 is taken to typify the existing approach, no more than US$11 million (Le 113 billion) could be mobilized through a budget reallocation and reserve fund to respond to events of comparable magnitude. Based on the estimated costs of response to shocks with different return periods, there would be a funding gap every other year when shocks hit Sierra Leone. Years like the year with the highest disaster cost occur approximately every 15 years on average;[19] if such a year were to happen again in the near future, approximately US$45 million (Le 461 billion) would be required to respond. The result would be a US$34 million (Le 348 billion) funding gap that would need to be addressed by the Government of Sierra Leone and its donor partners.

Figure 7 compares Sierra Leone's existing financial approach (the base strategy or strategy A) with two proposed approaches (strategies B and C).

The existing (base) strategy takes into consideration the fact that the GoSL can mobilize only US$0.5 million (Le 5 billion) through budget reallocation.

The proposed strategy B includes a contingency fund of US$11 million (Le 113 billion) (which would be used exclusively for disaster responses) and a contingent line of finance (grant or credit) of US$20 million (Le 205 billion). The contingency fund would be designed to cover more frequent events and thus would serve as the first layer of buffer to disaster events. The proposed US$11 million contingency fund is in line with the government budget of 2 percent of non-EIRs, assuming that the fund covers disaster-related costs only. A layer of contingent lines of finance (grant or credit) could be pre-arranged to cover costs that rise above the contingency fund's allowance. The proposed US$20 million (Le 205 billion) contingent finance allowance is based on the largest allowable CAT-DDO that Sierra Leone could finance through the World Bank.

The proposed strategy C further considers sovereign insurance on top of the contingency fund (US$11 million/ Le 113 billion), as well as a contingent line of grant or credit (US$20 million / Le 205 billion). The sovereign insurance instrument assumes that the GoSL transfers 50 percent of the risk to the private sector and retains the other half for potential losses of over US$31 million (Le 317 billion).

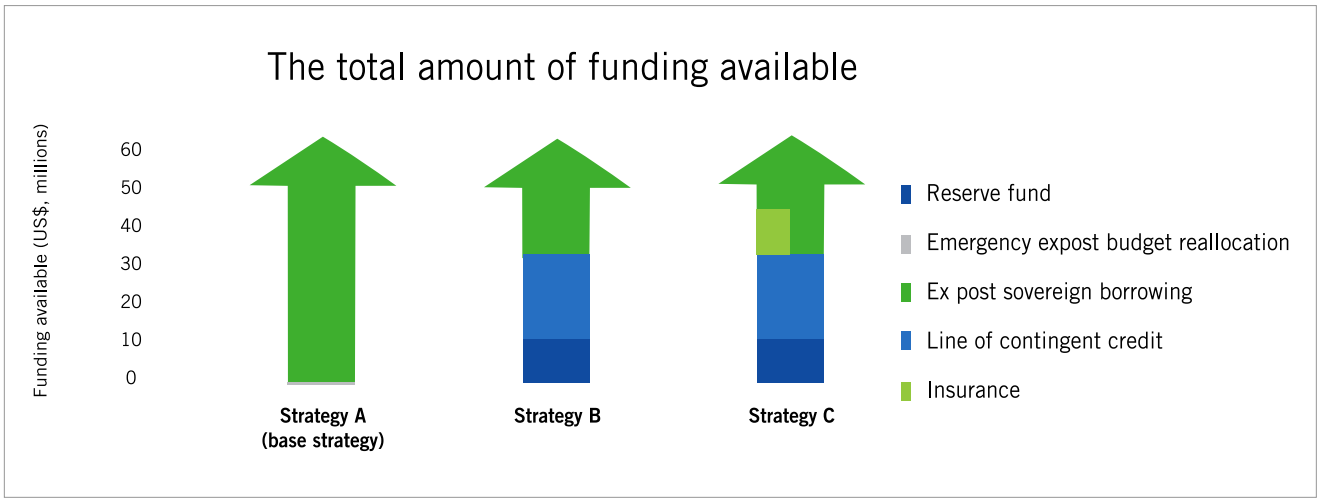
The attachment point of the insurance is chosen so that insurance can cover costs that are greater than the US$11 million (Le 113 billion) estimated for the contingency fund and the US$ 20 million (Le 205 billion) for the contingent line of finance. Based on the simulation, the insurance could start providing coverage at US$31 million (Le 317 billion)—the sum of the contingency fund and the contingent line of credit—and would be used to cover losses due to events that can happen as often as once in five years. Hence, the sovereign insurance payout would increase to cover each severe shock that Sierra Leone might encounter up to US$45 million (Le 461 billion).

The estimated average annual payout of the insurance is US$0.9 million (Le 9.2 billion), and its annual premium would cost around US$1.3 million (Le 13 billion).[20] It is assumed that the government could borrow resources from the capital market after a disaster if available resources are depleted. However, the cost of ex post sovereign borrowing can be rather high compared to other financial instruments available.

[19] The 2014 Ebola outbreak is not considered in order to compare events with relatively similar costs.

[20] The premium is calculated assuming the insurance pricing multiplier is 1.5, which means the premium equals 1.5 times the annual average loss.

Figure 7: Government Disaster Risk Financing Approaches: Existing vs. Proposed



Source: World Bank calculation based on data from Ministry of Finance and UN OCHA Financial Tracking Service, https://fts.unocha.org/.

The estimated cost of financing disaster losses through the different strategies can be compared. Opportunity cost of the different strategies refers to the financial cost of utilizing the different financial instruments in each strategy. Despite the generosity of donor financing, particularly for the 2014–2016 Ebola outbreak, funding from humanitarian aid can be unstable and uncertain after disaster; hence donor support is not included in the opportunity cost calculation. Instead, pre-arranged ex ante financing instruments are included as more appropriate for a coordinated post-disaster financing strategy.

Figure 8 presents the potential opportunity cost of funding a disaster response under existing and proposed approaches for different return periods. The opportunity cost is consistently lower with strategy B compared to strategy A (existing or base strategy). Strategy C incurs the lowest opportunity cost of all, as the analysis assumes that ex post sovereign borrowing carries the highest opportunity cost. Ex post sovereign borrowing forms all of strategy A and a large part of strategy B. The higher opportunity cost associated with ex post sovereign borrowing is caused by the higher marginal interest rate[21] which includes a spread to reflect the higher than usual default rate during times of crisis.

The delay period in financing through ex post borrowing further increases its opportunity cost.[22] A more cost-effective approach is to utilize multiple financial instruments that are designed to cover different layers of risk. The ex post sovereign borrowing would then act as the last resort when all other financial instruments had been exhausted.

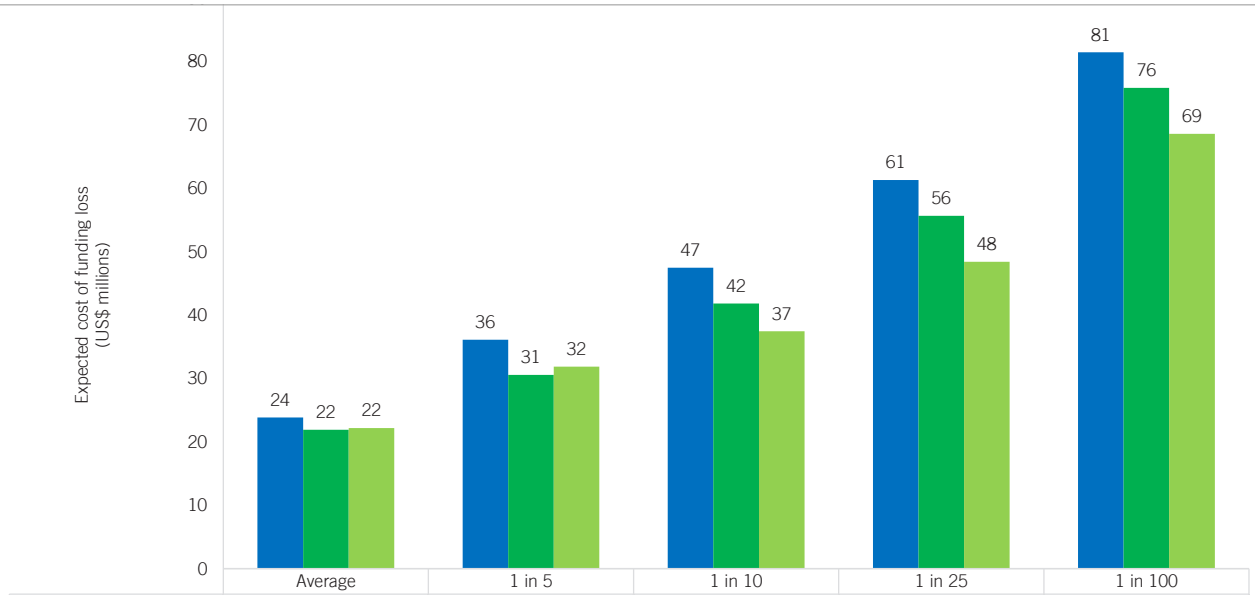
Proposed strategy B covers the layered risk with two financial instruments (other than just the ex post sovereign borrowing), as compared to none in strategy A. It therefore entails a smaller opportunity cost. Strategy C includes insurance as an additional risk transfer instrument on top of the two financial instruments proposed in strategy B. This helps to bring its opportunity cost further down. The exception is that the opportunity cost of strategy C is marginally higher than that of strategy B when damage costs are relatively low (that is, less than costs associated with a 1-in-5-year return period event), as insurance premiums are a fixed cost. When disaster costs are greater than US$31 million (Le 317 billion), and where insurance is attached, the payout starts to offset the US$1.3 million premiums (Le 13.3 billion).[23]

[21] The analysis assumes the marginal interest rate for ex post sovereign borrowing is 13 percent, whereas the contingent finance interest rate is 1.7 percent and interest rate on sovereign debt is 12.43 percent, referencing the annual yield of Sierra Leone's Treasury bill.

[22] The analysis assumes a delay period of nine months in financing through ex post borrowing.

[23] The insurance premium is based on an insurance pricing multiple of 1.5, which is applicable to the annual average loss of US$0.9 million.

Figure 8: Opportunity Costs of Funding Disaster Responses (US$, millions)



	Average	1 in 5	1 in 10	1 in 25	1 in 100
Strategy A (base strategy)	24	36	47	61	81
Strategy B	22	31	42	56	76
Strategy C	22	32	37	48	69

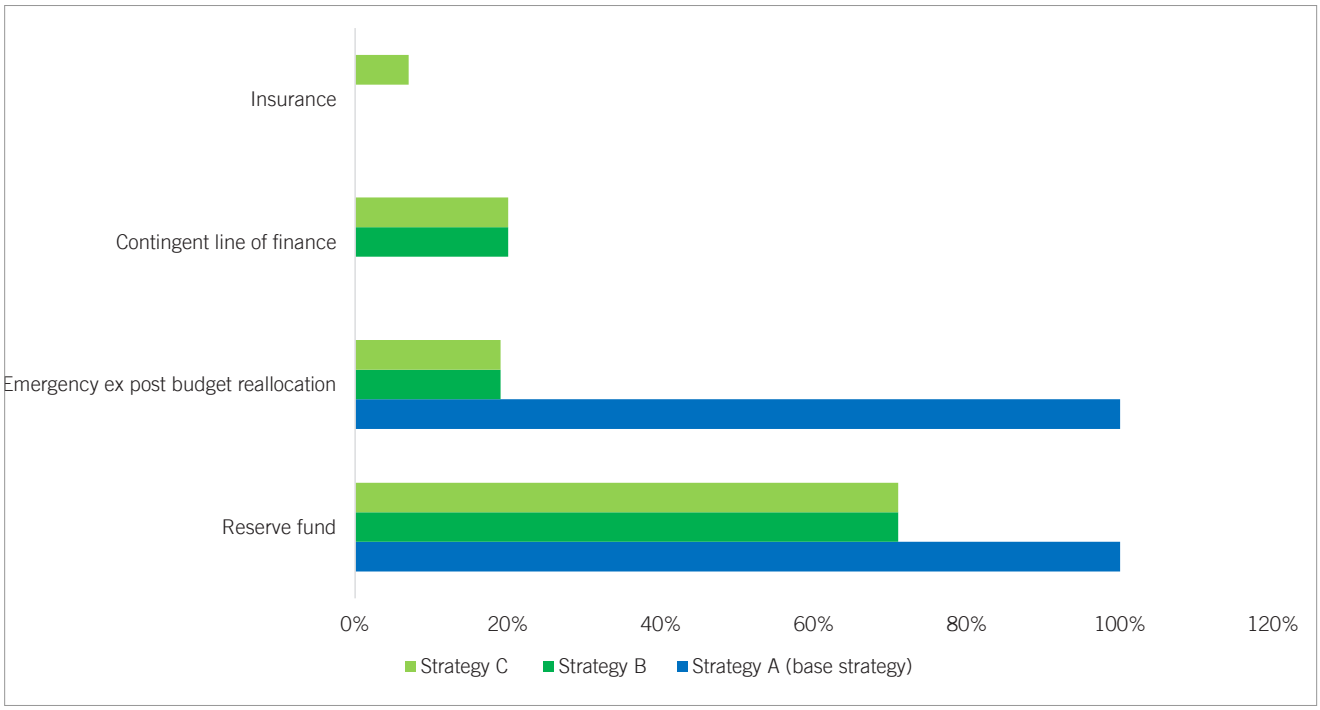
Source: World Bank.

The Government of Sierra Leone could achieve significant cost savings under the proposed approaches. Based on the evaluation framework developed by the World Bank for risk financing strategies (Clarke and others 2017), both proposed approaches would lead to an average savings on disaster response costs of US$2 million (Le 20.5 billion) per year. For extreme shocks, the proposed approaches would lead to even more significant cost savings: US$5 million (Le 51 billion) and US$12 million (Le 123 billion) under proposed strategies B and C, respectively. These savings arise in part by avoiding budget reallocations and in part by limiting ex post borrowing, which is costly during disaster scenarios[24]. Utilizing insurance under proposed approach C helps to further reduce funding costs for extreme and infrequent shocks.

The Government of Sierra Leone can stabilize its fiscal budget and minimize the chance of exhausting all ex ante financial instruments by implementing a DRF strategy. An appropriate DRF strategy should ensure available funding is effectively and efficiently used by minimizing the chance that pre-arranged instruments will be utilized in full too early. When all ex ante financial instruments are depleted, the GoSL will have to source additional ex post resources to cover the outstanding disaster response costs. This necessity would increase the time of the response, affect the well-being of people, and reduce the cost-effectiveness of using public funds. Of the three strategies evaluated, strategy C is least likely to exhaust all ex ante instruments. This also helps to decrease its reliance on ex post sovereign borrowing (figure 9).

[24] The analysis assumes the marginal interest rate on ex post sovereign borrowing to be 13 percent.

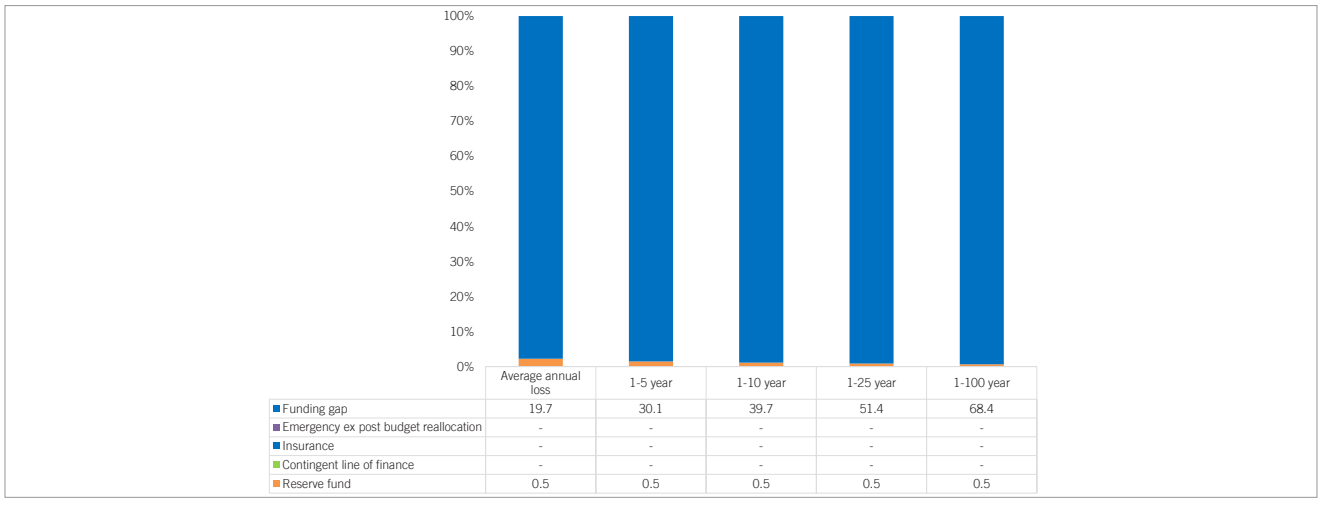
Figure 9: Chance of Each Instrument Being Fully Drawn over the Next Year



Source: World Bank.

The Government of Sierra Leone can minimize the funding gap for disaster response costs with the proposed Strategies B and C, thereby further speeding the recovery process. Strategies B and C prevent funding gaps for long-term average losses and low-severity events (that is, 1-in-5-year events). Strategy C further brings down the funding gap for medium-size events (that is, 1-in-10-year events). This allows the country to react faster to disasters by making it less reliant on unpredictable external assistance. Resources can also be utilized more efficiently by avoiding costly ex post financing. Figures 10–12 show how each instrument is utilized at different disaster severity levels across the three DRF strategies.

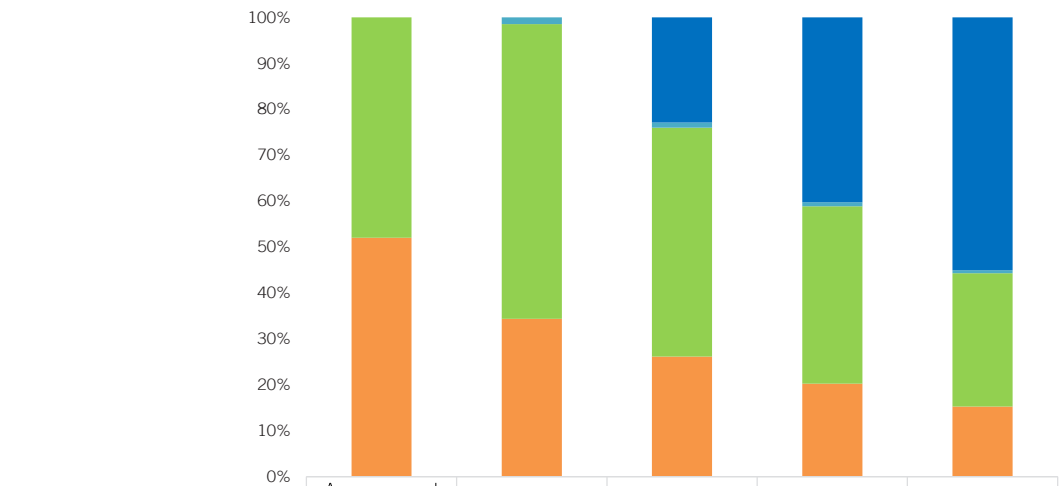
Figure 10: Utilization of Instruments by Return Period for Strategy A (base strategy) (US$, millions)



	Average annual loss	1-5 year	1-10 year	1-25 year	1-100 year
Funding gap	19.7	30.1	39.7	51.4	68.4
Emergency ex post budget reallocation	-	-	-	-	-
Insurance	-	-	-	-	-
Contingent line of finance	-	-	-	-	-
Reserve fund	0.5	0.5	0.5	0.5	0.5

Source: World Bank.

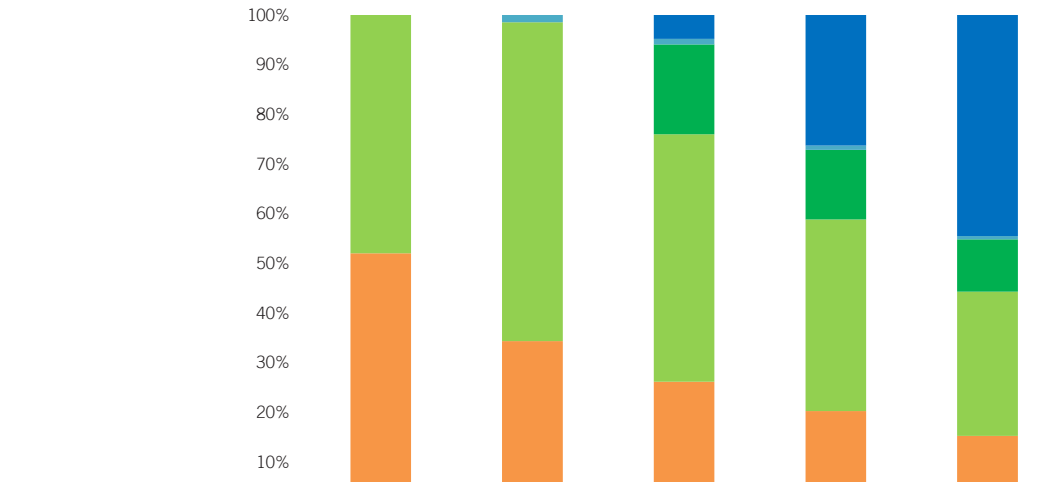
Figure 11: Utilization of Instruments by Return Period for Strategy B (US$, millions)



	Average annual loss	1-5 year	1-10 year	1-50 year	1-100 year
Funding gap	-	-	9	21	38
Emergency ex post budget reallocation	-	0.5	0.5	0.5	0.5
Insurance	-	-	-	-	-
Contingent line of finance	9.7	20	20	20	20
Reserve fund	10.5	10.5	10.5	10.5	10.5

Source: World Bank.

Figure 12: Utilization of Instruments by Return Period for Strategy C (US$, millions)



	Average annual loss	1-5 year	1-10 year	1-50 year	1-100 year
Funding gap	-	-	2	14	31
Emergency ex post budget reallocation	-	0.5	0.5	0.5	0.5
Insurance	-	-	7	7	7
Contingent line of finance	9.7	20	20	20	20
Reserve fund	10.5	10.5	10.5	10.5	10.5

Source: World Bank.

Key Recommendations

Based on the information found through the desk review and the data made available through public and government systems, the following recommendation for strengthening financial resilience to disasters are presented for the government's consideration:

• **Post-disaster expenditure tracking:** The availability of robust data on historical losses/expenditures is fundamental to making sound financial planning decisions. Good financial management of post-disaster resources entails accurately managing the complex disaster budget to ensure all bills are paid; releasing funding according to schedule; tracking and reporting expenditures to inform the project sponsor on the use of finances; performing financial analysis; and maintaining accurate financial records and documents in preparation for audits.

At present, there is no systematic way of tracking post-disaster expenditures for all events. Furthermore, there is little evidence of rules for what constitutes eligible post-disaster expenditures in the available expenditure data. To overcome this challenge, the GoSL should strengthen its public financial management systems, particularly by more robustly tracking post-disaster budget expenditures annually. Typically, a country's ministry of finance leads this activity, which allows the government to make informed decisions about how to manage post-disaster costs and determine which risks to hold on their balance sheets and which to transfer to international markets. Tracking of budget expenditures would also contribute to any decisions about potentially procuring market-based instruments in the future. In Sierra Leone, private and donor contributions form a significant part of post-disaster assistance. The country may also wish to consider tracking those as well to offer a more holistic picture of response costs in the country.

• **Trigger mechanisms:** Currently, the country does not have a very robust process for triggering a declaration of disaster. Funds are mobilized based on a subjective assessment of how serious a disaster is, and whether local disaster risk management agencies think they require support from the center. There is also no objective or data-driven way of determining whether an event is large or small. Therefore, there is no robust, documented decision-making process for how emergencies are actually triggered. The government could review the existing structure for triggering a disaster and develop a more robust process with objective criteria for decision-making. With improved data collection, the government could eventually identify more data-driven objective triggers for how funds are mobilized to manage disaster responses.

• **Pre-arranged finance:** Based on the diagnostic, the country could consider how to move toward more strategic planning of finances to deal with disasters. This effort would include setting priorities for the kinds of instruments to be developed and over what time frame. Based on these policy priorities, the Government of Sierra Leone could then seek to establish budget mobilization and execution systems to protect the relevant stakeholders from the impacts of shocks. To mobilize funding, the GoSL could explore the appropriateness of various financing instruments as part of a risk layering strategy. Typically, this work is led by a country's ministry of finance, but in close coordination with other relevant MDAs. For countries that have historically relied on humanitarian assistance, the involvement of relevant partners and donors can be useful in terms of coordination. This report offers two new approaches, i.e., strategies B and C as explained above, customized to Sierra Leone's circumstances and based on existing information. However, ultimately the country would need to determine what it wants to protect, what instrument to use for this purpose, and how much risk it wants to retain and/or transfer to markets over time.

Based on this analysis, the government could consider establishing various risk retention and risk transfer instruments that protect the country from events of varying frequencies and magnitudes. For example, this could include the following:

» *Establishing a dedicated contingency fund f*or disasters to provide timely resources in response to recurrent natural disasters. A contingency fund could be used to meet the costs of high-frequency, low-severity disaster shocks. Sierra Leone has already budgeted no more than 2 percent of its non-extractive revenues for its reserve fund. However, these funds are not exclusively used to cover disaster-related costs.

Thus, the GoSL could consider establishing a disaster-dedicated contingency fund within the Ministry of Finance with clear rules for disbursements and the replenishment of resources. Specifically, regular budget allocations could be made to the fund to ensure sufficient funding is available in the event of a disaster. Resources not used in a given year could then be used in the future. Drawing on its experience in other countries in the region, the World Bank could offer technical assistance in establishing such a fund.

An alternate option, one that can be viewed as a phased approach for a country-owned contingency fund, would be to start with the formation of a multi-donor trust fund (MDTF) established by a development partner. Since the current state in the country is such that donor contributions comprise a large share of post-emergency finances, establishing an MDTF could offer a way to ensure coordination of donor resources. It would also help to establish a robust governance mechanism with transparent rules and processes for channeling post-emergency assistance. The systems and processes designed under this MDTF could then be adapted for a contingency fund owned and managed by the government.

Regardless of the type of fund, good practice would require a systematic mechanism for capitalizing the fund beyond just donor sources, e.g., through annual allocation in the government budget.

» *Securing a contingent line of finance,* such as World Bank CAT-DDO, to complement the contingency fund and be triggered for slightly more severe events. Using a CAT-DDO, the Government of Sierra Leone could have access to a contingent grant/line of credit of up to US$20 million (Le 205 billion). This could provide immediate liquidity to address disaster shocks. Funding mobilized through a CAT-DDO could also help meet the needs associated with more severe disasters that exceed the budget of the contingency fund.

» *Purchasing market-based instruments* over time, such as an insurance policy, which could be structured to provide additional funding when the costs of responding to disasters exceed the contingency fund and contingent grant/line of credit. The Government of Sierra Leone could potentially consider sovereign insurance, for example, from the African Risk Capacity, which has introduced sovereign, parametric insurance products for outbreaks and epidemics to strengthen health systems (ARC 2019). Alternatively, domestic market insurance could be used to protect specific populations, for example, farmers, homeowners, and so on.

• **Pre-identify disbursement channels:** The country has used social protection mechanisms on three occasions to deliver post-disaster assistance. In each scenario, systems were developed on an ad hoc basis after the event. Given that the country has already seen the value of using safety nets as post-disaster delivery channels, the GoSL may consider building longer-term systems linked to pre-arranged finance that can be activated for disaster response. In the most recent scale-up of the safety net, for the COVID-19 response, the country linked the safety net to US$4 million (Le 41 billion) in contingency funds. This enabled Sierra Leone to see the fastest emergency cash transfer response to the COVID-19 pandemic in the region.

Furthermore, funding secured should be disbursed with an efficient modernized digital payment system. The national payment switch that is currently being set up should allow payment transfer to beneficiaries' mobile wallets directly so that beneficiaries without access to banks or financial institutions can still receive post-disaster relief promptly and securely. The system will also need be able to verify the identity of beneficiaries, which may involve tracking and monitoring cash flow to ensure smooth execution of digital payments at the occurrence of disasters, when funding is needed the most.

Table 1 below includes examples of recommended instruments that are currently in use or being prepared by countries in the region.

Table 1. Regional Instruments in Development or in Use

Instrument	Examples of countries with instrument (in place or in development)
Contingency funds	Mozambique (in place) Malawi (in development) Cabo Verde (in development) Madagascar (in development)
Catastrophe Deferred Drawdown Option	Seychelles (in place) Kenya (in place) Cabo Verde (in place) Malawi (in place) Madagascar (in place) Benin (in development) Lesotho (in development) Senegal (in development) Mauritius (in development)
Market-based instruments	Kenya (livestock insurance in place) Malawi (agriculture insurance in place; parametric insurance for social safety net in development) Mozambique (flood insurance in development) Rwanda (agriculture insurance in place)
Pre-identified disbursement channels	Ethiopia (well-developed shock-responsive safety net) Kenya (well-developed shock-responsive safety net) Uganda (well-developed shock-responsive safety net)

Credit: Photo by Dominic Chavez from World Bank Flickr

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Annex 1: Data on Disaster Response Costs and Post-Disaster Expenditures

Floods and Landslides (2017)

On August 14, 2017, Freetown experienced one of its most severe landslides, leading to massive human suffering, with over 1,141 declared dead or missing and over 6,000 people affected. The landslide also caused major destruction of infrastructure, including 349 building, bridges, roads, schools, and health facilities. On the same day, a flooding incident in the city damaged infrastructure and affected households. The magnitude of the disaster necessitated a level two national state of emergency on August 16, 2017.

Table 2 summarizes the estimated damages and losses by sector. According to the DALA, the housing sector (real estate) experienced the most extensive damages and losses, amounting to Le 115.46 billion (US$15.39 million), or 48.6 percent of the total damages and losses. This was followed by social protection, amounting to US$4.85 million, or 15.3 percent of damages and losses, and health, amounting to US$4.69 million, or 14.8 percent of damages and losses.

Table 2: Total Damages and Losses of 2017 Floods and Landslides (US$, millions)

Sector	Total damages and losses	Sector damages and losses as a percentage of the total
Housing (real estate)	15.39	48.6
Transport and drainage	0.98	3.1
Electricity and telecommunications	0.27	0.9
Water and sanitation	1.64	5.2
Health	4.69	14.8
Education	1.22	3.9
Social protection	4.85	15.3
Industry and commerce	0.82	2.6
Solid waste management	-	-
Environmental impacts	0.01	0.0
Disaster risk management	1.78	5.6
Total	31.65	
GDP (US$)	3,700.00	
Total loss as a % of GDP	0.9%	

Source: World Bank 2017.

Ebola Outbreak (2014 – 2018)

In 2014, an Ebola virus epidemic occurred in Sierra Leone and in the neighboring countries of Guinea and Liberia. On March 18, 2014, Guinean health officials announced the outbreak of a mysterious hemorrhagic fever that was later identified as Ebola virus disease. The disease spread rapidly in the area, reaching Sierra Leone in May 2014, and the growing number of cases led to many more infections. The country subsequently declared a state of emergency. As the situation worsened with increasing cases and deaths per day, humanitarian assistance was provided to support the medical teams and health workers. The total humanitarian aid received in Sierra Leone amounted to US$720 million (Le 7.400 billion). Table 3 provides a detailed list of donors assisting Sierra Leone during the Ebola outbreak.

Table 3: Total Donor Assistance to Sierra Leone During the Ebola Outbreak, 2014–2018

Donor agency	Disbursed (US$)				
	2014	2015	2016	2017	2018
African Development Bank (AfDB)	39,931,433				
Canada: Public Health Agency of Canada	8,527				
Canadian International Development Agency (CIDA)	1,505,012				
Central Emergency Response Fund (CERF)	7,000,000				
Department for International Development (DFID), United Kingdom	212,987,876	258,912,105	39,128,571	23,969,059	684,370
European Union (EU)	16,896,000				
European Union Humanitarian Aid and Civil Protection Department (ECHO)	15,426				
Food and Agriculture Organization (FAO)	120,000	344,467			
Government of Australia					
Government of Austria	263,000				

Government of Canada					
Government of China	2,396,500				
Government of Denmark	182,249				
Government of Finland	2,182,400				
Government of Gambia	500,000				
Government of Germany	2,227,937	251,656	4,520,100	4,785,278	
Government of Italy	6,464,000				
Government of Japan	550,000	1,521,782			
Government of Netherlands	321,537				
Government of Nigeria	500,000				
Government of Norway					
Government of Spain	198,000				
Government of Sweden	1,866,795				
International Organization for Migration (IOM)		489,656			
Irish Aid	12,095,570	1,017,685			
Islamic Development Bank (IDB)		500,000	37,500	164,133	
Office for the Coordination of Humanitarian Affairs (OCHA), United Nations	49,269				

Organization of the Petroleum Exporting Countries (OPEC)	500,000				
United States Centers for Disease Control and Prevention	253,206	193,841			
United States Department of State					
United Nations Children's Emergency Fund (UNICEF)	391,329				
United Nations Development Programme (UNDP)	89,637	3,507,267		132,391	
United Nations Mission for Ebola Emergency Response (UNMEER)		44,204			
United Nations Population Fund (UNFPA)	514,000	506,000			
United Nations Programme on HIV and AIDS (UNAIDS)		29,340			
United States Agency for International Development (USAID)	108,586,514	45,472,363			
United States Embassy	100,000				
World Health Organization (WHO)					
World Bank	27,900,000	61,098,881	10,960,585	667,610	

Source: Ministry of Finance; Office of National Security.
Note: This table was generated on June 11, 2020.

COVID-19 Pandemic (2020)

COVID-19 was first identified in Wuhan, China, at the end of 2019. It has since been found in at least 188 countries and territories across the globe, including Sierra Leone. Health officials in Sierra Leone detected the first case on March 31, 2020, and by late July 2020 had identified nearly 1,800 cases with 66 deaths. According to the World Health Organization (WHO 2020), cases were reported in 15 districts with almost 60 percent concentrated in Western Area Urban, which also accounted for the majority of deaths. Table 4 tracks the contributions for the country's COVID-19 response.

Table 4: Sierra Leone: COVID-19 Funding

COVID-19 FUNDS:

UNAUDITED RECEIPTS AND DISBURSEMENTS
(Cash Basis)
For the Period Ending December 31, 2020

		Le, Millions						
		Ministry of Health and Sanitation (MOHS)	**Integrated Health Project Adminis-tration Unit (IHPAU)**	**Ministry of Finance (MOF), Fiduciary**	**COVID FUND**	**Ministry of Finance (MOF)**	**Subtotal**	**Total**
Receipts								
	Government of Sierra Leone (GoSL)	-	-	-	-	375,000	375,000	
	Private Sector	-		-	59	8,903	8,962	
	Public Sector	-		-	500	2,820	3,320	
	Donors	-		-	251	4,147	4,399	
	Lab Testing				23,260		23,260	
	Enforcement Fines				1,048		1,048	

	Other Government Support					41,062	41,062	
Total Receipts								**457,051**
Disbursements								
	Behavioral Management	-	691	5,100	28,829	3,781	38,400	
	Case Management	-	765	9,907	60,289	42,400	113,362	
	Operational Coordination	-	3,854	22,656	136,835	19,059	182,404	
	Isolation/ Quarantine	-	236	14,058	11,108	-	25,402	
	Surveillance	5,000	507	5,520	22,691	-	33,718	
	Testing	-	39	1,863	28,393	-	30,295	
Total Disbursements								**423,580**
	Excess of Receipts over Disbursements							33,471
	Represented by Account Balances as of December 31, 2020							

	Bank of Sierra Leone (US$)					630		630
	Bank of Sierra Leone (Le)					-5393		(5,393)
Operational Accounts	Sierra Leone Commercial Bank				2,612	-		2,612
	United Bank of Africa				11,313			11,313
Testing Accounts	Union Trust Bank				4,217			4,217
	Ecobank SL Ltd (US$)				1,691			1,691
	Ecobank SL Ltd (Le)				11,423			11,423
	Orange Money				4,926			4,926
	Africell Money				1,003			1,003
CEMS	Rokel Commercial Bank				1,048			1,048
								33,471

Source: Sierra Leone Ministry of Finance.

Annex 2: Government Expenditures for Post-disaster Events after 2015

This table provides information on number of people affected by various disasters from 2015-2020, and also indexes the, by geographical information. The table also provides government's contributions towards managing the disasters listed in the table.

Table 5: Historical Disasters in Sierra Leone, Including Government Response Cost and Magnitude of Disasters as Measured by Population and Number of Households Affected

Year	Type of Disaster	Date	Disaster by Geographical Location	Affected Area	No. of Affected Population	No. of Affected Households	Government's Contribution (Le)
2015	FLOODS	September	Freetown	Freetown	14,050	2,423	
			South	Bo	3,178	490	
			East	Pujehun	2,309	378	
			South	Bonthe	4,650	642	
			North	Port Loko	250	24	
	FIRE	December	South	Kassiwo Village, Buhol Section, Nongoba Bullom Chiefdom, Bonthe District	252	61	
TOTAL					**24,698**	**4,018**	**4,273,807,687**
2016	FLOODS	September	Freetown	Freetown; Kroobay, Greybush, KissyBrook	859	119	
	FIRE	December	Bombali	Rogbom Village, Sanda Loko Chiefdom, Bombali District	374	50	
TOTAL					**1,233**	**169**	**97,835,000**

2017	**FIRE**	January	Freetown	Susan's Bay, Western Urban, Freetown	2,125	425	
			Freetown	Kolleh Town, Ascention Town, Western Urban	181	49	
			Freetown	Kolleh Town, Ascention Town, Western Urban	568	97	
	WINDSTORM		North	Mile 91, Yoni Chiefdom	713	213	
			North	RochainSal (Tai Salcost) Makampa Section, Sanda Loko Chiefdom, Bombali District	198	33	
			North	Tambaima -Town, Bombali District	105	13	
			North	Magboema Village, Bombali District	72	12	
	FLOODING	June	Eastern	Largo Town - Nongowa, Foindu Town- Lower Bambara Chiefdom Kenema District	444	74	
	MUDSLIDE/ FLOODING	August	Freetown	Regent, Kamayama, Kaningo, Dwazack, Culvert, Juba	3,379	562	2,063,933,352
TOTAL					**7,341**	**1,478**	**2,063,933,352**
2018	**WINDSTORM**	March	East	Dambo Village, Njaluahun Kailahun District	484	86	85,404,000
		June		Mamamah	910	221	119,500,000
			East	Gorahun Town, Tunkia Chiefdom, Kenema	962	135	136,820,000
			North	Makeni	700	215	124,680,000
			South	Bo City, Kakua Chiefdom	3,503	538	8,300,000
		`	North	Thalia Village, Kamukeh Chiefdom, Koinadugu District	111	43	22,508

				Boajibu Village, Simbaru Chiefdom	189	29	10,620,000
			North	Gbentu Village, Folosamba Kamba, Falaba District	132	48	17,820,000
			South	Gobaru Kpanga, Krim Chiefdom Yornie and Taninahun Villages, Pujehun District	872	154	65,600,000
			North	Kafuya Village, Dangawali, Kamadu Yiraia Falaba Dist	45	18	21,100,000
			North	Makeni	700	215	124,680,000
	FIRE	April	South	Tissor Village, Peri Chiefdom, Pujehun District	263	29	32,886,000
			South	Gbandi Village, Kpaka Pujehun District	302	29	31,736,000
		May	South	Jorya Village, Kamajei Chiefdom, Moyamba District	106	29	35,760,000
			South	Plaintain Island, Kargboro Chiefdom, Moyamba District	68	24	30,840,000
		May	Freetown	Bern Lane Off Wilkinson Road	418	92	1,930,000
			Freetown	Susans Bay	127	29	
		August	Freetown	Sumaila Town	71	14	840,000
				TOTAL	9,963	1,948	Le 848,538,508
	FIRE	April	Freetown	Kroobay	1,412	387	67,980,000

2019	FLOODS	June	South	Gbaima Bo	309	56	
			Freetown	Susans Bay	1,155	184	
			South	Blama Small B0	426	71	
			East	Kpetewoma Section/Coker Town - Nongowa Chiefdom in Kenema District	1,560	260	
			East	Kalawa Section, Gorama Mende Chiefdom	237	29	
			East	Kpetewoma Section, Coker Town, Mongowa Chiefdom	1,560	331	
			East	Gbo-Lambayama Section, Nongowa Chiefdom	10	2	
			South	Blama Town, Small Bo Chiefdom	426	67	
		August	Freetown	Freetown, Wellington, Tombo, Hamilton, Lakka, Waterloo	5,556	1,140	
			East	Sulima Pujehun	719	93	
			East	Malleh Pujehun	85	14	
			East	Daru	1,125	213	
			East	Nyawama Section	296	57	
			East	Buwaama Section, Daru	229	43	
			East	Sannoh Town, Njaluahun Kailahun	196	43	
			East	Police Barracks	48	11	
			East	Benduma Road, Daru	55	9	
			East	Ngayama Section	119	16	
			East	New London, Daru	52	12	
			East	Daru Joyama	130	22	
	FLOODS	September	Freetown	Lakka	224	49	
	Fire	July	North	Magburaka	30	17	3,599,000
	Floods	July	Freetown	Hamilton Village	109	58	1,665,000
		August	Freetown	Tombo		135	44,000,000
		July	South	Sulima Malleh, Sorogbeima Chiefdom	804	107	18,900,000
		August	Freetown	Wellington, Kuntorloh, Bathurst, Walter Street	39,783	8,214	22,000,000
				TOTAL	66,618	13,588	158,144,000
2020	WINDSTORM	June	East	Sorogbeima	2,492	348	367,924,000
	FIRE		Freetown	Dan Street	141	39	16,790,000
			Freetown	Milton Margai School for the Blind	25	7	2,700,000
			North	Kambie Village, Sella Limba	79	29	10,513,000
	FLOODs		North	Mansofonia Village	35	7	2,110,000
			South	Bonthe	585	120	57,575,000
			South	Bandaka Village, Pujehun	189	71	13,024,000
			North	Yeliboya	125	57	14,500,000
				TOTAL	3,671	678	485,136,000
GRAND TOTAL					61,199	10,964	7,927,394,547
	Government contributions for 2015, 2016, 2017, 2018, 2019, and 2020 = Le 7,927,394,547						

Source: Sierra Leone Ministry of Finance.

Note: Donor partners contributed to a majority of disaster relief needs. Disaster response entails much more than these expenditures.

Annex 3: Social Protection Benefit Packages in Response to the 2017 Mudslide

Table 6 provides a breakdown of the humanitarian cash transfers (funded by DFID). These comprised funds to support basic needs, rent support, and food assistance (funded by the World Food Programme).

Table 6: Social Protection Benefit Package for 2017 Mudslide

PROPOSED CASH TRANSFER VALUE								
	#	Rate (US$)	Unit	%	Frequency	TOTAL (US$)	ESTIMATE EXPLANATIONS	
Education Support								
School Costs - Primary	1	7.00	Annual fee	100%	1	7.00	On the understanding that there is a Free Quality School Education (FQE) for BSE? Spell out	
School Fees - Junior Secondary	1	15.00	Annual fee	100%	1	15.00		
School Fees - Senior Secondary	1	30.00	Annual fee	100%	1	30.00		
School Kit - Uniforms	1	11.00	Fabric/uniform	100%	1	11.00		
School Kit - Uniform Tailor	1	11.00	Labor/uniform	100%	1	11.00		
School Kit - Shoes	1	11.00	Pair of shoes	100%	1	11.00		
School Kit - Books	1	4.80	Books	100%	0	-		
School Kit - Supplies (backpack, notebooks, pens)	1	8.00	Package	100%	0	-		
Subtotal Education						85.00		
Household (HH) National Financial Inclusion Strategy (NFIs)? Spell out								
Mattresses	2	35.00	Unit	100%	0	-		

Sheets	2	15.00	Unit	100%	0	-		
Blankets	2	20.00	Unit	100%	0	-		
Jerry Can (20L)	2	3.00	Unit	100%	0	-		
Aquatabs	2	3.00	Sachet	100%	0	-		
Kitchen Utensils	1	25.00	Kitchen set	100%	1	25.00		
Clothing	1	60.00	Outfit	100%	0	-		
Mosquito Net	2	7.19	Net	100%	0	-	Will be provided as part of the GoSL anti-malaria campaign.	
Dignity Kits (soap, underwear, menstruation materials, towels)	1		Kit	100%	1	-	Will be provided as part of the supplies.	
Subtotal NFIs						25.00		
Shelter Assistance								
Rent	1	200.00	As a lump sum	100%	1	200.00	* Based on shelter costs (if shelters require payment). Estimate: $33/month rent in basic Freetown home.	
Subtotal Shelter						200.00		
Food (only if institutions doing wet feeding end support)								
HH Monthly Food Coverage	1	87.00	Month	100%	0	-	* US$58 = established minimum food basket by institutions supplying food	
Subtotal Food						-		
Medical Assistance (likely not necessary as medical actors continue to intervene)								

Oral Rehydration Tablets	3	0.13	Month	100%	0	-	* Estimated as support to 1/2 family to address the most vulnerable (Pregnant and Lactating Women (PLW), Children Under 5 years of age (CU5)). Not included in the package as it is assumed that these will be provided in the response.	
Malarial Medication	3	2.61	Month	100%	0	-		
Typhoid Medication	3	3.92	Month	100%	0	-		
Subtotal Medical Assistance						-		
Livelihood Assistance								
HH Livelihood Recovery Grant	1	109.00	Lump sum	100%	0	-	* Estimate based on US$50 Ebola livelihood recovery assistance in rural areas; doubled for urban context and the ongoing World Bank/European Union/GoSL Emergency Cash Transfer on QERAP? for COVID-19 response in urban cities.	
Subtotal Livelihood Assistance						-		
Documentation Recovery Assistance								
Medical Card Replacement Fee	6	2.00	Fee	100%	0	-	* Government needs to provide estimated cost for recovery fees.	
Birth Certificate Replacement Fee	6	2.00	Fee	100%	0	-	* Government needs to provide estimated cost for recovery fees.	
Subtotal Shelter						-		
TOTAL TRANSFER PER HOUSEHOLD						US$310.00		

Source: National Commission for Social Action (NaCSA).

Annex 4: Assumptions and Limitations of the Diagnostic Analysis

Disaster-related response costs - Disaster costs can be broken down into three main components (i) humanitarian funding; (ii) private donor support; and (iii) disaster-related government expenditures. Each of these three components is measured and estimated separately.

i. The humanitarian funding amount is assumed to be the total funding reported to the Financial Tracking Service (FTS) of the United Nations Office for the Coordination of Humanitarian Affairs (OCHA).
ii. Private donor support is assumed to be 2 percent of total of humanitarian funding and disaster-related government expenditures. This assumption is based on the COVID-19 report published by the Ministry of Finance at the end of 2020.
iii. The Government of Sierra Leone's disaster-related expenditures are available from 2015 to 2020. However, similar data for 2010–2014 are not readily available. Therefore, these expenditures were estimated using the average cost-per-person approach. The US$13 (Le 133,000) average cost per person is estimated through the disaster costs and affected population for each historical disaster record since 2015. These data were provided by the Ministry of Finance. See table 7 for the average cost-per-person calculation between 2015 and 2020

Table 7. Average Cost-Per-Person Calculation

Year	No. of affected population	No. of affected households	Government's Contribution(Le)	Government's Contribution(US$)	Cost per person (Le)	Cost per person (US$)	Average cost per person (Le)	Average cost per person (US$)
2015 (5 Floods, 1 Fire)	24,698	4,018	4,273,807,687	432,009	173,043	17	125,540	13
2016 (1 Flood, 1 Fire)	1,233	169	97,835,000	9,889	79,347	8	125,540	13
2017 (1 Flood, 3 Fires, 4 Windstroms, 1 Mudslide)	7,341	1,478	2,063,933,352	208,629	281,152	28	125,540	13
2018 (7 Fires, 11 Windstroms)	9,963	1,948	848,538,508	85,773	85,169	9	125,540	13
2019 (26 Floods, 2 Fires)	66,618	13,588	158,144,000	15,986	2,374	0.2	125,540	13

2020 (4 Floods, 3 Fires, 1 Windstrom)	3,671	678	485,136,00	49,039	132,154	13	125,540	13

Source: Ministry of Finance

The population for the years 2010–2014 is based on EM-DAT data adjusted to reflect the difference in how the affected population is measured with reference to the 2015 floods. 2015 is the year where both population measures (that is, the GoSL and EM-DAT figures) are the closest to one another . For years where the EM-DAT's population information is missing, for example, year 2011, the average of the historical, affected population based on the GoSL's record is used as a proxy.

Outlier. At US$730 million (Le 7,500 billion), the 2014 Ebola outbreak damage costs were the highest of all historical disaster costs. The second costliest event was the COVID-19 pandemic, which resulted in costs of US$43 million (Le 440 billion) in 2020 alone. The difference is substantial, and it is mainly due to the significant amount of humanitarian funding received in response to the Ebola outbreak. That event is being treated as an outlier to the database and is excluded from the distribution in order to provide a better distribution fit to the remaining data. Also, Ebola and events like it require the country to pull all available resources to respond to the crisis.

Economic assumptions. The following are the main economic assumptions used in the financial strategies:

i. The interest rate of sovereign debt is 12.43 percent per year according to the annual yield of Sierra Leone's domestic treasury bill.[25]
ii. The discount factor is assumed to be the same as the sovereign debt interest rate.
iii. The contingent finance arrangement is based on the lending term for the World Bank/IDA CAT-DDO. The interest rate is assumed to be 1.7 percent per year, and the repayment term is 38 years, with a six-year grace period.[26]
iv. The insurance pricing multiple is assumed to be 1.5, and it is in line with the current insurance market conditions.
v. The interest rate of ex post sovereign borrowing is 13 percent, slightly higher than the treasury bill. It reflects the potential deterioration of macroeconomic conditions following a disaster.

Other

The analysis is based on the sample historical data for which distributions are fitted to the sample data available. The Monte Carlo simulation that generates 15,000 simulation data points represents the underlying data set. Assuming disasters' behavior in the future will be similar to their historical pattern, and with the 15,000 simulations generated, the analysis allows for small-probability events, including severe and rare events. Reoccurrence of similar events affecting the same areas or regions within a short period of time may cause additional recovery cost. The additional cost incurred is allowed for in the analysis if the historical data featured similar events, such as the chain of disaster events including flood, landslide, and mudslide that happened in the Regent, Juba/Kaningo, and Malama/Kamayama areas of Freetown in 2017.

[25] Knoema, "Interest Rate and Treasury Bill Yields in Sierra Leone," https://knoema.com/SLIR2020/interest-rate-and-treasury-bill-yields-in-sierra-leone.

[26] World Bank, "IDA Financial Products—Lending Rates and Fees," https://treasury.worldbank.org/en/about/unit/treasury/ida-financial-products/lending-rates-and-fees.

Annex 5: Consultations with Government Officials

- Rtd.General Bureh Sesay, Director General, National Disaster Management Agency
- Mr. John Rogers, NDMA
- Mr. Sinneh Mansaray, NDMA
- Mr. Ishmail Tarawallie – Former Head, Office of National Security
- Dr. Jonathan P.J. Sandy, Former Staff, ONS
- Dr. Alhassan Mansaray, Director, Fiscal Risk Division
- Mr. Joseph Fatoma, Assistant Director, FRD
- Mr. Gbessay E Swarray, Deputy Director, Budget Bureau, Ministry of Finance
- Mr. Jacob Sessie, Assistant Director, Budget Bureau, Ministry of Finance

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