Contents

Government of Sierra Leone

National Adaptation Plan

May 2021

Chapter 1

Preliminaries

1.1 Acronyms

CSO	Civil Society Organizations
GoSL	Government of Sierra Leone
LEG	UNFCCC Least Developed Countries Expert Group
NAP	National Adaptation Plan
NAPA	National Adaptation Programmes of Action
NDC	Nationally Determined Contribution
MDA	Ministries, Departments, Agencies
MTDP	Medium-term Development Plan
SL-EPA	Sierra Leone Environmental Protection Authority
SL-MET	Sierra Leone Meteorological Agency
UNFCCC	United Nations Framework Convention on Climate Change

1.2 Executive Summary

This document serves as Sierra Leone's initial National Adaptation Plan (NAP) submission to the United Nations Framework Convention on Climate Change

(UNFCCC). The National Adaptation Plan (NAP) process was established under the United Nations Framework Convention on Climate Change (UNFCCC) in 2010 as part of the Cancun Adaptation Framework. The process enables Parties to the UNFCCC to formulate and implement NAPs as a means of identifying medium- and long-term adaptation needs and for developing and implementing strategies and programs to address those needs. The NAP should be understood as a continuous, progressive, and iterative process that follows a country-driven, gender-responsive, participatory, and fully transparent approach. The objectives of the NAP process are:

- To reduce vulnerability to the impacts of climate change by building adaptive capacity and resilience; and
- To facilitate the integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programs and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate.

The Government of Sierra Leone views its NAP as a continuous, progressive and iterative process to ensure a systematic and strategic approach to climate change adaptation in all government decision making, which will facilitate institutional coordination, resource mobilization, technology transfer and—ultimately—effective adaptation actions. This document is, therefore, a step forward in building a more resilient Sierra Leone. Ultimately, the NAP vision is to "reduces vulnerability by half by 2030 through increased risk awareness, improvements in rule compliance, increased institutional capacity and an integrated gender-responsive approach to adaptation in development policy and programs across sectors and scales."

Through the process to develop this NAP, five priority sectors and two cross-cutting priorities were identified. These priorities are the central pillars that are used to guide the document and are directly connected to the Medium-Term Development Plan (2019-2023). The sectoral and cross-cutting priorities are (1) Agriculture and Food Security, (2) Water Resources and Energy, (3) Coastal Zone Management, (4) Environment, (5) Disaster management, (6) Gender Equality and Social Inclusion and (7) Hard and Soft Infrastructure.

Drawing on existing climate policies, the NAP develops programs across these priorities that can be implemented with additional resources. Additionally, it provides an institutional framework for the NAP process moving forward and ways in which the NAP can be integrated into the Medium-Term Development planning process. Finally, the NAP provides recommendations for next steps moving forward.

Chapter 2

Introduction

2.1 Overview of the NAP Process

The National Adaptation Plan (NAP) process was established under the United Nations Framework Convention on Climate Change (UNFCCC) in 2010 as part of the Cancun Adaptation Framework. The process enables Parties to the UNFCCC to formulate and implement NAPs as a means of identifying medium- and long-term adaptation needs and for developing and implementing strategies and programs to address those needs. The NAP should be understood as a continuous, progressive, and iterative process that follows a country-driven, gender-responsive, participatory, and fully transparent approach. The objectives of the NAP process are : * To reduce vulnerability to the impacts of climate change by building adaptive capacity and resilience; and * To facilitate the integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programs and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate.

In practical terms, these objectives cover not only specific projects and programs aimed at decreasing vulnerability, but also a broader evolution of governance so that climate change considerations are mainstreamed into governance processes.

2.2 NAP Vision

Sierra Leone reduces vulnerability by half by 2030 through increased risk awareness, improvements in rule compliance, increased institutional capacity and an integrated gender-responsive approach to adaptation in development policy and programs across sectors and scales.

2.3 NAP Mandate

The mandate for Sierra Leone's NAP is grounded in its National Climate Change Strategy and Action Plan and its latest Medium-Term National Development Plan (2019-2023) which includes a cluster on addressing vulnerabilities and building resilience. The NAP builds on these existing policies and supports their implementation. Additionally, the NAP is aligned with the National Climate Change Policy Framework (2012), Nationally Determined Contribution (NDC), National Communications to the UNFCCC and National Adaptation Programmes of Action (NAPA). The NAP process supports the implementation of these policies and the forthcoming updated NDC.

2.4 NAP Process in Sierra Leone

The Government of Sierra Leone (GoSL) views its NAP as a continuous, progressive and iterative process to ensure a systematic and strategic approach to climate change adaptation in all government decision making, which will facilitate institutional coordination, resource mobilization, technology transfer and—ultimately—effective adaptation actions (Government of Sierra Leone 2019).

The Government of Sierra Leone officially launched its NAP process in 2018. Representatives of the GoSL attended the training workshop on NAP formulation organized by the UNFCCC Least Developed Countries Expert Group (LEG) in Nairobi. Following this, the country developed a NAP Framework in January 2019 and a Climate Change Communications Strategy under the National Adaptation Plan in 2020. This initial NAP continues the process of developing the institutional framework for medium- and long-term adaptation planning. In summer 2020, the two lead organizations, the SL-EPA and SL-MET convened several meetings to discuss the NAP, its process and priorities.

In October 2020, an inception workshop with representatives from the national and subnational government, private sector and civil society across all identified priorities was held. This workshop raised awareness about the NAP process, engaged key stakeholders in the planning and decision-making process and collected relevant data to inform the initial NAP. During the workshop, stakeholders discussed all the key elements that are integrated into this document. This convening, along with subsequent consultations, and a policy and literature review has informed the development of the NAP as a collaborative planning process. The draft NAP was shared with internal and external stakeholders for comment, inputs and feedback. Following this review and revision, a validation workshop was held in April 2021 to finalize the NAP and integrate further comments. A list of all those consulted throughout this process and the organizations that reviewed the document are included in Annex 1.

The NAP process helps Sierra Leone to further identify and address key adaptation issues, gaps, priorities and resource requirements for more effective plan-

ning, implementation and monitoring of adaptation in support of the NDCs and the Paris Agreement. Sierra Leone recognizes that establishing synergies and linkages, where possible, between the NAP and those other key processes is essential to:

- Contributing to achieving the Global Goal on adaptation by reducing vulnerability through integrating adaptation considerations into all relevant plans, policies, and strategies, and prioritizing and plan for adaptation

- Ensuring that the adaptation component of the NDCs becomes a strategic and ambitious vehicle for capturing, reporting and updating commitments and progress
- Aligning long-term national development priorities with the SDG framework.

Through the process to develop this NAP, five priority sectors and two cross-cutting priorities were identified. These priorities are the central pillars that are used to guide the document and are directly connected to the Medium-Term Development Plan (2019-2023). The sectors are:

1. Agriculture and Food Security
2. Water Resources and Energy
3. Coastal Zone Management (including fisheries, coastal ecosystems etc.),
4. Environment (including tourism, land, mineral resources, forestry, etc.)
5. Disaster management
6. Cross-cutting priority 1: Gender Equality and Social Inclusion (focusing on youth, women, elderly, persons with disabilities)
7. Cross-cutting priority 2: Hard and Soft Infrastructure (including health, water and sanitation, transportation etc.)

2.5 Functions

The NAP includes a stock take of adaptation priorities, vulnerabilities, and measures across identified priority sectors.

The functions of this are to: * Support the development of vulnerability assessments that inform new policies, projects and programs and guide monitoring and learning * Effectively communicate adaptation priorities and ambitions for the country * Guide investments in climate change adaptation for the short and long-term * Provide a guidance for stakeholder engagement and strategic partnerships for climate change adaptation across sectors * Identify entry points for information gathering, analysis, and dissemination * Serve as a basis for resource mobilization * Support mainstreaming of gender equality and social inclusion

2.6 Guiding Principles

The guiding principles of the NAP are:

- Inclusivity (ownership and shared responsibility) - The NAP Process will be inclusive in its process and implementation and consider the needs of all stakeholders in order to foster collaboration, coordination and networking among all stakeholders involved in the NAP process and climate change adaptation initiatives.
- Participation - The NAP development and implementation will include participation of state and non-state stakeholders including vulnerable groups.
- Data generation - The NAP process will be part of a data collection effort to be able to incorporate the best available information into planning
- Transparency - The NAP development and implementation will be open to the public and make its decision-making processes open.
- Accountability - The process of developing and implementing the NAP will be guided by an open and transparent manner and guided by systems that allow the continual assessment of practice and performance.
- Learning/reflexivity- The NAP will build capacity for reflecting on national adaptation actions to foster engagement in a process of continuous policy and community learning (from experience).
- Adaptability – This NAP should be seen as the first step in a continuous process of planning, implementation, monitoring and evaluation. It should be revised in consultation with all stakeholders as new climate, vulnerability and socioeconomic information, implementation lessons and best practices are available.

- Religious and cultural leadership- The NAP will support activities that build climate-relevant religious and cultural knowledge to leverage the positive influences of religion and culture on the role local leaders play in achieving climate change adaptation outcomes at the local level.
- Ethical citizenship- NAP implementation is likely to be improved with increased public awareness and citizen buy-in in the context of how individuals conceive their rights and responsibilities and the implications of their assumptions in a changing climate.
- Integrate Gender Equality and Social Inclusion in the objectives of the NAP and in its prioritized actions - The NAP will promote an inclusive environment by ensuring institutions promote gender equality and equality of opportunity for women, children, and persons with disability.

- Capacity development- Achieving NAP goals will require strengthening human, financial, and technical capacities amongst all relevant stakeholders and institutions.

2.7 Goals

The NAP goals are the following:

- Increase resilience capacity at all scales
- Support an integrative approach to climate change adaptation programming and policymaking
- Allocate 10% of annual national budgets to climate change adaptation across sectors
- Harmonize climate-relevant policies and regulations to improve coordination and cross-sector linkages
- All local councils have adaptation mainstreamed into local development plans by 2025
- Institutionalize NAP implementation through laws, policies, and regulations
- Establish a National Trust Fund for channeling adaptation support across sectors
- Direct 40% of international development funding toward adaptation priorities across different sectors

2.8 Overview of the NAP

The plan includes eight chapters. Chapter 2 describes the national circumstances in Sierra Leone to provide a background to understand how climate risks interact with the existing development context. Chapter 3 provides the climate science basis to inform adaptation planning in Sierra Leone including impacts and vulnerabilities on priority sectors. Chapter 4 presents the existing climate policy landscape and policies and plans that are related to the NAP. Chapter 5 analyzes existing adaptation priorities in Sierra Leone's current policies. Chapter 6 provides the institutional arrangements for the NAP including the links between the NAP and the Medium-Term Development Plan, the process to integrate adaptation into development planning and the proposed coordination mechanisms. Chapter 7 presents the next steps in the NAP process including a timeline and implementation strategy

Chapter 3

National Circumstances

3.1 Introduction

Climate vulnerability is a function of exposure, sensitivity and adaptive capacity (McCarthy et al. 2001). Vulnerability to climate change is structured by economic, social, geographic, demographic, cultural, institutional, governance and environmental factors (IPCC 2012). Vulnerability to climate risks is shaped by multiple factors on the ground. This includes social inequality, unequal access to resources, poverty, poor infrastructure, lack of representation, lack of social networks, and inadequate systems of social security, early warning, and planning (Yohe and Tol 2002; Brooks, Adger, and Kelly 2005; Ribot 2009). This chapter presents the underlying conditions in the country that shape sensitivity and adaptive capacity including its geography and the socio-economic context.

3.2 Geography

Sierra Leone is located in the south-western part of West Africa. It sits between latitudes 7N and 10N of the equator and between longitude 10W and 13W of the Prime Meridian. The country has a total area of 71,740 sq. km, divided into a land area of 71,620 sq. km and water of 120 sq. km. The country is divided into four main ecological regions: coastal mangroves, the wooded hill country, an upland plateau, and the eastern mountains. Freetown is the capital. Sierra Leone is divided into four geographical or administrative regions: the Northern Province, Eastern Province, Southern Province and the Western Area. Sierra Leone has high levels of biodiversity with lowland rainforests, mountain forests, freshwater swamps, coastal ecosystems, and marine ecosystems. The coastline covers 506 km and includes sandy beaches, cliffs, lagoons, estuaries, mudflats, creeks, bays, and mangrove swamps. There are about 105,200 ha of mangroves

along this coastline (WABiCC 2019). There are eight major river systems, the Great Scarcies, Little Scarcies, Rokel/Seli, Bankasoka, Jong, Sewa, Moa, and Mano. The highest peak on the Loma Mountains is Bintumani, which rises to 1945 m while Sankan Biriwa in the Tingi Hills rises to 805m (Government of Sierra Leone 2015a).

Figure 3.1: Source: (UN 2014)

3.3 Socio-economic Context

Sierra Leone has had an unstable modern history marked by a civil war from 1991-2002 and the two-year Ebola crisis (2014-2016). These events and political instability have led to severe socio-economic repercussions and contributed to the underlying vulnerabilities which persist today.

Sierra Leone is one of the poorest countries in sub-Saharan Africa and globally, with a GDP per capita of US$499 in 2017. It ranked 182 out of 188 countries on the United Nations 2020 Human Development Index, below the average for countries with similar GDP per capita (UNDP 2020a). The overall poverty rate in Sierra Leone is 57 percent, with 10.8 percent of the population living in extreme poverty (Government of Sierra Leone 2019). Poverty rates are concentrated in rural areas where 72.4% live in poverty. In Freetown, poverty is at 18.5 percent. Poverty is spatial as the North is the poorest, followed by the South and the East. The Comprehensive Food Security and Vulnerability Analysis (CFSVA 2015) reported that 49% (3,475,135.37) of people in Sierra Leone are food insecure, of which the majority are poor smallholder farmers that are living in the rural areas of the country (Government of Sierra Leone 2018).
The population is around 7.4 million (2018). The population growth rate has increased rapidly from 1.8 percent between 1985 and 2004 to 3.2 percent between 2004 and 2015. This has led to 40 percent increase from about 5 million in 2004 to more than 7 million today. At the current rate, the population will reach 10 million people by 2026 (Government of Sierra Leone 2019). Forty percent of Sierra Leone's population are youth. There is high unemployment among low and semi-skilled youth most of whom were unable to complete their education due to the civil war.

Sierra Leone's economy is small and undiversified. Sierra Leone has a mixed economic system with prominent state enterprises and a private sector. The major sectors of the Sierra Leone's economy are minerals (diamonds, iron ore, rutile, bauxite), fisheries, tourism, agriculture, and manufacturing. The economy has grown since the end of the civil war driven by agriculture and then by mining.

There were two recent economic shocks, the Ebola epidemic and the collapse of iron ore commodity prices, which lead to shrinking GDP growth. Since then, economic growth has fluctuated. Real GDP growth was weak in 2018 at 3.5% but improved slightly to an estimated 5.0% in 2019, driven by agriculture and services, and in the first half of 2019 by extractives (AfDB 2019).

Sierra Leone is especially vulnerable to external shocks. Sierra Leone does not have any control over the price of its major imported goods, such as rice and fuel, which account for over 50 percent of total import value. Additionally, its dependence on primary commodity exports makes it more susceptible. The African Development Bank projects that international iron ore prices will is projected to decrease from $77.70 per dry metric ton in 2019 to $72.40 in 2022, which is more evidence for the need for economic diversification away from extractive industries (African Development Bank 2019). Covid-19 has added additional shocks and GDP growth is expected to fall to 1.7%. This is primarily due to the decline in commodity prices and depressed trade, FDI inflows, tourism revenue following travel restrictions and declines in remittances.

Agriculture plays a crucial role in ensuring food security, poverty reduction and improving public health. Agriculture, a women dominated sector, employs more than half of the country's formal and informal workforce, and accounts for about half of GDP (Government of Sierra Leone 2019). Although 75 percent of its land is arable, only about 10 percent is cultivated, mainly for food crops such as rice, cassava, yams, and other root crops (Government of Sierra Leone 2018). Farmers, however, have limited access to improved varieties of seeds, equipment and fertilizers. Additionally, farming is mostly rainfed, making it more vulnerable to climate impacts (Government of Sierra Leone 2018). Fisheries activities which currently contribute about 10% of GDP, is a primary livelihood for 500,000 people and a main source of animal protein for over 80% of the population. Additionally, fish processing and marketing is a sector led primarily by women, similar to agriculture, making women's work more climate sensitive (Government of Sierra Leone 2018).

3.4 Urbanization and Infrastructure

According to the African Development Bank, Sierra Leone ranked 46 out of 54 countries on the Bank's Africa Infrastructure Development Index in 2020 (AfDB 2020). This points to the significant infrastructure investment needed across all sectors including water and sanitation, health, energy, transport, and ICT. The poor infrastructural landscape in Sierra Leone has had a tremendously negative impact on economic diversification, health and livelihoods. Infrastructure is a centerpiece of the Medium-Term National Development Plan and key to Sierra Leone's long-term development goals of becoming a middle-income country.

Access to affordable and reliable electricity is essential for human development. Currently, this is severely limited in the country. Biomass from wood and char-

coal is the source of energy for 80% of the population with related significant environmental and public health impacts such as deforestation and respiratory illnesses. As Sierra Leone addresses its climate goals in an integrated way, renewable and reliable energy sources are an essential component.

Many of the major causes of death and disability in Sierra Leone can be traced to challenges with environmental health and sanitation. Most of the country's population obtain water from unsafe open water sources and waterborne diseases are very common. There is also a dearth of sanitation facilities and almost 30% of the rural population practices open defecation. Sanitation is far below the reasonable SDG target of 66% for the country and the budget allocation for the sector is less than .02 percent of GDP (Government of Sierra Leone 2019). Infrastructure issues are compounded as more people move into urban centers. In Sierra Leone, urbanization has been accelerating since the civil war. The share of the population living in urban areas almost doubled from 21% in 1967 to almost 40% in 2015, with a high concentration in the capital Freetown, which has grown to a population of more than 1 million. This growth is now rapidly increasing. From 2004 to 2015 the population has increased 43% from approximately 5 million to approximately 7 million (Statistics Sierra Leone 2016). Urbanization has not been accompanied by sufficient resources to plan and manage this fast growth and cities have lacked the financing to make the necessary investments to cope with the accelerated demand for infrastructure and services. This has climate risk implications as this can increase vulnerability for an already vulnerable population especially those in informal settlements or working in the informal sector.

Gender Issues

Women are 51% of the population and suffer from gender inequality and discrimination. Sierra Leone historically stands in the bottom ten of the Gender Development Index (UNDP 2020b). Inequalities are apparent in terms of literacy rates, per capita GDP, access to land, and legal protection. Increased poverty among women in Sierra Leone results from a combination of factors, which include: limited skills and knowledge; unfriendly market structures that concentrate women in lower paying and time-consuming work and restrict their access to capital and credit; traditional family structures perpetuating gender inequality through patriarchal norms of property ownership and inheritance; discrimination in the public domain; weak and unequal trade and economic patterns (USAID 2019).

Over the past decade, the government has developed and enacted a range of national laws, policies, and strategies to address gender inequalities. This included the passage of the three 'gender justice' laws', which respectively address domestic violence, improve women's access to land through inheritance, and strengthen women's rights in marriage and divorce through a registration process. Several government entities have also have been established to support gender equality including the Ministry of Social Welfare, Gender and Children's Affairs; the Human Rights Commission; the Family Support Unit in the Sierra

Leone Police; and the Legal Aid Board. This institutional development however, has been insufficient. For example, women occupy less than 20 percent of elected positions although the Gender Equality and Women's Empowerment Bill, which establishes a minimum of 30 percent representation of women in governance at all levels. The Medium-Term Development Plan seeks to address this issue and includes empowering women as a key focus including to support implementation of current legislation.

3.5 Environmental Issues

Unregulated development has intensified overexploitation of land and marine environments which has resulted in substantial environmental degradation, loss of habitat and biodiversity, air and water pollution and their related social and public health impacts. In 2017, the Forestry Division of the Ministry of Agriculture and Forestry (MAF) calculated that less than five percent of the country's original cover in 1990 was still intact (Office of the Chief Minister GoSL 2019). This has continued to decrease at a rate of around 100,000 hectares every year, mainly through large-scale and subsistence agriculture, commercial logging and logging for charcoal for energy (Office of the Chief Minister GoSL 2019). Mining operations have also contributed to the rates of deforestation, land degradation and destruction of farmlands, inadequate availability of clean water, poor air quality and noise pollution (Mabey et al. 2020). There are 48 forest reserves and conservation areas in Sierra Leone, representing about 4 percent of the land area (180,250 hectares), although most of them are inadequately protected and managed.

Mangrove coverage in Sierra Leone is estimated to have decreased by approximately 25% since 1990 (WABiCC 2017). About 300,000 ha of wetlands and marine ecosystems are mangrove forests that are a critical source of livelihoods and ecological support along the coastal plains of the Western Area and other riverine areas across the country. Coastal ecosystems have been severely threatened by pollution, physical alteration and destruction of habitats, over-exploitation of resources, uncontrolled development, coastal erosion and climate change (EPA-SL 2015). Environmental issues are due to a host of challenges including a weak regulatory and legal framework, policy incoherence, conflicting government mandates, low management capacity, inadequate coordination, limited public awareness and education, limited data and information and finance.

Chapter 4

Climate Impacts, Vulnerabilities and Risks

4.1 Introduction

This chapter provides the climate science basis to inform adaptation planning in Sierra Leone. The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (AR5 IPPC) indicates that Sierra Leone is among the most vulnerable African countries to the increasing frequency of climate change impacts. The country has been ranked as the third most vulnerable after Bangladesh and Guinea Bissau to impacts of climate change (Government of Sierra Leone 2015a). This chapter serves a link between the physical process of climate change and the impacts in order to understand how climate change will intersect with the existing development context presented in the previous chapter.

4.2 General Climate Characteristics

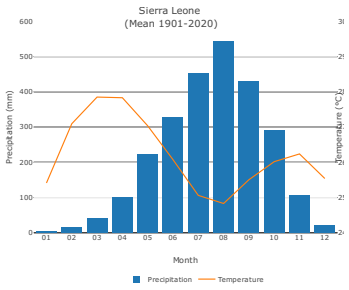
Temperature

Sierra Leone is characterized as a tropical climate. The average temperature is around 27 C. There are two seasons with different temperatures and rainfall patterns. The rainy season is from May to November and the dry season is from December to May. The average temperature during the rainy season is 22–25 degrees Celsius while the dry season is warmer with temperatures reaching 25 to 27 degrees accompanied by dry, cool winds which blow in from the Sahara Desert. Humidity during the rainy season can be up to 93% and decreases inland to about 47% as the rainfall declines. There is little variation in the day length due to the country's location near the equator. It should be noted that prior

to 2005, there were no automatic weather stations for the collection of data in Sierra Leone although the standard meteorological data was collected.

Precipitation

The rainy season is largely controlled by the movement of the tropical rain belt (also called the Inter-Tropical Convergence Zone, (ITCZ), which oscillates between the northern and southern tropics over the course of a year. During this period, the average rainfall is 2746 mm. Rainfall is highest along the coast and decreases as it moves inland (Government of Sierra Leone 2018). Along the coast it can reach 3000– 5000 mm per year while at the eastern border of the county it is 2000-2500mm (Government of Sierra Leone 2018). The average monthly rainfall peaks in July and August when the average number of rainy days is 27 (Government of Sierra Leone 2018). Weather stations were vandalized during the civil conflict which has created huge gaps in the precipitation record. There have been cases of water scarcity due to the delayed onset of the monsoon rains, and when the heavy rain has arrived there has been extensive flooding (UNDP 2012).



Normal precipitation and temperature for Sierra Leone (1981 – 2010). Data from the Climatic Research Unit CRU.CY.4.04 dataset (Harris et al., 2020).

4.3 Historical observations to assess variability, trends and extremes

Temperature Mean temperature in Sierra Leone has been above normal in recent decades (figures 1a and 1b). A signal of warming in Sierra Leone's is found in relation to base-periods 1961-1990 and 1981-2010. An overall warming of the country is more evident when anomalies are calculated using 1961-1990 as a base period, with increasing positive anomalies since the late 1980's. On the other hand, when anomalies are calculated using the base period 1981-2010, a constant warming is observed in at least the last two decades.

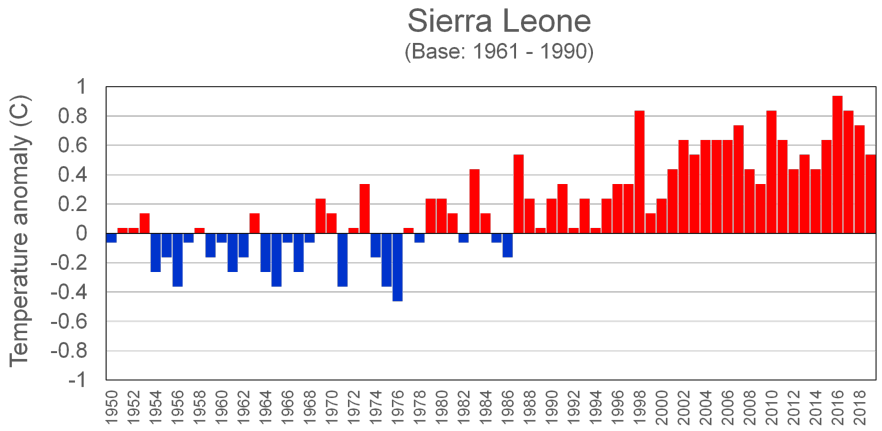


Figure 4.1: Fig. 1a. Annual temperature anomalies (C) for Sierra Leone (1950 – 2019) in relation to the 1961 -1990 mean, calculated from the Climatic Research Unit CRU.CY.4.04 dataset (Harris et al., 2020).

Based on the European reanalysis (ERA5; C3S, 2017), using 98 ERA5 daily temperature grid points over Sierra Leone, climate change indices and sector-specific climate indices reveal the picture of how climate change has impacted temperature in recent years at the country level. Climate indices (figure 1c) have been produced with Climpact3 -a software that allows calculation of climate indices from daily precipitation and temperature data (Alexander and Herold 2015).
Overall, between 1981 and 2019 (in relation to the base-period 1981-2010), evidence is found of a decrease in the diurnal temperature range (the difference between maximum and minimum temperature is decreasing); in addition, the annual percentage of cold nights (Tx10p, days when Tn $<$ 10th percentile) and the annual percentage of cold days (Tx10p, days when Tx $<$ 10th percentile) present a decreasing trend for the last 40 years (figure 2, a,b,c).

On the other hand, for the same period, increasing trends are evident in the

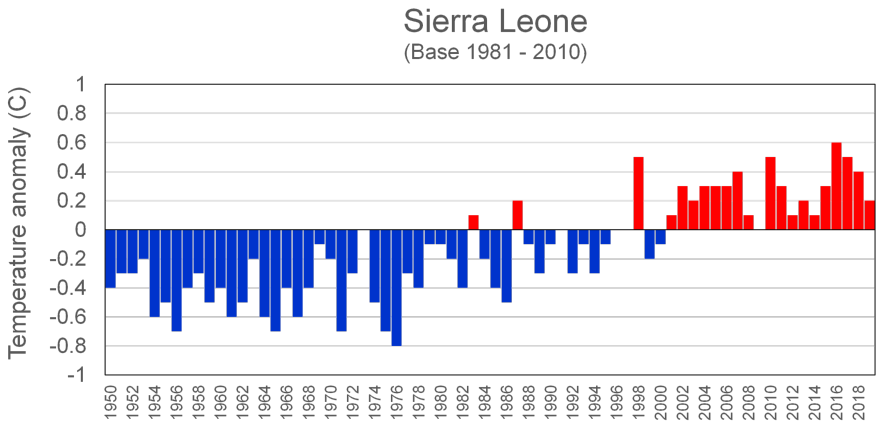


Figure 4.2: Fig. 1b. Annual temperature anomalies (C) for Sierra Leone (1950 – 2019) in relation to the 1981 -2010 mean, calculated from the Climatic Research Unit CRU.CY.4.04 dataset (Harris et al., 2020).

frequency of days with maximum temperature above the median (Txgt50p), as they are in the indices of warm nights (Tn90p, days when Tn > 90th percentile) and warm days (Tx90p, days when Tx > 90th percentile), (figure 2, d, e, f). These changes in temperature in Sierra Leone are found in all temperatures: the annual mean daily mean, the annual coldest daily minimum and the annual warmest daily temperature (figure 2 g, h, i). It is important to note that apart from the general trends detected, interannual variability lays in the background of the climate changes, making it imperative to develop adaptation strategies for both, positive and negative anomalies.

Precipitation

There has also been evidence of changes in rainfall patterns (Government of Sierra Leone 2018). Assessment of the long-term (1960 – 2003) rainfall conditions by McSweeney et al. (2010), demonstrated that the average annual rainfall overall has decreased since 1960. There are, however, year to year fluctuations. Additionally, there have been rotating periods of wetter and drier conditions. The 1960s and late 1970s were particularly wet, while the early 1970s and 1980s were very dry. In 2005 and 2006, rainfall was very low. There are also seasonal precipitation changes. From September to November, there is now calmer and dryer weather where previously the period was characterized by frequent thunder and lightning and short but heavy rainfall (Government of Sierra Leone 2018). However, year to year variations could also result in heavy precipitation events. For example, most of west tropical Africa was affected by floods due to above normal precipitation during some months of the year (WMO 2020).

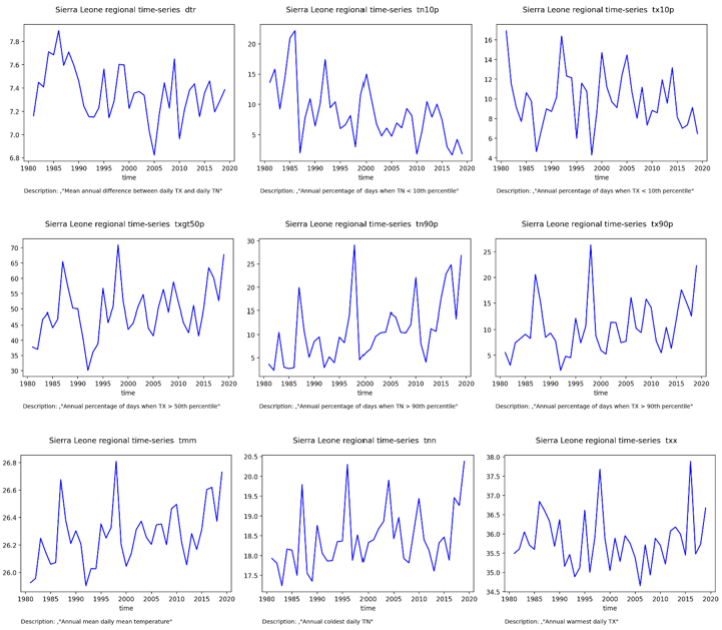


Figure 4.3: Fig. 2. Regional timeseries of climate indices for Sierra Leona 1981-2029 in relation to the 1981 -2010 mean. From left to right: (a) DTR (-); (b) Tn10p (-); (c) Tx10p (-); (d) Txgt50p (+); (e) Tn90p (+); (f) Tx90p (+); (g) Tmm (+); (h) Tnn (+); (i) Txx (+); where (+/-) denote (positive/negative) trends. Vazquez-Aguirre et al., 2021.

Extreme Events

Sierra Leone has been experiencing strong winds, thunderstorms, landslides, heat waves, floods, and seasonal drought (Government of Sierra Leone 2018). It has also been observed that the pre-monsoon period (April-June) has stronger winds and more frequent rainstorms. Extreme weather events-induced floods accounted for 90% of people affected by disaster in Sierra Leone (Government of Sierra Leone 2018).. From 1980 to 2010, floods affected 221,204 people and killed 145 people, representing about 11% of people killed by disaster (Government of Sierra Leone 2018). The whole country is vulnerable. More specifically, the most affected areas during these last years include: Kroo Bay, Susan's Bay, Granville Brook, Lumley area in Western Area, Port Loko and Kambia Districts, the Newton catchment area, Pujehun and Bo areas, Kenema and Moyamba Districts, and coastal beaches of the Western Area Peninsular (UNDP 2012). More recently, in August 2017 flooding and mudslides in Freetown killed more than 500 people.

4.4 Climate change overview: projected changes of key climate characteristics

Temperature

Various General Circulation Models (GCMs) have been used to develop climate change scenarios for Sierra Leone. The climate models (HADCM2, UKTR, CSIRO, ECHAM and UKMOEQ) indicate a steady increase in temperature with little inter-model variance. By 2060, there is an estimated 1–2.5°C increase in average temperatures by 2060 with more rapid warming inland (USAID 2016). The models predict an increase in temperature of about 5°C by 2100 (Government of Sierra Leone 2018). Specifically, for Freetown, there is a median change of 0.61°C from 2011-2040 compared to 1981-2010 (RCP 4.5). For the time period 2011–2040 compared to 1981–2010 (RCP 4.5), the monthly mean change lies between 0.26°C and 1.3°C (SMHI 2021). For the near-term future (2011-2040), climate indicators (SMHI, 2021) derived from the ensemble mean of bias corrected models in CORDEX Africa, indicate that temperature in Sierra Leone relative to the recent past (1971 – 2000) will increase in at least 1 C (medium emissions, RCP 4.5, figure 4a) and up to 1.5 C (high emissions, RCP 8.5, figure 4b) in the near future (2011 – 2040). The northern half of the country having the highest temperature increases in both cases.

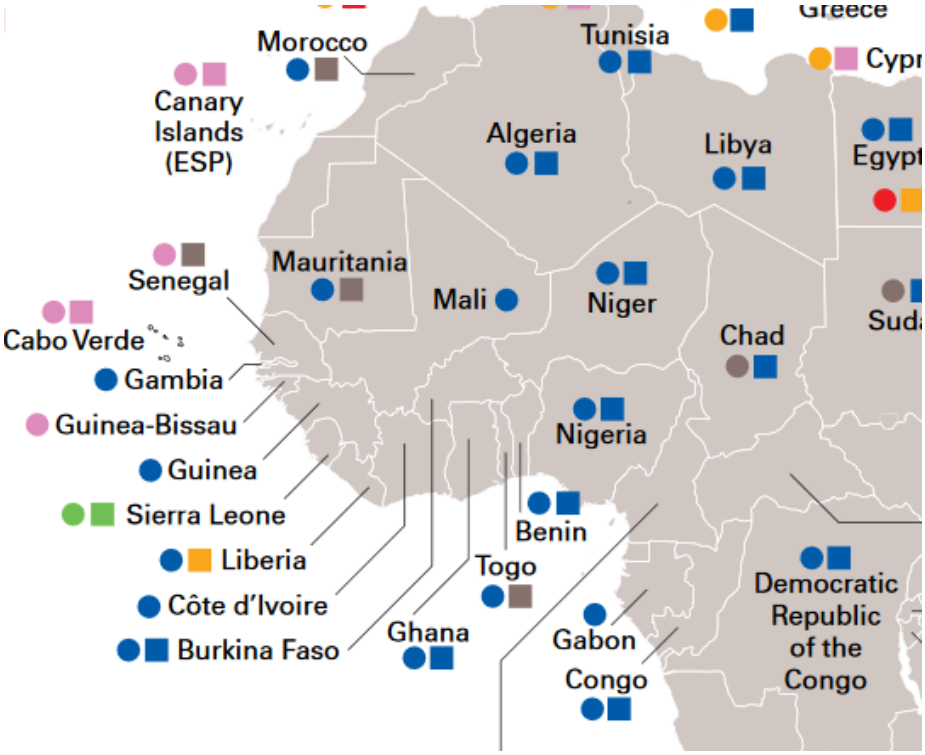


Figure 4.4: Figure 3: Map of deadliest and most costly weather, water and climate related hazards for each country (Source: WMO analysis of 1970-2019 data from the Emergency Events Database of the Centre for Research on the Epidemiology of Disasters, CRED)

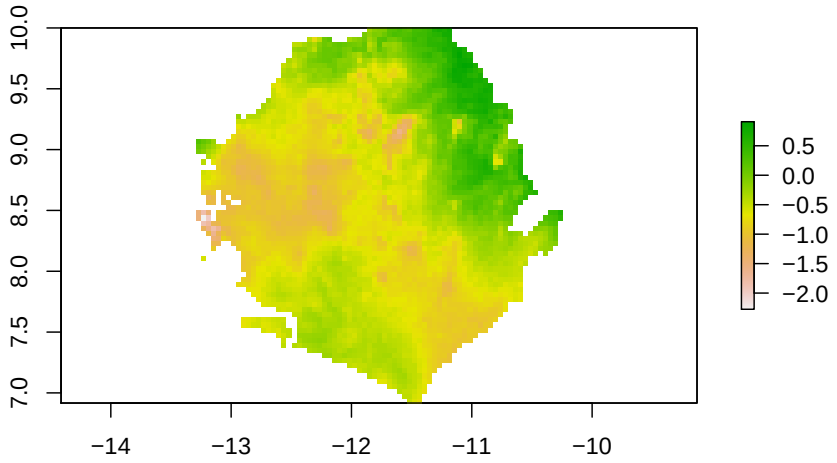


Fig. 4a. Mean temperature change (C) for Sierra Leone for 2020 – 2040 compared to reference period 1971 – 2000 for the medium emissions scenario (ssp245). BCC-CSM2-MR Model

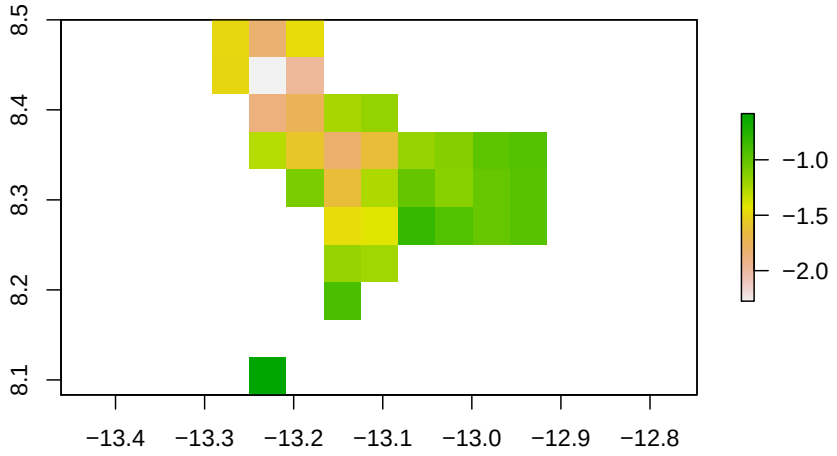


Fig. xx Mean temperature change (C) for Western & Southern Sierra Leone for 2020 – 2040 compared to reference period 1971 – 2000 for the medium

emissions scenario (ssp245). BCC-CSM2-MR Model

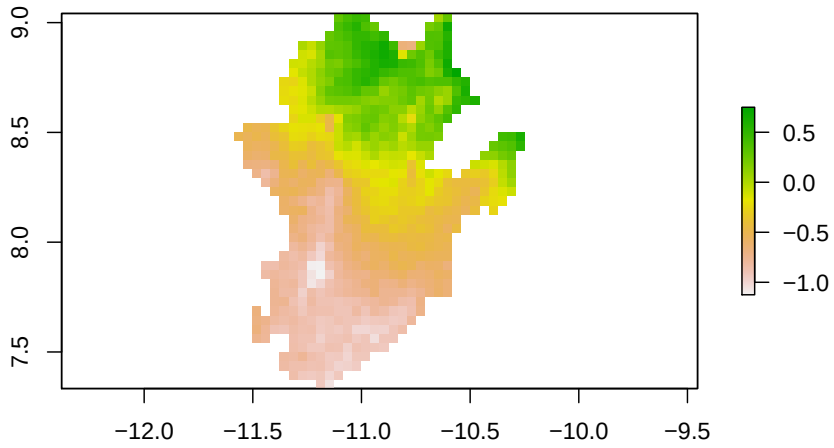


Fig. xx Mean temperature change (C) for Eastern & Northern Sierra Leone for 2020 – 2040 compared to reference period 1971 – 2000 for the medium emissions scenario (ssp245). BCC-CSM2-MR Model

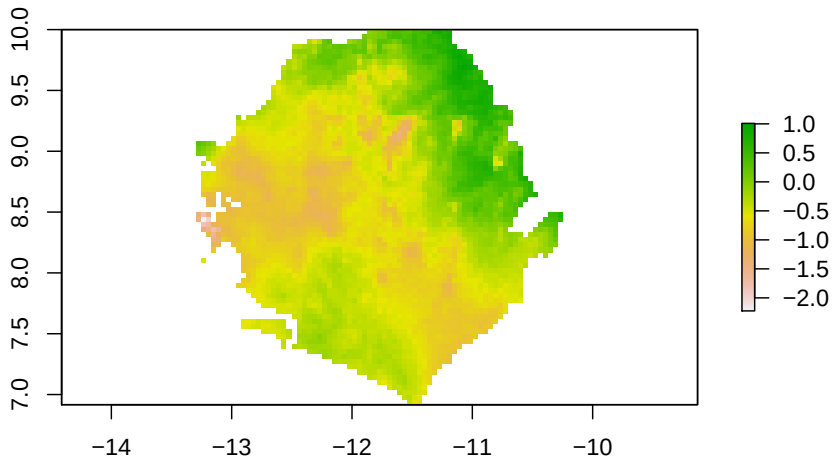


Fig. 4b. Mean temperature change (C) for Sierra Leone for 2020 – 2040 compared to reference period 1971 – 2000 for the high emissions scenario (585). BCC-CSM2-MR Model.

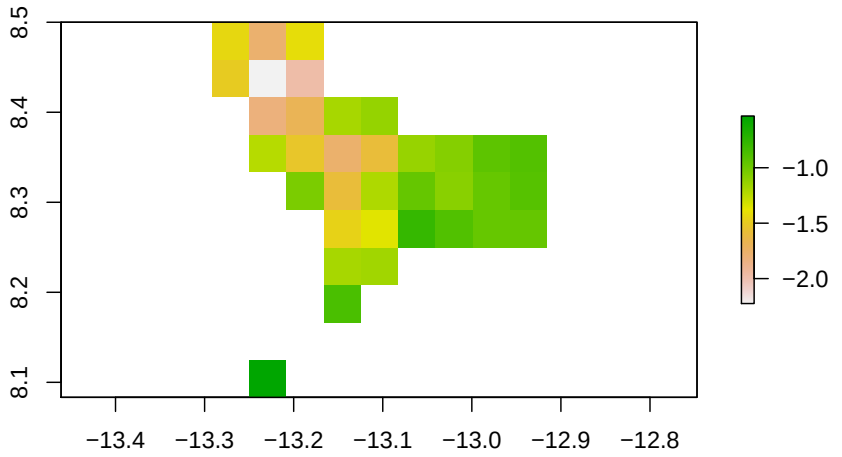


Fig. 4b. Mean temperature change (C) for Western & Southern Sierra Leone for 2020 – 2040 compared to reference period 1971 – 2000 for the high emissions scenario (585). BCC-CSM2-MR Model.

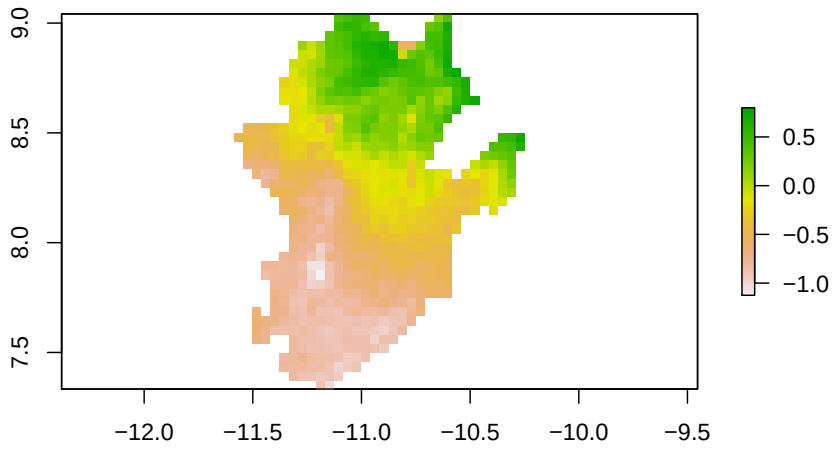


Fig. 4b. Mean temperature change (C) for Eastern & Northern Sierra Leone for 2020 – 2040 compared to reference period 1971 – 2000 for the high emissions scenario (585). BCC-CSM2-MR Model.

Precipitation

According to an analysis by McSweeney et al. (2010) using various General Circulation Models, rainfall in July, August and September is projected to change by -27 to +29% by the 2090s, and -19 to +33% in October, November and December. The proportion of total annual rainfall that falls in heavy events is projected to increase. Seasonally, this varies between tendencies to decrease in January, February, March and to increases in July to December.
Precipitation projections from the ensemble mean of bias corrected models in CORDEX Africa, indicate for the near-term future (2011-2040) and the entirety of Sierra Leone, a potential increase (up to 10%) in annual total precipitation, regardless the emissions scenario (SMHI, 2021, figures 5 a,b,c, below). However, increments in annual total precipitation do not necessarily mean that more precipitation is expected to occur constantly, but in the form of exacerbated extreme weather. So, an urgent need is the implementation or enhancement of weather and climate observation networks, which will enable monitoring, prediction and assessment of extreme events, which in turn will feed climate

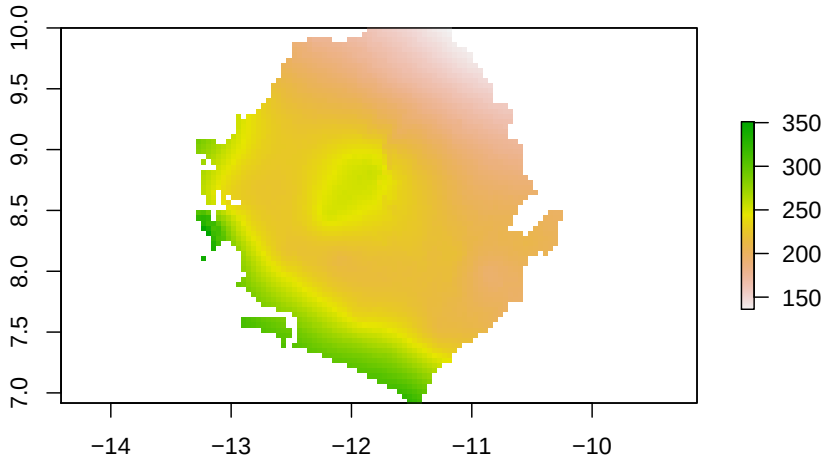


Fig. 5a. Precipitation (annual mean) for Sierra Leone for 2020 – 2040 compared to reference period 1971 – 2000 for the high emissions scenario (SSP585). BCC-CSM2-MR Model.

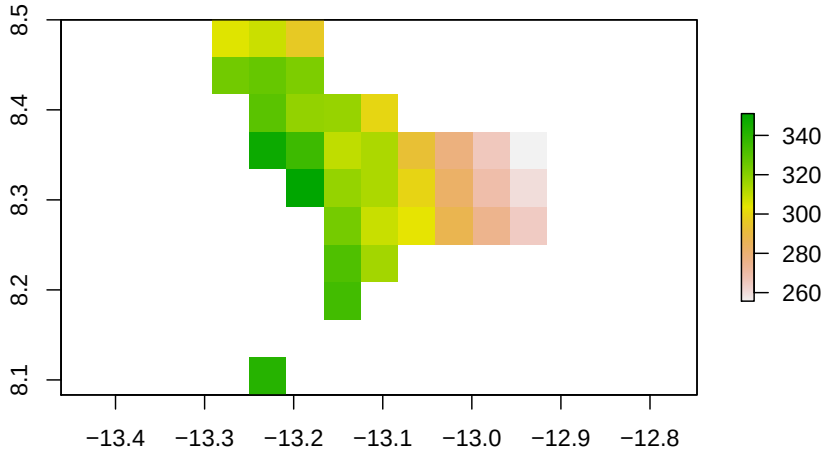


Fig. xx. Precipitation (annual mean) for Western & Southern Sierra Leone for 2020 – 2040 compared to reference period 1971 – 2000 for the low emissions

scenario (SSP126). BCC-CSM2-MR Model.

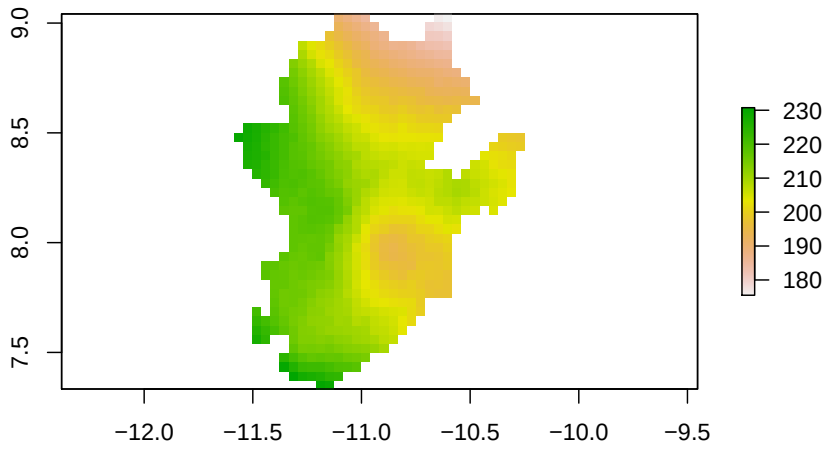


Fig. xx. Precipitation (annual mean) for Northern & Eastern Sierra Leone for 2020 – 2040 compared to reference period 1971 – 2000 for the low emissions scenario (SSP126). BCC-CSM2-MR Model.

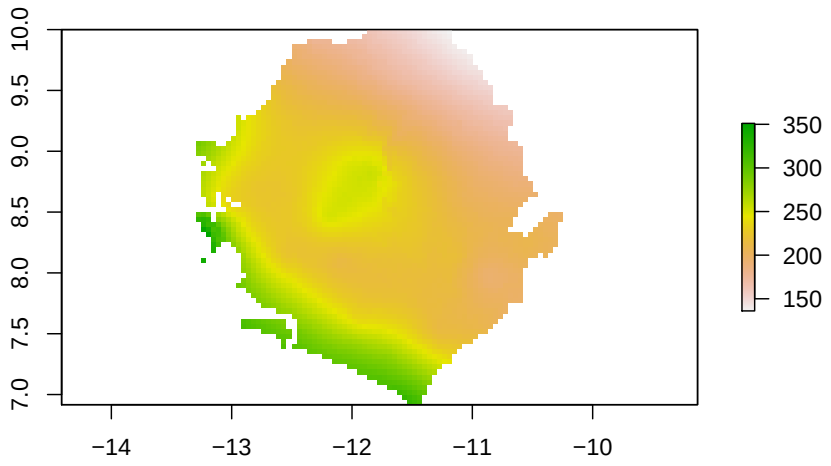


Fig. 5b. Precipitation (annual mean) for Sierra Leone for 2020 – 2040 compared to reference period 1971 – 2000 for the medium emissions scenario (SSP245). BCC-CSM2-MR Model.

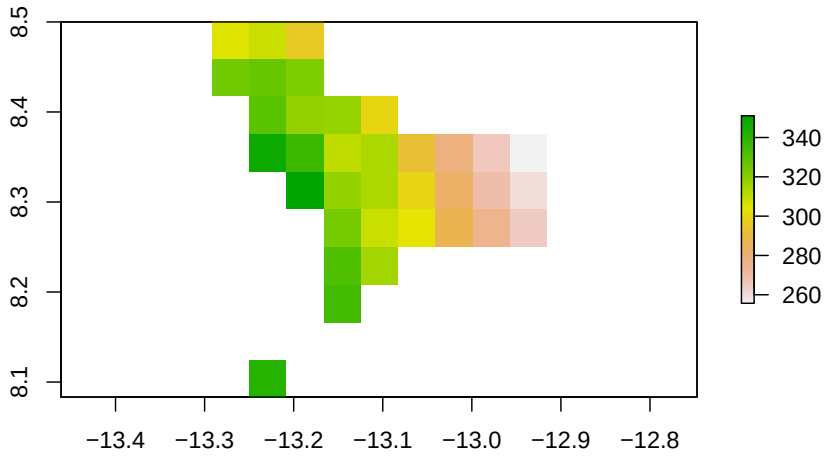


Fig. xx. Precipitation (annual mean) for Western & Southern Sierra Leone for 2020 – 2040 compared to reference period 1971 – 2000 for the medium emissions scenario (SSP245). BCC-CSM2-MR Model.

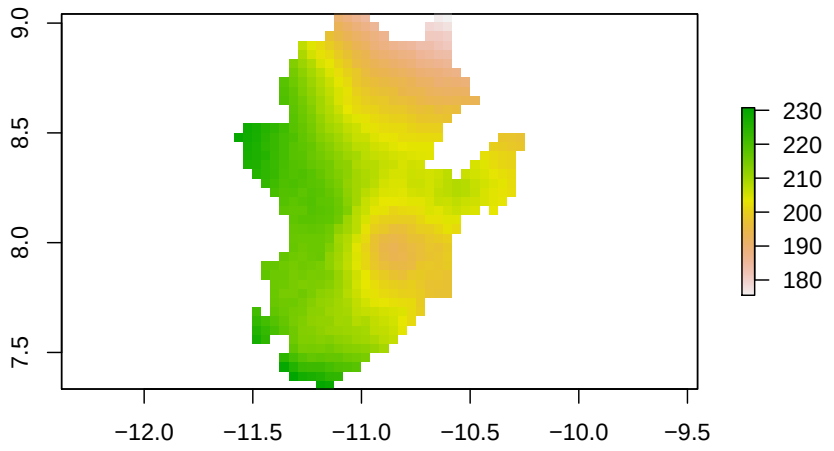


Fig. xx. Precipitation (annual mean) for Northern & Eastern Sierra Leone for 2020 – 2040 compared to reference period 1971 – 2000 for the medium emissions scenario (SSP245). BCC-CSM2-MR Model.

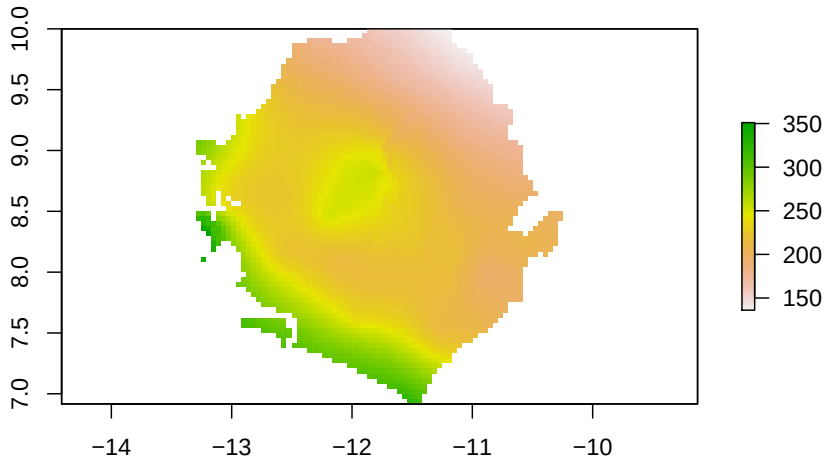


Fig. 5c. Precipitation (annual mean) for Sierra Leone for 2020 – 2040 compared to reference period 1971 – 2000 for the high emissions scenario (SSP585).

BCC-CSM2-MR Model.

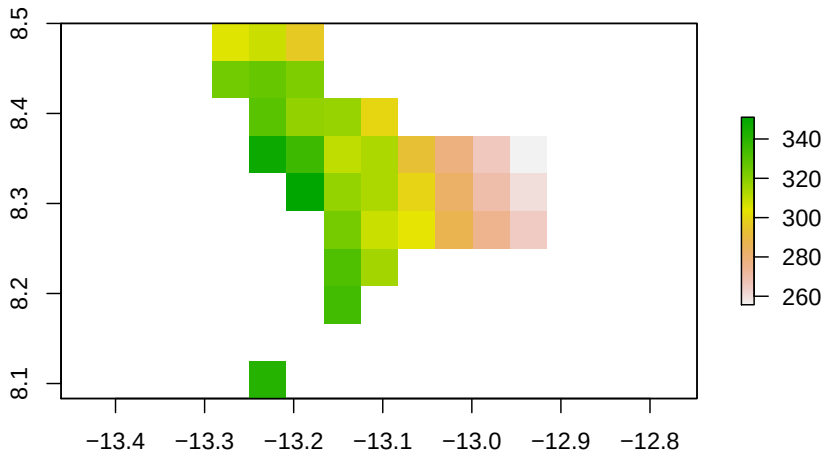


Fig. xx. Precipitation (annual mean) for Western & Southern Sierra Leone for 2020 – 2040 compared to reference period 1971 – 2000 for the high emissions scenario (SSP585). BCC-CSM2-MR Model.

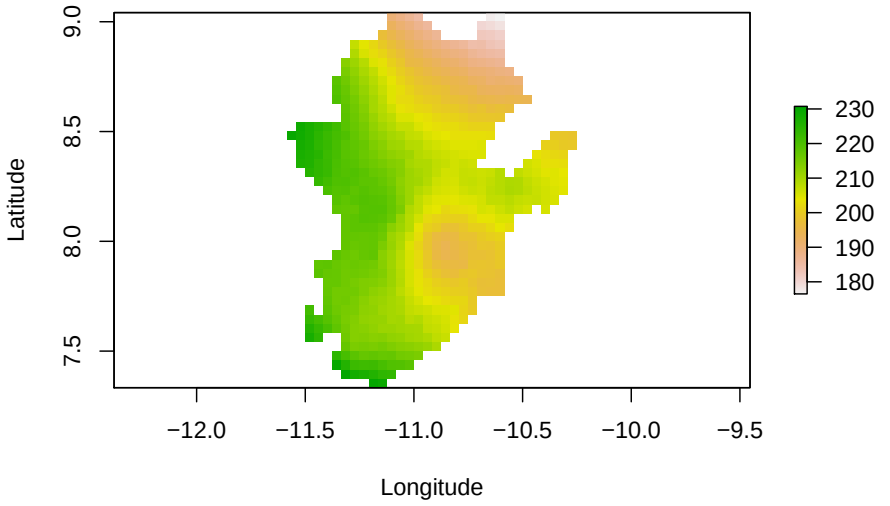


Fig. xx. Precipitation (annual mean) for Northern & Eastern Sierra Leone for 2020 – 2040 compared to reference period 1971 – 2000 for the high emissions scenario (SSP585). BCC-CSM2-MR Model.

Extreme Events

It is very likely that climate change will magnify natural disasters' severity in terms of intensity and frequency in Sierra Leone. Climate variability and climate change-induced extreme weather events will continue to affect the incidence of existing socio-natural hazards in Sierra Leone. All projections indicate substantial increases in the frequency of days and nights that are considered "hot" in current climate. Annually, projections indicate that "hot" days will occur on 26-63% of days by the 2060s, and 37-84% of days by the 2090s (McSweeney et al. 2010). These increases in hot days and night are more rapid along the coast than inland (McSweeney et al. 2010). Additionally, the proportion of total annual rainfall that falls in heavy events is projected to increase especially from July to December. This increase, coupled with alternating periods of wet and dry years are likely to increase the occurrence of extreme weather events.

Sea level rise

The country is yet to develop a fully functional marine meteorological station which is vital for the assessment of sea level. It is generally accepted that sea level is rising, and that this rise will continue into the foreseeable future. The IPCC suggested that the rise between the present (1980-99) and the end of this century (2090-99) would be about 0.35m (0.21-0.48m) for the A1B scenario and 0.26-0.59m for the A1F1 scenario (IPCC 2007).

4.5 Sectoral current and future vulnerabilities

Sierra Leone has been identified by the United Nations as one of the forty-six Least Developed Countries (LDCs). Its economic and social development factor poses a major challenge to development and makes the country vulnerable to the impact of climate change. Efforts to improve the quality of life of its people have been hampered by extreme poverty, structural weakness in the economy, civil conflict, the Ebola disease outbreak of 2014 and the lack of capacity related to growth and development. All these are further aggravated by the negative impacts of climate change. The Notre Dame Global Adaptation Index ranked Sierra Leone 151 out of 181 countries in terms of vulnerability to climate change with high vulnerability and low readiness (ND-GAIN 2018). A World Bank study has found that the mortality from multiple, climate-induced hazards is high and getting worse as exposure is expected to increase (World Bank 2017). The coast is particularly vulnerable to climate change because of the extent of mangrove forest loss, exposure of coastal populace to the effects of sea-level rise and winds and high poverty levels (WA BiCC 2019).
This section provides current and potential climate vulnerabilities and impacts

for all the priority sectors identified by the Government of Sierra Leone for the National Adaptation Plan process. Much of the information is based on the Third National Communication (2018). As part of that effort, vulnerability and adaptation assessments were undertaken for agriculture, water resources, human health and coastal zones based on climate change impacts for the years 2005 to 2035 and 2050. These, however, do not include social vulnerability and are based on limited available data. More detailed vulnerability assessments that look at interconnected risks are necessary to develop robust adaptation plans, while also expanding the assessment to include all the NAP priority sectors. This is a priority for the next stages in the NAP process. While the next section reviews existing information by sector, it is important to note that these impacts will interact with one another along with existing development stressors. Therefore, going forward it is critical to link these analyses and understand the interactions between climate and development activities.

Agriculture and Food Security

Agriculture is an important livelihood, primary food source and large component of the economy. Current climatic conditions are ideal for the production of Sierra Leone's primary crops: rice, sugar cane, banana, coconut, citrus, cocoa, pineapple, yam and cassava. With climate modelling projections for 2050, demonstrating increased temperatures (approx. +1.30C) and reduced rainfall (approx. -6%), this is likely to change. For instance, rice is the staple food crop in Sierra Leone and is grown mainly by small-scale farmers under rain-fed conditions. This makes agriculture and farmers' livelihoods especially vulnerable to changes in precipitation. This is compounded by the persistent rural poverty and farmers without insurance or the resources to invest in irrigation and other agricultural technologies. These climate impacts are also likely to increase water requirements for crops, while also increasing competition for water resources, as well as the increased incidence of pest and disease outbreaks.
Currently, the climatic variability and extremes experienced in Sierra Leone, including frequent rainstorms and the occurrence of seasonal drought, threaten agricultural production and food security. With increasing temperatures, changing precipitation patterns, and an increase in the intensity and frequency of extreme events such as droughts, could lead to food shortages, hunger and malnutrition. Water shortages could also lead to the loss of food production and the necessity to import and/or experience food shortages. These climate impacts compounded by fluctuating world commodity prices and poverty could lead to increased vulnerability, hunger and malnutrition (Government of Sierra Leone 2018). These impacts are even more pronounced for vulnerable groups such as women and the disabled, particularly in rural communities.

Water Resources and Energy

Water quality and availability are highly vulnerable to climate impacts. Major water uses include domestic (drinking, cooking, hygiene), agriculture (irrigation), industrial (beer, spirits, soft drink, cooling and waste disposal), and hydroelectric power production. Additionally, rural migration to Freetown, during

and since the civil conflict has increased pressure on urban water resources. Reliable and clean access water is essential for these multiple uses and populations with implications for social vulnerability and poverty.

Shifting rainfall patterns have created water supply problems. This has led to decreasing access to water and reduced stream flow of rivers and streams. Stream flow has decreased as there has been a decrease in rainfall since the 1970s. For example, the stream flow to the Mano River fell by 30% between 1971 and 1989. This has large impacts on access to water since about 80% of the rural population receives water from surface sources, including many streams and ponds. These streams also dry up during severe droughts which are likely to become more common. There is also seasonal variation where 40% of the protected water points suffer water shortages in the dry season (USAID 2016), demonstrating that existing vulnerability is already acute.

While sources of water have decreased, consumption by industry and mining is increasing. These water uses also lead to decreases in water quality, further lowering the overall clean water available for drinking. While irrigation is the primary non-industrial use of water, fewer than 30,000 hectares of farmland is currently irrigated. A large percentage of the population has no access to clean water. This will be further exacerbated by climate change. Urban water is also vulnerable as the Guma Valley reservoir supplies 90% of the water for Freetown. It was designed for 300,000 people while over 1.5 million people live in Freetown.

Hydropower, which supplies 60-70% of energy is also impacted from climate change as precipitation levels are less predictable and therefore more difficult to manage. Given that only 20.3% of the country has electricity, climate change policy needs to consider access to energy that can be withstand future climate risks. The challenges facing the water and energy sector are aggravated by rapid population growth, climate change, deforestation, natural disasters, and uncoordinated urban planning.

Coastal Zone Management

Climate change is having impacts on coastal communities, fisheries, and coastal environments which are important ecosystems and support livelihoods including tourism. The coast is densely populated. It is home to 1,347,000 people and growing at about 2.5 per cent annually. Fishing is central to the coastal economy, providing a source of income and livelihoods for both fishers, fish processors, and fish traders. It has led to a large secondary economy of boat building, wood cutting, fish, transportation, basket weaving, selling fishing gear, and trading. It is believed that approximately 40,000 artisanal fishers and their families operate more than 12,000 fishing boats that create up to 50,000 jobs in the fisheries sector (WABiCC 2019). Decreasing river flows, rising salinity of estuaries, loss of fish and aquatic plant species and reduction in coastal sediments are likely to damage coastal economies and the food security for coastal and riverside populations. As part of the Third National Communication, local vulnerability assessments were conducted and demonstrated the gendered vulnerability evident in coastal communities. This indicates a need for adaptation measures to be targeted to

women.

With sea level rise, loss of coastal ecosystems inundation from major rivers, flash floods during the rainy season and saline intrusions due to decreased low water flows in the dry season, there are increasing challenges to livelihoods. Coastal erosion is already a significant challenge in some coastal areas in Sierra Leone (such as Konakridee, Lakka, Hamilton and Plantain Island) where the coastline is shifting by about 4 to 6 meters a year (WABiCC 2019). Sea level rise has the effect of augmenting a decrease in the quality and quantity of ground water resources otherwise caused by human activities. If no action is taken, a total of 26.4km square is estimated to be lost to the sea. A World Bank analysis estimates that by 2050, sea level rise will lead to $46.8 million in building losses with 1881 buildings affected (2018).

Infrastructure

Infrastructure in Sierra Leone is vulnerable to climate impacts across the country. This is especially true as the current infrastructure is non-existent or poor due to the war and deferred maintenance. Roads are the primary mode of transport with limited or non-existent rail. River transport systems are often impassable during the rainy season. The coast, which will be impacted by sea level rise, beach erosion and coastal flooding, is densely populated and is an important economic center with ports and tourist facilities. Coastal communities such as Kroobay, Moa Wharf lack flood escape routes due to the low elevation of roads. Other roads also flood during the rainy season. This makes it difficult for farmers to transport their agricultural goods. Additionally, as future infrastructure investment occurs construction materials and design should be climate sensitive and consider heat stress and flood risk.

Water and sanitation infrastructure are sensitive to storm surge, sea level rise and flooding. Already a large percentage of the population lack access to clean water and sanitation facilities. Wastewater collection and treatment facilities are often situated at the lowest point possible as their operation often depends on gravity flow and are easily be inundated by water level rise. Therefore, climate-sensitive innovative designs of sanitation infrastructure are critical in adapting to climate change.

Health

Sierra Leone has one of the highest malnutrition and child mortality rates in the world, making the country's population extremely vulnerable to climate shocks. Incidents of high temperature morbidity and mortality are projected to increase. Increased temperatures are also associated with increased episodes of diarrheal diseases, seafood poisoning, and increases in dangerous pollutants. As temperatures increase above 25°C, malaria infection is expected to rise. Malaria is the most common cause of illness and death in the country. Malaria-related illnesses contribute to 38% and 25% of child and all-ages mortality rates, respectively. The most vulnerable groups include children aged under 5 years and pregnant women. Waterborne diseases are also expected to increase with more

frequent and intense flooding. Currently the heavy rains have increased the likelihood of the outbreak of communicable diseases. More intense dry seasons (with increased temperatures) in the north and west have been linked to reduced water quality and disease outbreaks. The last major cholera epidemic outbreak in 2012 caused 300 deaths and affected more than 20,000 people. Warmer seas contribute to toxic algae bloom and increased cases and food poisoning from consumption of shellfish and reef fish. This occurred in Freetown in July-August 2011 and August 2012. The Ebola outbreak revealed a deficient health system, including understaffed, unavailable or unaffordable health care that will be further stressed by climate change impacts (USAID 2016).

Environment

Ecosystems will be severely impacted by climate change and existing development stressors. With increased storm surges, flash floods, and high winds, these conditions will be exacerbated by pollution, landslides, coastal erosion, deforestation, biodiversity loss, and invasive species which will further stress ecosystems. Land cover is expected to change. 60% of the country will be under tropical dry forest, 24% under tropical very dry forest, and 12% cover under sub-tropical moist forest particularly in the south and east of the country.

This is the reverse of the current situation and indicates a northward shift in the vegetation i.e. from tropical rain forest to tropical dry forest. This will change the flora and fauna of these areas. The major challenges of forest management include, amongst others, poor governance, weak law enforcement, lack of coordination among sector ministries and illegal harvesting. Deforestation also increases both landslides and floods, by removing tree roots that stabilize the ground.

Disaster Management

The likelihood and intensity of extreme weather events will increase with the smallest change in temperatures. Although it is generally agreed that the incidence of severe weather will increase, there is no clear picture on the likelihood of a general increase in storm frequency (Government of Sierra Leone 2018). Sierra Leone is vulnerable to the increasing severity of droughts, floods and severe storms and their impacts on sectors such as agriculture, fisheries, as well as infrastructure and hydroelectric power production. Of the total number of people affected by disasters in Sierra Leone in the last 30 years, 90% of were affected by flooding (EM-DAT 2019). Specifically, from 2008 to 2011, floods affected 221,204 people and killed 145 people (11% of people killed by disaster). On Monday 14th August 2017 a devastating landslide occurred in Regent, Freetown, Sierra Leone. The landslide, which occurred in multiple phases, was located in an area which was already affected by severe flooding. As a direct result of the landslide and flooding, approximately 6,000 people were affected with 1,141 declared dead or missing. The total economic value of the effects of the landslide and floods is estimated at about SLL 237.37 billion (USD 31.65 million) according to the 2017 World Bank Loss and Damage Assessment Re-

port (World Bank 2017). These impacts are the result of a combination of climate variability and unsustainable land use practices (such as building on steep slopes) (WABiCC 2017).
Urban and rural seasonal flooding, recurrent flash flooding, and coastal flooding are the most common observed, leading to seasonal flooding of agricultural fields and low-lying areas, flooding along the coast areas and flood waters overflowing into roads and into residents' homes. More specifically, the most affected areas in the recent past during these last years include: Kroo Bay, Susan's Bay, Granville Brook, Lumley area in Western Area, Port Loko and Kambia Districts, the Newton catchment area, Pujehun and Bo areas, Kenema and Moyamba Districts, and coastal beaches of the Western Area Peninsular (Government of Sierra Leone 2018). There are also transboundary issues as heavy rainfall in neighboring countries may cause floods in Sierra Leone due to the overflowing of three rivers: Great Scarcies and Little Scarcies rivers from Guinea and Mano from Liberia (World Bank 2017). There are also cascading impacts from flooding. Many communities in Sierra Leone, especially the rural poor, depend on streams and swamps, which dry up during severe droughts. Floods overwhelm existing systems, contaminating drinking water and creating sewerage overflows.

4.6 Vulnerability Assessments

There has not been a comprehensive national vulnerability assessment conducted in Sierra Leone. Those that exist are focused on a sector or area. Many have been produced through donor financed programs. These small-scale assessments, however, have not been collected in one place or reproduced nationally. There is no comprehensive assessment that has considered social and ecological interactions, urban and rural issues and the interactions between climate and non-climate risks. Additionally, there has not been gender-sensitive analysis of vulnerabilities and risks. There is also a need to explore how transboundary factors will influence vulnerability such as changes in transboundary rivers, remittances and commodity markets. A comprehensive series of gendered vulnerability assessments are a top priority for the next stages in the NAP process. Sierra Leone's Third National Communication to the UNFCCC includes very limited analysis of vulnerability on agriculture, water resources, health and coastal areas (Government of Sierra Leone 2018). The policy states, "The UNDP Adaptation Policy Framework methodology provided the overarching approach for the V&A assessments, coupled with the most appropriate existing analytical tools. Stakeholder engagement and relevant consultations were priorities for the sectoral assessments, to the extent possible under the timeframe and funding circumstances. These included various workshops in various parts of the country throughout the process to invite technical inputs on the V&A assessments and the resulting policies and measures recommended." It is mostly based on studies carried out in other countries and there are significant gaps

in the analysis. The document explicitly calls for more national and regional vulnerability assessments. Sierra Leone Coastal Vulnerability Assessment was conducted as part of the USAID-funded West Africa Biodiversity and Climate Change (WABiCC) project. It examined the vulnerability of fishing communities and ecosystems through household surveys, participatory rural appraisals and mangrove forest inventories. This study is unique for its socio-ecological approach and its coastal variation. An overall vulnerability index which combined community and ecological vulnerability indices demonstrated higher vulnerability in the Scarcies and Shebro regions, linked to high exposure (Scarcies) and low adaptive capacity (Shebro), while SLRE and Yawri Bay have somewhat lower overall vulnerability, despite higher sensitivity of the communities" (WABiCC 2017). An image of the social vulnerability is below.

Figure 4.5: Figure 6 Map of the proportion of households in each of the five quintiles of vulnerability, defined over the total sample of households. Source: (WABiCC 2017)

The World Bank funded a Sierra Leone Multi-City Hazard Review and Risk Assessment in September 2018 (World Bank 2018). It provides an analysis of the qualitative and quantitative natural hazards and risks for three cities: Freetown, Makeni and Bo. The coastal erosion hazard and risk assessment and the sea level rise assessment for Freetown use the IPCC global Atmosphere Ocean General Circulation Model to provide a scenario analysis for 2050. The flood and landslide assessments do not incorporate climate risks.

4.7 Vulnerability and Climate Data Opportunities, Challenges and Needs

According to the National Communications and consultations there are various climate data and vulnerability assessment opportunities, challenges and needs. Data Collection, Availability and Research:

- Current data collection for the National Communications is limited, does not include all sectors and is not compatible with current meteorological models. There is also limited downscaled information. MET is collaborating with the EPA to develop a template for collecting climatic and non-climatic data that follows international guidelines proposed by the UNFCCC, WMO and other supervisory bodies. This is an important first step.
- A thorough assessment of climate services capacities that includes all climate-sensitive institutions is needed to analyze and identify training, technical and financial support.
- There is limited information on local and national vulnerability, impacts and risks. Comprehensive vulnerability and risk assessments need to be conducted for all sectors and regions and made accessible. These should be gender sensitive and incorporate youth and people with disabilities. The data collection process and subsequent assessments should be used as opportunities for policy and community learning.
- Strengthening of the climate database of all institutions in the country, provide up to date computer facilities and train experts in the input and storage of climate related data. For example, Sierra Leone has not implemented yet the WMO Integrated Global Observing System (WIGOS) and WMO Information System (WIS) which respectively provides a framework for WMO observing systems and connects all National Meteorological and Hydrological Services and regions together for data exchange, management and processing (WMO 2019).
- Retrieval of data lost during the civil war since only a small portion has been retrieved thus far (WMO 2019). Some of this data is in Niger and the UK and needs to be collected and integrated into the current systems for analysis.
- Intensification of research on climate change in Sierra Leone. Collaboration with national and international institutions that are in the field of research in climate change.
- Currently there is no access to reliable information for effective climate risk management. The lack of a climate information communication system enhances the country's vulnerability. Without appropriate information

and climate risk management tools, policies will lack the right navigation to govern climate risks in all sectors.

- There is limited dissemination of available forecasts, and forecasts are not packaged in a format that is accessible to end-users such as district planners or policy makers.

- Consistent data availability for hydrological data. For instance, Sierra Leone does not possess a quality management framework for hydrology which is based on reliable hydrological data and information as key inputs to the management of water resources (WMO 2019).

Equipment and Technical Needs:

- Procurement and installation of meteorological stations for the collection and monitoring of all categories of data (including aviation, agricultural, marine, and climatological data). For example, there is a need for approximately 200 agricultural stations. There are currently 8 weather stations and more are needed so that each of the 16 districts has a weather station. This will improve the ability to monitor the micro-climates within Sierra Leone and to understand climate change and its possible impacts in Sierra Leone. An increase in the amount of weather stations would also aid with provision of agricultural data so that there is better understanding of the climatic conditions. Finally, an increase in the number of automatic weather stations would also assist in providing data for ground truthing radar systems.

- Providing automatic recording equipment and instruments for continuous recording of meteorological, hydrological and climatological elements and phenomena.

- There is a need for procuring forecasting models and software.

Institutional and Human Capacity Needs:

- SLMet has varying levels of capacity for different types of data. It has significant capacity in aviation but less capacity in hydromet, marine met, and agromet. This needs to be remedied.

- The Environment Protection Agency has a Climate Change Secretariat that coordinate the development of the various convention reports, the Agency has capacity to conduct environmental monitoring, but lack the capacity to conduct a strong vulnerability assessment, adaptation modeling and adaptation planning. This needs to be strengthened.

- Inadequate staff and poor facilities for weather forecasting and related activities have undermined the ability of the Meteorological Agency to provide adequate support information to all sectors and stakeholders so that they can better adapt to the impacts of climate change. For instance, there is not enough staff to collect data from the manual stations and there needs to be training for people to work at the new stations as they are built.

- Capacity building and training for technical and non-technical staff in the Meteorological Agency, National Water Resources Management Agency (NWRMA) and Disaster Management Agency should be addressed in order to meet the present and future challenges including on data collection, management and decision-making on climate change, natural hazards and hydrology.

- National Water Resources Management Agency (NWRMA) needs capacity and technical support to revive the National Hydrological System.

- There is also a need to train people to repair and maintain stations rather than relying on only international experts.

- Strengthen and capacitate Statistics Sierra Leone so that it can respond to the data and information needs of the country through a coordinated and concerted approach with the various stakeholders.

- In the short term, there needs to be more experts trained in Meteorology. Currently, this training must occur internationally as there are no WMO accredited institutions in the country. In the longer term, there needs to be an accredited university program established in the country including a research program on environmental modeling.

- Address gaps in technical skills for generation information on climate change (for example: downscaled or long-term forecasts are non-existent and/or not utilized).

- Facilitate collaboration with national, regional and international agencies.

- Data and information are fragmented across the various sectors, and it is often difficult to ascertain their credibility and relevance.

- There are plans to tailor weather messages for the agricultural sectors next year. There still needs to be improved access to data for all stakeholders including local councils to inform decision-making and tailored access to information for other sectors.

- Currently, understanding of forecasts is poor as is the dissemination of information. Stakeholder and community training to interpret forecasts.

- To integrate local knowledge into forecasting and understanding of climate impacts, Chiefdom and District Surveillance Groups could be formed. This would create a network of local observers and monitors that can work together to document and share observations on climate trends, impacts, and consequences using a blend of local knowledge and scientific methodologies and tools.

Chapter 5

Adaptation Related Policies, Plans and Programs

5.1 Introduction

The chapter presents existing policies and plans that are related to the formulation and implementation of the NAP. The first section explores adaptation plans and policies, followed by plans that are related to formulating a comprehensive NAP. Lastly, the chapter describes a number of opportunities, challenges and gaps with respect to alignment with the existing strategic, legal and regulatory frameworks.

5.2 Climate Change Adaptation Plans and Policies

Sierra Leone has rapidly increased its climate policy portfolio since its NAPA was produced in 2007. Since then, it has developed a National Climate Change Policy, a National Climate Change Strategy and Action Plan, a National Determined Contribution (NDC) and three National Communications to the UNFCCC. It has also begun its NAP process prior to this document with a NAP Framework and a NAP Communications Plan. All these documents lay the foundation for the NAP.

Timeline

National Adaptation Plan of Action (NAPA) (2007)

From the start Sierra Leone has linked adaptation with its national development planning and international development goals. The NAPA document was based on the goals and objectives of the Poverty Reduction Strategy Paper (PRSP) and the Millennium Development Goals (Government of Sierra Leone 2007b). The NAPA specifically linked to PRSP goals to improve public health and biodiversity to support sustainable development. The NAPA projects were focused on immediate needs and the most urgent adaptation concerns in six sectors.

National Climate Change Policy (2012)

Developed through a participatory and iterative process, this National Climate Change Policy was developed following an assessment of climate risks based on its INC, NAPA, and Second National Communication. One of the policy goals is to enhance national capacity to adapt to climate change. Its mission is "to strengthen national initiatives to adapt to and mitigate climate change in a participatory manner that involves engaging all sectors of the Sierra Leone's society with appropriate and adequate consideration for the women, the youths, the aged, the poor and other vulnerable groups within the overall context of advancing sustainable socio-economic development in Sierra Leone" (2012a).

The policy makes clear the need for mainstreaming of adaptation and the links between its climate change and development planning. Specifically, it states, "climate change mainstreaming is imperative, which involves the integration of policies and measures to address climate change into our sectors and development planning and decision making, so as to ensure the long-term sustainability of our investments as well as reduce the sensitivity of development activities to both today's and tomorrow's climate." Mainstreaming climate change into development is viewed as necessary for making development and society more resilient.

National Climate Change Strategy and Action Plan (2015a)

The Action Plan moved Sierra Leone climate policy forward. It includes adaptation actions in the agriculture sector, adaptation to sea level rise, tourism

sector, fisheries, forestry, health and water resources. It includes projects with activities and costs. It also includes a resource mobilization strategy. It will be updated in 2021. It will be cross-sectoral and focus on vulnerable sectors and communities. It will include issues such as early warning systems, flood prevention infrastructure, capacity building and livelihood support.

National Communications to the UNFCCC

Sierra Leone has completed three National Communications to the UNFCCC. The first was completed in 2007, the second in 2012 and the third in 2018. The Initial National Communication under the UNFCCC includes a chapter on vulnerability and adaptation (Government of Sierra Leone 2007a). Adaptation measures were included for agriculture, forests, water resources and coastal zone with particular focus on public health. The policy development process produced the first vulnerability assessments for the country. The second national communication focused on agriculture, forestry, water resources, human health, coastal resources and human settlements and tourism (Government of Sierra Leone 2012b). The third national communication focused on agriculture, water resources, human health and coastal resources and human settlements (Government of Sierra Leone 2018). All three include vulnerability and adaptation interventions by sector based on limited data.

Nationally Determined Contribution to the Paris Agreement (NDC)

The NDC's vision is "to create a new era for a harmonious relationship between the economy, environment, social and long-term sustainability; shifts to a green economy and provides for the identification and implementation of various mitigation and adaptation measures" (Government of Sierra Leone 2015b). One of its goals is "reducing vulnerability to climate change impacts and increasing the resilience and sustainable wellbeing of all citizens." It is linked to previous climate and development policies and the NAP, in particular the National Climate Change Plan, National Climate Change Strategy and Action Plan and the NAPA. The NDC is iterative and it will be reviewed to inform the Medium-Term Development Plan. The NDC also included the intention to link the NAP and NDC actions moving forward. This will be carried out as the NDC will be updated in 2021 and be linked to the NAP process moving forward. It is also explicitly tied to the NAP and the actions listed in the NDC will be implemented through the NAP.

Additionally, the NDC makes clear that gender mainstreaming is a key component of the Medium-Term National Development Plan and NDC. This adds to the mandate for a gender responsive NAP Process.

NAP Framework

The NAP Framework (2019) was a first step to formulate and implement the NAP. It aims to set objectives for and determine the principles, approaches and structure of the NAP process for the country. This served as a basis for the NAP as part of an iterative and consultative policy process.

Sierra Leone's Climate Change Communications Strategy Under the National Adaptation Plan (2020)

The communication strategy aims to provide short- and mid-term direction on how the Government can utilize information strategically and effectively to support the NAP process. The strategy has the following goals: (1) Improve awareness and understanding of the Government of Sierra Leone's climate change adaptation initiatives and the NAP process through effective communication, education and training. (2) Promote an inclusive and participatory approach to adapting to climate change so that the Government of Sierra Leone can unite under a common vision and speak with one voice on the issue of addressing climate change impacts; (3) Generate support and political commitment among key decision-makers for the NAP process and for prioritizing, managing and resourcing efforts to address climate change adaptation issues; (4) Persuade the general public and the private sector of the need for a significant and timely investment in climate change adaptation from both public and private sources within and outside of Sierra Leone; (5) Encourage Sierra Leoneans to collectively embark on activities to strengthen the country's resilience to climate change.

Coastal Climate Change Adaptation Plan (CCCAP)

This plan was produced through a USAID project and was designed to be integrated into the NAP process. The primary vision of CCCAP is to identify and implement measures to conserve and make the best use of the coastal resources of Sierra Leone and contribute to the Sustainable Development Goals for the benefits of present and future generations through an ecosystem-based approach to climate change adaptation in the coast of Sierra Leone, as part of efforts to foster climate resilience in the country and hopefully with replication in West Africa. The ultimate outcome is to have coastal landscapes in Sierra Leone that are organized and furnished with the tools to plan for and adapt to the impacts of climate change.

Strategy for the Development of a Climate Change Abatement Economy (2010)

The strategy focuses on opportunities for earning forest carbon credits through the implementation of REDD/REDD+ programs. It articulates governments goals to develop and manage 2.5 million hectares of forests in the next decade to assist income-generating activities of non-timber forest products, sustainable tree crops and ecotourism.

National Framework for Climate Services (NFCS)

The NFCS for Sierra Leone is a response to the declaration of the World Climate Conference-3 (WCC-3) held in Geneva in 2009. It is set on the premise that a national framework is necessary for strengthening the design, delivery and application of climate services across sectors and communities. The action plan allows actors within the climate action arena to meet GFCS (Global Framework for Climate Services) requirements and contribute to wider national and

global efforts seeking to address the effects and impacts of climate change. It will support the integration of climate science and action into decision-making at different levels and across scale, and thus, ensure that the country is fully prepared to generate and use information on the risks and vulnerabilities that may cause severe losses and damage in the long-term. This makes the NFCS one of few unique country-level attempts to highlight the importance of a co-ordinated action to address requirements for engaging globally on matters of climate change.

5.3 Other relevant Documents and Policies

This section describes additional policies, strategies, and plans that are relevant to the NAP process.

The National Environmental Policy (NEP)

As the first national policy concerning the environment the NEP, which was approved in 1990 and revised in both 1994 and 2002, is a milestone document for environmental management with enormous implications for climate change. This policy highlights the general principles to be considered by all activities that have potential implications for the environment, in particular outlining the main environmental goals and objectives that underlie Sierra Leone's aspiration for sustainable development. Its relevance to climate change can be viewed in terms of the restraints that it poses to the uncontrolled use of forests, along with their natural resources.

The National Environmental Action Plan (2002)

Unlike the NEP, this plan (NEAP) sought to identify the specific activities that needed to be undertaken in order to protect Sierra Leone's environment. Most of these activities, which were intended to be integrated into any future national development plan for the country, relate to such issues as environmental education and training, environmental information systems (EIS), and the integration of NEAPs into national development plans. Because this plan also ranks and prioritizes environmental actions with a strong emphasis on protecting security of tenure, it has serious implications for climate change.

The Environmental Protection Agency Act (2008) and Environmental Protection Agency (Amendment) Act, 2010

The act created the Environmental Protection Agency and raised the profile of the environment within the administrative structure. This Act mandates the EPA-SL among others to a: Advise the President on the formulation of policies on all aspects of the environment and in particular make recommendations for the protection of the environment. It made the EPA the environmental focal point to ensure that Sierra Leone complies with relevant Multilateral Environmental Agreements (MEA's).

Sierra Leone Meteorological Agency Act (2017)

The 2017 SLMA Act establishes the Sierra Leone Meteorological Agency as the sole authority for providing meteorological and climatological services across Sierra Leone.

National Disaster and Risk Management Policy (DRAFT)

Sierra Leone developed its National Disaster and Risk Management Policy to address disasters and hazards which impose serious impediments to its development. It aims at (i) decreasing vulnerability among people and communities at risk from shocks, (ii) decreasing social, economic and environmental impacts and consequences of disasters, and (iii) avoiding setbacks on the national path towards sustainable development.

National Drought Management Plan, 2018 (A contingency Plan for Sierra Leone)

The NDMP, funded by the United Nations Convention to Combat Desertification (UNCCD), presents general guidelines for developing drought preparedness, and planning and managing actions for monitoring, impact prediction and assessment, and mitigation. It promotes incentives for a more proactive, anticipatory approach to drought management, and emphasizes the need to learn lessons from previous efforts to manage related risks and impacts while documenting, evaluating, and sharing information at multiple levels.

National Land Degradation Neutrality (LDN) Target Setting Process (2018)

In the Land Degradation Neutrality (LDN) Target Setting process, Sierra Leone's Technical Working Group (TWG) identified and established hotspots of degraded areas using the three indicators of land cover, land productivity dynamics and soil organic carbon content. The hotspots provided useful guidelines for establishing baselines of land degradation, from which the national voluntary targets were set.

The National Biodiversity Strategy and Action Plan (2003)

Developed in 2003, the NBSAP was formulated based on the NEAP. Its relevance to climate change is the highlighting of the condition of Sierra Leone's biological and ecological resources and the threats posed to their existence. This plan specifically identifies a range of cross-sectoral actions needed to ensure the effective protection and sustainable use of the country's resources. Several of these priority actions relating mainly to such thematic issues as forest management, land degradation, and soil and water management have also been outlined among the key priority activities of the NAPA.

Integrated Coastal Zone Management Plan 2016-2020 (2015) (ICZMP)

It is the first ICZM plan for Sierra Leone and was created to implement the recommendations from the State of the Marine Environment report. The goal

of the plan is to conserve the coastal and marine environment and to ensure that its resources are utilized in a sustainable manner for the benefit of coastal communities and the country as a whole.

Offgrid Solar Energy Strategy (OGSES)

The Offgrid Solar Energy Strategy and Monitoring Mechanism reviews and consolidates the many documents, plans, and policies in current use in the sector to develop deeper insights into the research and debates relevant to off-grid solar energy (OGSE) issues, including Stand-Alone Systems (SAS), Solar Home Systems (SHS), and productive uses of solar power, and identifies gaps, overlaps, and topics that should be included in the National Electrification Plan (NEP). It serves as a benchmark for examining the current situation of off-grid SAS and SHS solutions, maps stakeholders in terms of their influence and interest in these systems and offers a reference point for assessing progress made with the implementation of any future off-grid solar strategies and action plans.

National Policy on the Advancement of Women (2009) and the National Policy on Gender Mainstreaming (2009)

These policies were reinforced by the National Gender Strategic Plan (2009-2012), and the Sierra Leone National Action Plan (SILNAP) on United Nations Security Council Resolution (UNSCR) 1325 on Women, Peace and Security and UNSCR 1820 on Sexual Violence were adopted in 2009 and 2010 respectively.

5.4 CCA Projects and Programs

There have been numerous climate change adaptation projects and programs carried out by various international and national agencies. Many of these projects have been implemented in collaboration with civil society organizations. These projects have had numerous positive impacts including diversification in the Meteorological agency's capacity for information collection, processing and advisory services, increased awareness of climate change, support for communities and civil society, and piloting of adaptation actions. This list demonstrates that adaptation actions have occurred across sectors and the high donor dependence of adaptation work in Sierra Leone.

Name of project	Objective(s)	Value
National early warning system on food and nutrition security in Sierra Leone	Enhance the capacity of government and its partners to establish and operationalize a Food Security and Nutrition National Early Warning System (NEWS) both at national and district levels	652841
Linking agriculture, natural resource management and nutrition	Leverage agriculture, natural resource management, income-generating activities and empowerment of women for better nutrition.	468500

Name of project	Objective(s)	Va
Increasing community access to and quality of water, sanitation and improved hygiene practices in Freetown and Kenema	Increase community access to water and water quality, and to improve sanitation and hygiene practices in Freetown and Kenema	55
Increasing the resilience to hazards of the extremely poor and vulnerable in Freetown and Tonkolili	Increase the resilience of the extreme poor/vulnerable to hazards	15
Strengthening Climate information and Early Warning Systems for Climate-resilient Development	Improve climate monitoring and early warning systems through a series of targeted interventions.	$3
Energy efficient production and utilization of charcoal through innovative technologies and private sector involvement	Bring economic, social, and environmental benefits through the production of charcoal from sustainably sourced feedstock and promotion of improved cookstoves to reduce fuelwood demand, improve health, and reduce GHG emissions.	$2
Building adaptive capacity of water supply services to climate change in Sierra Leone	Enhance the capacity for climate-resilient decision-making in the water sector through policy reforms, technical capacity development activities, and informed public and private sector dialogues	$3
Adapting to climate change induced coastal risks in Sierra Leone	Strengthen the ability of government institutions and coastal communities to systematically manage climate change risks and impacts on physical infrastructure and socio-economic development.	$9
Environment and natural disaster management project	Support natural resource governance in the key areas of natural resource management, environment protection, policy and legal frameworks within the extractives sector, land tenure policy and adapting to the impacts of climate change and other man-made and natural disasters.	80
Sustainable livelihoods through improved natural resources management	Address challenges related to poor governance of natural resources by improving transparency processes, promoting constructive dialogue between civil society and key actors from the private sector and government, as well as by supporting activities that strengthen livelihoods for vulnerable youth.	$1
Voluntary guidelines on the governance of tenure of land, fisheries, and forests in the context of national food security	Collaborate across all VGGT relevant sectors (land, fisheries and forests) in an institutional framework to implement the guidelines and improve responsible tenure governance in the country	
Agricultural Value Chain Development Project	Strengthen climate-proof rural infrastructure through the rehabilitation of feeder roads and warehouses to improve product drying and storage capacity. It will also build the capacity of smallholder farmers through farmer field schools and provide them with credit for their investments in smallholder farms	$1
Rural finance and community improvement program phase 2	Strengthen and expand the rural finance system, and support gender mainstreaming, women's empowerment and youth engagement.	$4
Smallholder Commercialization Programme	Empower the rural poor to increase their food security and incomes on a sustainable basis	$5
Rural Renewable Energy Project	Develop a portfolio of solar mini-grids across southern and eastern. Support the energy access objectives and its renewed drive for clean energy access	

Name of project	Objective(s)	Value
Promoting Renewable Energy for Sustainable Development project (PRESSD)	Contribute to poverty alleviation through renewable energy services while promoting low-carbon development	€7 million
Biodiversity Conservation Programme	Improve the management of selected priority biodiversity conservation sites (CSs) and enhancing its capacity for replication of best biodiversity conservation practices.	$23.8 million
West African Peninsula Forest Conservation Project		
Freetown Emergency Recovery Project	Rehabilitate selected critical infrastructure and to strengthen government capacity for managing disaster risk	$10 million
Resilient Urban Sierra Leone Project	Improve integrated urban management, service delivery, and disaster emergency management in Freetown and select cities of Sierra Leone	$56.7 million
Integrated Resilient Urban Mobility Project	Improve the quality of public transport, address climate resilience, improve road safety in selected areas, and enhance institutional capacity in the transport sector	$50 million
West Africa Biodiversity and Climate Change Programme (WABiCC)	Improve conservation and climate-resilient, low-emissions growth across West Africa	$46 million
Sustainable and Thriving Environments for West African Regional Development (STEWARD)	• Promote sustainable livelihoods and forest management plans; develop climate-resilient water, sanitation and hygiene systems and services; monitor program impact on land and improving policy and legal frameworks; and develop viable payment for ecosystem service models, and viable and sustainable non-timber forest product value chains.	$18 million
Promoting Agriculture Governance and the Environment (PAGE)	Increase productivity while supporting sustainable natural resources management and promoting transparent and participatory democratic governance.	
Building biocarbon and rural development in West Africa (BIODEV)		
Supporting community based DRR	Build the capacity of targeted communities to implement community-based DRM, and by providing technical assistance to district and national institutions to integrate DRR and CCA in development planning.	699837

5.5 Policy Opportunities, Challenges and Needs

This section briefly describes some needs and opportunities to support adaptation policy, planning and projects:

- Review and revise the Draft Climate Policy
- Develop a Climate Act to mandate the integration of adaptation into development planning and clarify institutional roles and create a mandate for a National Climate Steering Committee.
- Most current policies, strategies and regulatory mechanisms have limited or no consideration of climate change issue. Vulnerability and risk assess-

ment conducted as part of the NAP process can be used to revise existing policy to integrate climate risks into plans.

- There is a lack of coordination and policy coherence across adaptation and adaptation-related policies. The Ministry of Environment should work to integrate all environmental institutions under its mandate in order to simplify policy development, coordination and monitoring and evaluation.

- Sierra Leone should review some of the sector policies and legal frameworks in the light of the required collaboration and coordination of the roles and functions of the MDAs to address adaptation. No Agency can efficiently function as a standalone agency and adaptation needs to be integrated into the daily work of each agency and their plans.

- The Ministry of Environment should engage all international convention focal points, organize quarterly meetings, and ask for status reports. This will enable them to leverage capacities within different agencies and departments and set standards for collaboration, communication and public engagement.

- All adaptation projects developed by MDAs should be reviewed by the Steering Committee to ensure that institutions collaborate and coordinate adaptation actions. The Ministry of the Environment could facilitate the setting up and coordination of the Steering Committee and provide regular reports on its performance.

- There is a lack of mechanisms to disseminate project information, lessons learned, and best practices to other stakeholders, including government departments. There has also not been any integrated assessment of adaptation projects as a whole to share lessons learned and use the assessment to create approaches that can be scaled up across the country. The NAP process can support the development of an integrated reporting and learning system. This would allow for the collection and analysis of previous projects and a systematic reporting and make the information available for all stakeholder in order to support use the information to inform all stakeholders and develop more effective programs in the future.

- Currently, there is no specific budget allocation for adaptation in Ministry budgets. This makes plans difficult to implement. A certain portion of the budget should be committed for adaptation to enable national institutions involved in planning and delivering climate adaptation projects can have more ownership over climate finance projects and be able to support their sustainability beyond the project termination.

- Build the capacity of the universities to be able to provide the expertise and services required to support effective policy implementation and develop a new generation of climate adaptation experts.

- There is a need to increase public and government awareness on (a) climate change impacts and risk (b) adaptation measures, and (c) how human interaction can either diminish (through adaptation and preparedness) or exacerbate climate change impacts. The NAP process can be used as a means to educate the public through implementing the NAP Communications Strategy.
- Policies do not incentivize private sector engagement.

Chapter 6

Priority Adaptation Actions

6.1 Introduction

This chapter presents the primary government stakeholders and adaptation priorities programs for Sierra Leone's initial NAP. The Government of Sierra Leone has defined the following priority sectors for its NAP:

- Agriculture and food security
- Water resources and energy
- Coastal zone management (including fisheries, coastal ecosystems etc.)
- Environment (including tourism, land, mineral resources, forestry, etc.)
- Disaster management
- Cross-cutting priority: Hard and Soft Infrastructure (including water and sanitation, transportation, health etc.)
- Cross-cutting priority: Gender Equality and Social Inclusion (focusing on youth, women, elderly, persons with disabilities)

This chapter includes an analysis and compilation of existing adaptation priorities that are within these defined sectors. The following plans were analyzed and included in the priority programs that are included in this chapter:

- Initial National Communications (INC)
- Second National Communications (2NC)
- Third National Communications (3NC)
- Nationally Determined Contributions (NDC)
- National Adaptation Programmes of Action (NAPA)
- Coastal Climate Change Adaptation Plan (CCCAP)
- Low-Carbon Climate-Resilient Development Strategy (LCCRDS)
- National Climate Change Strategy and Action Plan (NCCSAP).

- Medium-term National Development Plan (MTNDP)
- National Framework for Climate Services (NFCS)
- Integrated Coastal Zone Management Plan (ICZMP)
- Offgrid Solar Energy Strategy (OGSES)

These priorities were validated at the initial NAP stakeholder consultation workshop conducted in Freetown in October 2020. Within these sectors, the priorities that are supportive and linked have been classified into programs of adaptation. This is just a first step in this process. After additional consultations and vulnerability and risk assessments, these priorities will be developed further or modified to meet current and future needs.

6.2 Key Government Stakeholders By Priority

Agriculture and Food Security	Ministry of Agriculture and Forestry, SLMet, Planning Evaluation, Monitoring, Statistical Division (PEMSD), Environment Protection Agency, Municipality and District Councils
Water Resources and Energy	Ministry of Water Resources, National Water Resources Management Agency (Hydrological Services Department), Environment Protection Agency (Chemical Controls and Management Department), Renewable Energy Association of Sierra Leone, Ministry of Energy, Municipality and District Councils
Coastal Zone Management	Ministry of Fisheries and Marine Resources, Environment Protection Agency (Natural Resources Management Department) Coastal Chiefs Natural Resources Management Network, Sherbro River Estuary Co-management Committee, Community Management Associations, Municipality and District Councils, National Protected Area Authority
Environment	Ministry of the Environment, Environment Protection Agency, Ministry of Tourism and Cultural Affairs, National Protected Area Authority, National Tourist Board, Ministry of Lands and Country Planning, Municipality and District Councils
Disaster Management	Office of National Security (Disaster Management Department, Sierra Leone Meteorological Agency, National Fire Force, Sierra Leone Red Cross, Volunteer Services Oversea, Sierra Leone Civil Aviation Authority, Community Disaster Management Committees, Environment Protection Agency (Climate Change Secretariat), Ministry of Local Government and Rural Development, Municipality and District Councils
Cross-cutting: Gender Equality and Social Inclusion	Ministry of Social Welfare, Gender and Children's Affairs, National Children's Commission, Human Rights Commission, Municipality and District Councils

Agriculture and Food Security	Ministry of Agriculture and Forestry, SLMet, Planning Evaluation, Monitoring, Statistical Division (PEMSD), Environment Protection Agency, Municipality and District Councils
Cross-cutting: Hard and Soft Infrastructure (Health, Water and Sanitation, transportation)	Ministry of Health and Sanitation, Ministry of Transport and Aviation, Environment Protection Agency, Ministry of the Environment, Sierra Leone Meteorological Agency, Ministry of Information and Communication, Sierra Leone Road Safety Authority, Sierra Leone Roads Authority, Sierra Leone Motor Drivers Union, Municipality and District Councils, Road Maintenance Fund Administration

6.3 Priority Adaptation Programs

The priority adaptation programs have been divided by sector and included in table 6.3 below. The adaptation programs each have been classified according to five categories. The categories are described below:

1. Physical investments: These are priorities which involve building or construction.
2. Human capacity development: These are priorities that involve training or capacity development for individuals both within the government and among non-government stakeholders (e.g. private sector, NGOs, CSOs etc.).

3. Institutional strengthening: This refers to priorities that involve improving institutional capacity and other aspects of governance.

4. Regulatory modifications: This category refers to priorities that involve modification or enhancement of sectoral and/or subnational policy, regulatory, or legal frameworks.

5. Research: This identifies priorities that involve enhancing available data and information as well as the associated capacities to produce, process, and utilize data and information.

6.4 Priority Actions by Sector, Program and Type

I. Agriculture and food security	**Source**	**Physical Investm**
Program 1: Promote climate-smart agriculture and climate-resilient food security practices		

I. Agriculture and food security	**Source**	**Pl**
Adoption and application of climate-smart and conservation agriculture through best agricultural practices that enhance soil fertility and improve crop yield	NDC	
Integrated management of crops and livestock management	NDC	•
Develop and maintain seed banks to provide a variety of seed types that preserve biological diversity and enable farmers to make informed choices	NCCSAP	•
Promote innovative and adaptive approaches such as irrigation and water harvesting to protect farmers from variability in rainfall	NDC	•
Provide appropriate infrastructure, social services and mechanization of agriculture in the rural areas to slowdown massive movements of youths into urban areas	3NC	•
Mainstream Climate Change into Agricultural Development Strategies	3NC	
Program 2: Improve research and knowledge management capacities to Support Climate-Smart Agriculture and resilient land management	**Source**	**Pl**
Support the establishment of adequate weather stations around the country in order to provide reliable and adequate weather data that will be useful to properly inform farmers	NCCSAP/3NC	•
Provide adequate support to the Sierra Leone Agricultural Research Institute as well as Njala University to develop appropriate crop varieties and production practices that will enhance resilience to adverse weather conditions	NCCSAP/3NC	
Promote innovative and adaptive approaches such as irrigation and water harvesting, to protect farmers from variability in rainfall	NCCSAP/3NC	•
Develop modelling approaches and tools to allow assessment of impacts of climate change on export and domestic crops and meat production	NCCSAP/3NC	
Develop regional links to fund and promote plant breeding programs for common crops	NCCSAP/3NC	
Review approaches to integrated pest management under climate change	NCCSAP/2NC	
Conduct a feasibility study to gather information on community perceptions of climate-smart agriculture techniques	CCCAP	
II. Water Resources and Energy	**Source**	**Pl**
Program 1: Improve institutional and functional capacities for integrated water management		
Improve planning and coordination of the use of the river basin, which may provide solutions to problems of water quality and supply	NCCSAP/INC	

I. Agriculture and food security	**Source**	**Physical Investr**
Increase and maintain investment in hydrological monitoring and water use through a national database	NCCSAP/2NC	•
Fund research into adopting a water resources and water supply planning method under climate change	NCCSAP	
Develop appropriate modelling tools to assist strategic planning of water resources	NCCSAP/3NC	
Investigate shifting focus from ground water to surface water storage for water supply to reduce the reliance on vulnerable coastal aquifers	NCCSAP/3NC	
Program 2: Enhance universal access to energy by promoting renewables and energy efficiency	**Source**	**Physical Investr**
Establish and operationalize a National Centre for Renewable Energy and Energy Efficiency (NaCREEE) to promote off-grid Stand-alone Solar (SAS) investments through technical advice and knowledge sharing in the areas of policy and regulation, technology development and transfer, and public education	OGSES	
Increase awareness of off-grid SAS and strengthen market knowledge by improving market intelligence	OGSES	
Strengthen local institutions and empower the private sector through capacity, network, and partnership building	OGSES	
Provide up-to-date market information through further studies and awareness raising campaigns	OGSES	
Align technology development and knowledge transfer goals with regional goals set for 2030	OGSES	
Technically support the Energy Planning Unit in creating a pipeline of off-grid SAS projects	OGSES	
Introduce solar technology management in school curricula and technical and vocational education at the tertiary level	OGSES	
Develop guidelines for the standardization of off-grid solar systems including technical equipment, design and assessment methods, operations and maintenance procedures, and environmental compliance	OGSES	
Mobilize financial institutions to create investment packages and counterpart funding	OGSES	
Program 3: Mainstream considerations of Gender Equality and Social Inclusion into sectoral plans and strategies	**Source**	**Physical Investr**
Expand women’s and youth employment opportunities and participation in the management of off-grid solar energy interventions	OGSES	
Build women-led partnerships at the local level to facilitate knowledge exchange, resource mobilization, and sustained quality of services	OGSES	

I. Agriculture and food security	**Source**	**P**
Bridge the gap in the proportion of women to men employment as solar technicians, engineers, and project managers by promoting the entry of more women into jobs delivered within the sector through information, communication, education campaigns, scholarships, and job placements	OGSES	
Build the capacities of youth, women, PWDs, and other disadvantaged groups in using off-grid solar energy resources safely and productively (including for livelihood and business development or improvement)	OGSES	
III. Infrastructure (including WASH, transportation, and urban development)	**Source**	**P**
Program 1: Improve climate change adaptation infrastructure across priority sectors		
Enhance waste management systems at all levels to reduce pollution and greenhouse gas emissions so as to improve health of both humans and animals and reduce climate change	NDC	•
Support the construction of appropriate roads particularly feeder roads in the rural areas as a climate resilience strategy	NCCSAP	•
Diversify economic growth through a strengthened transport sector, particularly the infrastructure to contribute to the reduction of greenhouse gas emissions	LCCRDS	•
Program 2: Mainstream climate change adaptation considerations into sectoral plans and strategies	**Source**	**P**
Strengthen integration of climate change adaptation into the health sector	NDC	
Monitor and control WASH activities in informal settlements	NAPA	•
Program 3: Develop local institutional capacity to support coastal resources management	**Source**	**P**
Monitor academic and public news media to keep informed about changes in climate change science and adaptation tools, technologies, and success stories	CCCAP	
Operationalize a Coastal Chiefdoms Natural Resources Management Network (CCNRMN) and various co-management committees	CCCAP	
Support the development, validation and enforcement of by-laws on mangrove wood harvesting, fishing and sand mining, at local and regional levels to promote mangrove conservation and adaptation to climate change	CCCAP	
Collect physical and socioeconomic data to better understand vulnerabilities and impacts	CCCAP	
Train relevant coastal institutions on climate change adaptation and mangrove conservation	CCCAP	

I. Agriculture and food security	**Source**	**Physical Investr**
IV. Coastal Zone Management (including Fisheries, Marine Resources, and Coastal Ecosystems)	**Source**	**Physical Investr**
Program 1: Management of coastal and fisheries resources		
Promotion of non-destructive fishing techniques to maintain resilience of marine ecosystems	NDC	
Promotion of monitoring, control and surveillance of fishing grounds and fish stocks for sustainable exploitation	NCCSAP	
Promotion of climate change related education and awareness programs	NCCSAP	
Improve productivity and sustainable management of fisheries and the marine sector	MTNDP	
Develop and operationalize an integrated coastal zone management plan	NAPA	
Adopt an adaptive management approach for the governance of coastal management institutions and interventions	ICZMP	
Improve fisheries governance through awareness raising and law enforcement to regulate fishing practices	CCCAP	
Mainstream climate change adaptation into coastal development plans, thus using local development funds managed by councils to build resilience	CCCAP	
Program 2: Increase human (social) development through technology transfer and livelihood support	**Source**	**Physical Investr**
Strengthen the adaptive capacity of the most vulnerable groups and communities through social safety nets and insurance schemes	NDC	
Undertake research to assess local uptake potential of livelihood techniques and technologies	CCCAP	
Promote agri-sylvicultural practices and sustainable rice cultivation in coastal landscapes	CCCAP	
Program 3: Provide information and improve knowledge on climate risks and vulnerabilities	**Source**	**Physical Investr**
Delineate hazard (flood and erosion prone) areas along the coastline	NCCSAP	
Improve the quality of topographic data for the coastal zone	NCCSAP	
Establish robust and long-term mangrove ecosystem health surveillance, monitoring and analysis to develop insights into their current state and map future risks and vulnerabilities	CCCAP	
V. Environment (including forestry, mining, tourism, and land management)	**Source**	**Physical Investr**
Program 1: Improve Natural Resources Management in critical biodiversity hotspots		

I. Agriculture and food security	**Source**	**Pl**
Manage rangelands and pastures by managing grazing systems and grazing intensity, fire management and pasture rehabilitation	NDC	
Restore degraded lands with high production potential	NDC	•
Establish new forest reserves, national parks, and protected areas	NAPA	•
Program 2: Improve the resilience of environmental value chains across the sector	**Source**	**Pl**
Enhance the resilience of the tourism value chain	NDC	
Program 3: Mainstream climate change adaptation considerations into sectoral plans and strategies	**Source**	**Pl**
Integrate climate change adaptation into the mining/extractive sector	NDC	
Mainstream climate change adaptation into land reforms (including establishment of a land commission and revision of the land policy)	NDC	
Program 4: Improve institutional and functional capacities for environmental governance	**Source**	**Pl**
Review the current Draft Climate Policy into a comprehensive Climate Act	NDC	
Establish the enabling legislative framework to implement the NCCS&AP actions	NDC	
Establish and/or strengthen the high-level National Climate Change Council (NCCC), in the Office of the President	NDC	
Establish a Sierra Leone Climate Fund to be a financing mechanism for priority climate change actions and interventions	NDC	
Institutionalize coordination, monitoring, reporting and verification of climate change issues by strengthening the Environment Protection Agency for effective and efficient provision of technical policy advice to the Government and people of Sierra Leone	LCCRDS	
VI. Disaster Management	Source	Pl
Program 1: Establish early warning systems to improve local understanding of risks		
Promotion and facilitation of early warning and disaster preparedness system	NDC	•
Transformation of the National Meteorological Services of Sierra Leone	NDC	
Build capacity in observations and monitoring of climate systems, and in developing, packaging and communicating weather and climate information	NFCS	

I. Agriculture and food security	**Source**	**Physical Investr**
Develop deeper insight into climate-related hazards, vulnerability and risks	NFCS	
Promote climate related research, modelling and prediction of weather and climate events.	NFCS	
Program 2: Improve regulatory frameworks for disaster management	**Source**	**Physical Investr**
Adopt the current disaster risk reduction policy into a comprehensive Disaster Management and Emergency Response Policy	NDC	
Establish the enabling legislative framework to implement the DMD policy and action plan	NDC	
Establish and/or strengthen the high-level National DMD Council (NDMC), in the Office of the Vice President	NDC	
Establish a National DM Agency as the primary national government agency for disaster management response	NDC	

6.5 Sector Needs and Opportunities

Drawing on information collected from the inception workshop and consultations (including the SWOT analysis in Annex 1), there are clear needs for across the national government to be able to fulfill these priority programs:

All priority sectors require:

- Legislation to integrate adaptation into sector policy, work plans and projects, monitoring and evaluation
- Clarification of mandates related to climate change adaptation
- Increased enforcement of existing laws and regulations
- Integrated planning for adaptation across sectors and across national and local government
- Need for technical working group and focal points to improve coordination, collaboration and information exchange across sectors
- Capacity building at the national and local level, especially for women and other marginalized groups
- Increased incentives for private sector engagement on adaptation
- Increased number of staff and staff capacity
- Improved access to information across within and across sectors

- Increased funding for adaptation work

Chapter 7

Institutional Arrangements for the NAP Process

7.1 Introduction

This chapter demonstrates how the NAP priorities are linked to the current Medium-Term Development Plans and how the NAP process can serve as an entry point to integrate adaptation into national and local planning processes. This policy linkages provide a mechanism to understand how the NAP is incorporated into the current institutional system. Additionally, this chapter presents the coordination mechanism for the NAP process.

7.2 Linking NAP Priorities to the Medium-Term National Development Plan

The NAP priorities have clear linkages to various clusters in Sierra Leone's Medium-Term National Development Plan (2019-2023) (Government of Sierra Leone 2019). While the country's vision for the environment and climate change adaptation is clearly stated in cluster 7 of Sierra Leone's Medium-term National Development Plan (2019–2023) (Government of Sierra Leone 2019), the NAP includes issues that cross sectors and therefore clusters. This provides an implicit mandate for addressing the priorities in the NAP. Additionally, since the MTDP is explicitly connected to the SDGs, this provides an alignment between the three policies. The linkages between the NAP and MTDP goals are provided in the table below.

NAP Priorities	Selected MTDP Goals
Gender Equality and Social inclusion (focusing on youth, women, persons with disabilities	Cluster 1.5, 5/6 Empowering women Increasing social protection Increasing investment in children and adolescents Increasing investment in persons with disabilities Increasing youth employment and empowerment
Agriculture and Food Security	Cluster 2.1, 2.7 Improving productivity and commercialization of the agricultural sector Promoting an inclusive rural economy
Water Resources and Energy	Accelerating the provision of energy supplies
Coastal zone management (including fisheries, coastal ecosystems etc.)	Improving productivity and sustainable management of fisheries and the marine sector
Infrastructure (including health, water and sanitation, transportation etc.)	Cluster 1.3, 1.4, 3 Transforming the transportation systems Accelerating health-care delivery Enhancing environmental sanitation and hygiene Advancing housing and land management Improving the water infrastructure systems Improving information and communication technologies
Environment (including tourism, land, mineral resources, forestry, etc.)	Cluster 7, Cluster 2.3 Building national environmental resilience Revitalizing the tourism sector Strengthening forest management and wetland conservation Revitalizing the tourism sector
Disaster Management	Cluster 7.3 Improving disaster management governance

Given these linkages between the NAP priorities and the MTDP, the documents and their implementation become mutually supportive. By integrating the NAP into the MTDP activities (see the process described in 7.3), it ensures that development strategies are climate resilient. Since the MTDP directs the actions of MDAs and local councils, this also serves as a path to integrate adaptation into sector and local planning. Specifically, the MTDP is used by MDAs and councils to develop their plans and strategies. These plans and strategies are used to determine budget allocations. Through linking the NAP and the MTDP, it ensures there is budget allocations for adaptation activities and that all local investments are climate sensitive.

As the MTDP is reviewed in 2023, the NAP process and its connected vulnerability assessments will help to inform national priorities across sectors to help secure development and investment decisions from climate risks. The integration of the NAP into the next round of the MTDP streamlines the planning, budgeting and M&E process. This has many advantages for supporting implementation and ultimately in sustaining adaptation activities. Local councils can then allocate funds for adaptation priorities presented in the NAP. This will also ensure that development finance can be channeled to the local level

to address local climate vulnerabilities, and climate resilient development while also being explicitly tied to national policy and monitoring systems.

7.3 Linking NAP to Sector and Local Planning

The NAP and its linkages to the MTDP can serve as means to integrate adaptation into existing sector and local planning processes. The current planning process is presented in the graphic below. At each stage, there are clear entry points for the NAP process.

Figure 7.1: Linking NAP to Sector and Local Planning

7.4 NAP Entry Points at each stage in the policy process

Strategy Development

- Support the identification of information needs with agricultural, marine, aviation, hydrological, and climatological data services
- Applying risk and vulnerability assessments and socio-economic scenarios in a regular manner
- Spatial planning maps incorporating climate risk, hazards, key infrastructure, social and demographic data
- Prioritizing adaptation into sector and local strategies, plans and budgets at the strategic and planning levels
- Discussion across sectors about how to link sector strategies

Implementation Planning

- Identifying adaptation options to support scaling up in a systematic and structured way
- Integrated economic appraisal of projects and programs
- Prioritizing programs (for example, using multi-criteria and economic tools)

- Developing centralized planning/screening guidelines for climate change and disaster risk reduction for inclusion in official templates

- Gender checklists and gender responsive criteria
- Identify adaptation indicators and targets
- Developing realistic financing plans
- Engage donor to fund adaptation priority programs

Approval

- Apply centralized planning/screening guidelines for climate change and disaster risk reduction

Budgeting

- Costing adaptation options
- Prioritize adaptation activities

Implementation

- Integrate new climate information to tailor implementation strategy
- Inform public about linkages between project and climate impacts
- Capacity Building for all implementors to understand linkages between adaptation and their work

Monitoring and Reporting

- Track national progress toward adaptation targets
- Integrate adaptation into national M&E systems
- National and international reporting on adaptation
- collects data for measuring adaptation baselines and performance
- MRV of support: finance, technology transfer, capacity building
- Feed into systemic and iterative national adaptation planning
- Work with local animators/structures to generate climate and disaster data in real time
- Train CSOs to monitor climate change adaptation projects implemented by MDAs

7.5 Non-government Stakeholder Groups and Roles

There are important roles for non-government stakeholders to play in planning, implementation and monitoring and evaluation of the NAP. Through taking a collaborative and whole of society approach, the NAP has ownership and support across sectors, scale and communities. More specific roles within coordination bodies and suggested organizations are provided in the next section.

- Civil society organizations (CSOs): The NAP process in Sierra Leone will actively engage the CSOs in planning, advocacy, education and awareness-raising, evidence-based research, and M&E of adaptation efforts at various levels in the country. This will include women rights and youth organizations.

- Academia and research institutions: This group can conduct research on different aspects of climate change adaptation, vulnerability and resilience, and it should be guided to align its focus areas with adaptation priorities, so that its impact is as direct as possible vis-à-vis adaptation action. This includes improving the understanding of climate change impacts on the population and the environment, as well as developing partnerships with Government entities and communities to conduct adaptation that addresses adaptation needs in Sierra Leone.

- Private sector: Large, medium and small businesses can support a business case for private sector investment in adaptation, finance and incentivize

adaptation actions. It can also be an engine for empowering women-led enterprises and women entrepreneurs.

- Development partners: Sierra Leone's NAP process recognizes the role of the international community, especially development partners, as critical for resource mobilization, capacity development, and technology development and transfer for current and future adaptation actions.
- Traditional and religious leaders: These leaders have an important role in society and can promote climate change adaptation practices.
- Media: The media can build awareness around adaptation and climate change, share stories of adaptation actions to spur actions and provide avenues for learning about adaptation inside and outside the country.
- Public: The general public has a vital role to play in the planning, implementation and monitoring of the NAP and adaptation interventions in order to enhance their adaptive capacity and resilience to climate shocks

7.6 Institutional Framework Coordination Mechanisms

The institutional framework below builds on the plan from the NAP Framework. At the top, it includes a Parliamentary Committee (PC) and an Interministerial Committee (IC). These two committees will be created to gain the political and legislative support needed for implementing the NAP. The Interministerial Committee is co-chaired by the Ministries of the Environment and Finance. The IC will have ministers or their designees from the priority sectors. The IC will provide policy oversight, coordination and resource mobilization for the NAP. The Parliamentary Committee (PC) chaired by the head of the Environment Committee in the House of Parliament. Its members PC comprise leaders and secretaries of the parliamentary committees identified. The Parliamentary Committee (PC) provides legislative support and oversight, monitoring and evaluation, policy advocacy and public outreach.

The IC and PC will oversee the National Steering Committee (NSC). Chaired by the Environment Protection Agency, the NSC will include departments and agencies of government from the priority sectors. The NCS roles include overall coordination of NAP implementation, define policies and strategies, resource mobilization, ensure policy coherence, lead adaptation planning across sectors and levels and drive the ownership of the NAP process.
A Scientific and Technical Advisory Taskforce will provide technical support and advisory services to the NSC and the consultative committees. This includes data gathering and analysis, advising the NSC and consultative committees on data gathering and dissemination best practices, define, identify and conduct research to support adaptation actions for vulnerable groups including

women, people with disabilities, children and the elderly, develop processes for information sharing and collection of lessons learned, coordinate bilateral and multilateral assistance and link with municipalities and support actions on sectoral priorities. There are three consultative committees: (1) the private sector consultative group, (2) local councils, communities and civil society consultative group and (3) development partner consultative group. The three committees provide policy and implementation advice the steering committee on relevant issues and build support for NAP implementation through activities such as research, capacity building and awareness raising.

Institutional Framework

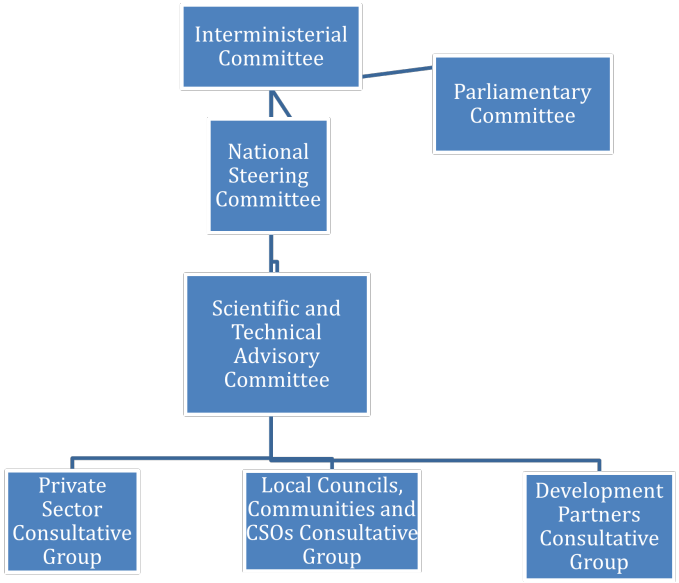


Figure 7.2: Institutional Framework

Proposed members of Committees and Roles

Group	Members	Roles and responsibilities
Inter-ministerial Committee	All ministries covering priority sectors identified for the NAP (and those that are cross-cutting) Chair: Vice President Co-Chair: To be determined	Policy oversight Coordination Resource mobilization

Group	Members	Roles and responsib
	• Ministry of Agriculture and Forestry • Ministry of Youth Affairs • Ministry of Gender • Ministry of Planning and Economic Development • Ministry of Finance • Ministry of Social Welfare • Ministry of the Environment • Ministry of Fisheries and Marine Resources • Ministry of Mines and Mineral Resources • Ministry of Tourism and Culture • Ministry of Transport and Aviation • Ministry of Water Resources • Ministry of Works and Public Assets • Ministry of Energy	
Parliamentary Committee	Heads and Secretaries of Parliamentary Committees on: • Environment • Transparency and accountability • Finance • Planning • Legislation • Representative of Women's Parliamentary Caucus	Legislative support an Monitoring and evalua Policy advocacy Public outreach
National Steering Committee	Environment Protection Agency National Protected Area Authority Sierra Leone Agricultural Research Institute (SLARI) National Water Resources Management Agency (NWRMA) Electricity and Water Regulatory Commission (EWRC) National Tourist Board (NTB)	Overall coordination o Define policies and str Resource mobilization Ensuring policy cohere Lead adaptation plann Drive ownership of NA

Group	Members	Roles and responsibilities
	Ministry of Planning and Economic Development	
	Sierra Leone Maritime Administration (SLMA)	
	Sierra Leone Meteorological Agency (SLMet)	
	Sierra Leone Roads Authority (SLRA)	
	Sierra Leone Housing Corporation (SALHOC)	
	Environment Protection Agency (EPA)	
	Forestry Division	
	Office of National Security (ONS)	
	National Fire Force (NFF)	
Scientific and Technical Advisory Taskforce (STAT)	Universities	Data gathering and analysis
	Sierra Leone Agricultural Research Institute (SLARI)	Advise the steering committee on rele
	Sierra Leone Meteorological Agency (SLMet)	Review data gathered from different s advise on fit with broader NAP activiti
	National Water Resources Management Agency (NWRMA)	Advise sub-structures on data gatheri dissemination best practices
	Environment Protection Agency (EPA)	Define/identify vulnerable groups (wo youth, elderly, etc.)
	National Association of Environmental Professionals (NAEP)	Information sharing (institutionalize le
	Sierra Leone Institution of Engineers (SLIE)	Coordinate bilateral and multilateral a and link with municipalities
	Statistics Sierra Leone (SSL)	Define sectoral priorities for adaptatio
	Sierra Leone Institution of Geoscientists (SLIG)	
Private Sector Consultative Group	Water packaging companies (e.g., Grafton, Luvian, etc)	Information dissemination
	Fertilizer producers	Financial support/financing
	Sierra Leone Investment and Export Promotion Agency	Knowledge transfer
	Sierra Leone Produce Marketing Board	Supporting the integration of adaptive increase the private sector resilience investments, climate-related insuranc
	Chamber of commerce and industry	
	Chamber of Agribusiness	Advisory services
	Sierra Leone Association of Insurance Companies	

Group	Members	Roles and responsib
	Association of Commercial Banks	
	Renewable Energy Association of Sierra Leone (REASL)	
	Small Medium Enterprises Development Agency (SMEDA)	
	Sierra Leone Water Company	
	Guma Valley Water Company	
	Addax Bioenergy Ltd (Sunbird)	
	Miro Forestry Ltd	
	Kingho Mining	
	Chamber of Mines	
	Leadway enterprises	
	Hotel Association of Sierra Leone	
	Telecom companies	
	Sierra Leone Artisanal Fishermen Union	
	Sierra Leone Timber Association	
	SELI hydropower	
Local Councils, Communities and CSOs Consultative Group	Local Councils	Advocacy
	Coalition of CSOs	Awareness raising and
	Climate Change, Environment, and Forestry Consortium (CEFCON)	Resource mobilization
	Sierra Leone Alliance Against Hunger	Capacity building
	Campaign for Good Governance	Research/M&E
	Marine watch	Networking
	WONES	
	Environmental Foundation for Africa (EFA)	
	Sierra Leone Association of Journalists (SLAJ)	
	Conservation Society of Sierra Leone (CSSL)	
	Inter Religious Council of Sierra Leone (IRCSL)	
	Sierra Leone Muslim Congress (SLMC)	
	Sierra Leone Labor Congress (SLLC)	

Group	Members	Roles and responsibilities
	WASH Network (WASHNet)	
	Sierra Leone Union for Disability Issues (SLUDI)	
	PACJA	
	Green Scenery	
	Sierra Leone Urban Research Centre (SLURC)	
	Environmental Forum for Action (ECFORAC)	
	50-50 Group	
Development Partners Consultative Group	UN Development Programme (UNDP)	Resource mobilization
	US Agency for International Development (USAID)	Technical support including supportin Readiness for adaptation and GCF di
	World Meteorological Organization (WMO)	Knowledge transfer
	World Health Organization (WHO)	
	German International Cooperation (GIZ)	
	Irish Aid	
	World Bank Group (WBG)	
	African Development Bank (AfDB)	
	EU	
	Food and Agriculture Organization (FAO)	
	International Fund for Agricultural Development (IFAD)	
	Department for International Development (DFID)	
	Islamic Development Bank (IDB)	
	UN Environment Programme (UNEP)	
	UNFCCC	
	ECOWAS	
	African Union (AU)	
	UN Children's Fund (UNICEF)	
	UN Industrial Development Organization (UNIDO)	
	China Aid	

7.7 Recommendations

Based on the information contained in this chapter, there are several priorities with respect to improving the NAP process that should be addressed.

- Determine clear legal pathway to incorporate guidance and recommendations from the NAP into sector and local planning and budgeting processes, and to implement the priorities described in the NAP.
- Set legal guidance for clear mandate and roles for the various agencies working on climate change.
- A data sharing agreement should be signed between all responsible agencies to enable information sharing and knowledge exchange in a transparent and participatory manner.
- The NAP process should be aligned with current and future development plans, so that institutions responsible for national development planning and budgeting can feel involved and obliged to contribute.
- Increase coordination roles of the Ministry of Environment in climate change adaptation. This includes convening government and non-government stakeholders, supporting capacity building and information exchange and building a shared understanding of policy, project and program implementation goals.
- Establish the institutional system presented in this chapter.
- Appoint and provide capacity building support to sectoral focal points and sectoral adaptation teams, which will guide the process of mainstreaming climate change adaptation and implementation of the NAP within sectors.

Chapter 8

Next Steps

8.1 Introduction

This chapter presents the next steps in the NAP process. This includes a roadmap with key activities and an implementation plan. These next steps are part of an iterative process which will lead to subsequent versions of a NAP and its implementation.

8.2 NAP Process Roadmap

2021

- Validation of initial NAP
- Submission of initial NAP to UNFCCC
- Validation of National Framework for Climate Services (to inform full NAP and NDC review)
- Two NSC meetings to plan for the NAP process
- Formalized steering and interagency coordination groups
- Regional consultations on NAP and NDC review process
- Finalization of National Electrification Plan (to inform NAP and NDC review)
- Finalization of NDC review (NAP to inform review)
- Validation of revised NDC
- Review of National Climate Change Adaptation Plan
- Review of National Climate Change Adaptation Policy
- Conduct a gender analysis
- Consultations on GCF NAP Readiness Grant
- GCF NAP Readiness application submitted

- Work on integrating climate change into the education curriculum (2021-2022)

2022

- Award of GCF grant (Q2) (18-24 months implementation)
- Vulnerability and Risk Assessments
- Institutional and human capacity needs assessment and strengthening plan
- Stakeholder consultations

2023

- Development of Medium-Term National Development Plan (2024-2029) (NAP process to inform PRSP5)
- Preparation of full NAP (NAP to be informed by Medium-Term National Development Plan)
- Validation of NAP

2024-2029

- NAP priority program Implementation begins
- 4th National Communications (NAP data to inform NC4)
- Beginning of PRSP5/Medium Term National Development Plan (2024-2029)
- Integration of adaptation into national, sector and local planning and budgeting (2025)

8.3 Implementation Strategy: Actions and Needs

The realization of the actions identified in the NAP will require substantial financial resources, investment, technology development and transfer, and capacity building. International cooperation is an important and necessary prerequisite for leveraging of inputs for the implementation of the NAP.

Capacity Development

Various institutions and communities involved in the NAP process have considerable technical and non-technical skills that are essential for the NAP process. These capacities, which are found across society including within specialized Ministries, Departments and Agencies (MDAs), state corporations, private sector, research and learning institutions will be utilized in the planning and implementation of the NAP. There are, however, gaps in capacity development

and need for further learning and support. These are detailed in the previous chapters. There is a need for support for cooperation across the government and internationally including south-south cooperation, regional cooperation, bilateral and multilateral cooperation. Additional effort will be focused on implementation of a climate curriculum, technical training programs and building south-south exchange and learning programs.

Mobilization of Finance

The priorities included in this document provide various potential projects for public and private and international and national funding. While the costs for this plan cannot be calculated at this stage, there are a few documents that provide an estimate for the costs. The NDC expenditure commitment estimates USD900 Million with most of the financing needed for adaptation. There are also estimates for costs in the MTDP (2019-2023). The total costs for all the priorities that are linked between the NAP and MTDP is approximately $3 billion for the five-year period. The section entitled, "Addressing vulnerabilities and building resilience" includes $96.38 million in costs for five years. Further analysis will need to be conducted for a more accurate accounting.
Two financing goals have been set out for the NAP:

1. Establish a National Trust Fund for channeling adaptation support across sectors
2. Direct 40% of international development funding toward adaptation priorities across different sectors

Stakeholder Involvement

Subsequent planning and implementation of the NAP will continue to adopt a collaborative and adaptive learning approach through incorporating inputs from consultative groups and ensure strong involvement of all stakeholders including government agencies, NGOs, private sector, universities, community-based organization, women's rights organizations. and development partners.

Communication Strategy

A Climate Change Communications Strategy Under the NAP has been developed. This includes detailed information on targeted messages and is an essential component of the next steps for developing and implementing the NAP.

Monitoring and Evaluation, Learning and Reporting

A framework for monitoring and evaluation needs to be developed to support learning, accountability, transparency and reporting. This system needs to be integrated between local and national governments. Given, that the NAP is a working document, there needs to be a system in place to integrate lessons over time. Additionally, there also needs to be a platform created for knowledge sharing and information exchange. This second part requires the development of a data sharing policy which will ensure data exchange between sectors, and between public and private institutions.