Save the Children

Sierra Leone Coastal Resilience Project (SLCRP)

Annex 2: Feasibility study

Accredited Entity: Save the Children Australia
Version: Final – 29 January 2024

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Abbreviations

ACC	Anti-Corruption Commission
AFLOU	Agriculture, Forestry and Other Land Use
AfCFTA	African Continental Free Trade Area
AML	Anti-Money Laundering
APC	All People's Congress
AR-6	Sixth Assessment Report (by IPCC)
ASGM	Artisanal and Small-scale Gold Mining
B-Lo	Business Loop
BMTA	Boulaneh Gold Miners and Traders Association
BMZ	German Federal Ministry for Economic Cooperation
BoP	Balance of Payment
CAPs	Community Adaptation Plans
CBOs	Community-Based Organisations
CCAP	Climate Change Adaptation Plan
CCAP	Sierra Leone Climate Change Adaptation Plan for the Coastal Landscape Complex
CCNRMN	Coastal Chiefdoms Natural Resources Management Network
CDM	Clean Development Mechanism
CEFCON-SL	Climate Change, Environment & Forest Conservation Consortium
CET	Common External Tariffs
CFA	Franc. - Communauté Financière Africaine
CFM	Complaints and Feedback Mechanism
CFT	Countering the Financing of Terrorism
CH_4	Methane
CLC	Coastal Livelihood Circles
CMDA-SL	Conflict Management and Development Associates
CO_2	Carbon Dioxide
CPI	Corruption Perception Index
CTU	Clarity, Transparency, and Understanding
CSSL	Conservation Society Sierra Leone
DMD	Disaster Management Department
DDP	District Development Plan
EARF	Energy Access Relief Facility
ECF	Extended Credit Facility
ECOWAS	Economic Community of West African States
EFA	Environmental Foundation for Africa
EIA	Environmental Impact Assessment
ENFORAC	Environmental Forum for Action
EPA	Environmental Protection Agency
EPA SL	Environmental Protection Agency Sierra Leone
EPP	Employment Promotion Programme
ESMP	Environmental and Social Management Plan
EU	European Union
EWS	Early Warning System
FATF	Financial Action Task Force
FMCA	Financial Management Capacity Assessment
GAP	Gender Action Plan
GATT	General Agreement on Tariffs and Trade
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GESI	Gender Equality and Social Inclusion
GHG	Greenhouse Gas

GIZ	Gesellschaft fur Internationale Zusammenarbeit
GNI	Gross National Income
HDI	Human Development Index
HFO	Heavy Fuel Oil
IA	Island Aid Sierra Leone
ILO	International Labour Organization
IMBO	Institute of Marine Biology and Oceanography
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial Process and Product Use
IRUMP	Integrated Resilient Urban Mobility Project
LDC	Least Developed Countries
LPG	Liquefied Petroleum Gas
MCC	Millennium Challenge Corporation
MEAL	Monitoring, Evaluation, Accountability and Learning
MFMR	Ministry of Fisheries and Marine Resources
MPA	Marine Protected Area
MRV	Monitoring, Reporting and Verification
MTNDP	Medium-Term National Development Plan
NaCREEE	National Centre for Renewable Energy and Energy Efficiency
NAMA	National Adaptation Mitigation Action
NAP	National Adaptation Plan
NCCC	National Climate Change Council
NCCS&AP	National Climate Change Strategy and Action Plan
NDA	Nationally Designated Authority
NDC	Nationally Determined Contribution
NDMA	National Disaster Management Agency
NDMDC	National Disaster Management Department Council
NDP	National Adaptation Plan
NDP	National Development Plan
NDVI	Normalized Difference Vegetation Index
NGOs	Non-Governmental Organisations
NPAA	National Protected Areas Authority
NPRC	National Provisional Ruling Council
NTB	National Tourist Board
OECD	Organisation for Economic Co-operation and Development
PCM	Project Cycle Management
PESSMS	Project Environmental and Social Safeguard Management System
PIU	Project Implementation Unit
PPP$	Purchasing Power Parity
PSC	The Project Steering Committee
PWDs	People with Disabilities
RCPs	Representative Concentration Pathways
REDD+	Reducing Emissions from Deforestation and Forest Degradation and foster conservation, sustainable management of forests, and enhancement of forest carbon stocks
RETs	Renewable Energy Technologies
RUF	Revolutionary United Front
SAP	Simplified Approval Process
SAS	Stand-alone Solar
SLAFU	Sierra Leone Artisanal Fishermen Union
SLCRP	Sierra Leone Coastal Resilience Project
SLL	Sierra Leonean Leone
SL-Met	Sierra Leone Meteorological Agency
SLPP	Sierra Leone People's Party
SOCFIN	Société Financière des Caoutchoucs

SSPs	Shared Socioeconomic Pathways
ToT	Train of Trainers
TVET	Technical and Vocational Education and Training
UN	United Nations
UNDP	United Nations Development Programme
US	United States
USAID	United States Agency for International Development
USD	United States Dollar
VSLA	Village Saving and Loan Associations
WA BiCC	West Africa Biodiversity and Climate Change Programme
WAMZ	West African Monetary Zone
WASH	Water, Sanitation and Hygiene
WoNES	Women's Network for Environmental Sustainability
WTO	World Trade Organisation

Executive Summary

Sierra Leone is a Least Developed Country (LDC) located along the West African coast and is highly vulnerable to the negative effects of climate change upon a range of sectors and sub-sectors. The country is expected to experience future climate-related changes including increases in mean temperatures, higher incidence of hot days, decreased incidence in the number of rainy days, higher incidence of unpredictable and intense precipitation, sea level rise, coastal erosion and a higher incidence of extreme weather events. The country has experienced floods, droughts and extreme weather events which have impacted key sectors such as agriculture and fishing and have threatened agricultural and fishing livelihoods in rural coastal communities. Climate change threatens food security and the livelihoods of most of the population. The highest percentage of food insecure people in Sierra Leone are those involved in agriculture and fishing-based livelihoods, such as the production and sale of cash crops, fishing and unskilled wage labour. Rural coastal communities are the target groups and target areas of the proposed project. These communities have also seen their health, education and ecosystems being disrupted by these increasing climate-related impacts.

It is highly vulnerable to economic shocks, with one of the lowest gross domestic products (GDP) in the world at around USD 3.91 billion by the end of 2021, according to Trading Economics global macro models.[1] Per capita, this translates into USD 629.94 for 2021.[2] While the economy has recovered after the 2014-2016 Ebola outbreak and Covid-19-related drop in economic output, it still remains one of the poorest worldwide. . Sierra Leone has a low adaptative capacity because of its weak governance, poverty levels, disrupted educational attainments from 1990s, and limited girls' and women's participation in all economic activities. A large number of public international institutions, multilateral and bilateral funds, and international non-governmental organisations (NGOs) are present in the country, a reflection of the still critical needs and unrealised economic potential in the country. However, the vast majority of donors active in Sierra Leone are focused on issues other than climate change (due to the also high development needs) and the country has struggled to fully access climate finance mechanisms to date, leaving a specific and substantial gap in available climate adaptation funding.

The proposed 'Sierra Leone Coastal Resilience Project (SLCRP)' aims to reduce the vulnerability of coastal communities to climate change risks and impacts by supporting climate-resilient livelihood practices for farmers and fishers, enhancing food-value chains, protecting coastal ecosystems, promoting sustainable resource use and strengthening locally-led, participatory governance processes to mainstream climate change responses. Within this context, this Feasibility Study details the potential for these interventions, focusing on adaptation activities as they relate to livelihoods, ecosystems, and health. The project is well-placed in the overall sustainable development context of Sierra Leone, building on the foundations of previous projects, and providing additional impacts to ongoing activities by bilateral donors in the fields of nutrition, water, sanitation and hygiene (WASH) and employment.

The findings of this Feasibility Study informs the Funding Proposal and draws from both desk research on baseline conditions and adaptation activities, as well as on a large number of dedicated consultations with the local communities, national agencies and international institutions active in the country. This Feasibility Study has specifically benefited from in-country consultations, a qualitative study and a quantitative household survey that reached 402 respondents serving to validate the proposed activities, support better assessment of the needs of target population and inform the selection of the target beneficiaries (reaching 260,000 coastal people, including a strong women and youth focus). The SLCRP's proposed activities are strongly aligned with priority sectors defined in the country's Nationally Determined Contribution (NDC) and initial National Adaptation Plan (iNAP), as well as in other sectoral priorities.

Section 1 presents the baseline of the project and provides a brief analysis of the macroeconomic, social and governance contexts of the country. This section presents Sierra Leone as a country that has achieved significant progress over the past two decades, although growth has been constrained first by the Ebola outbreak of 2014-2016, and then the Covid-19 epidemic in 2020, the effects of which are still ongoing, impacting the country's economic and social recovery. This section also presents the past and

[1] https://tradingeconomics.com/sierra-leone/gdp
[2] https://tradingeconomics.com/sierra-leone/gdp-per-capita

ongoing work by key international and national institutions, detailing the projects that have most relevance to the SLCRP.

Section 2 presents an overview of observed and projected climate change. It draws on current climatology and future projections from available global open sources such as the Global Circulation Models (GCM), the Sixth Assessment Report (AR6) from the Intergovernmental Panel on Climate Change (IPCC), using projections made under the Representative Concentration Pathways (RCPs) as well as, more recently, using the Shared Socio-economic Pathways (SSP) scenarios. National data from the Hazard and Risk Profile Information System in Sierra Leone (HARPIS-SL) model has also been considered. This section lays out the climate-related hazards facing the country and presents the relevant information on climate data availability and gaps. It also discusses the observed and projected changes and impacts of climate change, finding that these present clear risks to livelihoods and economic performance in the intervention districts.

Section 3 presents the adaptation analysis and an analysis of the climate vulnerabilities of the country and key sectors is presented, focusing on the coastal districts where the project will intervene. A short overview of the vulnerability of the coastal sectors and livelihoods is followed by a detailed sectoral discussion focusing on agriculture and fishing, water (including sanitation and hygiene, i.e., WASH), coastal and marine ecosystems and how they are expected to be impacted by climate change.

Section 4 presents a barrier analysis, with details on financial, technological, informational and capacity, fiduciary, etc. barriers that are currently limiting climate resilience by the target populations. These barriers are considered in the activities proposed under Section 5.

Section 5 presents an overview of the project's Theory of Change and project activities. There are three main outcomes of the SLCRP:

Outcome 1: Coastal communities and institutions have governance structures, plans, knowledge, skills and solutions in place to undertake local adaptation to climate change.
Outcome 2: Coastal communities have climate-resilient farming, fishing and alternative livelihoods and businesses.
Outcome 3: Mangroves are conserved and restored for coastal resilience and communities have increased capacity to co-manage mangroves with government institutions.

Section 6 describes the geographical targeting of the project and the selection process of direct and indirect beneficiaries. The project will reach 260,000 direct beneficiaries (representing 20% of the entire coastal population), of which 60% are expected to be women and girls (156,000), and 1,000,000 indirect beneficiaries. Working at community-level will ensure that the most underserved and vulnerable groups ('last mile' beneficiaries) are reached so that they benefit most from the GCF-supported interventions in strengthening their resilience to climate change.

Section 7 presents the implementation arrangements and governance. Save the Children Australia is the Accredited Entity with GCF. The Save the Children Fund (SCUK), Save the Children Sierra Leone and Sierra Leone's Environment Protection Agency will be the project's three Executing Entities.

Section 8 presents the project's Monitoring and Evaluation approach, including accountability and project-level feedback and recourse mechanisms available to end-beneficiaries.

Section 9 presents project alignment with the GCF's six investment criteria. This section closely follows the template for the Funding Proposal.

Section 10 presents key recommendations for the project based on the desk research, national vulnerability analysis, field study, and evaluation of alternative approaches conducted for this feasibility study. The recommendations include a strong suggestion adopt both locally-led and ecosystem-based adaptation approaches, ensure focus on promoting gender equality and on empowerment of youth and children, the need for an integrated and comprehensive approach to strengthening resilience in coastal communities, a recommendation to ensure communities have direct access to adaptation resources, and the need to focus on locally-appropriate and context specific information and skills to ensure sustainable uptake and capacity building of community members.

References are presented as the final section of this Feasibility Study.

1. Sierra Leone's Context: Baseline Assessment

1.1 Geographical context

Sierra Leone is located in West Africa between the Republic of Guinea in the north and the Republic of Liberia to the southeast. The western coastline stretches for 465 km along the Atlantic Ocean. It is situated in the northern hemisphere between latitudes 7° and 10° N and longitudes 10° and 13° W and covers 72,325 km^2 of territory. The country enjoys a tropical climate and two seasons that determine the agricultural cycle: the rainy season from May to November, and a dry season from December to May.[3] Sierra Leone experiences the *harmattan* aeolian phenomenon which manifests as cool, dry winds that blow in from the Sahara Desert and result in night-time temperatures that can drop to 16 °C during the dryer months.[4] Coastal plains, mangroves, interior lowland plains, plateaus, forested hills, and mountains characterize Sierra Leone, and the country is endowed with substantial natural resources: mineral deposits, fertile agricultural land, and a deep natural harbour.

The Sierra Leone coastline connects with a substantive continental shelf that extends offshore for some 25,000 km^2. This considerable continental shelf — combined with the local currents — creates a substantial upwelling that places Sierra Leone within one of the world's most productive marine ecosystems.[5] The specific orientation of the coast in Sierra Leone — i.e., perpendicular to the moisture-bearing winds — combined with the regional topography makes the coastal area of the country and its Guinean and Liberian neighbours the wettest part of the region, and among the wettest in the world, with rainfall regularly exceeding 4,000 mm/year.[6]

Agro-climatically, the country is divided into four distinct regions, namely Coastal Plains, Rainforest, Savannah Woodland, and Transitional Rainforest/Savannah Woodland. While upwards of 70% of Sierra Leone's land area is considered arable, the most fertile areas are the coastal plains that are comprised of mangrove swamps, riverine grasslands, inland valley swamps, and floodplains of the major rivers.[7] About 80-90% of the c. 8.4 million (2021) people[8] in Sierra Leone reside in non-metropolitan areas and most of the population derives their income from natural resources. Agriculture comprises the largest sector of the economy and employment. Climate change impacts now threaten food security and the livelihoods of most of the population. Changes in precipitation and temperature, increase in risks of droughts, floods, and increase in sea level affect the country's agriculture, water, energy, infrastructure and coastal areas. This is exacerbated by human actions. For example, landcover analyses show that indigenous forests in Sierra Leone have declined in coverage by as much as 65% since the late 1980s and overall forest decline has been almost 13% between 1990 and 2010[9], while the reduction of mangrove cover is adversely impacting fisheries.[10]

1.1.1 All Districts

Sierra Leone is divided into four provinces (until 2017, three) and one Western Area; these are further divided into 16 districts (previously 14), and the districts are further divided into 190 (previously 149) chiefdoms (Figure 1). The proposed project will target coastal districts, with the exception of the following two: Western Urban, which is the district where the capital Freetown is located, and Western Rural, to the south and south-east of the capital. A full analysis of coastal districts' climate related vulnerabilities and how they impact livelihoods and ecosystems can be found in Sections 2 and 3, while a study of beneficiary communities is presented in Section 6.

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[3] Blinker, L. 2006. *Country Environment Profile: Sierra Leone*. European Union Report. [Online]. Available: https://europa.eu/capacity4dev/file/32962/download?token=49VpV7Nw
[4] Ibid.
[5] Mondal, P., Trzska, S., and de Sherbinin, A. 2017. Landsat-Derived Estimates of Mangrove Extents in the Sierra Leone Coastal Landscape Complex during 1990–2016. *Sensors*, 18 (12). [Online]. Available: 10.3390/s18010012
[6] Mondal, P., Trzska, S., and de Sherbinin, A. 2017. *Landsat-Derived Estimates of Mangrove Extents in the Sierra Leone Coastal Landscape Complex during 1990–2016.* Sensors, 18 (12). DOI: 10.3390/s18010012
[7] Ibid.
[8] According to World Bank for 2021. Available: https://data.worldbank.org/indicator/SP.POP.TOTL?locations=SL Population estimates vary, with the official 2021 census reporting a slightly lower figure. However, there has been some uncertainty and indeed criticism of the census, with critics and other sources questioning some of the official figures, in light of other reliable data sources like school enrolments. For example: http://igrsl.org/wp-content/uploads/2022/06/IGRs-response-to-the-Census-Final.pdf
[9] https://rainforests.mongabay.com/deforestation/2000/Sierra_Leone.htm
[10] https://ejfoundation.org/news-media/exiled-in-sierra-leone

Figure 1: Map of Sierra Leone showing all districts and chiefdoms[11]

1.1.2 Target Districts

The project will focus on all four of the coastal landscapes that comprise the SLCLC, namely the Sierra Leone River Estuary, Yawri Bay, Scarcies River Estuary (SRE) and Bonthe-Sherbro River Estuary, as well as coastal and upriver communities in Pujehun district. There are seven coastal districts in Sierra Leone -these include from North to South: Kambia, Port Loko, Western Urban (where Freetown is situated), Western Rural, Moyamba, Bonthe and Pujehun. The SLCRP will focus on 75 of the most climate vulnerable small holder farming and artisanal fishing communities along the coastline of Kambia, Port Loko, Moyamba, Bonthe and Pujehun districts. The project will not intervene in the Western Urban or Western Rural area, which are the two areas within the Freetown Peninsula.[12] It will enhance the resilience of 260,000 direct and 1,000,000 indirect beneficiaries in five rural coastal districts. In line with

[11] Statistics Sierra Leone https://www.researchgate.net/figure/Political-map-of-Sierra-Leone-with-districts-and-chiefdoms-Source-Statistics-Sierra_fig1_325894430

[12] Concerning secondary data sources for climate-related issues within subnational areas of Sierra Leone, most published sources focus on urban and peri-urban areas within and adjacent to Freetown and the peninsula, with references to more rural areas comparatively scarcer. While some of the areas referred to below and in other parts of this report are not within the target districts, those references have been retained as evidence of broader trends and the occurrence of impacts in specific areas of Sierra Leone. Areas outside and within the project's target districts have been indicated as such for ease of reference. The results of the quantitative household survey undertaken during 2022 in target districts have been used to supplement secondary data sources that do provide information on more rural areas.

the gender and youth focus, of the 260,000 direct beneficiaries, 156,000 are estimated to be women (representing 60%) and 104,000 are men (representing 40%). The process followed and information sources used for the selection of target areas and for beneficiary calculations are presented in Section 6 below.

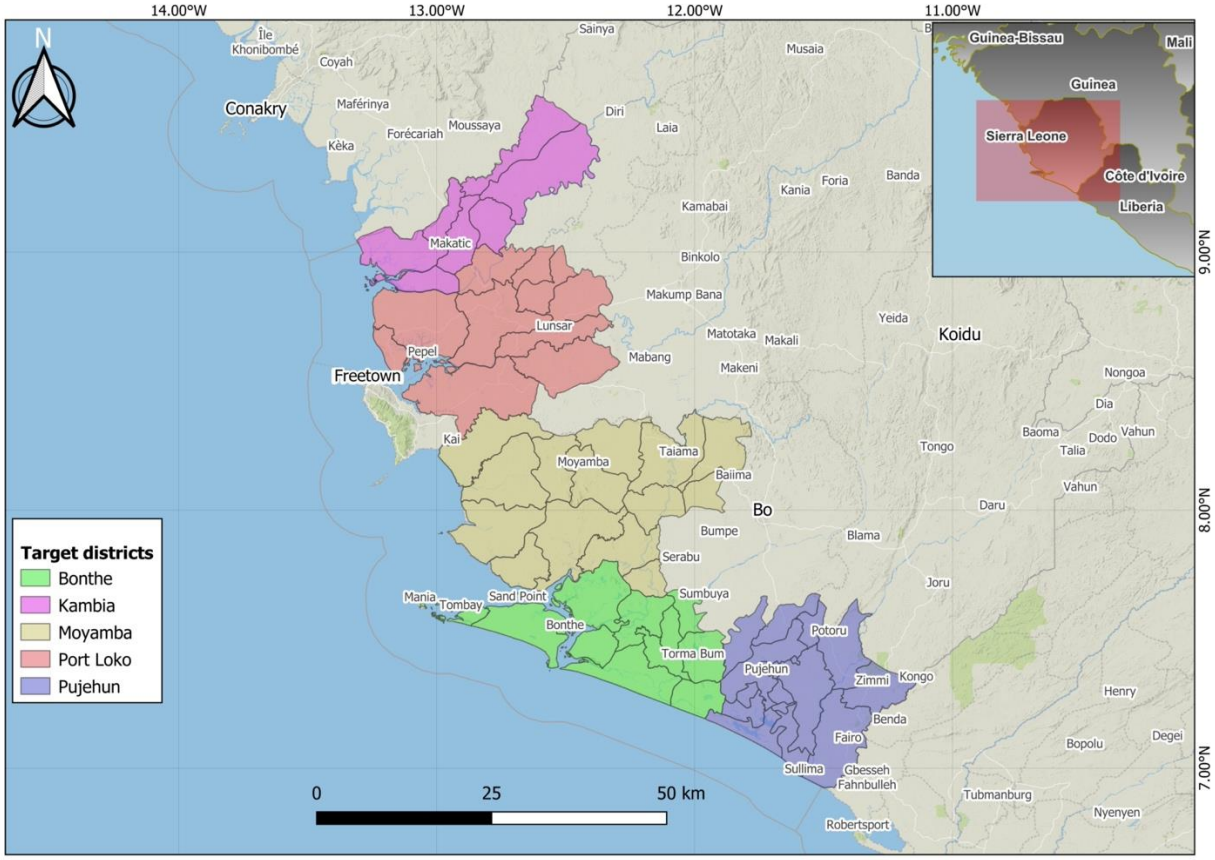

Figure 2: Map of Sierra Leone showing target districts[13]

Table 1: Population in coastal districts of Sierra Leone (2015 census)

District	Male	Female	Total	Target Chiefdoms	Target Chiefdoms population	Of which direct beneficiaries
KAMBIA	165 541	179 933	345 474	Magbema, Mambolo, Samu	194 907	74 802
PORT LOKO	255 030	275 835	530 865	Bureh, Kaffu Bullom, Koya, Bakeh Loko, Lokomasama, Maforki	356 390	70 655
BONTHE	99 014	101 767	200 781	Bendu Cha, Dema, Imperri, Jong, Nongoba Bullom, Bonthe Urban, Sittia	133 271	49 157

[13] Data sources: AmeriGeo. 2022. *Sierra Leone Administrative Boundaries*. [Online]. Available: https://github.com/wmgeolab/geoBoundaries/raw/a351e5f8d458d049f43742e327ee2665b82e51c4/releaseData/gbOpen/SLE/ADM0/geoBoundaries-SLE-ADM0-all.zip; and OpenStreetMap Foundation. 2023. *Basic (EPSG:4326) map tile*. Licensed under the Open Data Commons Database License. [Online]. Available: https://opendatacommons.org/licenses/odbl/

MOYAMBA	153 699	164 889	318 588	Bagruwa, Bumpeh, Kagboro, Ribbi	133 095	52 714
PUJEHUN	168 869	177 592	346 461	Gallinas, Kpaka, Mono Sakrim	52 671	12 672
WESTERN RURAL	221 351	222 919	444 270		444 270	n/a
WESTERN URBAN	528 207	527 757	1 055 964		1 055 964	n/a
Total	1 591 711	1 650 692	3 242 403		2 370 569	
Total (Non-Western Area)	842 153	900 016	1 742 169		**870 334**	**260 000**

**Bolded districts represented SLCRP targeted districts*

1.2 Sierra Leone's oceans and coastline

Sierra Leone has rich biodiversity that includes freshwater swamps, coastal ecosystems and marine ecosystems. The country's coastline extends 506 km and includes sandy beaches, cliffs, lagoons, estuaries, mudflats, creeks, bays and mangrove swamps. The coastline is bordered by the Atlantic Ocean and is made up of four distinct regions, also known as the Sierra Leone Coastal Landscape Complex, namely the Scarcies River Estuary (Kambia and northern part of Port Loko district), Sierra Leone River Estuary (Port Loko district), Bonthe-Sherbro River Estuary (Bonthe district), and Yawri Bay (Moyamba district), and Turner's Peninsula – a long stretch of coastline just South of the Bonthe-Sherbro river estuary. The Scarcies River Estuary hosts historically important localities.[14]

Mangrove cover is dense along coastal Sierra Leone. The Kambia district represents 7.6% of Sierra Leone mangroves, which extend 8 to 10 km inland and up to 15 km along the rivers. This region is highly populated with large economic activity from fishing where smoked fish are exported to Freetown and Guinea. The mangroves and wetlands along the Western Area Rural and Port Loko regions are of international importance. The protected area covers 295,000 hectares of this estuary and are one of two sites in Sierra Leone protected under the Ramsar Convention.[15] The estimated mangrove cover in the Western Area Rural and Port Loko is 19.9% of the total mangrove cover of Sierra Leone and extends between 0.5 and 3 km inland. Despite the protection under the Ramsar Convention, these areas of mangrove cover face constant threats due to urbanisation and industrial activities. Mangroves in the Moyamba region represent 14.3% of the total mangrove cover. Dense mangroves extend up to 20 km inland, along the three main rivers, Ribi, Bumpe and Kagboroo creek. Mangroves in the Bonthe district or Sherbro Island area are part of the Sherbro River mangrove system which contributes the largest part of the total mangrove in Sierra Leone, or 58.2%. Mangroves ecosystems in this region appear to be less degraded than in other regions and are not overexploited. Lower population density and low natural resource exploitation mean that this area has a marked potential for conservation as well as the introduction of sustainable management practices.[16] Fishing in these areas forms an essential part of the livelihoods of many communities due to the presence of important infrastructure and ports in this region. A spatial and temporal analysis from Global Mangrove Watch[17] (GMW) was used to assess the extent of mangrove degradation in Sierra Leone between 1996 and 2020 is presented in section 3 (3. Project Rationale: Climate Impacts, Adaptation and Livelihoods Analysis).

The coastal region along the Moyamba and Western Urban districts, also play an essential role in the country's economy, industry, fisheries and tourism sectors.[18] The Queen Elizabeth II Quay in Freetown is the largest natural harbour in West Africa.[19] Sierra Leone's coast is more densely (although variably)

[14] Available Online: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Sierra%20Leone%20First/210804%202125%20SL%20NDC%20(1).pdf
[15] https://rsis.ramsar.org/sites/default/files/rsiswp_search/exports/Ramsar-Sites-annotated-summary-Sierra-Leone.pdf?1622463434
[16] Available Online: https://pdf.usaid.gov/pdf_docs/PA00WGWH.pdf
[17] Global Mangrove Watch. 2020. 2010 Baseline Released Version 1.2. [Online]. Available: https://www.globalmangrovewatch.org/.
[18] Available Online: https://www.fao.org/3/ae703e/ae703e00.pdf
[19] Available Online: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Sierra%20Leone%20First/210804%202125%20SL%20NDC%20(1).pdf

populated than the other regions, with the Western Area Urban District, including Freetown registering a population density of 1,224 persons per square km. Approximately 28% of Sierra Leone's population live on or near the coast and rely on coastal resources for their livelihoods and economic development. In addition, the coastline is essential for Sierra Leone's tourist industry, with over 70 hotels and tourist resorts scattered along the coast. It is estimated that there are about 105,200 hectares of mangroves along this coastline. Increased population growth, industrialisation, pollution, overexploitation of marine resources as well as climate change have placed considerable strain on Sierra Leone's marine and coastal biodiversity and ecosystems.[20]

1.3 Macroeconomic context and trade

Sierra Leone is a low-income country confronting severe structural challenges to its sustainable development and the implementation of climate finance. According to the United Nations (UN), as an LDC, Sierra Leone is highly vulnerable to economic and environmental shocks and have low levels of human assets.[21]

1.3.1 Gross Domestic Product

Following the devastating civil war which ended in 2002, Sierra Leone returned to economic growth in the following years. Despite the sustained growth recorded in the years 2012, 2013, and 2015, the country has one of lowest gross domestic product (GDP) in the world at around USD 3.91 billion by the end of 2021. This translates into GDP per capita of USD 629.94.[22] Its GDP is estimated to trend around USD 4.10 billion in 2022 and projected to reach USD 4.30 billion in 2023. Though Sierra Leone has made some progress in mobilizing revenue and maintaining budget discipline, the country remains at significant risk from the consequences of the COVID epidemic.[23] Monetary and economic matters include the widening of the budget deficit to 5.7% of GDP because of a revenue shortfall arising from lower economic activity.[24] To tackle the growing monetary and economic difficulties, the country has implemented an Extended Credit Facility (ECF) arrangement with the International Monetary Fund. The goal is to create fiscal space to support the government's reform agenda of policy prioritisation through the National Development Plan (NDP).[25]

Table 2: GDP Growth (2010-2023)

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022 Est.	2023 Proj.
5.30%	6%	15.20%	20.70%	4.60%	20.50%	6.40%	3.80%	3.50%	5.30%	-2.00%	3.20%	3.40%	4.30%

Source: IMF (GDP as realised 2010-2021; forecast for 2022; projections for 2023)

[20] Available Online: https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf
[21] https://www.un.org/development/desa/dpad/least-developed-country-category.html
[22] www.tradingeconomics.com/Sierra-leone/gdp-per-capita
[23] https://www.imf.org/en/Publications/CR/Issues/2020/04/17/Sierra-Leone-2019-Article-IV-Consultation-Second-Review-Under-the-Extended-Credit-Facility-49345
[24] African Economic Outlook. https://www.afdb.org/en/countries-west-africa-sierra-leone/sierra-leone-economic-outlook.
[25] Ibid.

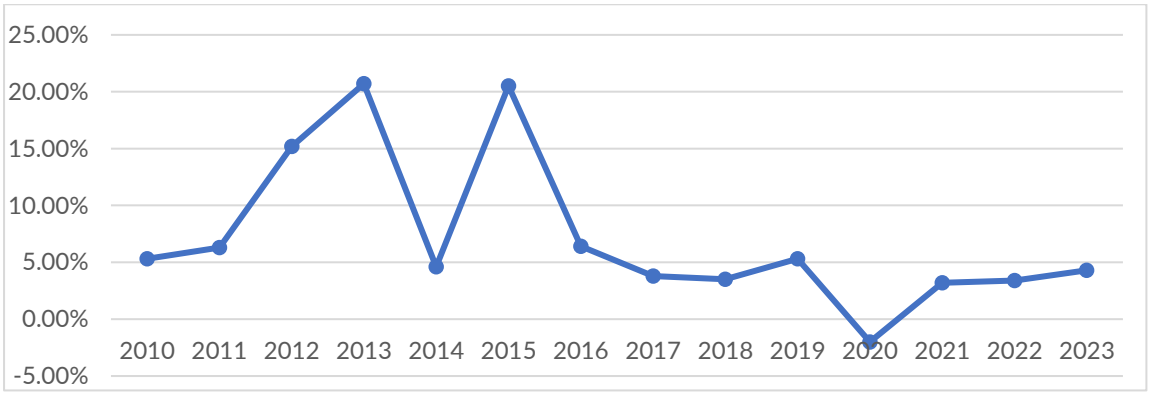

Figure 3: Real GDP growth (annual per cent change)
Source: IMF

Sierra Leone has made significant progress over the past two decades in terms of post-conflict recovery and is now firmly on the path towards the further consolidation of peace and democracy and long-term sustainable development. The post-conflict economic performance of Sierra Leone has been strong, until the Ebola outbreak of 2014-2016, and then the Covid-19 epidemic in 2020, both of which critically impacted the country's economic and social recovery. It is estimated that Sierra Leone lost USD 1.4 billion in GDP during the Ebola outbreak and entered a severe recession.[26] The economic shock was compounded by the sharp decline in the world price of iron ore and other commodities, and specifically for Sierra Leone, by specific issues related to corporate governance in the mining sector. The Ebola epidemic caused not only serious health impacts throughout the country but it also undermined food security in Sierra Leone, as many households saw a reduction in their income-generating opportunities on the back of restricted travel and business activities.[27] An array of negative impacts were experienced, such as a decrease in trade and transportation, reduced number of tourists, adverse effect on agricultural market chains, decrease in mining activity and hesitance of investors to start businesses in this kind of environment, which led to less tax revenue and rising unemployment.[28] A similar pattern of reduction in industrial output and economic growth was experienced during the Covid-19 pandemic. The African Economic Outlook, released on 12 March 2021, summarised some of the impacts of the pandemic in Sierra Leone's economy, stating that the decline in GDP can be attributed to "weak external demand for major exports, particularly diamonds, and to declines in the mining, transport, trade, and tourism sectors".[29] The COVID-19 pandemic further accentuated the vulnerabilities of the fragile economic landscape. GDP fell by 2.7%[30] in 2020 as it led to a slowdown in all sectors following global supply chain disruptions and lockdown measures[31], reversing some of the recent gains in poverty reduction.[32]

1.3.2 Share of sectors in GDP

The key sectors in the Sierra Leone's economy are agriculture (including fisheries), services (including tourism), and industry (including energy and mining). Agriculture accounts for 60% of Sierra Leone's GDP. The second most important sector, services, includes wholesale and retail trade, transport, financial services, education, health care, and real estate. Finally, the industry sector represents only 6.5% of the GDP, which is considered to be below expectation considering the role and potential of mining. Nevertheless, the presence of high levels of non-licensed artisanal mining for diamonds and gold is likely to substantially distort GDP figures for the country.[33] The household survey conducted by the national consultants as part of stakeholder engagement in 2022, which included 402 respondents in the target coastal districts, also confirmed the critical role of agriculture and fishing for the local economy.[34]

[26] https://reliefweb.int/report/sierra-leone/update-economic-impact-2014-2015-ebola-epidemic-liberia-sierra-leone-and-guinea.
[27] https://reliefweb.int/sites/reliefweb.int/files/resources/FFP%20Fact%20Sheet_Sierra%20Leone_1.30.18.pdf.
[28] https://www.mercycorps.org/blog/ebola-outbreaks-africa-guide/chapter-4.
[29] African Economic Outlook. https://www.afdb.org/en/countries-west-africa-sierra-leone/sierra-leone-economic-outlook.
[30] African Economic Outlook. https://www.afdb.org/en/countries-west-africa-sierra-leone/sierra-leone-economic-outlook.
[31] World Bank Country Overview in Sierra Leone. https://www.worldbank.org/en/country/sierraleone/overview#1.
[32] World Bank Country Overview in Sierra Leone. https://www.worldbank.org/en/country/sierraleone/overview#1.
[33] https://documents1.worldbank.org/curated/en/272761511578835426/pdf/SIERRA-LEONE-PAD-11032017.pdf
[34] *Report on the Stakeholder consultations and Environmental and Social Management plan - Data Collection in Rural Communities in Sierra Leone* – prepared by Conflict Management and Development Associates (CMDA-SL)

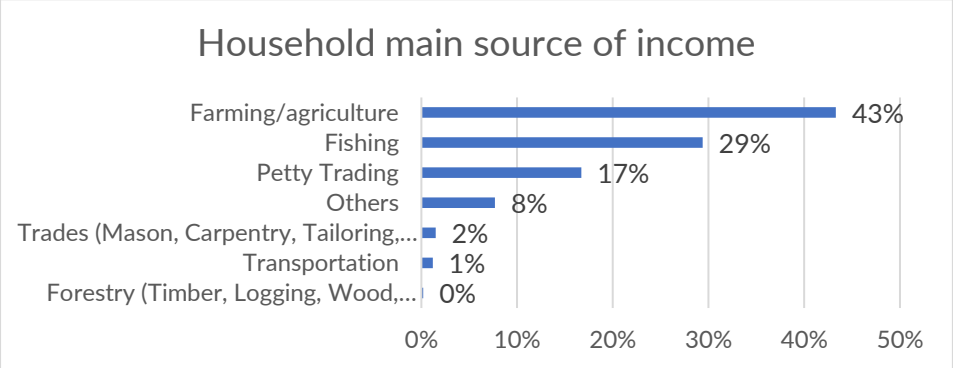

Figure 4: Household main source of income.
Source: Household Survey, CMDA-SL (2022)

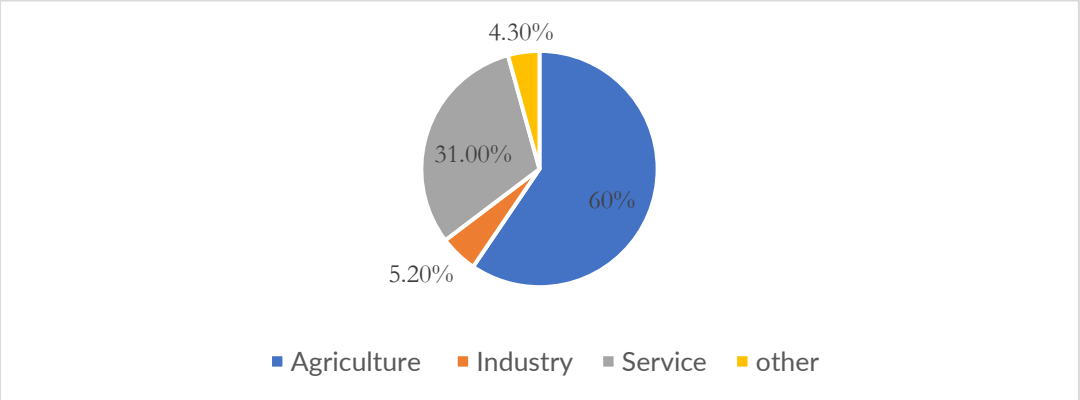

Figure 5: GDP Composition by sector in % (2020)
Source: World Bank[35]

1.4 Agriculture

Agriculture is a critical sector for Sierra Leone's economy, employing two-thirds of the workforce. Thanks to the favourable geographical position and fertility of the land, with several rivers, arable land, abundant rainfall, a warm climate, and significant irrigation potential, the agricultural production volume is – on average – considered sufficient for local consumption and exports.[36] Agriculture plays a crucial role in ensuring food security, poverty reduction and improving public health.[37] Despite this potential, 80% of the food consumed in the country is imported. The agricultural sector is comprised mainly of small-scale producers engaged in subsistence farming using traditional local processes and tools. The main agricultural product is rice, which is the country's staple food. Although rice is an important source of food in the country and production employs most of the rural population, production is not sufficient to meet the needs of the population. Despite a climate and topography favourable to growing rice, in 2020 Sierra Leone imported USD 134 million worth of rice, representing the largest food import in the country. Sierra Leone imports rice primarily from China, Brazil, India, Pakistan, and Paraguay.[38] Increasing rice production has now become a government priority in order to enhance food security. Other domestic food products include cassava, maize, millet, cashew nuts, ginger, vegetables, fruits, and sugar cane, as well as cash crops such as cocoa, coffee and oil palm, and livestock. In addition, commercial agricultural companies operate in biofuel and energy production, palm oil, timber, rice, sorghum, pineapple cultivation and canning, juice concentrate manufacturing and agricultural machinery contracting services.

[35]https://data.worldbank.org/indicator/NV.AGR.TOTL.ZS?locations=SL
[36] https://www.trade.gov/country-commercial-guides/sierra-leone-agriculture-sector#:~:text=The%20agriculture%20sector%2C%20including%20livestock,than%2060%20percent%20of%20GDP.
[37] Sierra Leone's Updated NDC. https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Sierra%20Leone%20First/210804%202125%20SL%20NDC%20(1).pdf.
[38] https://oec.world/en/home-a

1.5 Fisheries

Sierra Leone's exclusive economic zone (EEZ) is one of the richest fishing areas in the world. With a continental shelf fed by seven large rivers and more than 500 kilometres of coastline, the EEZ contains a wide variety of commercially valuable species. These include shrimp, cephalopods, lobsters, demersal and pelagic species. Fisheries provide 80% of animal protein and 10% of GDP. This activity also accounts for direct employment of more than 100,000 people and indirect employment for an additional 500,000 people along the coast. ** This section has been redacted in accordance with the GCF Information Disclosure Policy, as the portion is confidential under the disclosure policy of the Accredited Entity. **

1.6 Tourism

Sierra Leone's tourism potential remains largely untapped. Although the country offers a diversity of ecosystems, a wide variety of landscapes, beautiful white sandy beaches, rainforests, picturesque mountains and interesting wildlife, the necessary infrastructure remains critically underdeveloped. The civil war severely affected the sector and destroyed much of the infrastructure present then. Recovering from the war, between 2003 and 2013 tourism activity grew steadily by an average of 28% per year. This growth was then curbed by the Ebola virus epidemic, and again under Covid-19 restrictions. While visitor arrivals have rebounded gradually, the sector continues to face many problems such as a poor regulatory environment, a weak policy framework, an outdated tourism master plan, weak institutional capacity, limited access to finance, poor service delivery, inadequate infrastructure, poor maintenance of tourism sites and corruption.[39]

1.7 Energy

Although Sierra Leone is endowed with great potential for renewable energy generation from various sources, including biomass from agricultural waste, hydropower and solar energy, this capacity remains underutilised. Increasing access to clean energy is a key priority for the government. Both low-cost-energy projects and support to mini-grids have been proposed as solutions to the low access rates. According to the World Bank, only 23% of Sierra Leoneans have access to electricity, which is below the similarly low sub-Saharan average of 30%, compared to the global average of above 80%.[40] Less than 1% has access to clean cooking fuels.[41] Sustainable Energy for All estimates electricity access rates at approximately 26%, with a steep drop to only 6% in rural areas.[42] Increased access to clean energy could positively impact on people's welfare and ability to access services, therefore improving economic competitiveness, job creation and poverty reduction. Private companies mention inadequate electricity provision as a major cause for high costs, disrupted production, and reduced profitability. More recently, progress has been made on solar capacity increases, both at mini-grid and grid-scale. It remains to be seen how this will be impacted by the ongoing supply chain and inflation crisis.[43]

The electricity sector is small, with less than 150 MW of power capacity connecting fewer than 150,000 connections, and the cost of electricity is heavily subsidised. The entire country lacks a stable and reliable public electricity supply and domestic demand remains largely unmet.[44] By sector, 70% of all energy was consumed in households, 15% in commercial and public services, 10% in transport and 5% in industry. Currently, 85% of the final energy used comes from biomass from firewood. This includes mangrove forests, which provide wood for fish smoking and domestic cooking. The second source of energy, imported petroleum products, is mainly used for electricity generation and accounts for 15% of energy consumption.[45] In 2018, 55% of electricity production was from hydropower, while 45% was from oil.

1.8 Mining

The mining sector is the second largest in terms of employment after agriculture. It is estimated that 300,000 to 400,000 people are employed in the sector, including in the diamond industry, many of

[39] https://www.trade.gov/country-commercial-guides/sierra-leone-tourism-infrastructure.
[40] https://www.worldbank.org/en/news/press-release/2021/01/28/more-than-270000-sierra-leoneans-to-get-better-access-to-electricity
[41] https://ourworldindata.org/energy/country/sierra-leone
[42] https://www.seforall.org/news/sierra-leone-closing-the-energy-access-gap-with-mini-grids
[43] https://www.seforall.org/news/sierra-leone-closing-the-energy-access-gap-with-mini-grids and https://sl.usembassy.gov/installation-of-sierra-leones-first-commercial-solar-power-purchase-agreement/
[44] https://www.trade.gov/country-commercial-guides/sierra-leone-energy-infrastructure.
[45] https://au-afrec.org/en/western-africa/sierra-leone

which are artisanal miners.[46] Sierra Leone has many different minerals, including rutile, bauxite, gold, iron ore, limonite, platinum, chromite, coltan, tantalite, columbite and zircon. However, the sector has also been badly affected by the difficulty of falling iron ore prices during the Ebola epidemic in 2014 and more recently during the Covid-19 pandemic. In 2018, mining constituted 65% of export earnings and 3% of employment. The National Minerals Agency under the Ministry of Mines and Mineral Resources was established by the government in 2012, to implement clear policies and regulations, enhance transparency and accountability and ensure that mineral resources support economic and social development.

Of specific interest in the country are diamonds. The discovery of diamonds in 1930 had a strong impact on the development of the country in social, economic, and political terms. Unlike other countries (such as South Africa), in Sierra Leone the stones are closer to the surface and little excavation is required. This has attracted many unskilled workers. Mining operations are often located in remote locations beyond the reach of governmental control, leading to exploitation of workers and as well as tax evasion. Smuggling of the precious stone is also common: the World Bank estimates that the value of diamonds smuggled out of the country each year is now between 50 and 90% of the total production.[47]

1.9 Trade

Sierra Leone is a member of several trade and cooperation bodies in the African continent, which have at least in part supported the country's integration efforts, although integration has not progressed linearly. Sierra Leone has been a member of the World Trade Organisation (WTO) since 23 July 1995 and previously a member of GATT since 19 May 1961. Sierra Leone is a member of the Economic Community of West African States (ECOWAS), an intergovernmental organisation of 15 West African countries established on 28 May 1975. It is the main structure for coordination in the region, aiming to promote cooperation and integration to create a West African economic and monetary union. The government remains committed to the promotion of intra-regional trade, including cross-border trade by making progress in applying the ECOWAS common external tariff. Consequently, within the ECOWAS region, the movement of people between the common space of territories has improved significantly, but the capital flow remains limited. The country is also part of the West African Monetary Zone (WAMZ), a coalition of West African Economic Community member states that do not use the CFA franc. Founded in 2000, the zone has aimed to create a common currency inspired by the European Union's Euro. The new currency was supposed to start circulating in 2015, but the project has been stalled since then.

Trade policy is not advancing consistently. In 2017, for example, Sierra Leone moved to a more restrictive trade regime and introduced several tariffs on targeted goods such as beverages and tobacco products, but in 2018 Sierra Leone joined the African Continental Free Trade Area (AfCFTA) and ratified the African Continental Free Trade Agreement, a trade agreement to cover an African market of 1.2 billion people and a gross domestic product (GDP) of USD 2.5 trillion, across the fifty-five member states of the African Union. This free-trade area is the largest in the world in terms of the number of participating countries.

Access to finance

In Sierra Leone there are 14 commercial banks, 17 community banks, 50 microfinance institutions (MFIs), five of which take deposits, three mobile phone operators and 59 financial services associations (FSAs). However, only 12.4% of adults in Sierra Leone have a bank account.[48]

In addition, data from the Geospatial 2018 report[49] showed that over 42% of chiefdoms lacked financial access points. With over 60% of the population residing in rural communities, this leaves most people in other parts of the country without adequate access to formal financial services.

The situation is even more challenging in rural areas where the poverty rate is higher than in urban areas. Poverty rates are also more than twice as high in rural areas as in urban areas - 73.9% and 34.8%,

[46] https://theconversation.com/how-the-wealth-from-sierra-leones-diamonds-fails-to-enrich-local-communities-96365.
[47] https://www.business-humanrights.org/en/latest-news/sierra-leone-local-population-doesnt-benefit-from-diamond-industry-due-to-corruption-smuggling-says-analyst/.
[48] https://www.uncdf.org/article/6923/sierra-leones-journey-towards-digital-and-financial-inclusion
[49] https://www.afi-global.org/wp-content/uploads/2022/04/Sierra-Leone-NSFI-2022-2026_FINAL_Final.pdf

respectively. The disparity is even more stark for extreme poverty rates, with 19.9% in rural areas and 3.9% in urban areas.

To address this issue, the Bank of Sierra Leone (BSL) has launched its National Financial Inclusion Strategy (NFIS) 2022-2026[50]. The plan targets women, youth, the rural population and medium, small and micro enterprises (MSMEs). The objectives of the NFIS are to promote the development of and expand access to client-centred financial products and services specifically for key underserved population groups such as women, youth, rural communities and MSMEs.

This strategy document[51] highlights that high transaction costs, lengthy waiting times, limited access points and often low levels of financial literacy, continue to be barriers to financial inclusion for rural communities and for women and youth in particular. From the perspective of FSPs, the high operating costs and an overall lack of infrastructure has been limiting their ability to expand to rural areas. Similar to the case for women and youth in general, there are also limited products and services that cater to the needs of rural households (e.g., agricultural lending, rural finance products), and high transaction and transportation costs. Against this background, Village savings and loans associations (VSLAs) and Osusus (small informal loan groups) are the most common savings channel, particularly among women and rural communities. The strategy notes that these informal community structures are valuable and that it is important to find ways to link these informal savings and lending groups to the financial sector through formal financial structures, particularly MFIs, Community Banks, FSAs and/or mobile money operators (MMOs) which are in closer proximity to these underserved groups. The strategy therefore considers policies that support linking many of these informal transactions to the formal space by leveraging the large mobile money agent network. To encourage increased access for underserved groups such as people in rural areas, the Bank of Sierra Leone has also issued Guidelines on the Use of Agents, Tiered KYC Guidelines, and a proposed law amendment, in order to provide an opportunity to leverage agents to onboard new clients – which has proven to be beneficial not only for FSPs, but also for clients who can now have access to financial products and services closer to their communities.

The strategy document emphasises that overcoming these barriers to accessing and using formal financial products and services for women, youth and people in rural areas (including financial literacy, restrictive social norms, high interest rates and asset ownership requirements) can make a significant impact on financial inclusion and economic growth in Sierra Leone. In this regard, it notes that the current collateral registry helps address some of the challenges that women face when it comes to asset ownership by allowing them to use moveable assets as collateral. The strategy aims to undertake additional initiatives that support women-centric product development and aims to link formal financial services with informal sectors – particularly for market women and women-owned micro and small enterprises. A specific recommendation from the strategy is to improve links from existing VSLAs and Osusu groups to formal FSPs[52].

Initiatives that are addressing these barriers to financial inclusion include the World Bank-supported Sierra Leone Financial Inclusion project[53] and the JOAC-funded Financial Inclusion programme implemented by CAFOD in Sierra Leone[54]. An internationally successful approach for strengthening VSLAs and for business skills training for women, the Economic and Social Empowerment (EA$E) Model has also been used in parts of Sierra Leone and other West African countries[55].

1.10 Key Macro-Economic Challenges

1.10.11 Inflation

Inflation has been receding in recent years, although it still remains high, in particular in the second quarter of 2022 because of rising fuel and food prices, as described below. The inflation rate for consumer prices in Sierra Leone varied over the past 41 years between -3.3% and 178.7%. During the period from the end of the civil war in 2000 to 2020, the inflation rate fluctuated between -0.9% to

[50] Sierra Leone National Financial Inclusion Strategy 2022-2026. Available here.
[51] Sierra Leone National Financial Inclusion Strategy 2022-2026. Available here.
[52] Sierra Leone National Financial Inclusion Strategy 2022-2026. Available here.
[53] https://www.worldbank.org/en/news/loans-credits/2019/01/17/sierra-leone-financial-inclusion-project
[54] https://joa.je/news-events/2022/how-vslas-are-helping-with-financial-inclusion/
[55] The EA$E Implementation Manual is available here

18.2%.[56] For 2021, an inflation rate of 11.87% was realised, significantly above world average of 3.42%.[57] For 2022, the total inflation rate is expected to be much higher. In June 2022, for instance, inflation jumped to 28%[58] on the back of a hike in the prices of petroleum products and the price of wheat (both directly related to the conflict in Ukraine). Additional contributing factors to rising inflation include the easing of Covid-related restrictions with a pick-up of economic activities.[59] This volatile situation led to strikes and protests in the summer of 2022, with an estimated 21 civilians and 6 police officers killed.[60]

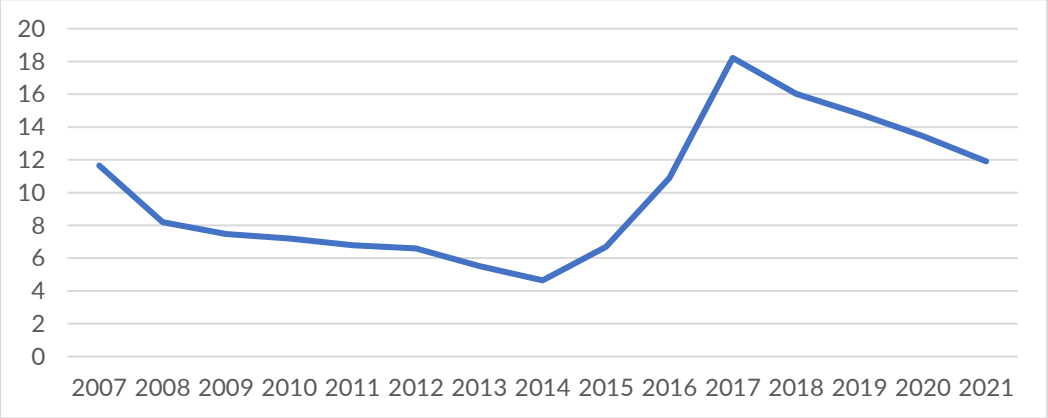

Figure 6: Inflation, consumer prices (annual %)
Source: World Bank[61]

Table 3: Price of gasoline (May-Aug 2022)

Date (2022)	Price in Leones	Price in EUR[62]	Price in USD[63]
February	10,000	0.62	0.60
March	12,000	0.75	0.73
May	15,000	1.04	1.05
June	18,000	1.23	1.26
July	22,000	1.53	1.54
August	20,000	1.39	1.40

Source: Sierra Loaded (February, March data)[64]; Global Petrol Prices (May to August)[65]

1.10.12 Food Price Inflation

Food price inflation have also contributed to the rising inflation rates. Cost of food in Sierra Leone increased 30.6% in July of 2022 over the same month in the previous year, as illustrated below.

[56] https://www.worlddata.info/africa/sierra-leone/
[57] Ibid.
[58] https://tradingeconomics.com/sierra-leone/inflation-cpi
[59] https://www.theguardian.com/global-development/2022/aug/21/sierra-leone-protests-inflation-cost-of-living
[60] Ibid
[61] https://data.worldbank.org/indicator/NE.IMP.GNFS.CD?end=2020&locations=SL&start=2010
[62] Exchange rate on 11 September 2022 1 SLL = 0.0000693772 EUR / 1 EUR = 14,414.0 SLL (xe.com)
[63] Exchange rate on 11 September 2022 1 SLL = 0.0000699319 USD / 1 USD = 14,299.6 SLL (xe.com)
[64] https://www.globalpetrolprices.com/Sierra-Leone/gasoline_prices/
[65] https://www.globalpetrolprices.com/Sierra-Leone/gasoline_prices/

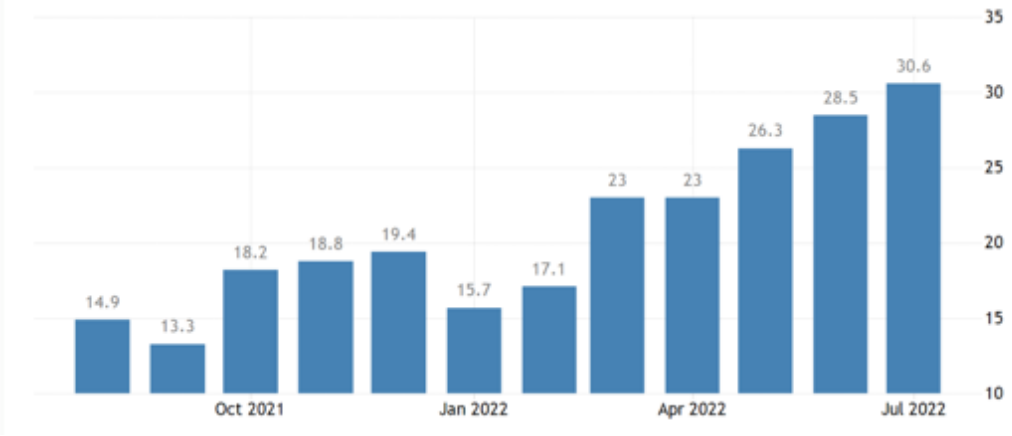

Figure 7: Food Price Inflation
Source: Trading Economics[66]

The increase in food prices in Sierra Leone is part of a trend in inflationary pressures that have affected all countries in 2022. However, in sub-Saharan Africa, this is exacerbated by the high dependence on food imports which have been affected by the war in Ukraine (including the blockade on Ukrainian ports) and fuel prices, as also described above. According to the IMF, on average households in many African countries spend a large share of their income on food. While food represents 17% of expenditure in advanced economies, in sub-Saharan Africa the figure is 40%.[67] Cost of food was already an issue of concern during and in the aftermath of Covid-19, thus impacting food security (the issue of food security in Sierra Leone is dealt with further below).

1.10.13 Foreign Exchange

Historically, the country has experienced critical currency fluctuations, and over the last five years the value of the currency has almost halved.[68] The Leone continues to lose its value, see for example Figure 7 below on the Leone exchange rate against the USD between September 2021 and September 2022. In part with a view to stabilise the currency, the old ISO 4217 code for the currency (SLL) has been changed into SLE, at a rate of SLL 1000 to SLE 1. While the authorities have said that the change will make it easier to carry cash and use it for payments, there is criticism that the move has been confusing and brought no substantive value to the currency.[69]

Figure 8: Currency trend against USD, Sept 2021 to Sept 2022 (1 SLL = 0.0000699319 USD)
Source: xe.com[70]

[66] https://tradingeconomics.com/sierra-leone/food-inflation#:~:text=Food%20Inflation%20in%20Sierra%20Leone,percent%20in%20November%20of%202019.
[67] https://www.thesierraleonetelegraph.com/growing-hunger-high-food-prices-in-africa-dont-have-to-become-worse-tragedy/
[68] https://www.exchangerates.org.uk/USD-SLL-exchange-rate-history.html
[69] https://www.aljazeera.com/economy/2022/7/1/sierra-leone-knocks-zeros-off-bank-notes-in-currency-re-calibration
[70] https://www.xe.com/currencycharts/?from=SLL&to=USD&view=1Y on 11 September 2022

1.10.14 Balance of payments

Sierra Leone's main imports are machinery and transport equipment (50% of total imports), fuel (20%) and foodstuffs. Sierra Leone's main import partners include Guinea, Ivory Coast, China and South Africa.[71] Sierra Leone's exports have been increasing after the UN sanctions were lifted in late 2010. The main exports are diamonds (63% of total exports), cocoa (22%) and coffee. Sierra Leone's main export partners are Belgium, Netherlands, China and the United States.[72] The decline in exports after 2011 caused a severe imbalance in the current account deficit, which reached -65% of GDP.[73] The value of the balance of payments has been negative throughout the last decade, ranging from -24% in 2015 during the Ebola crisis to -7% in 2020. At the end of September 2020, foreign exchange reserves were USD 565 million (4.2 months of import cover), compared with USD 506 million (3.5 months of import cover) in 2019. Remittances are an important source of foreign currency, accounting for USD 59 million in 2020.[74]

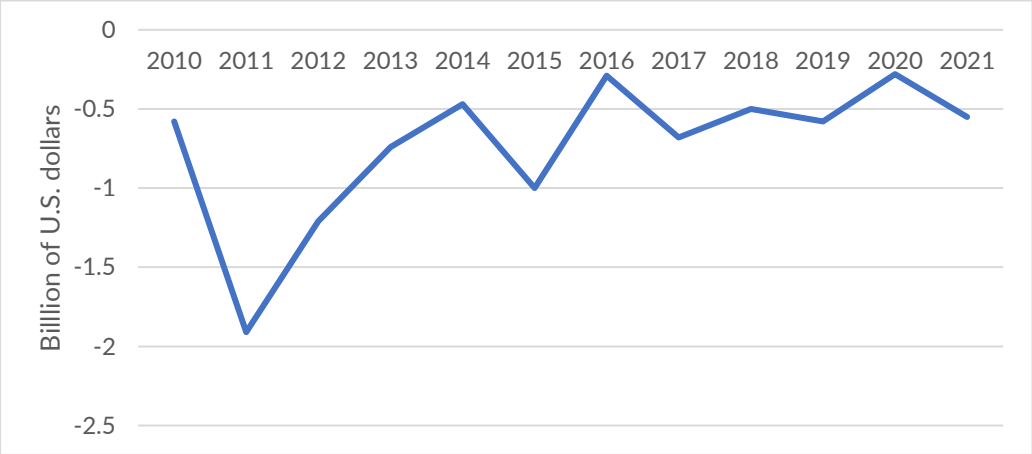

Figure 9: Current Account Balance
Source: IMF

1.11 Human Development Indicators

1.11.1 Human development

Between 1990 and 2019, life expectancy at birth in Sierra Leone increased by 16.1 years, expected years of schooling increased by 5.3 years and the average years of schooling increased by 2.1 years, while gross national income (GNI) declined by 6%. Despite substantial improvements in the standard of living, Sierra Leone remains one of the least developed countries in the world. Sierra Leone's HDI value rose from 0.287 to 0.452, between 1990 and 2019, an increase of 57.5%. Yet in 2019 it still ranked 182 out of 189 countries and territories in the human development index, a rank shared with neighbouring Burkina Faso. As a consequence of the civil war, Sierra Leone's GNI per capita declined by about 6.0% per year between 1990 and 2019, and the Ebola epidemic led to another decline of 6% between 2015 and 2016.[75] By 2019, GNI had not caught up with the level it had reached in 1990, showing the long-term impact of the civil war on the economic performance of Sierra Leone. Table 4 below illustrates Sierra Leone's progress under each of the HDI indicators.

Table 4: Sierra Leone's Human Development Indicators

Year	Life expectancy at birth	Expected years of schooling	Mean year of schooling	GNI per capita (2017 PPP$)	HDI Value
1990	38.6	4.9	1.6	1,774	0.287
1995	37.1	5.7	2	1,452	0.287
2000	39.4	7	2.3	824	0.295

[71] https://tradingeconomics.com/sierra-leone/imports
[72] https://tradingeconomics.com/sierra-leone/exports
[73] African Economic Outlook. https://www.afdb.org/en/countries-west-africa-sierra-leone/sierra-leone-economic-outlook.
[74] https://www.statista.com/statistics/1012383/remittance-inflows-to-sierra-leone/
[75] https://hdr.undp.org/sites/default/files/Country-Profiles/SLE.pdf.

2005	44.5	8	2.7	1,219	0.354
2010	49.4	8.9	3.1	1,432	0.399
2015	52.9	9.7	3.4	1,534	0.431
2016	53.4	9.9	3.4	1,439	0.431
2017	53.9	10.2	3.5	1,594	0.443
2018	54.3	10.2	3.6	1,614	0.447
2019	54.7	10.2	3.7	1,668	0.452

Source: UNDP[76]

1.11.2 Social Indicators

Most social indicators point out to Sierra Leone being an extremely fragile state, with over 10% of the population living in extreme poverty[77] **and around 56% living below the national poverty line.** The World Bank states that the definition of poverty differs from country to country. However, extreme poverty can be defined as living on less than USD 1.90 per person per day.[78] An array of factors influences the reasonable definition of extreme poverty, which also affects the classification of food insecurity.

In Sierra Leone, 49% of the population is considered to be food insecure.[79] Food security is defined by the United Nations Committee on World Food Security as "when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life".[80] In the three months prior to the survey questionnaire, 66.4% of the respondents said they feared a lack of food and 73.1% said that they ate foods that they really didn't want to eat during this period because they had no alternative, indicating that in the target districts food insecurity maybe higher.

Food insecurity is driven by multiple factors, including chronic and acute climate events such as droughts, floods, and erratic precipitation patterns that can negatively affect the already low agricultural productivity, reducing yields, food availability, and depleting household food stocks, with a detrimental impact on food security.[81] The World Food Programme states that while food insecurity is prevalent across the country, more food insecure people live in rural communities. Furthermore, food insecurity affects the most marginalised groups more than others, as evidenced by our quantitative survey of 402 households in target districts. For example, female-headed households (65%) were more likely than male-headed households (43%) to say that '*in the next three months, I am worried my household will not have enough food*.' The Figure below displays a similar relationship for disabled people compared to those without disabilities. The district with the highest portion of people food insecure (i.e., moderately food insecure plus severely food insecure) are Kenema (71%), Bonthe (71%), Fabala (69%), Pujehum (66%), and Moyamba (66%). The districts with the portion significantly less food insecure are West Urban Area (16%), West Area Rural (24%), West Area Slum (33%).[82]

[76] Human Development Report 2020, https://hdr.undp.org/sites/default/files/Country-Profiles/SLE.pdf. Please note that the year 2019 is the last one available on the web site of the UNDP.
[77] Sierra Leone's Updated NDC. https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Sierra%20Leone%20First/210804%202125%20SL%20NDC%20(1).pdf.
[78] https://www.worldbank.org/en/news/feature/2016/06/08/ending-extreme-poverty.
[79] Sierra Leone's Updated NDC. https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Sierra%20Leone%20First/210804%202125%20SL%20NDC%20(1).pdf.
[80] https://www.ifpri.org/topic/food-security.
[81] https://documents1.worldbank.org/curated/en/728231623317357684/pdf/Sierra-Leone-Disaster-Risk-Management-Diagnostic-Note.pdf
[82] World Food Programme (2021), https://docs.wfp.org/api/documents/WFP-0000129312/download/

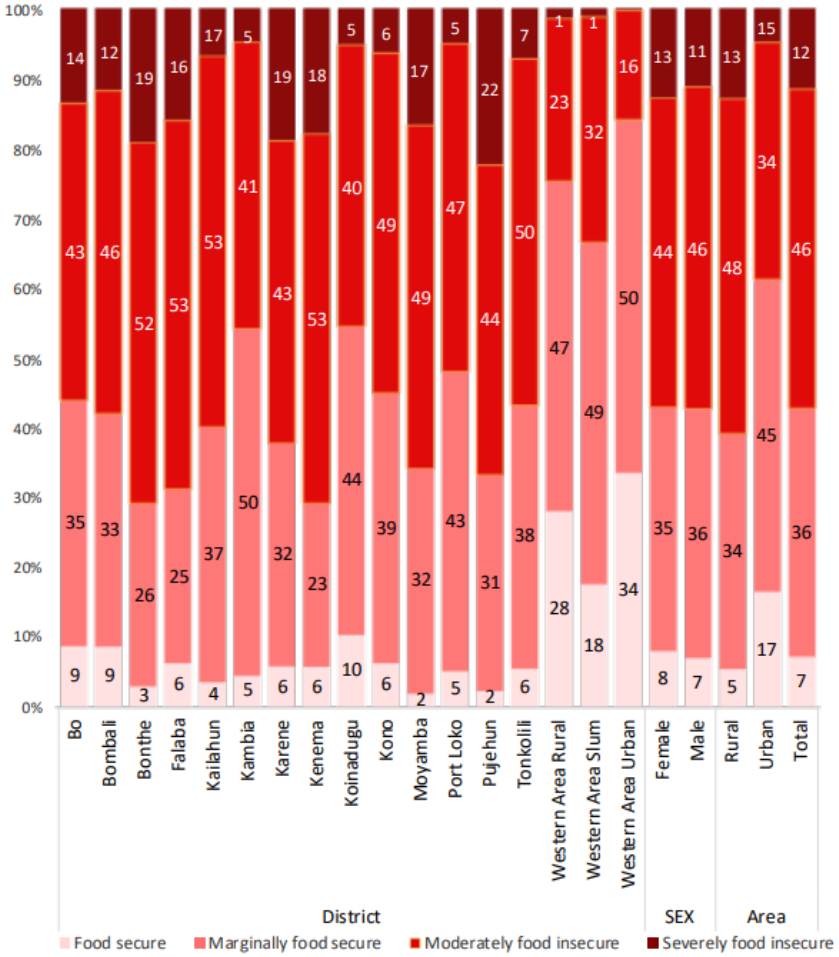

Figure 10: Food Insecurity by District

Source, World Bank, WFP[83]

Despite these challenges, life expectancy has increased from 39 years in 1990 to 54 years in 2018.

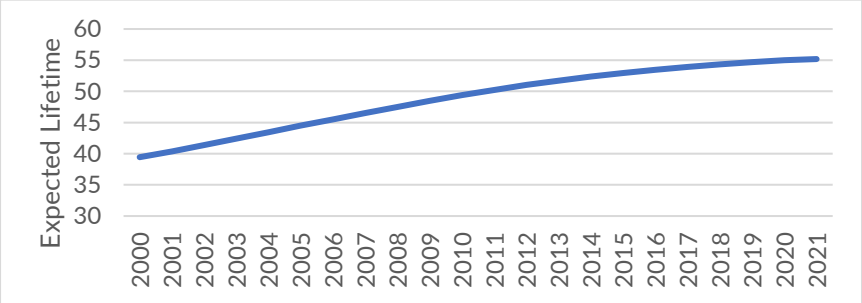

Figure 11: Life Expectancy at Birth.

Source: Macrotrend[84]*; World Bank*[85]

[83] World Food Programme (2021), https://docs.wfp.org/api/documents/WFP-0000129312/download/
84 www.macrotrends.net/countries/SLE/sierra-leone/life-expectancy#:~:text=The%20life%20expectancy%20for%20Sierra,a%200.68%25%20increase%20from%202018.
85 https://data.worldbank.org/indicator/SP.DYN.LE00.IN?locations=SL

1.11.3 Youth Unemployment

Around 30% of Sierra Leone's population is between the age of 15 and 35 years. Youth unemployment is considered a major source of civil conflict in the country. According to the ILO, the country is experiencing ''a high youth labour underutilization rate, particularly among young women".[86] The underutilised labour potential is about 49% of the youth population, with most of them performing only irregular means of employment. Around 12% of the youth population are officially unemployed and 5.9% are inactive non-students.[87] In addition, illiteracy remains a persistent problem and young people without the necessary skills and education find it very difficult to compete for the few jobs available.[88] This high level of non-utilization of a potentially productive work force has negative consequences for economic growth, with youth in urban areas tending to be more likely than those in rural areas to be unemployed or underemployed.[89] ** This section has been redacted in accordance with the GCF Information Disclosure Policy, as the portion is confidential under the disclosure policy of the Accredited Entity. **

1.11.4 Gender Gap

Sierra Leone faces a significant gender gap, i.e., the difference between women and men as reflected in social (including gendered climate contexts as defined by women's roles and responsibilities and the way those are affected by climate impacts, risks and vulnerabilities), political, intellectual, cultural, or economic attainments or attitudes. The Gender Inequality Index for the country is estimated at 0.644 which ranks it 155 out of 162 countries[90], reflecting significant gender-based inequalities in reproductive health, empowerment, and economic activity. To reduce the gender gap and foster women's empowerment across all economic activities, the government introduced three gender equality laws in 2007, the Domestic Violence Act[91] , the Devolution of Estates Act[92] and the Registration of Customary Marriages and Divorce.[93] The national campaign was supported by the President and focused on a minimum quota of 30% for women in political decision-making positions.[94] However, fifteen years later, gender parity is still very low in the different administrations, with e.g., only 13.2% of parliamentary seats held by women. Gender inequalities are also very present at the school level, with only 9.5% of adult women having attained secondary or higher education, less than half compared to 20% of their male counterparts.[95] There also remain distinct inequalities for women and youth related to access to and control of resources, including land tenure and access to finance and credit. These are particularly pronounced in rural and coastal areas, such as those the SLCRP will target.

The GESI assessment and action plan are provided as a separate annex (Annex 4 for the Funding Proposal under the SAP modality) and provide a detailed assessment of Sierra Leonean laws, policies and institutional arrangements, governance and decision making, livelihoods, gender-based violence, and disability. Annex 4 also includes the project's gender and social inclusion action plan.

1.11.5 Disabilities

Climate change enhances differences and creates injustice. The most fragile populations are the most likely to suffer from the consequences of it. The CMDA Household survey showed that people with disabilities tend to feel more food insecure. Indeed, 66% of people without disabilities responded that they had felt food insecure at least once in the three months prior to our survey, compared to 81% of people with disabilities.

[86] https://www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_542024.pdf.
[87] https://www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_542024.pdf.
[88] https://www.sl.undp.org/content/sierraleone/en/home/countryinfo.html.
89 https://documents1.worldbank.org/curated/en/400641619674751559/pdf/Post-Review-Youth-Employment-Policy-Brief.pdf
[90] https://hdr.undp.org/sites/default/files/Country-Profiles/SLE.pdf.
[91] Domestic Violence Act 2007. http://www.sierra-leone.org/Laws/2007-20p.pdf.
[92] Devolution of Estates Act 2007. http://www.sierra-leone.org/Laws/2007-21p.pdf.
[93] Registration of Customary Marriages and Divorce. http://www.sierra-leone.org/Laws/2009-01.pdf.
[94] https://www.sl.undp.org/content/sierraleone/en/home/countryinfo.html.
[95] https://www.sl.undp.org/content/sierraleone/en/home/countryinfo.html.

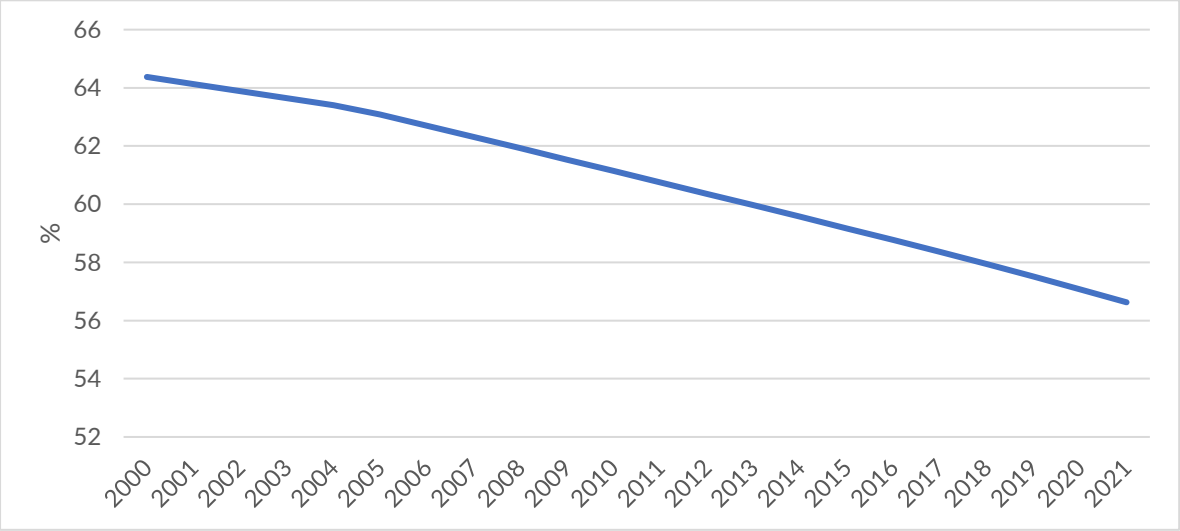

Figure 12: The influence of disabilities on food insecurity perception

Source: Household Survey, CMDA-SL (2022)

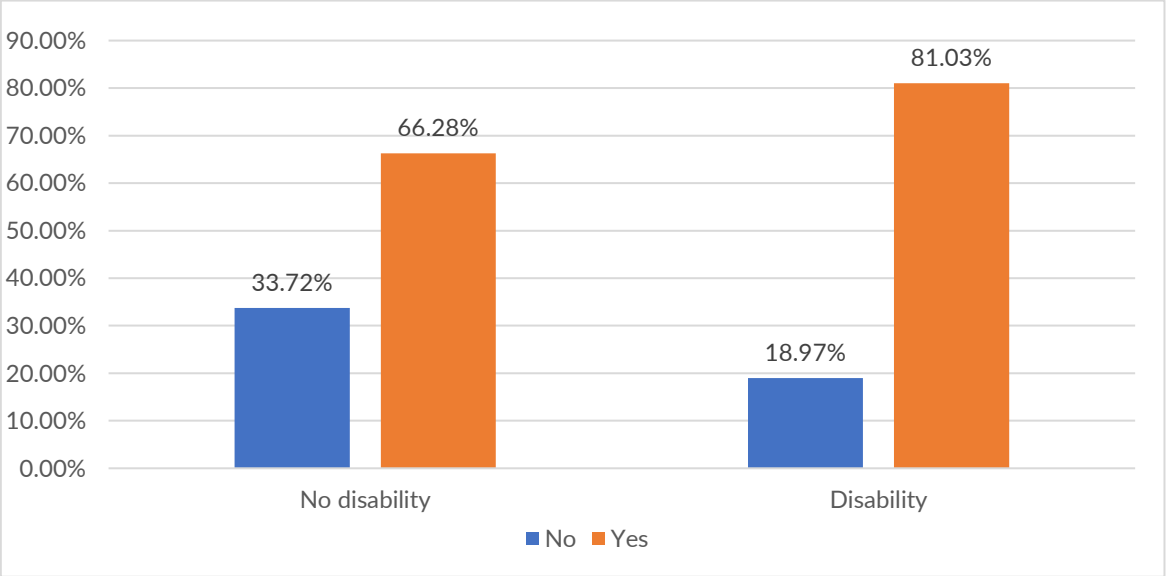

Figure 13: The influence of disabilities on food insecurity perception by disability

Source: Household Survey, CMDA-SL (2022)

1.12 Impacts from COVID-19

Sierra Leone is no stranger to frequent and sometimes devastating shocks, such as the 2014 Ebola crisis or the heavy rains of 2017 that led to fatal mudslides in the capital city of Freetown. The interventions put into place during these crises created more resilient and prepared crisis response units in the country that could be deployed to tackle the Covid-19 pandemic, and there is some evidence that the country was better prepared to deal with the pandemic than others, e.g., reporting lower numbers of infections and deaths than other countries in the region. Nevertheless, in order to halt the spread of the virus, schools were closed and restrictions to people's movement were implemented, with impacts on youth in particularly girls. The education sector was severely hit as it remained inactive for 8 months. School closures affected learning, in particular for girls aged 12-17, who were 16% less likely to return to school upon reopening. Also, child labour by girls increased by 19 percentage points. Teenage pregnancy

increased by up to 65% in some communities due to the socio-economic conditions imposed by the outbreak.[96] To deal with this challenging scenario, the government of Sierra Leone responded with some interventions such as disinfection of schools and distance learning via the dedicated Radio Teaching Programme.

1.13 Demography

1.13.1 Demographic Outlook

The country's demographic landscape is diverse, with 16 different ethnic groups, a predominantly rural society, and a fast-growing and young population. The population is rapidly growing, and it has increased by 24% in the last 10 years. The main reason for the population growth is the high birth rate, with the average woman giving birth to 4.5 children.[97] Current estimates predict that the population of Sierra Leone will be around 13 million by 2050. The demographic distribution of Sierra Leone's population is that of a predominantly rural country, albeit rapidly urbanising, with 57% of people living outside of the urbanised centres. As a result, the population density is highly skewed. The Western Zone Urban District, which includes the capital and largest city, Freetown, has a population of 853,651 and a population density of 1,224 persons per square kilometre. The second most populous city, located in the southern part of the country, is Bo with a population of 233,684. Bo is very diverse and is home to one of the most prestigious universities in the country.[98] In contrast, the Koinadugu District, in the north, has a population density of 21 persons per square kilometre, which affects e.g., the cost of basic service provision.

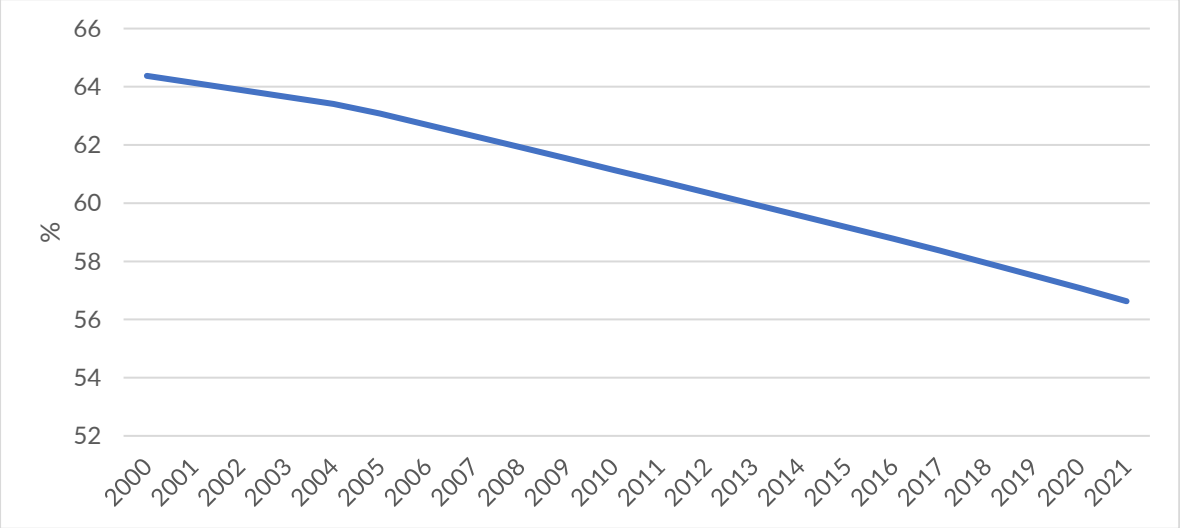

Figure 14: Rural population (% of total population)
Source: Statisticstimes.com[99]; World Bank[100]

There are about 16 different ethnic groups in Sierra Leone, each with its own dialect. The Temne are the largest group – 35% of the total population -, followed by the Mende – 31%. The Temne are concentrated in the north and the capital city, while the dominant ethnicity in the southeast and the Kono district is the Mende. Other Sierra Leonean ethnicities include the Limba, representing 8% of the total population and native to the North, the Fula – 7% -, who are descendants of Fulani migrant settlers from the 17th and 18th centuries who came from Guinea, the Mandingo - 2% -, from Guinea traders,

[96] https://blogs.worldbank.org/africacan/phoenix-sierra-leones-journey-build-back-better-after-crisis-strikes.
[97] https://worldpopulationreview.com/countries/sierra-leone-population.
[98] https://worldpopulationreview.com/countries/sierra-leone-population.
[99] https://statisticstimes.com/demographics/country/sierra-leone-demographics.php#:~:text=As%20of%202021%2C%20the%20population,in%20Sierra%20Leone%20in%202021
[100] https://data.worldbank.org/indicator/SP.RUR.TOTL?locations=SL

the Kono – 5% -, who also descend from Guinea migrants and the Krio – 3% - people, who are descendants of freed African American, West Indian and liberated African slaves.[101]

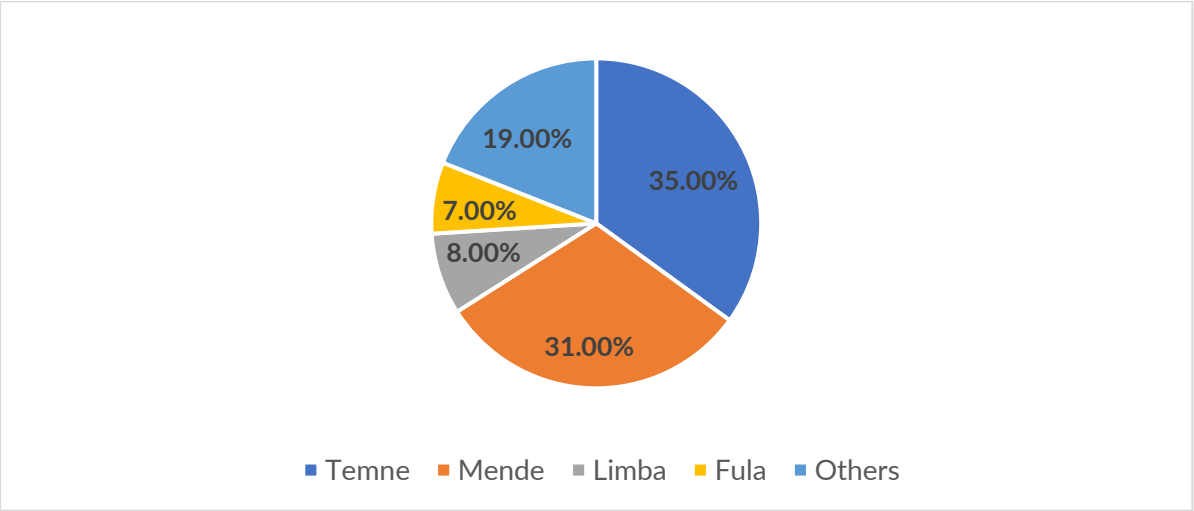

Figure 15: Ethnic Composition Sierra Leone (2022 data)
Source: World Population Review[102]

1.14 Political Context

1.14.1 The Civil War

Sierra Leone gained independence from Britain on 27 April 1961. Since its independence, the country has experienced many challenges in the social, economic, and political spheres. From 1991 to 2002, Sierra Leone was devastated by a civil war that led to over 50,000 deaths and the displacement of over 2 million people.[103] The war broke out on 23 March 1991, when Liberian rebel leader Charles Taylor and his group, the National Patriotic Front of Liberia, supported by Fody Sanko's Revolutionary United Front (RUF), tried to overthrow the President of Sierra Leone, Joseph Mama. The conflict was particularly fierce and prolonged, as the RUF and the Sierra Leone government were often funded by 'blood diamonds' extracted by slaves.[104] On 29 April 1992, President Joseph Moma was overthrown in a military coup led by Captain Valentine Strasser, and the Interim National Provisional Ruling Council (NPRC) was formed. A series of successful coups continued, hindering development and economic growth. In January 1999, world leaders intervened to encourage negotiations between the RUF and the government. The Lomé Peace Agreement was signed on 7 July 1999. In 2002, the Sierra Leonean army defeated the RUF with UN, British and Guinean air support. On 18 January 2002, the new President Ahmad Tejankaba declared the end of the civil war in Sierra Leone.[105]

1.14.2 Political Organisation of the Country

Since the end of the civil war in 2002, multi-party elections have been held regularly in the country. However, the opposition has faced police violence and restrictions on assembly. Civil society groups are restricted by cumbersome regulations, and government corruption remains widespread. The President is elected based on universal suffrage for a maximum of two 5-year terms. Although Sierra Leone still faces many challenges today, efforts are being made to consolidate the country's democratic ambitions. In 2012, during the Presidential, Parliamentary and Local Council (district-level) elections, the high turnout, with 87% of eligible voters exercising their right, was a sign of the country's strong commitment to maintaining peace, good governance, and development. In 2018, Sierra Leone conducted presidential and parliamentary elections resulting in a peaceful transfer of power from one political party to another. Julius Maada Bio of the Sierra Leone People's Party (SLPP) defeated incumbent All People's Congress (APC) President Samra Kamala and succeeded Ernest Bai Koroma, his predecessor for a limited

[101] https://worldpopulationreview.com/countries/sierra-leone-population.
[102] https://worldpopulationreview.com/countries/sierra-leone-population
[103] https://www.sl.undp.org/content/sierraleone/en/home/countryinfo.html.
[104]http://emiguel.econ.berkeley.edu/assets/miguel_research/25/_Paper__War_and_Local_Collective_Action.pdf.
[105] https://www.blackpast.org/global-african-history/sierra-leone-civil-war-1991-2002/.

time. ** This section has been redacted in accordance with the GCF Information Disclosure Policy, as the portion is confidential under the disclosure policy of the Accredited Entity. **

The government commitment to public sector reform has been promising. The government has put in place a combination of measures such as gathering experts from the diaspora, training and recruiting mid-level technical experts and implementing performance management systems and performance contracts. In addition to this, it is noted that improved local governance and local economic development practices have increased revenues at the Local Council level, and the Ministry of Local Government and Rural Development has improved its functioning by establishing the National Association of Local Councils.[106] Local Councils are also called "District Councils" and each district has one such a council[107].

**** This section has been redacted in accordance with the GCF Information Disclosure Policy, as the portion is confidential under the disclosure policy of the Accredited Entity. ****

1.16 Money-laundering and financial crime

Sierra Leone is not included on the Financial Action Task Force (FATF) List of Countries[108] that have been identified as having strategic anti money laundering/combating the financing of terrorism (AML/CFT) deficiencies. However, there are weaknesses in the AML/CFT regime in the country, as reported by the Inter-Governmental Action Group against Money Laundering in West Africa (GIABA) since 2007. AML/CFT controls remain underdeveloped and underfunded. Sierra Leone was deemed a Jurisdiction of Concern by the US Department of State 2016 International Narcotics Control Strategy Report (INCSR). Key findings from the report cover the following areas:

- While Sierra Leone is not a regional financial centre, weak financial institutions, weak regulations, pervasive corruption, and lack of financial crimes enforcement has made the country vulnerable to money laundering. Due in part to its large seaport, Sierra Leone is an attractive shipment point for illegal drugs and other forms of illegal commerce, such as for the smuggling of pharmaceuticals, gold, and diamonds.
- Most financial transactions, including currency exchanges and remittances, are unregulated and vulnerable to money laundering. There is no indication money laundering activity in Sierra Leone is tied to the financing of terrorism.[109]

1.17 Relevant projects and programmes

Sierra Leone is highly committed to climate action and recognises the serious threat that climate change poses. Climate action has been taken in partnership with international institutions, such as the Green Climate Fund (GCF) and the Global Environment Facility (GEF) to tackle climate change impacts and enhance the climate resilience framework in Sierra Leone. This section considers recent and ongoing projects and programmes from multilateral and bilateral institutions that focus on climate change and the environment. In some cases, development work has been included, as it provides relevant material to be considered (as, for example, social-developmental co-benefits, namely in governance, health or education).

A 'spotlight' table (Table 4 below) of key selected projects is also included here below, in order to extract specific lessons learnt that can be of benefit for the implementation of the proposed GCF-funded Sierra Leone Coastal Resilience Project, as well as to analyse the potential for synergies with SLCRP. The proposed GCF project will learn from and build complementarities and synergies with relevant national and regional adaptation actors and current, recently concluded and planned initiatives. This will ensure that SLCRP can fully develop and build from the lessons learnt achieved for other interventions.

[106] https://www.sl.undp.org/content/sierraleone/en/home/countryinfo.html.
[107] International Development Association, 2021. Accountable governance for basic service delivery project, Sierra Leone. Available here
[108] https://www.fatf-gafi.org/countries/. FATF is the global money laundering and terrorist financing watchdog.
[109] https://www.knowyourcountry.com/sierra1111#:~:text=There%20is%20no%20indication%20money,to%20ending%20the%20Ebola%20outbreak.

In particular, planned initiatives that the SLCRP's executing entities will especially seek to complement and align with during the design and implementation phases of this project include: i) the AfDB Freetown WASH and Aquatic Environment Revamping Program, in particular its sub-program on CIEWS110; ii) a small scale mangrove conservation initiative implemented by the National Protected Area Authority and a co-management committee in the Sherboro river estuary (Bonthe district); iii) Yawri Bay area community ecosystem protection initiative via by-laws and eco-guards implemented by the Conservation Society of Sierra Leone; and iv) a regional West African mangrove restoration project being funded by the European Union.111 The table below considers the most relevant recent and ongoing projects and programmes with specific relevance on the potential for synergies and complementarities with the proposed GCF-funded Sierra Leone Coastal Resilience Project. The first three projects below share direct synergies with the SLCRP and Save the Children Sierra Leone are in close contact with former WA BiCC staff, UNDP, AfDB and to ensure resources are shared and learnings are captured and built upon in new target communities.

The SLCRP is also well-aligned with several global and national strategies proposed by multilateral agencies, including the World Bank Group Climate Change Action Plan (CCAP) 2021 – 2025,[112] and the UN climate action plan for Sierra Leone (2022).[113]

The World Bank action plan explicitly mentions within its 'agriculture, food, water and land' section, that it will 'step up support for climate-smart agriculture… using nature based solutions where appropriate.'. It furthermore states that it will 'help countries manage flood and drought risks together, reducing the water-related shocks and protecting livelihoods and productive resources'. Both of these strategies are key parts of the SLCRP, in outcomes 2 and 3 in particular.

The UN climate action document for Sierra Leone furthermore includes several recommendations which are also covered in the SLCRP. For example (there are more recommendations in the report that align with the SLCRP, but an abridged list is included here for brevity):

- '*Provide technical support to Government for preparing global and bi-lateral climate fund applications. These are complex and require a range of technical expertise, often taking several months.'* Throughout the SLCPR design process, Save the Children have provided technical support to government, and the project implementation will include further work on this.
- '*Support urban/rural/coastal planning strategies that promote sustainable use of natural resources and minimize risks from climate-related disasters'* The SLCRP includes 'coastal protection plans' and 'mangrove management plans' under the community adaptation plans, as well as the coastal governance platforms which will monitor the strategies.
- '*Support rural communities and farmers to adopt climate-smart inputs and technologies, including through agricultural extension programs.' Through o*utput 2.1, the SLCRP will deliver new inputs and technologies, including solar driers, cold storage, efficient fish smoking ovens, and climate-resilient seeds among others.

[110] Which includes a pilot early warning system project planned for Western Area Rural district

[111] Management of mangrove forests from Senegal to Benin "PAPBio C1-Mangroves". https://www.subventions-mangroves.org/Home

[112] "World Bank Group. 2021. World Bank Group Climate Change Action Plan 2021–2025: Supporting Green, Resilient, and Inclusive Development. © World Bank, Washington, DC. http://hdl.handle.net/10986/35799 License: CC BY 3.0 IGO."

[113] UN, Climate action for Sierra Leone, 2022. https://sierraleone.un.org/en/download/111904/191136

Table 5: Selected Relevant Projects with Synergies and Lessons Learned for SLCRP

Project name; Financial / Implementing partners	Objective / Lessons learnt	Districts (Localities) covered	Potential for synergies and complementarities
USAID – West Africa Biodiversity and Climate Change Programme (WA BiCC) (2015 – 2021)[114] USAID – USD 48.9 million National Protected Areas Authority (NPAA), the Environmental Protection Agency (EPA)	To enhance livelihoods and natural ecosystems in West Africa by working with partners at "the community, national and regional levels to strengthen policies and systems to improve natural resource management and the health and resilience of selected coastal and upland forest ecosystems. Lessons learned: a) building partnerships with a wide array of institutions at different levels is a prerequisite for success. For example, the Sherbro Co-management Committee has proved a replicable model for the SLCRP Coastal Governance Platform. B) the local populations must be empowered and have the right skillsets to lead on restoration and conservation activities; c) WA BiCC failed to address livelihoods alternatives. More focused was needed to address the drivers of deforestation, for instance in reducing mangrove wood use, and to offer some compensation or alternatives.[115]	Scarcies River Estuary (SRE), Sierra Leone River Estuary (SLRE), Yawri Bay, and Sherbro River Estuay (SRE)	The Sierra Leone Coastal Landscape Complex (SLCLC) Project is part of WA BiCC. SLCLC proposed a set of measures including: the ecological restoration and management of critical coastal ecosystems, investments in livelihoods and sustainable development, and disaster risk reduction through early warning systems. Considering this, the measures in the SLCRP will be aligned with the SLCLC and will scale up proven interventions from WA BiCC. SLCRP will also seek to tackle the drivers of deforestation and offer livelihoods alternatives to seek to achieve long-term sustainability.
UNDP / GEF – Adapting to climate-induced coastal risks (2018 -2023)[116] USD 9.9 million funding from GEF	To address the vulnerability Sierra Leone's coastal areas, with focus on six pilot sites. Three main outcomes: i) enhanced availability of high quality climate risk information that is critical for development decision-making in the coastal zone; ii) appropriate protection measures, policy, budgeting and legal tools and integrated coordination mechanisms developed to improve and support policy design and implementation in dealing with current	Along the coastal zone in six pilot sites; Conakry Dee, Lakka, Hamilton, Tombo, Shenge and Turtle Island	The objectives of this project align with SLCRP's in 2 ways; production of high-quality climate risk data and coastal protection measures (including legal and policy measures, gender and youth focus). Both are essential for ensuring efficient climate change response and reducing the

[114] https://www.usaid.gov/west-africa-regional/fact-sheets/west-africa-biodiversity-and-climate-change-wa-bicc

[115] For example, during the stakeholder consultation visits in April-May 2022, community members that were involved in WABiCC repeatedly confirmed that they were still cutting mangroves extensively, even in project intervention areas. When questioned on the reasons, they explained that WABiCC, while clearly raising awareness and promoting the benefits of mangrove conservation, did not offer any alternatives. Community members indicated that there were no specific tools provided, livelihood options enabled, or any form of payment (either in 'cash for work', or payment for planting) associated with mangrove restoration.

[116] Approved in 2016, but the beginning of the implementation of the project was delayed to 2018. https://info.undp.org/docs/pdc/Documents/SLE/AWP%202016_Climate%20Change%20induce%20coaster%20risk.pdf and https://www.adaptation-undp.org/projects/adapting-climate-change-induced-coastal-risks-management-sierra-leone

and USD 31.8 million in co-financing	and long-term coastal challenges; and iii) public awareness enhanced and climate resilient alternatives to sand mining promoted for better adherence of policy makers and communities on adaptation. Lessons learned: a) It is critical to offer livelihoods alternatives and diversification to reduce mangrove deforestation. B) Limited financing, with focus on capacity building rather than physical interventions. C) Stressed the importance of supporting decision-making through access to information and data, creating public awareness about the potential impacts of climate change.		coastal impacts of climate change on the vulnerable populations who reside there, two of the primary objectives of SLCRP. It is not clear how much of the stated co-financing is realised, which may indicate potential underfunding for the focus areas in the UNDP-GEF project.
Freetown WASH and Aquatic Environment Revamping Programme (2021-2025)[117][118] USD 50 million - GCF USD 169.1 million co-financed AfDB with Guma Valley Water Company and Ministry of Water Resources	To mainstream climate change and variability considerations into the Freetown WASH and Aquatic Environment Revamping Program. Climate variability and change pose significant challenges to the availability and quality of Sierra Leone's extensive water resources. Focus is on climate resilient water and sanitation infrastructure, integrated water resources management, and strengthened climate resilient forest management in the Greater Freetown Area. Second priority on early warning systems and climate information services across Sierra Leone.	Freetown	This project can generate important (albeit general) lessons-learnt for the SLCRP, in particular in WASH. The SLCRP will complement this and expand the positive impacts by supporting last-mile dissemination of early warnings and climate information in its target areas, leveraging new weather stations that the AfDB project will instal. To note, that SLCRP will not be deployed in Freetown, therefore there will not be overlapping between the two interventions.
Agricultural value chain development project (2020 – 2026)[119] [120] USD 52.61 million IFAD	To increase the production and improving the marketing of rice, palm oil, cocoa and vegetables. This project contributes to the Government's priorities of rice self-sufficiency, crop diversification and rural poverty reduction. / Implementation is still ongoing. Some concern in difficulties to reach all target farmers, and women	Countrywide	This project aligns with the SLCRP's objectives as one of its main outcomes is increasing the climate resilience of agricultural supply chains. Furthermore, this project also focuses on increasing agricultural productivity and reducing poverty amongst the most vulnerable

[117] https://www.afdb.org/en/documents/sierra-leone-freetown-wash-aquatic-environment-revamping-project-ipr-november-2021
[118] https://devtracker.fcdo.gov.uk/projects/46002-P-SL-E00-004/summary
[119] https://www.adaptation-fund.org/project/promoting-climate-resilience-coco-rice-sector-sierra-leone/
[120] https://webapps.ifad.org/members/lapse-of-time/docs/english/EB-2018-LOT-P-19-Project-Design-Report.pdf

Adaptation Fund (other co-financing sources) National Programme Coordination Unit and Ministry of Agriculture and Forestry	in particular. Climate-smart agriculture manuals have been developed and were found to be effective.[121]		populations in Sierra Leone which, by definition, would increase the resilience of these communities. The project does not cover other areas covered by SLCRP, namely on fishing, trade, WASH, health, and ecosystems.
UNDP / GEF – Early warning systems (2013-2018)[122] USD 4 million – GEF USD 20 million co-financing UNDP	To develop an early warning system in case of extreme weather events. The focus of the project was to enhance the climate resilience of Sierra Leone by developing an Early Warning System and improving the availability of climate information for long-term planning. Lessons learned: The project was successful in improving the capacity of national hydrometeorological institutions to monitor extreme weather but was unsuccessful in using that information to support evidence-based decision-making for early warning and adaptation response. There is also an insufficient number of stations.	Countrywide	An Early Warning System is essential for the goal of increasing the resilience vulnerable coastal communities in the face of extreme or unexpected weather events and minimizing the impact of impending such events, which aligns with SLCRP's goal of reducing the overall vulnerability of coastal communities and contributing to sustainable development. SLRP can benefit from knowledge / data from existing stations, keeping in mind that the number and distribution of stations is very low.
National Greening of Schools Programme (from 2019) Funding size unconfirmed Irish Aid with Environmental Foundation for Africa	To build a constituency of environmentally informed leaders by focusing on environmental awareness among teachers and children. Areas covered: waste disposal, sanitation, reforestation and other forms of natural resource management will be progressively introduced in the school curriculum. The focus is on creating a stronger civil society by providing awareness raising and practical knowledge for children. Lessons learned: The strengthening of curricula has been part of a holistic approach by Irish Aid that has demonstrated the importance of empowering children to strengthen governance over the longer term.	Pilot program in 10 schools in Western Area and 10 schools in Pujehun and Kenema Districts.	Linkages with the climate curriculum programme under SLCRP. SLCRP will cover different communities, thus avoiding a potential overlap with schools already targeted by Irish Aid.

[121] See: https://www.ifad.org/documents/38711624/40089498/Sierra+Leone+2000001544+SL-AVDP+Supervision+Report+November+2021.pdf/6140f85f-ec64-79b9-b9c8-a5c978d87f99?t=1636714491419

[122] https://www.thegef.org/projects-operations/projects/5006

International Climate Finance

Green Climate Fund (GCF)

Sierra Leone nominated a National Designated Authority in February 2015 and has been working actively with the Green Climate Fund since then[123]. There is an active readiness project supporting the authorities, and three approved regional, multi-country projects that include Sierra Leone (FP128, FP148, FP190). Currently, Sierra Leone does not yet have a country-specific project supported by the GCF.

GCF Readiness Programme

Furthermore, **Sierra Leone's Green Climate Fund Readiness Support for Sierra Leone** was approved in 2021 (https://www.greenclimate.fund/document/green-climate-fund-readiness-support-sierra-leone) and is being implemented with the support of UNEP[124]. Guided by national development policies and priorities, the readiness programme will include preparatory activities to:

> a) strengthen National Designated Authority (NDA) under the leadership of the GCF Focal Point;
> b) strengthen stakeholders' engagement and effective participation; and
> c) assist Sierra Leone in developing a gender- responsive country programme including climate change adaptation and mitigation priorities, and development of project/programme concept notes.

Energy Access Relief Facility (Regional)

The "**Participation in Energy Access Relief Facility** ("EARF") – FP148"[125] aims to increase access to clean energy in nine African countries by providing liquidity through low-interest, unsecured junior loans to key energy companies to continue their business during the COVID19 crisis.[126] Project components include the disbursement of concessional loans to energy companies that are helping mitigate climate change and have a demonstrated need for liquidity support, with the projected impact of reducing CO_2 emissions, creating local green jobs and improving the low-emissions energy capacity installed; and monitor the financial and operational status of companies that have received concessional finance, quantifying the impact that EARF funds have had and facilitate knowledge exchange between companies to encourage the adoption of best practices.

The project size is large with USD 60,000,000 of financing (50% GCF and 50% co-financing). It was launched in November 2021 and is planned to be completed in 2025 or 2027. Relevant stakeholders include local communities, Acumen – a non-profit impact investment fund – and Social Investment Managers and Advisors, LLC (SIMA) – a fund manager with a focus on innovative investment structuring in emerging market impact investments.

Arbaro Fund – Sustainable Forestry Fund (Regional)

The "**Arbaro Fund – Sustainable Forestry Fund** – FP128"[127] (2020 – ongoing)[128] USD 200 million (USD 25 million GCF and USD 175 million co-Financed). Its objective is to enable sustainable plantation forestry techniques through investments in novel sustainable projects in Latin America and Sub-Saharan Africa.[129] Besides climate mitigation benefits – an increase of carbon sinks, reduction of illegal logging and conservation of natural forests -, it will bring adaptation co-benefits through sustainable land management.

Specifically for Sierra Leone, components of the project comprise the identification and execution of projects focused on sustainable timber production. The overall project size is considered medium, with USD 200,000,000 of total financing (USD 25,000,000 GCF and USD 175,000,000 co-Financing). It started in October 2020 and the completion date is under revision. Expected outcomes are the

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[123] https://www.greenclimate.fund/countries/sierra-leone
[124] Report of the Green Climate Fund to the Conference of the Parties, 29 Oct 2021, Table 11, p.92 - https://unfccc.int/sites/default/files/resource/cp2021_08_adv.pdf.
[125] Participation in Energy Access Relief Facility ("EARF") - FP148. https://www.greenclimate.fund/project/fp148.
[126] https://www.greenclimate.fund/project/fp148.
[127] Arbaro Fund – Sustainable Forestry Fund – FP128. https://www.greenclimate.fund/project/fp128.
[128] Arbaro Fund – Sustainable Forestry Fund – FP128. https://www.greenclimate.fund/project/fp128.
[129] https://www.greenclimate.fund/project/fp128.

strengthening of institutional and regulatory systems and the improvement of the management of land or forest areas contributing to emission reductions.

GCF with African Development Bank

Freetown WASH and Aquatic Environment Revamping Programme (2021-2025) USD 50 million by GCF and USD 169.1 million co-financed (AfDB and blended finance) is under execution by Guma Valley Water Company and Ministry of Water Resources. This is part of a large water-supply programme which is currently under development by AfDB and has three main components.

1. Water supply infrastructure improvement - immediate investments
2. Integrated infrastructure improvement
3. Capacity for IWRM (Integrated Water Resource Management) and livelihoods improvement

The programme includes two proposed GCF-funded projects. The first will focus on climate resilient water and sanitation infrastructure, integrated water resources management, and strengthened climate resilient forest management in the Greater Freetown Area. Key hazards in the target areas include increasing seasonal and interannual variability of weather events; frequent and intense floods; coastal erosion and inundation with salinity intrusion, attributed to sea level rise and challenges induced by drainage congestion and riverbank erosion. Forestry degradation in the areas around the capital and upper western peninsula catchment, and the degradation of mangroves amplifies the negative effects of these hazards. Save the Children has had several interactions with the AfDB in order to coordinate the design and objectives of the projects and determine the areas of interventions. The SLCRP will be both synergistic and complementary to this project, as it will target different geographical and rural areas while the AfDB focus of urban WASH interventions. The second proposed AfDB project focuses on early warning systems and climate information services across Sierra Leone, in particular upscaling of existing CIS and generation of new climate data. The SLCRP will complement this and expand the positive impacts by supporting last-mile dissemination of early warnings and climate information in its target areas and at the level of the communities, thus leveraging new weather stations that the AfDB project will install.

IFAD with Adaptation Fund

Promoting Climate Resilience in the Cocoa and Rice Sectors as an Adaptation Strategy[130] (2020 – 2026), with a budget of USD 9.9 million, was funded by the Adaptation Fund, implemented by IFAD (as part of the Agriculture Value Development Project[131]), and executed by the Ministry of Agriculture and Forestry (MAF).

This project aims to achieve resilience in the rice and cocoa sector by identifying and implementing a comprehensive set of agricultural practices and agricultural diversification strategy through integrated farming systems designed to increase yields and minimize environmental degradation while maintaining the ecological functions and the rice and cocoa production value chains. The direct beneficiaries of the project are 35,000 smallholder farmers and 10,000 rice producers, 5,000 cocoa producers, of which at least 40 % will be women and 40% young people.

This project aims to deliver its objective through the following three components.

1. **Climate Resilient and Smart Agricultural Production:** the primary outcome of this component is that volume and value of production is increased, and production systems are made more climate resilient. The component will support the preparation of Business Development Plans at the level of the Agri-Business Centres that will include a comprehensive plan of the investments needed to develop the productive capacities of rice, cocoa or oil palm. Capacity building for improved production techniques and extension will be provided using the Farmer Field School methodology.

2. **Agricultural Market Development:** the main outcome of this component is improved performance and organization of the selected value chains for increased smallholder production and productivity. This component contains two sub-components:

[130] https://www.adaptation-fund.org/project/promoting-climate-resilience-coco-rice-sector-sierra-leone/
[131] https://webapps.ifad.org/members/lapse-of-time/docs/english/EB-2018-LOT-P-19-Project-Design-Report.pdf

a. Market access: consists of strengthening the business skills of agri-business centres, Farmer Organizations and Farmer Field Schools and facilitating value chain organization and deal making through the establishment of provincial level multi-stakeholder platforms
b. Climate resilient rural infrastructure: the primary outcomes of this sub-component are rehabilitating 20 warehouses to improve product drying and storage capacity, constructing secondary roads and farm tracks and undertaking spot improvements on trunk roads.

3. **Project Coordination and Management:** Since this project will be implemented by both the National Programme Coordination Unit and the Ministry of Agriculture and Forestry at the district level, technical assistance for coordination and management will be provided to the district coordination units as needed.

Global Environment Facility (GEF)

Resilient Urban Sierra Leone Project[132] **(2021 – 2026)** USD 50 million funded by the World Bank (IDA) and USD 6.73 million from GEF, implemented by Freetown City Council, Western Area Rural District Council, Bo City Council, Fiscal Decentralization Division in Ministry of Finance, National Disaster Management Agency. The project aims to improve integrated urban management, service delivery, and disaster emergency management in Western Area and secondary cities of Sierra Leone. Sierra Leone's urban population has almost doubled in the past five decades, with over 40% of the population now living in urban areas. Given the country's exposure to a range of natural hazards including recurrent flooding and landslides, there is considerable risk of disruption of economic and social functions and imposing high public and private costs for rehabilitation. This disaster and flood risk is further compounded by extremely limited solid waste management capacity, which has not kept pace with urbanization, especially in Freetown.

Given Sierra Leone's vulnerability to urban climate-related shocks, this project supports the country's disaster risk management capacity, contributing to climate resilience.

This project comprises of four components:

Component 1: institutional and capacity development in integrated urban management
Component 2: resilient municipal infrastructure investment and urban greening
Component 3: emergency management institutional and capacity development
Component 4: project management; staffing, monitoring and evaluation

The GEF Small Grants Programmes

Since 2013, the GEF has been supporting an array of projects in Sierra Leone through the "**GEF Small Grants Programmes**".[133] This set of grants intends to provide funds to local organisations for environmental and community improvement. It also puts the needs of marginalised and poor communities at the centre as it promotes policy dialogues at all government and stakeholders' levels. This dialogue also acts as a platform for building partnerships and networks across civil society. It is a fertile ground for coming up with innovative ideas to address environmental issues and sustainable development goals challenges.

In 2011, SGP was formally launched in Sierra Leone and since then has financially supported 122 projects. The analysis by focal area shows that there have been 33 projects under the **Climate Change focal area,** amounting to USD 1,144,114 in grants and in cash/in-kind co-financing.[134] SGP supported projects contributed to the reduction of 29,588 tons of CO_2 through the introduction of energy-efficient and renewable energy technologies. Other relevant areas include 29 **Biodiversity** projects mostly in the Gola Rainforest area in Kenema, Kailahun and Pujehun districts. The outcome of the biodiversity conservation efforts was the protection of an area covering 3,535 hectares, which enhanced the overall livelihood of the communities. Under the **Land Degradation and Sustainable Forest Management** focal area, 31 projects were supported. The Community Forest Management (CFM) approach helped restore 30,645 hectares of degraded land. On a further 1,351 hectares of land sustainable agricultural

[132] https://projects.worldbank.org/en/projects-operations/project-detail/P168608
[133] https://sgp.undp.org/goo.gl/index.php?option=com_sgpprojects&view=allprojects&country=SIL&Itemid=278
[134] https://sgp.undp.org/hq/index.php?option=com_sgpprojects&view=allprojects&country=SIL&Itemid=278

management practices for cocoa, cashew, coffee and oil plantations have been adopted. In the **Chemicals and Waste Management** focal area, 8 projects were funded to introduce waste management practices such as reduction, reuse and recycling that benefited over 1,000 families and fostered a better understanding of the circular economy. It reduced 1,209,600 tons of domestic waste and created sustainable jobs for over 400 vulnerable youth and women.

As further described below, several relevant GEF-supported projects have been executed via the United Nations Development Programme.

United Nations Development Programme

Adapting to Climate Change Induced Coastal Risks Management in Sierra Leone

The UNDP-GEF "**Adapting to Climate Change Induced Coastal Risks Management in Sierra Leone**"[135] (2018 -2023), USD 9.9 million funding from GEF and USD 31.8 million in co-financing. The project intends to address the vulnerability Sierra Leone's coastal areas by supporting the ability of coastal communities to manage climate change risks and impacts. The project will also enhance the quality and accessibility of climate-related data, specifically marine and sea parameters databases, to better inform decision-makers when it comes to policy decisions and planning. The geographic focus is along the coastal zone in six pilot sites (Conakry Dee, Lakka, Hamilton, Tombo, Shenge and Turtle Island). There are three main expected outcomes from the interventions: 1. Improvement of high-quality climate risk information (weather forecast) in the coastal zone; 2. Protection measures along with support for policy and legal tools; 3. Public awareness and intelligent alternatives to sand mining. The project started in April 2018 and is planned to end in April 2023.

Funding amounts account for just over USD 9.9 million (GEF) and USD 31.8 million (expected co-financing). The complete breakdown of costs is as follows: Project Preparation Grant Amount USD 200,000; Co-financing Total USD 31,800,000; GEF Project Grant USD 9,975,000; GEF Agency Fees USD 947,625; Total Cost USD 41,975,000The project is being implemented with full community and government level engagement[136], including key national partners, such as the Environmental Protection Agency (EPA-SL), the Ministry of Fisheries and Marine Resources (MFMR), the Institute of Marine Biology and Oceanography (IMBO), the National Tourist Board (NTB) and civil society stakeholders actors like NGOs and CBOs, such as The Conservation Society Sierra Leone (CSSL), the Environmental Foundation for Africa (EFA), the Environmental Forum for Action (ENFORAC), the Island Aid Sierra Leone (IA), the Women's Network for Environmental Sustainability (WoNES), the Climate Change, Environment & Forest Conservation Consortium (CEFCON-SL), Sierra Leone Artisanal Fishermen Union (SLAFU) and Civil Society Alliance on Climate Change.

According to its mid-term evaluation, project progress involves the successful installation of four automated Oceanic Monitoring Systems (OMS) along the coastal zone. In addition, there was an improvement in weather information through the update of an existing online meteorological application. Other progress is the development of a study entitled "Assessment for Constructing Sea Level Rise Scenarios: Benchmarks for Future Shoreline Positions in Sierra Leone" by the Environmental Protection Agency of Sierra Leone (EPA-SL) and a Coastal Vulnerability Analysis (CVA) that provides important information to the project stakeholders. The project has successfully built a programme that supports decision-making through access to information and data, creating public awareness about the potential impacts of climate change. Furthermore, trainings for the Government of Sierra Leone were conducted and a total of 102 ha of mangroves were restored between the Environmental Forum for Action (ENFORAC) and the National Tourist Board (NTB).

As part of the 'climate change induced coastal risks' project, in 2019 UNDP launched a tender for the provision of five solar-powered cold storage rooms to preserve fish and meat, to be used in selected communities (two of the proposed possible project sites in the present SLCRP project, Shenge and Konakridee are benefitting from the cold storage provided through the UNDP project)[137]. This

[135] https://www.thegef.org/projects-operations/projects/5902
[136] STAP Review Document - https://www.thegef.org/projects-operations/projects/5902.
[137] Participants in Save the Children's field mission also observed new solar-powered cold-chain storage facilities in two of the project sites, which had started functioning in around March/April 2022. These were built as part of the UNDP "Climate Change Induced Coastal Risks Management in Sierra Leone" project and were being used to store fresh fish.

technology is considered to be useful to reduce the need to smoke the fish / meat (using mangrove wood typically) and enables farmers / fishers to extend the shelf life of their product.

The National Disaster Management Agency – Early Warning Systems (EWS) work

NDMA-SL is an Agency established by an Act of Parliament to manage disasters and emergencies throughout Sierra Leone, to establish offices of the Agency throughout Sierra Leone, to establish the national, regional, district, and chiefdom disaster management committees, to establish a National Disaster Management Fund to provide finances for the prevention and management of disasters and similar emergencies throughout Sierra Leone and to provide for other related matters. NDMA has coordinated work on the Early Earning Systems with some agencies, including UNDP and the Red Cross. NDMA has been providing Early Warning Systems, e.g., now also via mobile GSM – based EWS, a dedicated phone number (1199), regional teams in place, awareness raising workshops, training of volunteers. NDMA is working on setting up additional alerts tools to cover additional hazards, such as flooding.

Since June 2022, NDMA has been **implementing an EWS activity as part of the five-year GEF funded project titled: "Adapting to climate change induced coastal risks management in Sierra Leone"** with funding from the United Nations Development Program (UNDP), in collaboration with the Environmental Protection Agency (EPA), the Ministry of Fisheries and Marine Resources (MFMR), Institute of Marine Biology & Oceanography (USL-IMBO) and the National Tourist Board (NTB) is.[138] The project is aimed at strengthening the ability of coastal communities to systematically manage climate change risks and it's impacts on the physical infrastructure and economic livelihoods through the use of Community-based Early Warning Systems (CBEWS) which is based on a "people-centred" approach through the empowerment of individuals and communities that are threatened by hazards to act sufficiently and effectively in order to reduce the possibility of injury, loss of life, damage to property, environment, and loss of livelihood. The four coastal communities in which the project is being implemented are Konakridee – Kaffu Bullum Chiefdom, Port Loko District; Shenge – Kagboro Chiefdom, Moyamba District; Turtle Island – Dema Chiefdom, Bonth District and Tombo, Western Area Rural District in Sierra Leone.

Building the Adaptive Capacity of Water Supply Services to Climate Change in Sierra Leone

The "**Building the Adaptive Capacity of Water Supply Services to Climate Change in Sierra Leone**" UNDP project[139] " (2016 -2019), received USD 2.9 million from GEF, USD 9 million from the government and USD 1 million from other funders. It was implemented by UNDP and executed by the Ministry of Water Resources. The project intended to build adaptive capacity to catalyse active public and private sector engagement to manage the water supply services in Freetown and some rural districts (Pujehun, Kambia and Kono districts). The goal of the project was to enhance the capacity for climate resilient decision making in the water sector through policy reforms, technical capacity and by fostering informed public and private sector dialogues. The project sought to complement several water-related projects established by the UNDP and other funders in Sierra Leone. Within water resources management, the project focused on addressing the skills deficit of water managers and the insufficient policy framework to secure the vital economic aspects and the functionality of water management systems in a changing climate in the urban setting (Freetown and Guma Valley Reservoir) and in the rural setting (southern, northern and eastern regions). The project was signed in May 2014 but because of the Ebola outbreak, it only started in 2016 and ended on the 31st of December 2019.

The project had 2 expected outcomes:

1. The revision of critical policies for water management to create incentives for climate-smart investment by the private sector. The strategy was to use specific technical capacity development activities and foster informed public and private sector dialogues.
2. Developing climate-resilient water supply infrastructure in Freetown and Pujehun, Kambia and Kono districts. The strategy was to focus on "pioneering innovations that particularly address the dry season water supply problems."

[138] https://ndma.gov.sl/2022/06/21/with-support-from-undp-ndma-embarks-on-early-warning-capacity-building-in-four-coastal-communities/

[139] www.sl.undp.org/content/sierraleone/en/home/projects/building-the-adaptive-capacity-of-water-supply-services-to-clima.html

Main achievements include:

- Capacities of at least two line ministries and two District Councils to mainstream adaptation concerns within water policies and local development plans strengthened.
- Capacities of two research/training centres to deliver relevant trainings on climate change issues.
- A strong focus on the delivery of water engineering and the introduction of new technologies in the targeted rural and urban areas.
- Success in the provision of access to clean water in remote areas.

A sound model of local water governance that can be replicated elsewhere. The project was developed based on extensive local consultations, with strong community participation in the implementation of interventions. Also, several stakeholders participated in the process of the project, such as the Ministry of Water Resources (MWR), the Ministry of Finance and Economic Development (MoFED), the Ministry of Health and Sanitation (MoHS) and the Ministry of Local Government and Rural Development (MLGRD), Local Councils and EPA – SL. Multilateral institutions alongside the private and third sectors also played a paramount role in building a climate-resilient framework in Sierra Leone.

Strengthening Climate Information and Early Warning Systems for Climate Resilient Development and Adaptation in Sierra Leone

The "**Strengthening Climate Information and Early Warning System Project in Sierra Leone**" (2013 – 2018), with a funding of USD 18 million was implemented by Sierra Leone Meteorological Department, UN Office of Disaster Risk Reduction, UNDP and GEF. It aimed to develop an early warning system in case of extreme weather events. The focus of the project was to enhance the climate resilience of Sierra Leone by developing an Early Warning System and improving the availability of climate information for long-term planning. The implementation of this project is part of the number one priority of Sierra's Leone NAPA intervention. Key components_of the project comprised the transfer of climate technologies for the establishment of a monitoring infrastructure and the integration of climate information into development plans and early warning systems. Project size is depicted as the following: Financing amount: USD 4,000,000; Co-financing total: USD 18,389,000.

The project started in October 2013 and was officially closed at the end of August 2018. It had the support of the UNDP Programme on Climate Information for Resilient Development in Africa (CIRDA) regional initiative, the Sierra Leone Meteorological Department (SLMD) under the Ministry of Transport and Aviation (MTA), the Office of National Security – Disaster Management Department (ONS-DMD), the Ministry of Water Resources (MWR) and the Environment Protection Agency-Sierra Leone (EPA-SL) amongst others. According to the Terminal Evaluation, there were two main outcomes:

- Improved the capacity of national hydrometeorological (NHMS) institutions to monitor extreme weather and enhance sector weather forecasting; and
- Efficient and effective use of hydrometeorological information for generating early warnings and support long-term development plans.

The Terminal Evaluation concluded that the project was quite effective in successfully achieving Outcome 1. However, the implementation of expected Outcome 2 wasn't successful. The impression is that the project is not completed, with no real path towards an effective Early Warning System in Sierra Leone.

Bilateral Climate Finance

USAID

USAID has been actively participating in projects alongside the government in Sierra Leone in a range of sectors to support the Sustainable Development Goals. Projects fields are Democracy, Governance and Peacebuilding, Economic Growth, Global Health and Gender Equality and Women's Empowerment.

West Africa Biodiversity and Climate Change (WA BICC)

The West Africa Biodiversity and Climate Change (WA BICC) (2015 – 2021) with a budget of USD 48.9 million was funded by USAID. This project intended to enhance livelihoods and natural ecosystems in West Africa by working with partners at "the community, national and regional levels to strengthen policies and systems that will improve natural resource management and the health and resilience of

selected coastal and upland forest ecosystems."[140] It ran from May 2015 to May 2020 with a budget of USD 48.9 million. The project focused on countries in the Economic Community of West African States (ECOWAS) and had support from the lead implementing partner Tetra Tech ARD alongside other institutions such as the Development & Training Services Inc. (dTS), centre for International Earth Science Information Network (CIESIN), Population Communications International (PCI) Media Impact, Wetlands International Africa (WIA), Pact World together with non-governmental organization networks. The objectives of the programme included combatting wildlife trafficking, improving coastal resilience in West Africa and reducing deforestation, degradation and biodiversity loss in key forests.

The Sierra Leone Coastal Landscape Complex (SLCLC) Project[141] is part of WA BiCC. It categorizes adaptation into three focal areas (themes): Ecological restoration and management of critical coastal ecosystems, livelihoods and sustainable development, and disaster risk reduction and early warning systems:

i. The first theme, ecological restoration and management of critical coastal ecosystem, aims to build healthy coastal ecosystems by facilitating mangrove restoration and management as an ecosystem-based adaptation/mitigation solution.
ii. The second theme, livelihoods and sustainable development, sustains healthy and resilient communities by providing people with sustainable alternatives to making a livelihood, supporting efforts to raise awareness, and increasing skill-based trainings.
iii. The last theme, disaster risk reduction and early warning systems, focuses on building resilience through appropriate infrastructure, supporting particularly vulnerable regions, and reducing hazards and risks.

The SLCLC comprises several locations where WA BiCC activities have been concentrated - notably the Scarcies River Estuary (SRE), Sierra Leone River Estuary (SLRE), Yawri Bay, and Sherbro River Estuay (SRE). In order to increase coastal resilience to climate change in the SLCLC, WA BiCC developed strategies and actionable work plans tailored to particular community needs. In line with the Theory of Change for WA BiCC's Component 2, the program's dual strategy has been to identify and promote effective interventions while developing an enabling policy environment. In the Sierra Leone Coastal Landscape Complex, the work plans now being put into practice have been developed in collaboration with and active support of the Sierra Leone National Protected Area Authority (NPAA) and the Coastal Chiefdoms Natural Resources Management Network (WA BiCC third annual report).

Notable achievements of WA BiCC in Sierra Leone

Sierra Leone's Climate Change Adaptation Plan (CCAP) benefited from extensive revisions at the April 2019 national workshop organized in partnership with UNDP. More than 40 participants helped mainstream climate adaptation into national policy frameworks, collaborating to align the CCAP with the National Climate Change Strategy and Action Plan. Participants helped write a plan that enhances national strategies for climate change. A section was added to elucidate how regional policies/strategies could be integrated from the Abidjan Convention's protocols on Integrated Coastal Zone Management (ICZM) to Sustainable Mangrove Management and ECOWAS's Environmental Policy (ECOWEP). The collaborative environment of the actual workshop enabled greater cross-institutional support for coastal resilience. Sierra Leone's Environmental Protection Agency (EPA), for example, offered its support and commitment to continued work. Finally, efforts were made to plan next steps, with various government ministries and agencies discussing alignment of the plan with their particular mandates.

While implementation of coastal adaptation activities and enactment of the Co-Management plan in the SRE is still in its early stages, the mapping exercise was a significant achievement for the region. Undertaken in collaboration with local communities and government partners such as the National Protected Areas Authority/Conservation Trust Fund (NPAA/CTF), the field mapping-built capacity for collection of data and its application in future adaptation (Njisuh 2019). Prior mapping efforts had not included community members. This work built a broad capacity for using geo-spatial information technologies, as well as public investment in climate change issues across the coastal area, while also contributing to a more robust foundation of climate information to enable future development.

[140] https://www.usaid.gov/west-africa-regional/fact-sheets/west-africa-biodiversity-and-climate-change-wa-bicc
[141] https://www.wabicc.org/mdocs-posts/review-of-coastal-adaptation-practices-in-developing-countries/

Support to the Village Saving and Loan Associations (VSLAs) has already resulted in tangible progress for impacted communities. Since the training was conducted, 78 VSLAs have been registered. The 35 VSLAs registered at the Council level have developed official bylaws or constitutions, while 43 have registered at the town chief level (Tetra Tech 2019). These registered groups collectively mobilized USD 90,455, and 75 of them provided loans to a total of 1,788 people. This subsequent 91% increase in capital creates a promising financial landscape for future work in the area. Women represented 52% of the 159 participants in a 2019 training to support the growth of VSLAs in the SLCLC. Compared to participation in VSLA capacity strengthening in West Africa as a whole, where women currently make up 28.06% of 1,532 trainees, work in the SLCLC is making strides towards more equitable sustainable development.

Best practices

WA BiCC's project evaluation identifies the following: grounding adaptation measures in existing institutions, policy frameworks, and data infrastructure is critical towards ensuring that projects are sustainable and suited to the long-term nature of climate adaptation. WA BiCC's mainstreaming of the Climate Change Adaptation Plan into the National Climate Change Strategy and Action Plan was therefore critical towards ensuring government buy-in. It helped to develop an environment of collaborative adaptation, connecting common goals and work, in order to reduce isolated workflows and over-extended resources in the long term.

Lessons learned

- ***Building partnerships with a wide array of institutions at different levels is a prerequisite for success.***

Building trust and multi-stakeholder commitment to full participation and ownership requires significant time and effort. It took WA BiCC three years to access certain key institutional documents. The newly established community-based governance structure emerged after 9 months of intensive stakeholder consultations and community mobilization processes, with extensive funding and leadership from WA BiCC. WA BiCC has also worked closely with many institutions at local, national, and regional levels to ensure coastal resilience activities are replicable, scalable, and sustainable. This required planning activities with the full involvement of key stakeholders at local and national levels such that there is community ownership of processes, outputs/outcomes, and future commitments to coastal adaptation without WA BiCC's direct participation. The Sherbro Co-management Committee (whose establishment was a successful deliverable of the WA BiCC project) has been taken as a model for the development of the Coastal Governance Platform of the SLCRP.[142] This committee is currently governing the Sherbro River estuary, and was instrumental in developing the Sherbro Co-management Plan.[143] The committee brings together a variety of stakeholders and includes 11 elected members drawn from ten chiefdoms and the municipalities that make up the Sherbro River estuary, with a chairperson to guide the affairs of the institution. The committee also includes an advisory body including members from traditional authorities – including the ten paramount chiefs who govern the chiefdoms that make up the Sherbro River estuary, national and district authorities, such as the NPAA and EPA. Stakeholders have reported on the success in this pilot initiative, and that they would welcome additional funding to replicate the model in other protected areas.

- **Recognition that mangrove forests are critical to reaching adaptation impacts in Sierra Leone**

As part of the WA BICC project, in 2017, the "Climate Change Vulnerability Assessment in Mangrove Regions of Sierra Leone" report was launched and intended to "understand factors that contribute to the vulnerability and resilience of communities and mangrove ecosystems in coastal Sierra Leone. The goal was to inform the design of project interventions, including climate adaptation activities under the West Africa Biodiversity and Climate Change (WA BiCC) project".[144] The work was led by the Centre for International Earth Science Information Network (CIESIN) at Columbia University and included a team of field researchers from WA BiCC, Fourah Bay College, Njala University, the National Protected Areas Authority (NPAA), Environmental Protection Agency (EPA), the Ministry of Agriculture, Forestry and Food Security, the Ministry of Lands, Country Planning and Environment, the Ministry of Fisheries and Marine Resources, Conservation Society of Sierra Leone and other stakeholders. The study initially

142 https://www.wabicc.org/newly-elected-co-management-committee-pledge-to-protect-sierra-leones-sherbro-river-estuary/
143 https://www.wabicc.org/mdocs-posts/sherbro-river-estuary-co-management-plan/
144 https://www.wabicc.org/wp-content/uploads/2019/01/WA-BiCC-SL_CCVA-Abridged-Report.pdf

concluded that the communities that will suffer the most from the changing temperatures are those in coastal fishing villages located in or near mangroves. By doing so, the preliminary scoping mission recognised the importance of mangroves for climate change adaptation. A bottom-up approach was utilised as the study aimed to inform adaptation strategies and natural resource management at the community level, for example through the establishment of 24 natural resource management committees and a Coastal Chiefdom Natural Resources Management Network.[145]

- **When working on mangrove forests, it is critical to address the main drivers of mangrove loss and degradation, and not just focusing on mangrove restoration.**

The WA BiCC Mid-Term Evaluation, 2019, stressed that conservation practices and promoting livelihoods alternatives were not set as outcomes in the project. Without a diversification of their economic activities and feasible alternatives to using mangrove woods, communities could not continue to apply the recommendations made by WA BiCC on stopping mangrove wood cutting. This point was also validated during the field visits. During stakeholder consultation visits for this project design to communities that were involved in WA BiCC previously, community members repeatedly confirmed that they were still cutting mangroves extensively, even in project intervention areas. When questioned on the reasons for this, they explained that WA BiCC, while clearly raising awareness and promoting the benefits of mangrove conservation, did not offer any alternatives. Community members indicated that there were no specific tools provided, livelihood options enabled, or any form of payment (either in 'cash for work', or payment for planting) associated with mangrove restoration.

- **The interventions need to be accompanied by applicable livelihoods alternatives, avoid maladaptation, and apply Ecological Mangrove Rehabilitation (EMR), even in absence of a clear regulatory framework around mangrove deforestation.**

WA BiCC has proposed a social and behavioural change (SBC) approach to influence positive behaviours around the sustainable use of mangrove wood. Despite the existence of customary law for local environmental protection, mangrove cutting is largely unregulated and the resource is perceived as inexhaustible, even in places where it was clearly depleted. Providing livelihoods alternatives as well as appropriate technologies (fish dryers, efficient ovens) can be scaled up, alongside capacity building to ensure that sustainable behaviours continue after the end of the project implementation. At the same time, it is important that the alternatives do not lead to maladaptation, as in the case of Scarcies river where the mangroves on the banks have been replaced by rice farming. Here, unprotected banks have been eroded.

Like other programs in Africa, WA BiCC recognizes the critical role of applied Ecological Mangrove Rehabilitation (EMR) principles that seek to maintain or reconstruct the right biophysical and socio-economic conditions for mangroves to grow back naturally. WA BiCC tested the establishment of nurseries to replant mangroves and recognised the fact that adaptive management is key to recreate the best conditions for mangroves to grow.

- **The establishment of Village Savings and Loan Associations (VSLA) was well received but fell short of supporting private sector development.**

The focus on VSLA has been positively received and considered to have had great impact on people's personal livelihoods, but efforts to engage the private sector and create supply and demand for improved technologies (such as improved fish-smoking ovens, cook stoves, oyster culturing, etc.) could have benefitted from more focus on sustainability.[146] A later impact assessment showed that 8 out of 10 members said the VSLA scheme helped decrease the destruction of mangroves. More than half said the savings group helped the community reduce poor fishing practices, by allowing members with loans to procure improved, legal fishing nets.

- **Site selection must be conducted critically, in consultations with the local populations as well as with technical specifications / eligibility criteria in mind**

The failure of some of the mangrove nursery was attributed to, inter alia, the site selection process. The selection process needs to be consultative as well as grounded in science. For example, WA BiCC concluded that the site selection was a deliberate, consensus-based process at first, but later became

[145] www.wabicc.org
[146] https://pdf.usaid.gov/pdf_docs/PA00WF5R.pdf

more ad hoc as many of the initial sites failed and the Mangrove Restoration Committees (MRCs) felt pressured to begin restoration efforts elsewhere to show success. As a result, some mangroves were planted in areas with acceptable soil quality but with limited tidal influence. In many cases, mangroves were planted in sites exposed to extensive herbivory by domestic animals. Several other sites proved to be unsuitable or were not accepted for reasons such as insecure land tenure.

Gesellschaft für Internationale Zusammenarbeit (GIZ)

Employment Promotion Programme (EPP)

The Employment Promotion Programme (EPP)(2020 – 2024) received EUR 22 million from GIZ and the EU. It is delivered as a joint GIZ programme in collaboration with the EU and the Ministry of Planning and Economic Development that focus on promoting economic growth and sustainable development by creating jobs. The project started in 2020 and is planned to go on until 2024. It will cost 22 million euros. The rationale behind this programme is that the improvement of human capital provides access to viable financing and good jobs. As noted above, Sierra Leone remains one of the least developed countries in the world with a high rate of unemployment that constraints the socio-economic development and poses a risk to the political and social stability of the country.

Young people and women in the rural areas of Sierra Leone are particularly affected by unemployment. However, even those who are employed are still vulnerable, with 60% of the working population classified as poor, meaning that despite their employment, the household falls below the poverty line. Specifically, the EPP aims to sustainably improve the employment and income situation of youth in agriculture and micro-small and medium-sized enterprises, especially in rural areas like Falaba, Kionadugu, Kono and Kailanhun in the North and the East of the country.

The EPP structure is based on skills development, Technical and Vocational Education and Training (TVET) and dual studies, agricultural value chain development, private sector business loop (B-Loop) and private sector facility for growth. Projected outputs are the training of 500 young people in basic employments related skills, construction or renovation and equipment of five vocational schools, and training of 250 schoolteachers. Until now, the programme has benefited: 42,000 farmers who have received training for material input; 14,000 youth who received life skills training; 2,300 small scale enterprises have received financial or material support; 10,000 youth received business training; nearly 2,000 permanent or seasonal jobs have been created. Energising Development project in the founding states of the Mano River Union: Liberia, Sierra Leone, Guinea

Commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ) and delivered through GIZ, the project focused on the environment and climate issues in the districts along the Mano River. Implemented between 2012 to 2018, the project's key objectives included:

- providing better access to a sustainable, modern, reliable, affordable, socially responsible and environmentally friendly energy supply by installing solar energy systems for medical facilities and schools
- introducing solar energy systems for offices and petrol stations as well as deploying mini-grids in remote, off-grid regions
- improving cooking technologies by introducing energy-efficient stoves.

National Action Plan on Artisanal and Small-Scale Gold-Mining Sector

National Action Plan on Artisanal and Small-Scale Gold-Mining Sector (2022 – ongoing). As part of GIZ's programme on Regional Resource Governance in West Africa, it has partnered with NGO Pact on the project financed by the German Ministry for Economic Cooperation and Development (BMZ) and the European Union (EU). The project aims to support the Government of Sierra Leone in implementing its National Action Plan (NAP) with the specific goal of reducing mercury use and improving the governance of Sierra Leone's artisanal and small-scale gold mining (ASGM) sector.

Pact's Project is designed to support ASGM miners and traders in the Tonkolili district through technical assistance activities to improve productivity and mitigate environmental and health impacts in ASGM communities. More broadly, "the Project aims to enable Sierra Leone's compliance with international standards including the Minamata Convention on Mercury, but also the OECD Due Diligence Guidance, and the recent EU Regulation on Conflict Minerals – which impose requirements on international buyers

procuring gold from Sierra Leone". Key progress has been achieved since the implementation of the project, with highlights to the completion of a Technical Guide, Facilitation Guide and PowerPoint presentations for 10 Training Modules and the support to the establishment of the Boulaneh Gold Miners and Traders Association (BMTA), registered with the District Council.

Irish Aid

Ireland's government have been working with Sierra Leone's government to implement supportive projects through Irish Aid since 2002 and set up an office in 2005. Key focal areas of their intervention include reducing gender inequality, improving nutrition for women and children, and enhancing conditions for fair elections and the enjoyment of human rights. The outcomes of these programmes are set to be achieved by strengthening government systems and supporting civil society. There is also a small allocation to respond and reduce the risk of disasters like severe flooding and landslide. In 2019, the government launched a five-year "Ireland in Sierra Leone Mission Strategy 2019-2023". The vision forms the basis for Ireland's programmes in the country over the next five years, with a planned budget of EUR 67 million to "support Sierra Leone's efforts in consolidating development gains and achieving the Sustainable Development Goal (SGD) targets by 2030."[147]

The different fields of work that Irish Aid[148] are involved in Sierra Leone include: Nutrition

Irish Aid partners with organisations such as WHO, FOCUS-100, Directorate of Food and Nutrition (DFN), UNN-reach and the SUN Secretariat alongside key stakeholders to **support priority for policies toward child malnutrition, food insecurity and child wellbeing**. One success of such engagement was the Breast Milk Substitute Act of 2021. Ongoing partnership with Welthungerhilfe and Action Against Hunger (AAH) is set to develop integrated nutrition-sensitive agri-food programmes considering climate change at community level.

Gender Equality

Irish Aid supports women's empowerment through several programmes in partnership with international organisations. The PROTECT (Protecting and Empowering Girls to Reach their Full Potential) project with **UNFPA aims to reduce adolescent pregnancy in Sierra Leone**. With UN Women, Irish Aid supports the POWERED (Protection and Empowerment of Women for Equality, Resilience and Development) project, which focus on supporting the Ministry of Gender and Children's Affairs in implementing women's empowerment policy. The Irish Embassy partnered with Save the Children on a multi-sector project to address the root causes and contributing factors to teenage pregnancy in four urban communities.

Education

Ireland supported the introduction of the **Free Quality Education Programme that increased girls' access to education**. Through Irish Aid, Ireland continues to support earlier work in education to scale up the access to quality education for children, especially vulnerable girls. Ireland is an active financial contributor to a World Bank-led multi-donor Trust Fund that aims to improve the management of the education system, teaching practices and learning conditions.

Governance

Ireland supports the capacity building process to enable the **participation of Civil Society in the development of Sierra Leone**. Projects in partnership with UNDP give support to the National Civil Registration Authority (NCRA) for the establishment of a comprehensive civil register that will enable voter registration. Irish Aid also has projects that support capacity strengthening of human rights and women's participation in politics.

Climate – Combatting deforestation

Irish Aid has supported projects to **combat deforestation in Sierra Leone**.[149] Through the EU Global Climate Change Alliance, Irish Aid is contributing to the United Nations Collaborative Programme on

[147] https://www.dfa.ie/media/missions/sierraleone/ourrole/19-023_Sierra-Leone-Strategy_web.pdf, p. 2.
[148] https://www.irishaid.ie/what-we-do/countries-where-we-work/our-partner-countries/sierra-leone/
[149] https://www.irishaid.ie/what-we-do/our-priority-areas/environment-and-climate-change/environment-climate-change-action-partners/

Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD), in Sierra Leone.

Climate – Greening Schools

Irish Aid signed a partnership agreement, in 2019, with the Environmental Foundation for Africa to pilot a **national competition on greening schools in Sierra Leone**.[150] The rationale behind the project is that by focusing on environmental awareness among teachers and children, the process of building a constituency of environmentally informed leaders will be easier. Positive actions such as waste disposal, sanitation, reforestation and other forms of natural resource management will be progressively introduced. The four main objectives are: 1. To create individual responsibility and awareness toward the environment; 2. To provide incentives for participating schools/communities to protect their local environment; 3. Train and facilitate the formation of school/community based environmental committees; and 4. Capacity building in sustainable practices such as waste management, conservation, sanitation and reforestation.

Other smaller initiatives that the proposed project will learn from and build on include: i) Conserving the Yawri Bay Ecosystem in Sierra Leone's Coastal Corridor (2021-2022)[151] implemented by the Conservation Society of Sierra Leone; ii) Darwin Sherbro Oyster Project (2014-2019)[152]; iii) Sustainable Utilization of Mangroves Using Innovative Fish Smoking Systems (completed)[153]; iv) Sierra Leone - Artisanal Fisheries Development Project (2003-2010)[154]; and v) Sierra Leone Wetlands Conservation Project (2011-2015).[155] The SCLRP will also align with past, ongoing and planned initiatives that are working towards establishing the national capacity and architecture for forest carbon measurement, reporting and verification in Sierra Leone. These include: i) an EU-funded initiative to be implemented by the FAO and the Ministry of Environment to conduct a national forest inventory and build capacity as precursor to establishing the national Forest Reference Level, with funding of USD2.5 million committed and the intention to lay the groundwork for establishing a National Forest Monitoring System[156]; ii) REDD+ capacity building in Sierra Leone funded by the EU from 2012 to 2017[157]; iii)the Gola REDD Project that is conserving, monitoring and selling carbon credits on the voluntary carbon market from 69,000 ha of the Gola Rainforest[158]; iv) an FCDO-funded initiative, implemented by Crown Agents, Tacugama Chimp Sanctuary and the Ministry of Environment's Forestry Division, in the Loma forest in Northwestern Sierra Leone, to monitor, report and verify tree cover and reforestation efforts using drone technology and geo-tagging of trees by community members, as well as general capacity building for MRV[159]; v) efforts by national university academics such as the Njala University quantification of carbon stock in two plantation areas in Southern Sierra Leone[160]; and vi) the EU-funded assessment of mangrove ecosystem services and carbon credit potential in the Sherbro estuary area, one of the SLCRP project intervention areas, by international consultants and staff from the National Protected Area Authority, EPA and the NGO The Conservation Society of Sierra Leone.[161] The SCLRP's capacity building for the conservation, restoration and monitoring of mangrove forests in its target areas

[150] http://www.efasl.org/site/

[151] This project aims to strengthen the management of Yawri Bay in Sierra Leone by increasing its protection status through nomination as a Ramsar Site and initiation of the protected area gazettal process. Design a state-of-the-art management plan with a detailed and budgeted action plan; raise funds to implement the plan, and promote compliance with the plan by local communities and private companies in the fisheries and salt production sectors. https://www.cepf.net/grants/grantee-projects/conserving-yawri-bay-ecosystem-sierra-leones-coastal-corridor

[152] Darwin Sherbro Oyster Project, funded through the Darwin Initiative (2014-2019) is working with remote communities in the Sherbro River Estuary in Southern Province, Sierra Leone to offer sustainable income for local women through the culture, processing and marketing of native mangrove oysters. https://www.stir.ac.uk/darwinoysterproject.

[153] GEF Small Grant implemented by UNDP in Yawri Bay. Details available here.

[154] https://projectsportal.afdb.org/dataportal/VProject/show/P-SL-AA0-010

[155] Sierra Leone - Wetlands Conservation Project (English). Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/711481475848511731/Sierra-Leone-Wetlands-Conservation-Project

[156] FAO has also developed a standard Global Forest Resources Assessment report in 2020 for Sierra Leone. https://www.fao.org/3/cb0062en/cb0062en.pdf

[157] https://www.gcca.eu/programmes/redd-capacity-building-sierra-leone

[158] https://www.reddprojectsdatabase.org/view/project.php?id=400

[159] https://www.crownagents.com/project/linking-carbon-markets-to-local-communities-project-verdant/

[160] https://www.researchgate.net/publication/339124643_Ground_Forest_Inventory_and_Assessment_of_Carbon_Stocks_in_Sierra_Leone_West_Africa

[161] https://www.eeas.europa.eu/sites/default/files/documents/SRE_Final%20Report_Ecosystem_Services_Assessment.pdf

and at national level will contribute to the above efforts that are collectively working towards establishing a national Forest Reference Level and National Forest Monitoring System in Sierra Leone.[162]

1.18 Policy and Regulatory Environment

Sierra Leone's climate regulatory and governance landscape comprises an array of policies and laws to address the country's response to climate change, environmental degradation and development. ** This section has been redacted in accordance with the GCF Information Disclosure Policy, as the portion is confidential under the disclosure policy of the Accredited Entity. **

Nevertheless, the overall corpus of related policies and laws provides a good foundation for projects focused on addressing Sierra Leone's climate risk.

1.18.1 Sierra Leone Vision 2025

After two years of consultations, in 2003 the "**Sierra Leone Vision 2025 – Sweet Salone**"[163] was published. The part-aspirational, part-technical document presents a strategic direction that builds on the need to enhance leadership, reconciliation, national institutions, democratic governance, and physical infrastructure in the country. Those are considered to be the overarching foundations for economic growth and sustainable development. The document discusses the need to bring change in an inclusive manner by working also with the private sector, NGOs, and public institutions. The mention of climate change was still in its infancy at that point in time, with only two references addressing the issue as one of the possible 'threats' to the nation in the document.

1.18.2 Conservation and Wildlife Policy

The "**Conservation and Wildlife Policy**"[164], published in 2010, supports application of three sections of the constitution of Sierra Leone, namely, Section 7. (1) a. "harness all the natural resources of the nation to promote national prosperity and an efficient, dynamic and self-reliant economy; Section 18. (1) 3 a. concerning restrictions on freedom of movement "which is reasonably required in the interests of defence, public safety, public order, public morality, public health or the conservation of the natural resources, such as mineral, marine, forest and other resources of Sierra Leone, except in so far as that provision or, as the case may be, the thing done under the authority thereof is shown not to be reasonably justifiable in a democratic society"; and Section 10. concerning foreign policy objectives "respect for international law and treaty obligations, as well as the seeking of settlement of international disputes by negotiation, conciliation, arbitration, or adjudication, including for environmental litigation. The Conservation and Wildlife Policy also presents specific policy statements and accompanying strategies to address the legislative gap in conservation and wildlife policies, including on the establishment of conservation areas, the management of wildlife outside of conservation areas, the collection and utilisation of scientific evidence and traditional knowledge for informed decision-making, solutions for adaptive wildlife management, and the establishment of programmes to support skills development in wildlife management.

1.18.3 Forest Policy

The "**Forestry Policy**"[165] was also published in 2010. This document takes stock of some of the key weaknesses in the regulation and management of forestry, land and natural resources and seeks to bring integration with existing frameworks, such as the Framework for Effective Management of Natural Resources, which is part of the Sierra Leone Poverty Reduction Strategy II called 'Agenda for Change'. The Policy also presents pasts and current legislation that guides forest management in Sierra Leone, such as the Forestry Act of 1988, subsequent changes in 2008 with the introduction of development, exploitation and trade reforms. The reforms standardise the processes and guidelines for leasing Community and Forest Reserve forests, issuing logging permits, use of stumpage fees, benefit sharing

[162] National Forest Monitoring Systems (NFMS) and assessments provide forest resource information that inform national forest policies, planning and sustainable development. Forest monitoring systems include measurement, reporting and verification (MRV) functions and aim to produce high-quality, reliable data on forests, including forest-carbon estimates. NFMS components include: i) satellite land monitoring systems (SLMS) and other data collection; and ii) National Forest Inventories (NFI) or other data collection providing information on emission factors (EF). All these are needed for a country to fully engage with the REDD+ mechanism under the UNFCCC to receive payments for results.
[163] Sierra Leone Vision 2025. https://unipsil.unmissions.org/sites/default/files/vision_2025.pdf.
[164] Conservation and Wildlife Policy. http://extwprlegs1.fao.org/docs/pdf/sie149515.pdf.
[165] Forestry Policy. https://s3-eu-west-1.amazonaws.com/rdwebsite/slforestry/ForestryPolicyFinal_21July2010.pdf.

from forest exploitation, transportation of forest products, urban tree management services, export permits, import of chain saws and sawmills, registration of timber and wood product enterprises, and establishes a Conservation Trust Fund. The Forest Policy also considers the Environmental Protection Act of 2000 created the National Environment Protection Board which is charged with coordination of all environmental programming between Ministries, agencies and local authorities. The Act also identified the need for Environmental Impact Assessments (EIA) for certain projects and provides guidelines for the scope of the EIA as part of the application of procedural rights in forest management. In 2008, further legislation created the Sierra Leone Environmental Protection Agency (current EPASL, also currently the NDA) with overall responsibility for environmental management.

The policy highlights key challenges in the sustainable management of forestry, land and natural resources, including competing land uses for livelihood purposes, unsustainable extractive practices, conflicting mandates across multiple public institutions, limited overall capacity, limited information and research, and finally the issue of land tenure and ownership. It also presents specific principles to overcome these barriers, such as the needs to mainstream good governance and a rights-based approach in land and resource use, better and comprehensive community engagement, sustainable development and equitable distribution of the benefits from the utilisation of national natural resources.

1.18.4 Agenda for Prosperity

The "**Agenda for Prosperity: Sierra Leone's Third Generation Poverty Reduction Strategy Paper (2013 – 2018**)"[166] sets the country's goals to achieve strong and consistent economic growth, strong governance and human development attainments, with a key target for the country to become a middle-income country by the year 2035. The paper describes measures to increase the production of staple food crops for food security, activities to reduce rural poverty, strategies to move towards more inclusive and efficient agricultural and food systems - including by increasing farmers' access to agricultural inputs - access to finance and access to new technologies. Finally, the paper is also concerned with the environment and sustainable use of natural resources and presents ways forward to include the participation of all groups, such as women and youth, in order to bring just and inclusive sustainable development and equity in benefit sharing from the utilisation of natural resources.

1.18.5 Second National Biodiversity Strategy and Action Plan 2017-2026

In 2017, the "**Second National Biodiversity Strategy and Action Plan 2017-2026**"[167] was published. This last revision of the first document with the same name came about to update the focus of action from the country's public policies. The main objectives of the new policy are: "1) Ensure well-protected biodiversity by focusing on improving legislation and policy implementation across all sectors, 2) Improve practical and functional methods and mechanisms to safeguard biodiversity, resulting in the improved conservation status of threatened and rare species, 3) Implement practical and robust conservation actions that significantly improve the status of species, habitats sites and ecosystems within and beyond protected areas, 4) Improve the standard of living, ecosystem services and opportunities provided to people, particularly local communities, through sustainable and inclusive biodiversity conservation actions, and 5) Enhance sectoral and public engagement, and build capacity and awareness, that contribute to effective planning and results-oriented execution of conservation programmes."[168]

1.18.6 Medium-Term National Development Plan (2019-2023)

The "**Medium-Term National Development Plan (2019-2023**)"[169] or MTNDP is a comprehensive document that sets key objectives as well as related implementation plans (including strategies for better sector integration and resource mobilisation) with the aim of building an inclusive, diversified, and resilient green economy, keeping the long-term objective for Sierra Leone to become a middle-income country. The terms of the document also include the improvement of public health, gender and

[166] The Agenda for Prosperity: Sierra Leone's Third Generation Poverty Reduction Strategy Paper (2013 - 2018). https://www.fao.org/faolex/results/details/en/c/LEX-FAOC149110/.
[167] Second National Biodiversity Strategy and Action Plan 2017-2026. https://www.fao.org/faolex/results/details/en/c/LEX-FAOC176343/.
[168] Second National Biodiversity Strategy and Action Plan 2017-2026. https://www.fao.org/faolex/results/details/en/c/LEX-FAOC176343/.
[169] Medium-Term National Development Plan (2019-2023). https://www.slurc.org/uploads/1/0/9/7/109761391/sierra_leone_national_development_plan.pdf.

community empowerment, and education through improved social justice, cohesiveness, security and peace. Finally, it also underscores the role of a solid natural and physical infrastructure to achieve the above objectives. One key policy cluster (Policy Cluster 7) on addressing vulnerabilities and building resilience in Sierra Leone takes stocks of several weaknesses in the country's adaptability to natural disasters, climate impacts and epidemiological crises, all of which have led to a deterioration of macroeconomic and development indicators. This section of the MTNDP suggests the need to rethink public policy as it pertains to the management of the environment and natural resources. Under this cluster, the government is focusing on the following result areas: a) Building national environmental resilience; b) Strengthening Forest management and wetland conservation; and c) Improving disaster management governance.

1.18.7 Sierra Leone Climate Change Adaptation Plan for the Coastal Landscape Complex

The "**Sierra Leone Climate Change Adaptation Plan for the Coastal Landscape Complex (CCAP)"**[170], rolled out in 2020, was prepared by the West Africa Biodiversity and Climate Change Programme (WA BiCC), with funding from the United States Agency for International Development (USAID) and in collaboration with the National Protected Areas Authority (NPAA), the Environmental Protection Agency (EPA), the United Nations Development Programme (UNDP) and other stakeholders. CCAP offers a mechanism for implementing, tracking, evaluating, and communicating adaptation actions and results that are considered critical to the climate change adaptation plan's overall success, taking also into consideration Sierra Leone's roles and responsibilities on designated coastal areas and wetlands, as a member of the Ramsar Convention on the Protection of Wetlands.[171] Taking stock of weaknesses of effective public policies and general confusion arising from a proliferation of initiatives aimed at addressing climate change, CCAP aims at bringing together robust and tested practices that could inform climate adaptation choices and evaluate their effectiveness. CCAP also seeks to strengthen collaboration and mutual learning between science and local practices, recognising the need to integrate plans and actions between local, national and international stakeholders to support a coherent but targeted response to a transboundary phenomenon using the Ecosystem-Based Approach. While the full CCAP is not available, a validation consultation was held in 2019.[172] The documentation from this meeting, assuming that the measures therein are those that were eventually adopted, provide a good overview of the direction of the CCAP. Based on the documentation, it can be expected that the CCAP:

- highlights the climate change adaptation planning process that was conducted to identify natural and human-induced risks across coastal Sierra Leone;
- reviews existing methods, tools and policies related to climate change adaptation in Sierra Leone and other similar countries, as well as related past experiences and best practices to identify gaps; and
- proposes a consolidated set of measures for increasing resilience and ensuring that these measures are appropriate in the context of coastal Sierra Leone.

The proposed measures include, inter alia: the ecological restoration and management of critical coastal ecosystems, investments in livelihoods and sustainable development, and disaster risk reduction through early warning systems. Considering this, the measures in the proposed project can be expected to be fully aligned with the CCAP.

1.18.8 National Climate Change Policy and a climate change communications strategy under the National Adaptation Plan

The most recent document dealing with the measures proposed to combat the effects of rising global temperatures is the revision of the **National Climate Change Policy and a climate change communications strategy under the National Adaptation Plan (NAP)**[173], updated in the 2021 NDC.

[170] Sierra Leone Climate Change Adaptation Plan for the Coastal Landscape Complex (CCAP), see https://pdf.usaid.gov/pdf_docs/PA00WJRG.pdf
[171] https://www.ramsar.org/wetland/sierra-leone
[172] Sierra Leone Climate Change Adaptation Plan for the Coastal Landscape Complex (CCAP), see https://pdf.usaid.gov/pdf_docs/PA00WJRG.pdf
[173] Sierra Leone's Climate Change Communications Strategy Under the National Adaptation Plan. https://napglobalnetwork.org/wp-content/uploads/2020/10/napgn-en-2020-Sierra-Leone-Climate-Change-Communications-Strategy-under-the-NAP.pdf.

The communication strategy, developed with the support of the United Nations Development Programme and the Green Climate Fund[174], aims to "provide short- and mid-term direction on how the government can utilise information strategically and effectively to support the NAP process. The strategy draws from wide-ranging consultations with key government stakeholders all over the country to make it a comprehensive and realistic guide that will support Sierra Leone's communication under the NAP".[175] The communications strategy provides Sierra Leone with short and mid-term guidance on how to use communications tools strategically and effectively to support the implementation of the NAP. The development of the strategy is a part of the NAP Global Network's second programme. To achieve its premise of serving as a line of dialogue between the government and the population to create awareness about the effects of climate change and inform of measures being taken to address this challenge, "the strategy draws from wide-ranging consultations with key government stakeholders all over the country to make it an inclusive and realistic guide that will support the communication of Sierra Leone's NAP".[176]

1.18.9 Updated NDC and National Climate Change Adaptation and Mitigation Strategies

Introduction

Sierra Leone's updated Nationally Determined Contribution (NDC), published in July 2021, brought about the expansion of climate mitigation and adaptation pledges to deal with the adverse impacts of climate change and foster investments for building a climate-resilient infrastructure network to the more frequent climatic vulnerabilities ahead. In the revised NDC, the country aims to reduce carbon dioxide emission levels, compared to a 2005 baseline, by 5% by 2025, 10% by 2030, and 25% by 2050; and to enhance the adaptive capacity, strengthen resilience and reduce vulnerability by 2030. In addition, a key objective in the NDC is a transformational shift toward a low-emission development pathway, by targeting priority sectors, implementing REDD+ (Reducing Emissions from Deforestation and Forest Degradation), as well as promoting innovation and technology transfer for sustainable breakthroughs in energy, integrated waste management, transport and agriculture. Technology transfer through private sector partnerships will create new markets, provide jobs, and support economic growth, while reducing greenhouse gas emissions.

For mitigation, the priority sectors include energy; industrial processes and product use; waste; Agriculture, Forestry, and Other Land Uses (AFOLU); and the blue economy. Priorities for energy focus on reducing emissions from local industries, power plants and other fossil fuel-based energy sources. As part of NDC priorities for climate change mitigation, the blue economy is emphasised and incorporates traditional maritime industries such as fisheries, tourism, mining, boat building, aquaculture systems, and carbon stored in mangroves and seagrass ecosystems. Integrated and sustainable water management is an additional priority – this includes addressing both demand and supply concerns, including reduced availability, quality, and allocative efficiency.[177]

With regards to **adaptation**, the priority sectors are Agriculture and Food Security, Water Resources and Energy, Coastal Zone Management (including fisheries, coastal ecosystems), and Environment (including tourism, land, mineral resources, forestry). Improving the resilience of environmental value chains across several sectors, including agriculture, forestry, mining, tourism, and land management, is a key objective prioritised as part of climate change adaptation in Sierra Leone. This includes working with the private sector. Addressing inequality and poverty through encouraging the development of sustainable livelihoods and forest management plans, are crucial adaptation strategies. Furthermore, developing climate-resilient water, sanitation and hygiene systems and services, is addressed in the NDC as part of combatting future water scarcity. Improved monitoring of climate change and disaster response are additional strategies prioritized in Sierra Leone's revised NDC. Ecosystem conservation as well as

[174] https://www.gcfprojects-undp.org/sierra-leone-prepares-national-adaptation-plan-achieve-resilience-across-all-sectors
[175] Sierra Leone's Climate Change Communications Strategy Under the National Adaptation Plan. https://napglobalnetwork.org/wp-content/uploads/2020/10/napgn-en-2020-Sierra-Leone-Climate-Change-Communications-Strategy-under-the-NAP.pdf.
[176] Sierra Leone's Climate Change Communications Strategy Under the National Adaptation Plan. https://napglobalnetwork.org/wp-content/uploads/2020/10/napgn-en-2020-Sierra-Leone-Climate-Change-Communications-Strategy-under-the-NAP.pdf.
[177] Sierra Leone's Updated NDC. https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Sierra%20Leone%20First/210804%202125%20SL%20NDC%20(1).pdf

improved policy and legal frameworks for achieving such adaptation and mitigation goals is also addressed in this NDC. Emphasis is also placed on developing viable payment for ecosystem service models.[178] A wide range of activities have been identified to deliver on the policy priorities.

Oceans and coastline

As part of Sierra Leone's Climate Change Adaptation Strategy (2015) and the country's NDC, numerous objectives are mentioned which pertain to the country's coastline and marine resources. These include the following activities, and those activities that are aligned with and/or form part of the proposed projected are highlighted (in bold):

- **Develop local institutional capacity to support coastal resources management**
- **Coastal Climate Change Adaptation Plan (CCCAP – see above)**
- Integrated Coastal Zone Management Plan (ICZMP)
- Train relevant coastal institutions on climate change adaptation and mangrove conservation
- **Promotion of climate change-related education and awareness programmes**
- **Mainstream climate change adaptation into coastal development plans, using local development funds managed by councils to build resilience**
- **Promote agri-sylvicultural practices and sustainable rice cultivation in coastal landscapes**
- **Delineate hazard (flood and erosion-prone) areas along the coastline**
- **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**
- Improve the quality of topographic data for the coastal zone
- Promotion and facilitation of early warning and disaster preparedness system
- Development and enforcement of the Marine Resources Act
- Drafting the Wetland Conservation Act
- New marine-protected areas to be designated
- Increasing support for ecotourism across coastal communities
- **Increasing risk awareness of coastal communities to climate change**
- **Increasing coastal mangrove restoration efforts**
- **Encouragement of Community-Based Organisations for effective coastal resources management**
- **Coastal resilience project supporting data collection on coastal communities and fisheries practices**
- Beach nourishment as a response to sea-level rise
- Flood prevention infrastructure
- **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**
- **Capacity building and livelihood support to be cross-sectoral and focus on vulnerable sectors and communities.**

Fisheries sector

As part of Sierra Leone's Climate Change Adaptation Strategy (2015) and the country's NDC, numerous objectives are mentioned which pertain to the country's fisheries sector and marine resources. These include the following activities and those activities aligned with and/or form part of the proposed projected are highlighted (in bold):

- **Promotion of non-destructive fishing techniques to maintain the resilience of marine ecosystems**
- Promotion of monitoring, control and surveillance of fishing grounds and fish stocks for sustainable exploitation
- Improve fisheries governance through awareness-raising and law enforcement to regulate fishing practices and
- **Capacity building and livelihood support to be cross-sectoral and focus on vulnerable sectors and communities.**

[178] Ibid.

Agriculture and livestock production sectors

As part of Sierra Leone's Climate Change Adaptation Strategy (2015) and the country's NDC, numerous objectives are mentioned which pertain to the country's agricultural sector and natural resource management. These include the following activities and those activities aligned with and/or form part of the proposed projected are highlighted (in bold):[179],[180]

- **Build the capacity of smallholder farmers through farmer field schools and provide them with credit for their investments on farms**
- The Smallholder Commercialisation Programme aims to provide small-scale farmers with appropriate support to enhance agricultural productivity and promote value addition
- Manage rangelands and pastures by managing grazing systems and grazing intensity, fire management and pasture rehabilitation
- **Restore degraded lands with high production potential**
- Promotion and facilitation of early warning and disaster preparedness system
- Increased access to finance for agribusiness
- Increasing access to finance due to the establishment of Agricultural Business Centers and Financial Service Associations
- Ongoing agricultural investments by district councils
- **Increased capacity building support for farmers and Farmer Based Organizations**
- **New approaches to combating soil erosion, including climate-resilient agricultural techniques such as mulching, cover crops, contour ploughing, reduced tillage and crop rotation**
- **Promote agroforestry where fruit, cereals, legumes, timber and non-timber forest products are produced with considerable opportunity for value-addition and income diversification;**
- Integrated management of crop and livestock production
- Improve planning and coordination of the use of the river basin, which may provide solutions to problems of water quality and supply
- Fund research into adopting water resources and water supply planning under climate change impacts
- **Introducing irrigation technologies, including the development of micro-systems for drip irrigation and rainwater harvesting**
- **Researching and applying climate-ready crop varieties**
- Livestock breeds that combine productivity with hardiness and tolerance to heat stress should be promoted, and
- Increase and maintain investment in hydrological monitoring and water use through a national database.

Additional adaptation strategies have been put forward from previous research on climate-change impacts on Sierra Leone's agricultural sector. These include the following activities and those activities aligned with and/or form part of the proposed projected are highlighted (in bold):[181]

- Expand the number and capacity of weather stations country-wide to provide farmers with reliable weather data
- Develop seed banks (or join international efforts to do so)
- Build feeder roads in rural areas that can withstand flooding
- Encourage the sustainable development of infrastructure, social services, and agricultural mechanization in rural areas
- Improve irrigation efficiency
- **Promote public awareness of climate change, water storage, and management**
- Support agricultural research system to develop short-duration crop varieties, particularly groundnut, that adapt to varied weather conditions.

[179] Online Available: https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf
[180] Online Available: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Sierra%20Leone%20First/210804%202125%20SL%20NDC%20(1).pdf
[181] Jalloh, A., Nelson, G.C., Thomas, T.S., Zougmoré, R.B. and Roy-Macauley, H. eds., 2013. West African agriculture and climate change: a comprehensive analysis.

Agriculture and Fisheries value chains

As part of Sierra Leone's Climate Change Adaptation Strategy (2015) and the country's NDC, numerous objectives are mentioned which pertain to the country's agriculture and fisheries value chains. These include the following activities and those activities aligned with and/or form part of the proposed projected are highlighted (in bold):[182,183]

- Strengthen climate-proof rural infrastructure through the rehabilitation of feeder roads and warehouses to improve product drying and storage capacity
- **Develop and promote the utilization of technologies and tools for reducing food waste by improving value chains**
- Support the construction of appropriate roads particularly feeder roads in rural areas
- Develop Climate-resilient infrastructure within the manufacturing and transport sectors
- Develop capacity to facilitate greater energy efficiency in the manufacturing sector.

[182] Online: https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf
[183]https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Sierra%20Leone%20First/210804%202125%20SL%20NDC%20(1).pdf

2. Sierra Leone's Climate Profile and Climate Change Impacts

2.1 Overview of Sierra Leone's climate

Sierra Leone has a typical tropical climate and inland regions are more temperate than the coastal zone. Rainfall across Sierra Leone and the monsoon season are influenced by the movement of the Inter-Tropical Convergence Zone (ITCZ).[184] According to the Köppen-Geiger climate classification system, Sierra Leone has two climate classifications (see Figure 15 below). The northern half of the country (all inland) is classified as having a tropical savanna climate (As/Aw), while the southern half of the country (including its entire coastline) is classified as having a tropical monsoon climate (Am).[185]

Average monthly rainfall peaks in July and August and the average annual precipitation recorded across the country is 2,477 mm. Rainfall is highest along the coast, reaching 3,000 mm to 5,000 mm per year, and precipitation decreases toward the inland regions of the country.[186] Sierra Leone's mean annual temperature equals 26.54°C[187] and average monthly temperatures range from 22 to 27°C, with lower temperatures evident during the wet season.[188]

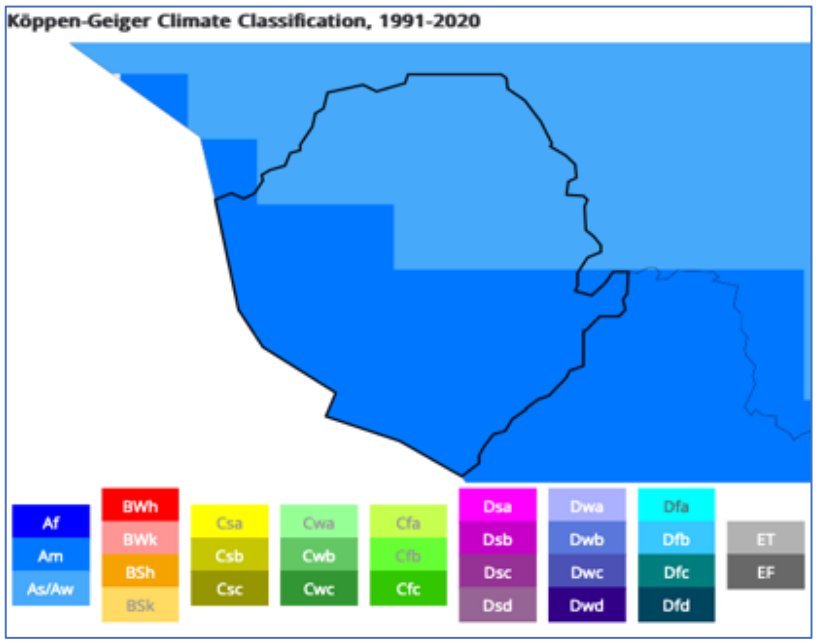


Figure 16: Koppen-Geiger climate classification of Sierra Leone

Source: World Bank, Climate Knowledge Portal[189]

2.1.1 Data availability and gaps

This section considers climate data and models from Global Circulation Models (GCM), such as those used by IPCC (i.e., AR6-related data); AR5 data[190] and also considers local data from the Hazard and Risk Profile Information System – Sierra Leone (HARPIS-SL) system. HARPIS is a joint UNDP-National Disaster Management Agency project that integrates Geographic Information Systems (GIS) and Management Information System (MIS) systems with mobile data collection technology to provide sophisticated tools and web services to enhance the disaster risks, hazards, vulnerability, exposure and disaster management landscape in Sierra Leone. HARPIS-SL has been designed and developed by

[184] Available Online: https://climateknowledgeportal.worldbank.org/country/sierra-leone/
[185] Available Online: https://en.climate-data.org/africa/sierra-leone-128/
[186] Available Online: https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf
[187] Available Online: https://climateknowledgeportal.worldbank.org/country/sierra-leone/climate-data-historical
[188] Available Online: https://pdf.usaid.gov/pdf_docs/PA00WJRG.pdf
[189] Source: https://climateknowledgeportal.worldbank.org/country/sierra-leone
[190] https://climateinformation.org/

INTEGEMS under the UNDP sponsored "*Update of Sierra Leone Hazard Profile and Capacity Gap Analysis Project*". This project's main objective has been to establish a national climate risk profile through climate vulnerability scenarios by district and national regions. It should be noted that prior to 2005 there were no automatic weather stations for the collection of data in Sierra Leone, although standard meteorological data was collected. Weather stations were vandalized during the civil conflict, creating huge gaps in the precipitation data.[191] Additionally, interviews with the Meteorological Agency (SL-Met) and the National Disaster Management Agency (NDMA) have also provided further views and directions in understanding climate vulnerabilities in the country. It is critical to bear in mind that during the civil war, meteorological stations as well as some archives were destroyed, which has created a patchy data landscape for the country.

2.1.2 District-specific climate overview

From 1961 to 1990 Bonthe (see map of districts below) had a recorded average annual rainfall of 3,659 mm. The Western area, both Rural and Urban, as well as the Bonthe, Moyamba, Port Loko and Pujehun districts are classified as tropical monsoon (Am) according to the Köppen-Geiger climate classification system[192]. Mean precipitation in this region is significant and substantial year-round, with a short dry period having little impact on mean precipitation across the seasons. Tokeh Village in Western Area Rural, has a mean annual temperature of 25.7°C and average annual precipitation of 3,125 mm. Situated in the Western Urban district, Freetown receives approximately 2,946 mm of mean precipitation annually and has an average annual temperature of 25.7°C.[193] Mani, situated in Pujehun district, has an average annual temperature 25.3°C and average annual precipitation of 2,759 mm, with the greatest number of rainy days recorded in October.[194] Lunsar is situated in Port Loko district in the coastal centre of Sierra Leone and receives approximately 2,581 mm of mean precipitation annually and has an average annual temperature of 26.1°C. Most rainy days are recorded during August.[195]

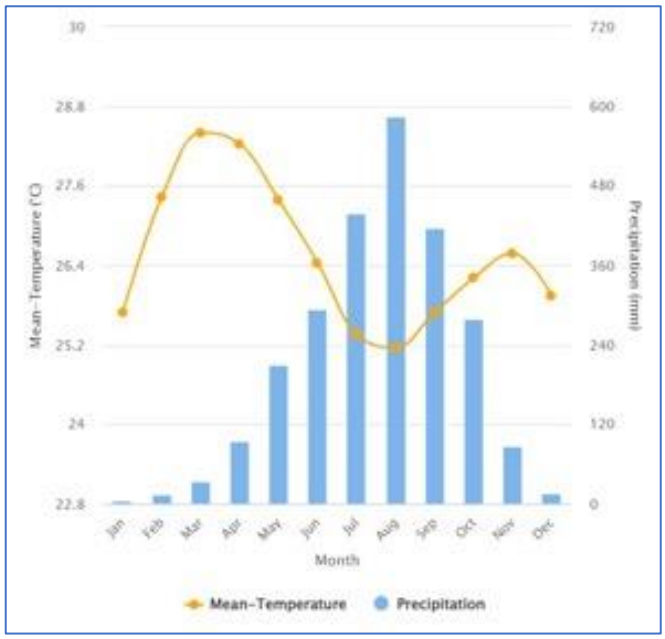


Figure 17: Monthly climatological overview for Sierra Leone from 1991 until 2020

Source: World Bank, Climate Knowledge Portal[196]

According to the Köppen-Geiger climate classification system, Kambia district in the northwest of Sierra Leone has a tropical savanna climate with rainy summer months. Kambia Town in the Kambia district

[191] GoSL, 2021, National Adaptation Plan.
[192] Available Online: https://en.climate-data.org/africa/sierra-leone-128/
[193] Available Online: https://en.climate-data.org/africa/sierra-leone/western-area-1285/
[194] Available Online: https://en.climate-data.org/africa/sierra-leone/southern-province-2563/
[195] Available Online: https://en.climate-data.org/africa/sierra-leone/northern-province/lunsar-416122/
[196] Source: https://climateknowledgeportal.worldbank.org/country/sierra-leone

has an average annual temperature 26.2°C and average annual precipitation of 1,882 mm.[197] Despite village-specific Köppen-Geiger climate information not being available for Moyamba and Bonthe districts, annual mean temperatures and rainfall are in accordance with a tropical monsoon climate.

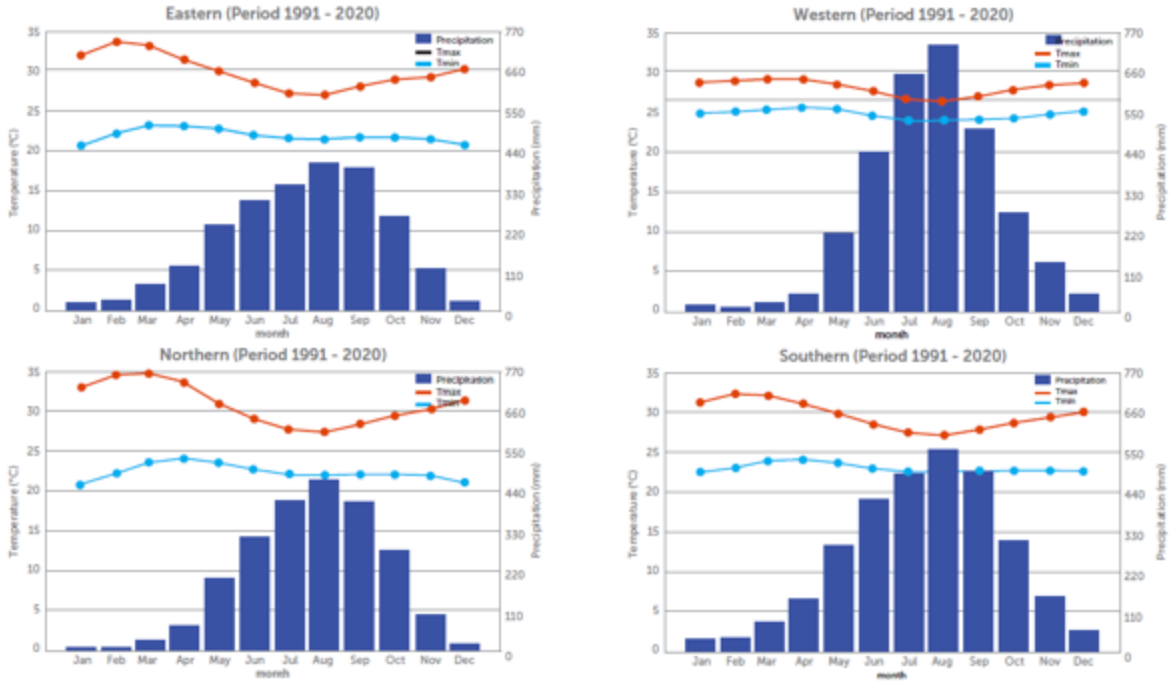


Figure 18. Monthly precipitation and minimum and maximum temperatures for the Eastern, Western, Southern and Northern provinces. *Source: SL-MET, 2021*

2.2 Climate change in Sierra Leone

Sierra Leone is ranked as the 19th most vulnerable country to climate change in the world and ranks 144th in terms of its readiness to improve resilience on the ND-Gain index[198], which considers exposure to predicted climate change, sensitivity to climate hazards and adaptive capacity. This ranking and the index scores for Sierra Leone places the country in the 'most at risk' category on the worldwide ND-GAIN index, highlighting the urgent need for adaptation investments and innovations.

2.2.1 Sierra Leone's observed climate change, 1960 to 2020

Temperature

Sierra Leone has experienced increasing average annual temperatures since 1960. A signal of warming in Sierra Leone is found in relation to base periods 1961-1990 and 1981-2010. 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 1980s. On the other hand, when anomalies are calculated using the base period 1981-2010, constant warming is observed in at least the last two decades. Since 1960, mean annual temperatures have increased by 0.8°C at an average rate of 0.18°C per decade.[199] In addition, cold days are decreasing and those characterised by extreme heat are increasing.[200] The greatest increase in temperature has been recorded between March and April, with the greatest increase

[197] Available Online: https://en.climate-data.org/africa/sierra-leone/northern-province/kambia-776527/
[198] ND-GAIN Country Index. Available here
[199] https://climateknowledgeportal.worldbank.org/country/sierra-leone/climate-data-historical
[200] https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf

occurring in the Northern Province of Sierra Leone.[201] Heatwaves have become more frequent and have increased in intensity across the country.[202]

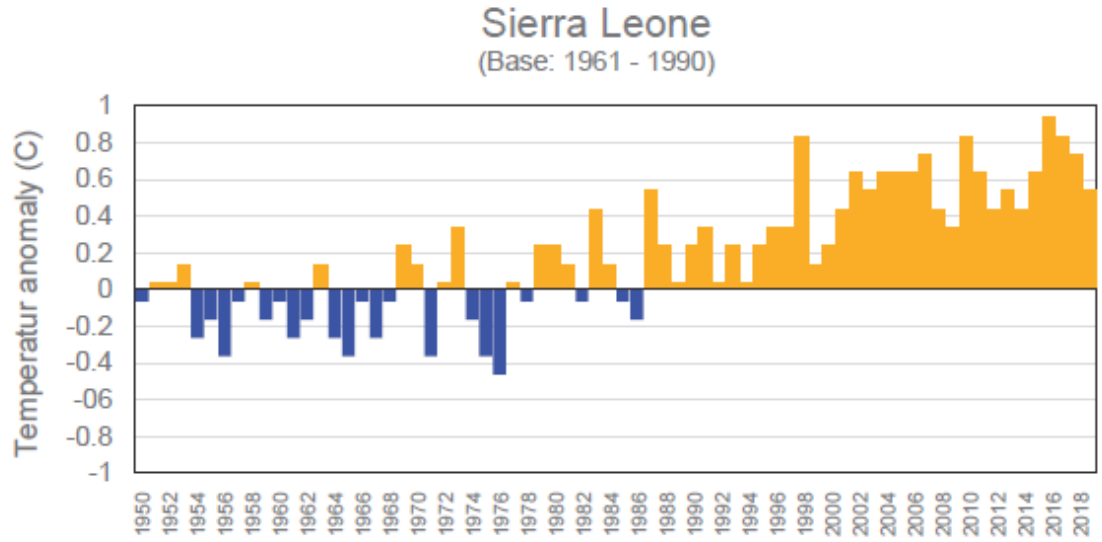


Figure 19. Annual temperature anomalies for Sierra Leone (1950-2019) in relation to the 1961-1990 mean Source: CRU CY.4.04 dataset[203]

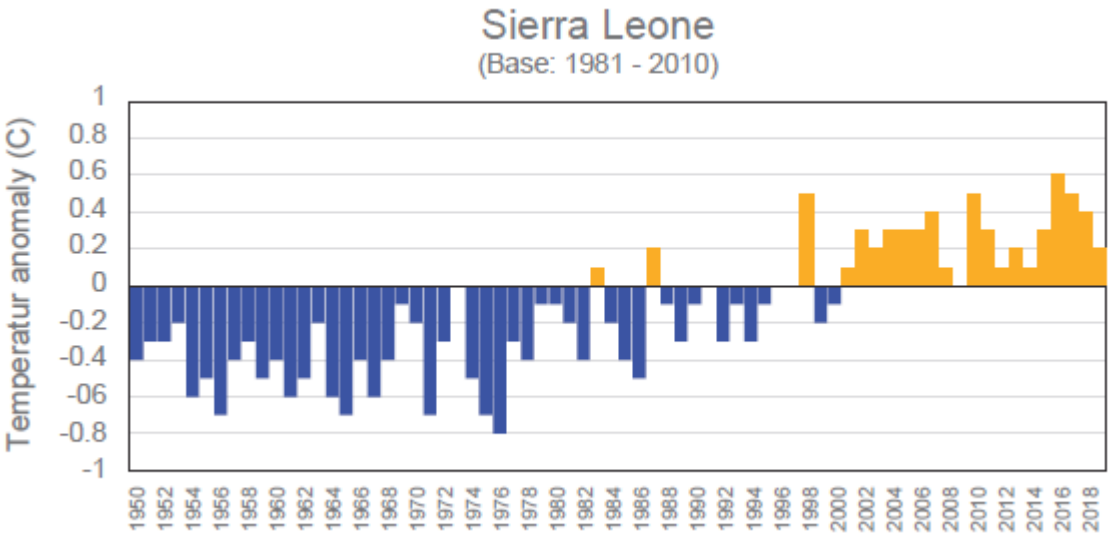


Figure 20. Annual temperature anomalies for Sierra Leone (1950–2019) in relation to the 1981–2010 mean Source: CRU CY.4.04 dataset[204]

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 how climate change has impacted temperature in recent years at country level. Climate indices have been produced with

[201] https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Sierra%20Leone%20First/210804%202125%20SL%20NDC%20(1).pdf

[202] Source: https://unfccc.int/sites/default/files/resource/FinalThird%20Nat.%20Com.%20document%20111.pdf

[203] Harris et al., 2020, Version 4 of the CRU TS monthly high-resolution gridded multivariate climate dataset. Scientific Data 7, No.109. https://doi.org/10.1038/s41597-020-0453-3

[204] Harris et al., 2020, Version 4 of the CRU TS monthly high-resolution gridded multivariate climate dataset. Scientific Data 7, No.109. https://doi.org/10.1038/s41597-020-0453-3

Climpact3, a software that allows calculation of climate indices from daily precipitation and temperature data.[205] During the period 1981-2019, evidence is found of a decrease in the diurnal temperature range (i.e., the difference between maximum and minimum temperature is decreasing). In addition, the annual percentage of cold nights (Tx10p, days when Tn < 10th percentile) versus cold days (Tx10p, days when Tx < 10th percentile) presents a decreasing trend for the last 40 years. For the same period, increasing trends are evident in the frequency of days, with maximum temperatures 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). These changes are found in all temperatures - the annual mean, daily mean, the annual coldest daily minimum and the annual warmest daily temperature. It is important to note that, other than general trends detected, inter-annual variability exists in the background of these climate changes, making it imperative to develop adaptation strategies for both positive and negative anomalies.

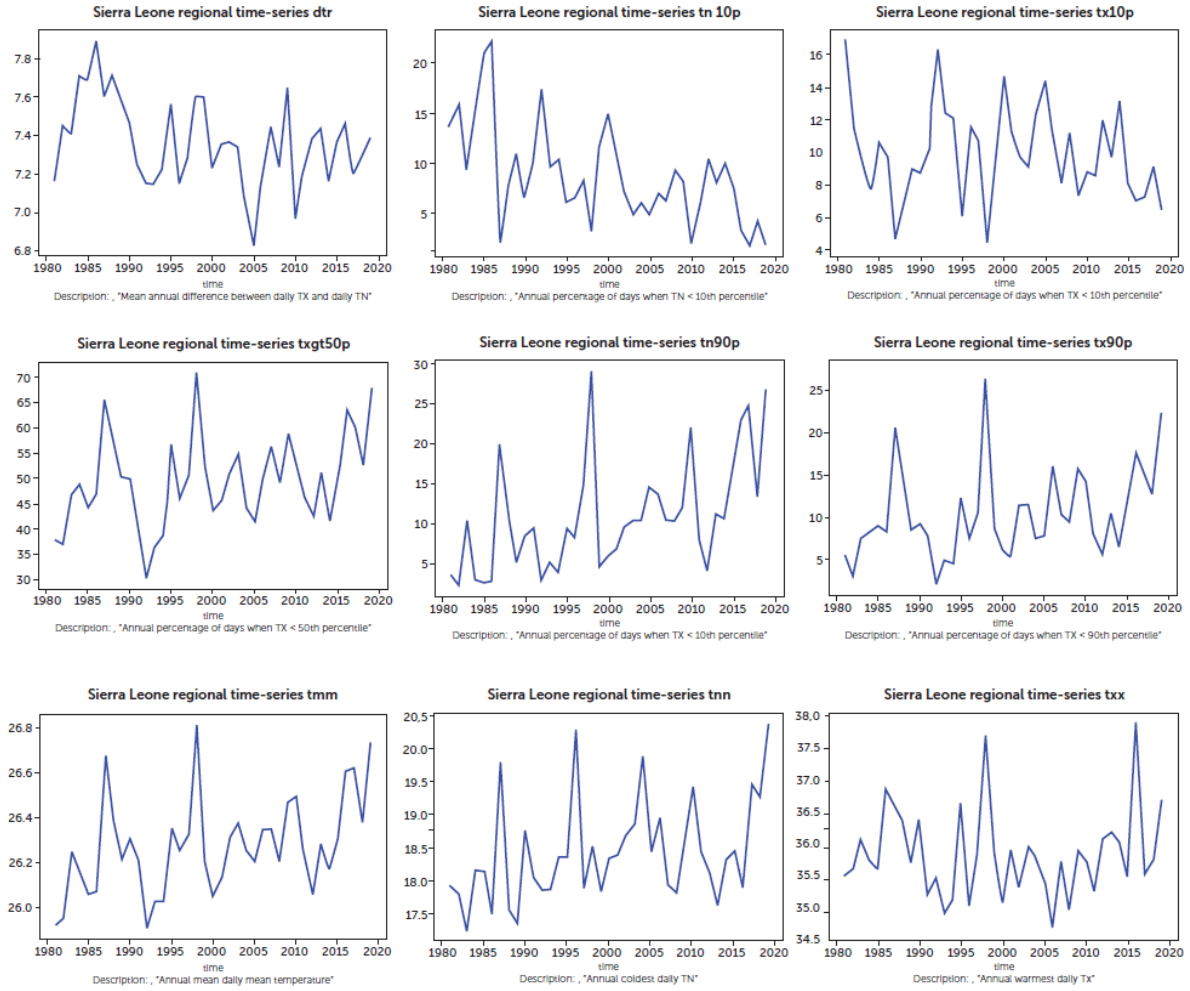


Figure 21. Regional timeseries of climate indices for Sierra Leone 1981-2020 in relation to the 1981 - 2010 mean.

From left to right:

(a) Daily temperature range DTR (-)
(b) Percentage of days when TN (Daily Minimum Temperature)< 10th percentile Tn10p (-)
(c) Maximum Temperature Tx10p (-)
(d) Percentage of days with temperature above the median Txgt50p (+);

[205] Alexander, L.V. and N. Herold (2015). ClimPACTv2 Indices and Software. A document prepared on behalf of the Commission for Climatology (CCl) Expert Team on Sector-specific Climate Indices (ET-SCI), Available here.

(e) Percentage of days when TN > 90th percentile Tn90p (+);
(f) Percentage of days when TN < 10th percentile Tx90p (+)
(g) The daily mean temperature. Tmm (+)
(h) Monthly minimum value of daily minimum temperature Tnn (+)
(i) Monthly maximum value of daily maximum temperature Txx (+) where (+/-) denote (positive/ negative) trends.

Source: GoSL, 2021, National Adaptation Plan; Vazquez-Aguirre, J.L., C, Villa-Falfán and M, Guillen-Cadena (2021). Using the temperature ERA5 reanalysis for the calculation of sector-specific climate indices (Climpact3) for Sierra Leone.

Precipitation

Assessment of rainfall conditions from 1960 to 2003 demonstrates changes in rainfall patterns with average annual rainfall decreasing. Average annual precipitation, however, fluctuates, with rotating periods of wetter and drier conditions. Rainfall patterns have become more erratic and in addition, the pre-monsoon period from April to June has been characterised by stronger winds and more frequent rainstorms.[206] Changes in precipitation between July and August have become more pronounced, with more precipitation recorded in the western province of the country during these months.[207] There has been an increasing trend in rainfall variability across Sierra Leone, with droughts becoming prolonged as well as intensified precipitation events and flooding increasing in frequency.[208] These impacts have adversely affected surface and ground water recharge.[209]

Sea-level rise and oceans

Sierra Leone does not yet have a fully functional marine meteorological station, which is vital for sea level assessment. For the region encompassing Guinea, Guinea Bissau, Liberia and Sierra Leone, there are no appropriate sea level data from tide gauges available. Sea level rise across the north-eastern Atlantic has been close to the global average.[210] Sea level rise has risen by 101 mm since 1993 globally, which equates to 3.4 mm per year.[211] Satellite data for the period from 1993-2012 indicate a sea level rise of 2-4 mm/year in the eastern Tropical Atlantic, however not taking into account vertical land movements. Average global ocean pH globally has decreased by 0.1 units since pre-industrial times, however no specific measurements are being recorded along Sierra Leone's coastline.[212] Average surface temperatures across the Atlantic Ocean have increased by 0.41°C.[213]

2.2.2 Sierra Leone's projected climate change

Overall

Revised mapping of the Köppen-Geiger climate classification has been analysed alongside climate models from CMIP5, in order to strengthen model accuracy for projected climate change and provide further insights into potential spatial changes in regional climatic zones in the context of climate change. For Sierra Leone, accuracy ranges from 60 to 95%. In the northern parts of the country, confidence levels range from 60 to 75%, whereas confidence levels along the coastline range from 80 to 95%.[214] According to IPCC Working Group I (WGI) atlas, there is high confidence that extreme heat, surface temperatures and precipitation events will increase across Sierra Leone.[215] Based on these models,

[206] https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf
[207] https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Sierra%20Leone%20First/210804%202125%20SL%20NDC%20(1).pdf
[208] https://unfccc.int/sites/default/files/resource/FinalThird%20Nat.%20Com.%20document%20111.pdf
[209] Government of Sierra Leone. 2021 National Adaptation Plan. [Online]. Available: https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf
[210] https://unfccc.int/sites/default/files/resource/FinalThird%20Nat.%20Com.%20document%20111.pdf
[211] https://climate.nasa.gov/vital-signs/sea-level/
[212] https://unfccc.int/sites/default/files/resource/FinalThird%20Nat.%20Com.%20document%20111.pdf
[213] Ridgway, T. and Hoegh-Guldberg, O., Climatic drivers of change and the future of African ocean assets.
[214] Beck, H.E., Zimmermann, N.E., McVicar, T.R., Vergopolan, N., Berg, A. and Wood, E.F., 2018. Present and future Köppen-Geiger climate classification maps at 1-km resolution. *Scientific data*, *5*(1), pp.1-12. Available Online: https://www.nature.com/articles/sdata2018214
[215] Available Online: https://interactive-atlas.ipcc.ch

climate change is expected to intensify weather events in both number and magnitude, with flooding, extreme heat, erratic rainfall and storm surges increasing in frequency in the future.

Temperature

Mean annual temperatures across Sierra Leone could increase to 27.3°C (SSP 1-1.9) or 28.1°C (SSP 5 – 8.5)[216] by 2060, with more rapid warming likely in the inland regions of the country.[217] Under the SSP 2 4.5 mid-emission scenario, relative to a baseline period of 1981 to 2010, mean temperatures in the near term (2021–2040) are expected to increase by 0.9°C across Sierra Leone according to IPCC's Sixth Assessment Report 20).[218] In addition to increases in average annual temperatures, it is also expected that the number of days in which day-time temperatures exceed 35°C will increase by 2040. Models used in the preparation of the IPCC's Sixth Assessment Report indicate that the number of days per annum with maximum temperatures above 35°C, relative to a baseline period of 1981–2010, will increase on average by 14.8 by 2040 across Sierra Leone (SSP2 4.5 scenario, Figure 23).[219] Projected changes in mean air temperature (°C) across Sierra Leone, between the mean of the period 1980–2016 and the expected mean of the period 2071–2100, derived from climate model outputs are estimated at 3 to 4°C.

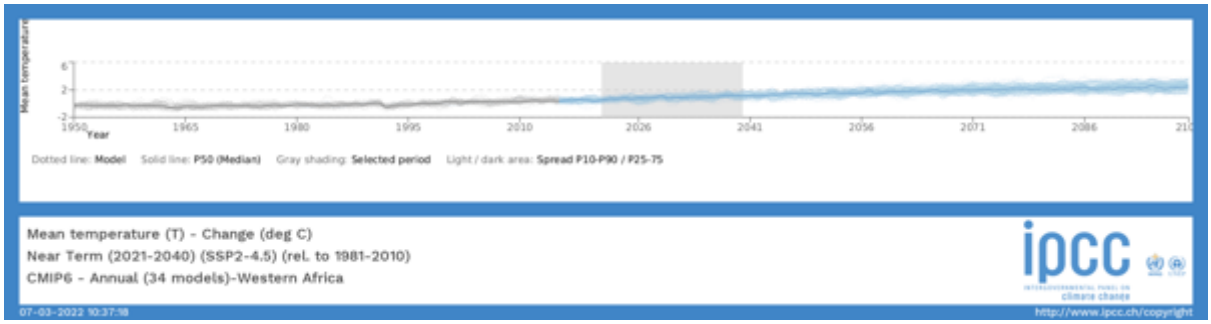


Figure 22: CMIP6 – Mean temperature (T) Change degrees Celsius, Western Africa. *Source: IPCC*[220]

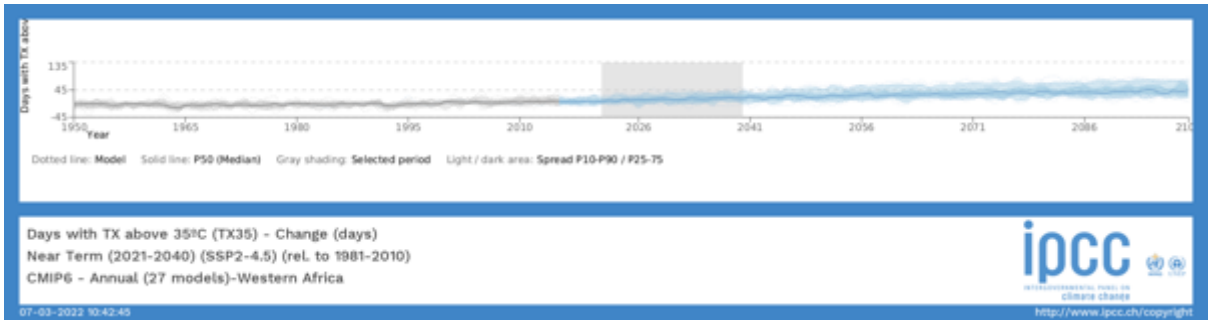


Figure 23: CMI–6 - Days with Temperature above 35°C, Western Africa. *Source: IPCC*[221]

At a more localized level, the northern regions of the country are likely to experience greater mean temperature increases according to the Köppen-Geiger modelling. Heat waves are expected to intensify in future, particularly across the northern regions of the country, such as Kambia and Port Loko.[222] Bonthe, Southern Sierra Leone, has been used as a reference site for the country's coastal areas, with projections based on the RCM ensemble mean of bias-corrected models in CORDEX Africa downscaled projections.[223] Data is reflective of a recent historical baseline (1981 – 2010) with analysis of emission pathways RCP 4.5 (medium scenario) and RCP 8.5 (high scenario) across the time horizons 2011-2040

[216] https://climateknowledgeportal.worldbank.org/country/sierra-leone/climate-data-projections
[217] Available Online: https://pdf.usaid.gov/pdf_docs/PA00WJRG.pdf
[218] Available Online: https://interactive-atlas.ipcc.ch
[219] Available Online: https://interactive-atlas.ipcc.ch
[220] Available Online: https://interactive-atlas.ipcc.ch
[221] Available Online: https://interactive-atlas.ipcc.ch
[222] https://thinkhazard.org/en/report/221-sierra-leone/EH
[223] All data for temperature and precipitation CORDEX Africa models was accessed from www.climateinformation.org

and 2041- 2070. (RCP 6 is currently unavailable). Specific modelling for projected temperature changes per district has not been available.[224]

For the near-term future (2011-2040), the ensemble mean of models in CORDEX Africa indicate that temperature in Bonthe, Southern Sierra Leone, relative to the recent past (1981 – 2010), will increase by at least 1°C (medium emissions, RCP 4.5,) which is considered a small change; and up to 1.5°C (high emissions, RCP 8.5), considered a medium level change. See Figure 24Figure 26 below.

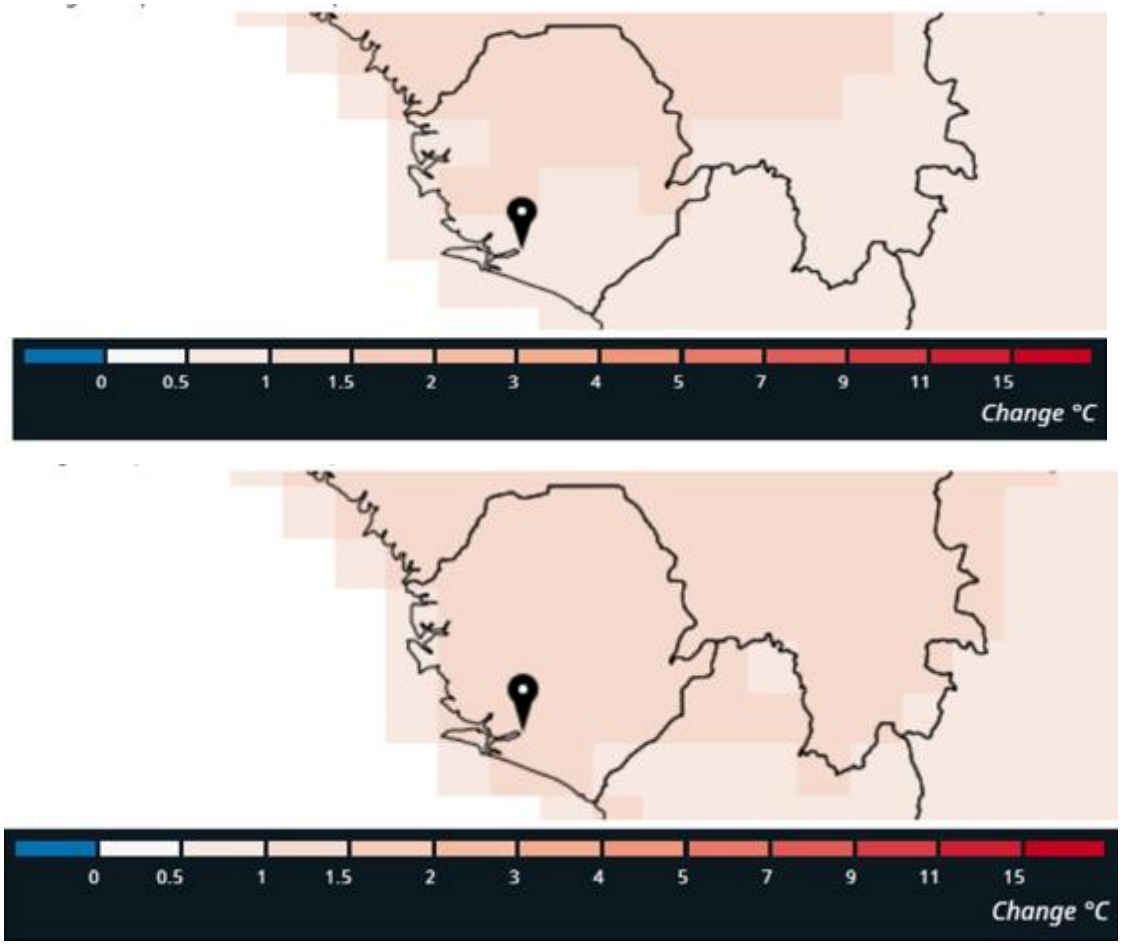


Figure 24. Temperature (annual mean), Time period: 2011–2040, Historical period: 1981–2010 for the medium emissions scenario (RCP 4.5 top map); high emissions scenario (RCP 8.5 bottom map) Model: CORDEX Africa Ensemble Mean, Model results for an area covering the location: Bonthe, Southern Sierra Leone (7.61, -12.17).

Source: CORDEX Africa Ensemble Mean

For the mid-term future (2041-2070), the ensemble mean of models in CORDEX Africa indicate that temperature in Bonthe, Southern Sierra Leone, relative to the recent past (1981 – 2010), will increase by at least 1.8°C (medium emissions, RCP 4.5) which is considered a medium change; and by up to 2.5°C (high emissions, RCP 8.5), considered a large change.

[224] Beck, H.E., Zimmermann, N.E., McVicar, T.R., Vergopolan, N., Berg, A. and Wood, E.F., 2018. Present and future Köppen-Geiger climate classification maps at 1-km resolution. *Scientific data*, *5*(1), pp.1-12.

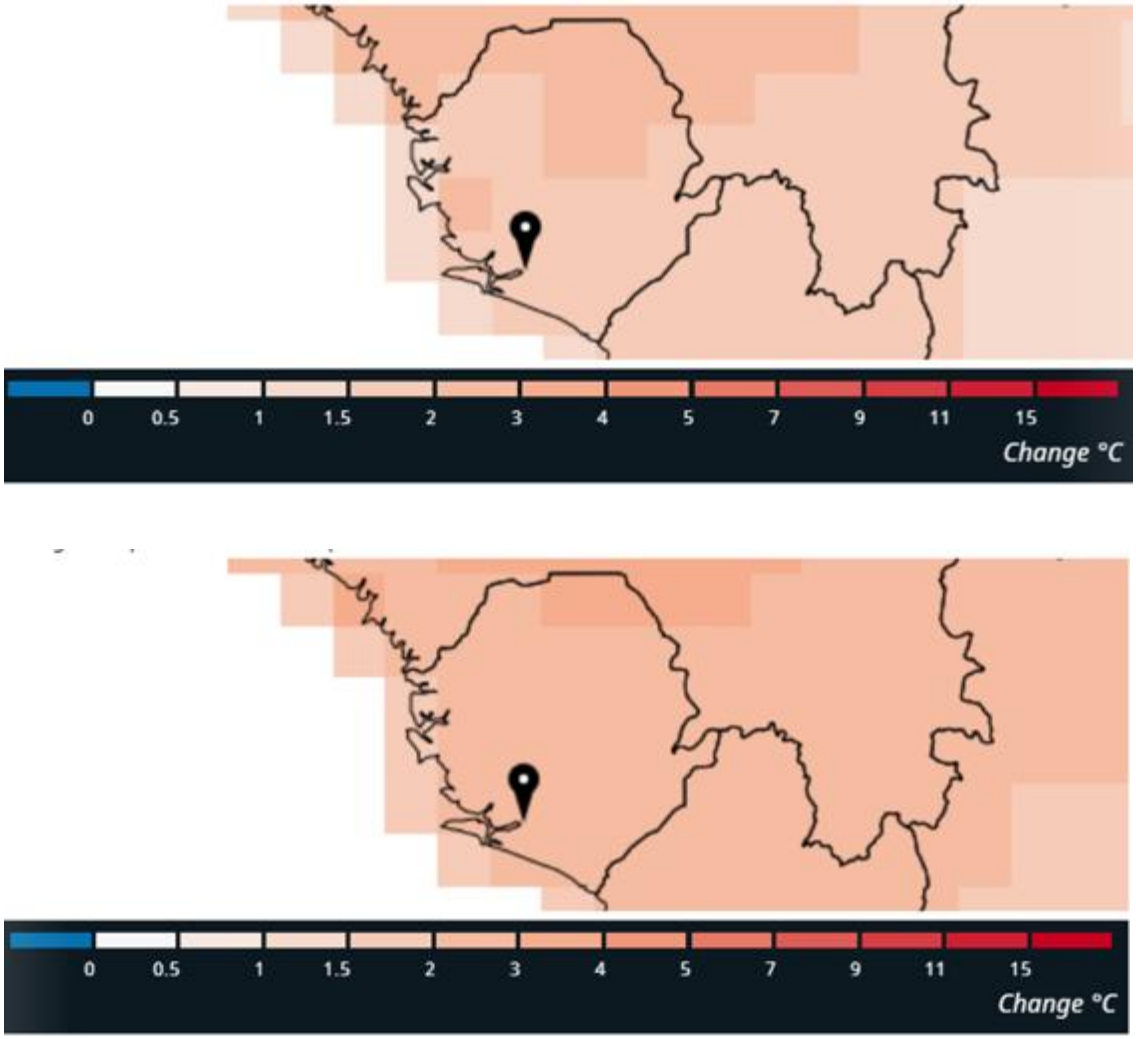


Figure 25. Temperature (annual mean), Time period: 2041-2070, Historical period: 1981–2010 for the medium emissions scenario (RCP 4.5 top map); high emissions scenario (RCP 8.5 bottom map), Model: CORDEX Africa Ensemble Mean, Model results for an area covering the location: Bonthe, Southern Sierra Leone (7.61, -12.17). *Source: CORDEX Africa Ensemble Mean*

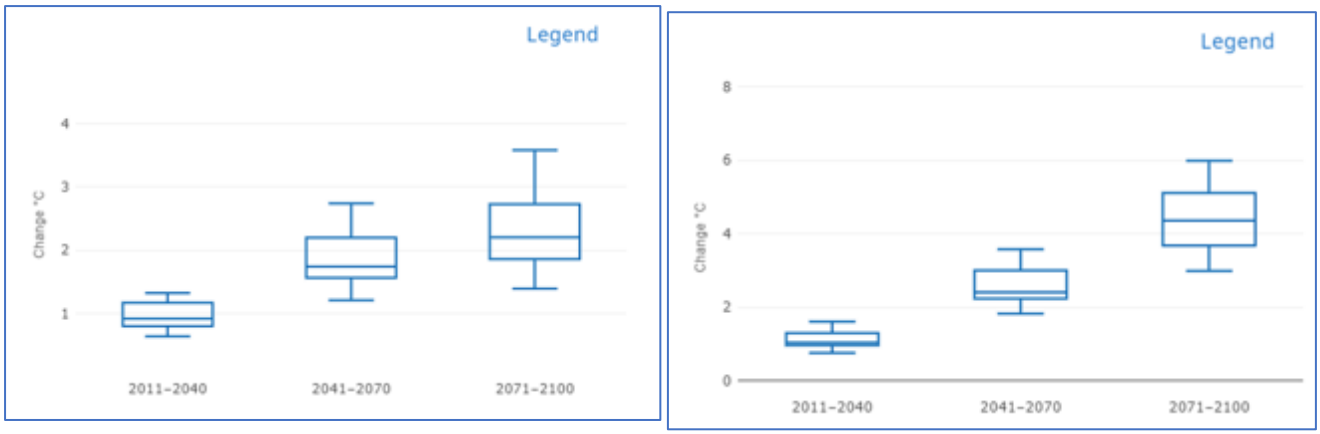


Figure 26. Temperature (annual mean), Time period: 2011–2040, 2041-2070 and 2071-2100. Historical period: 1981–2010, RCP 4.5 (left) and RCP 8.5 (right), Model results for an area covering the location: Bonthe, Southern Sierra Leone (7.61, -12.17). *Source: CORDEX Africa Ensemble Mean*

Precipitation changes

Based on modelling it is expected that seasonality in rainfall could become more pronounced with decreased precipitation in January, February and March, in comparison to increased rainfall from July to December.[225] Across the year, mean annual precipitation across Sierra Leone is expected to increase, however, with a parallel increase in the intensity and frequency of extreme rainfall events.[226] Erratic rainfall or variability in precipitation – characterised by altered rainfall patterns, increased dry days, as well as intensified rainfall events and flooding – is likely to increase in future across the country.[227] Such impacts are likely to adversely impact the availability of water in future due to changes in surface and ground water recharge.[228] According to the models used to inform the IPCC's Sixth Assessment Report, maximum one-day precipitation across Sierra Leone, under the SSP2 4.5 mid-emissions scenario will in the near term (2021–2040) increase by 11.5% relative to a baseline of 1981–2010. Under the same scenario, near term (2021–2040) total precipitation is expected to increase on average by 4.5% across Sierra Leone relative to a baseline period of 1981 to 2010, as modelled for the IPCC's Sixth Assessment Report.[229] Projected changes in mean precipitation between 1980–2016 and 2071–2100 are derived from climate model outputs and are estimated at 0.8 to 1. The northern regions of the country are likely to experience greater mean precipitation increases according to the Köppen-Geiger modelling.[230]

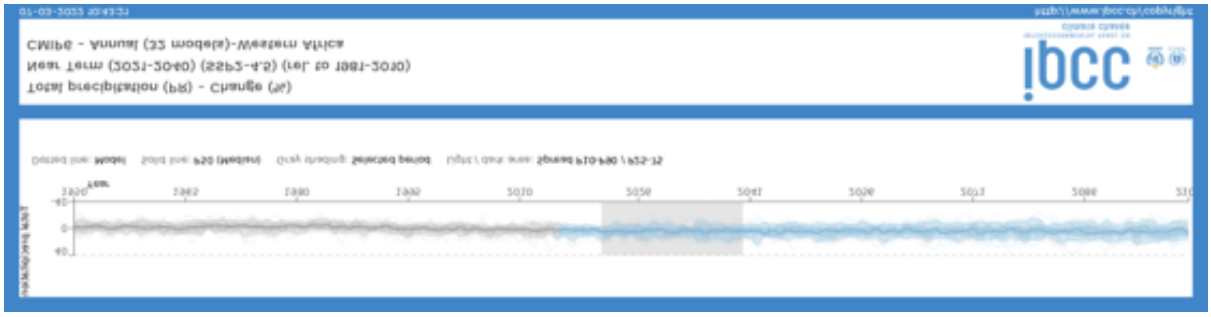


Figure 27: CMI–6 - Total precipitation (PR) Change %Western Africa. Near Term (2021-2040) SSP2-4.5 (rel. to 1981-2010). *Source: IPCC*[231]

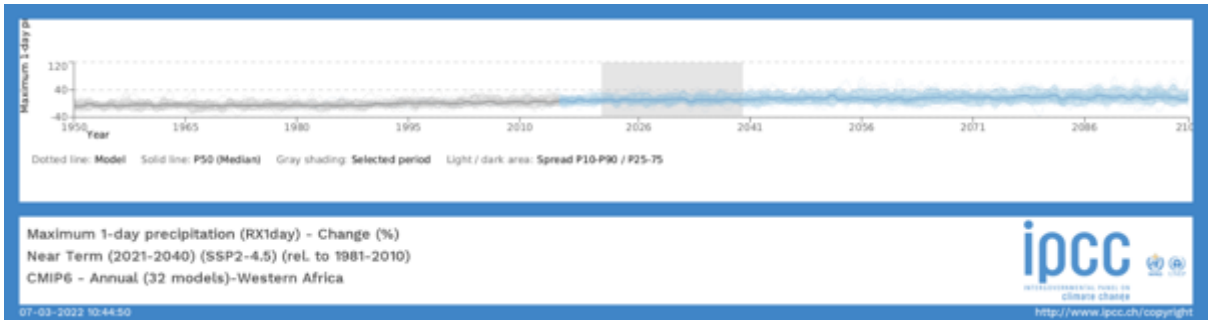


Figure 28: CMI–6 - Maximum 1-day precipitation (RX1day) Change %, Western Africa. Near Term (2021-2040) SSP2-4.5 (rel. to 1981-2010)

Source: IPCC[232]

At a country level picture and according to an analysis by McSweeney et al., (2010) using various GCMs, by 2090, rainfall in July, August and September is projected to change by -27 % to +29% and by -19% to +33% in October, November and December. The proportion of total annual rainfall that falls in heavy

[225] Available Online: https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf
[226] Available Online: https://pdf.usaid.gov/pdf_docs/PA00WJRG.pdf
[227] https://unfccc.int/sites/default/files/resource/FinalThird%20Nat.%20Com.%20document%20111.pdf
[228] Government of Sierra Leone. 2021 National Adaptation Plan. [Online]. Available: https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf
[229] Available Online: https://interactive-atlas.ipcc.ch
[230] Beck, H.E., Zimmermann, N.E., McVicar, T.R., Vergopolan, N., Berg, A. and Wood, E.F., 2018. Present and future Köppen-Geiger climate classification maps at 1-km resolution. *Scientific data*, *5*(1), pp.1-12.
[231] Online Available: https://interactive-atlas.ipcc.ch
[232] Available Online: https://interactive-atlas.ipcc.ch

events is projected to increase. Seasonally, this varies between tendencies to decrease in January, February, March and to increase 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 Leonne, a potential increase (up to 10 %) in annual total precipitation, regardless of the emissions scenario.[233]

When moving from a country-level analysis (McSweeney et al. 2010, and CORDEX Africa — described above) to a downscaled level focussing on the location of Bonthe (as a local reference site), the ensemble mean of bias-corrected models in CORDEX Africa, show incremental increases in precipitation, narrowing the range of projected rainfall futures. See Figures 27-28. For the near-term future (2011-2040), the ensemble mean of models in CORDEX Africa indicate that precipitation in Bonthe, Southern Sierra Leone, relative to the recent past (1981 – 2010), will increase by at least 7% (medium emissions, RCP 4.5,); and to at least 5% (high emissions, RCP 8.5), which is considered a small change.

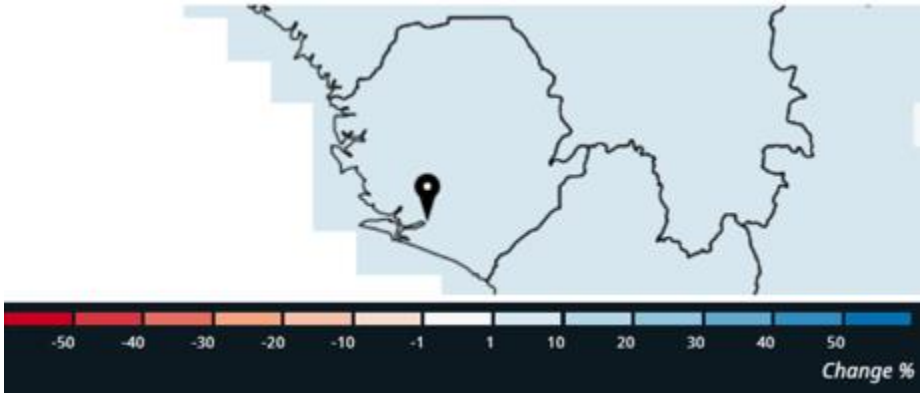
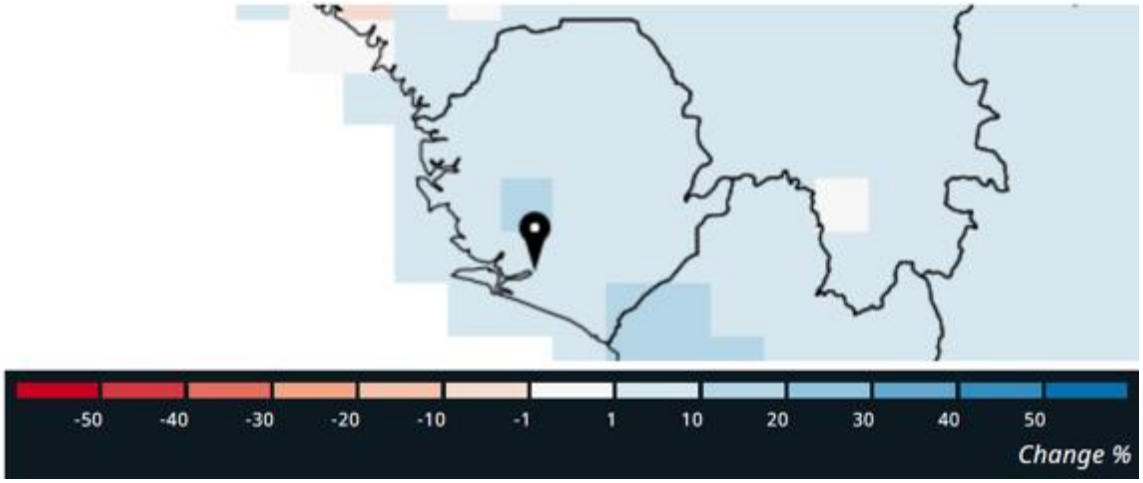


Figure 29. Precipitation (annual mean, time period: 2011–2040)

Time period: 2011–2040, Historical period: 1981–2010 for the medium emissions scenario (RCP 4.5 top map); and the high emissions scenario (RCP 8.5 bottom map) Model: CORDEX Africa Ensemble Mean, Model results for an area covering the location: Bonthe, Southern Sierra Leone.

For the mid-term future (2041-2070), the ensemble mean of models in CORDEX Africa indicate that precipitation in Bonthe, Southern Sierra Leone, relative to the recent past (1981 – 2010), will increase in to at least 8% (medium emissions, RCP 4.5) and to at least 12% (high emissions, RCP 8.5,), considered a small level change.



[233] GoSL, 2021, National Adaptation Plan.

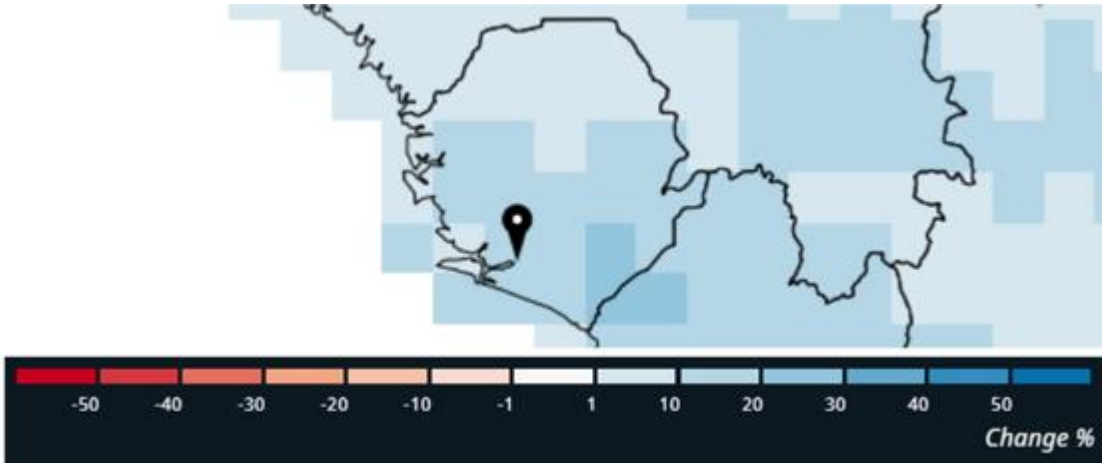


Figure 30. Precipitation (annual mean)
Time period: 2041–2070. Historical period: 1981–2010 the medium emissions scenario (RCP 4.5 top map); and the high emissions scenario (RCP 8.5 bottom map), Model: CORDEX Africa Ensemble Mean, Model results for an area covering the location: Bonthe, Southern Sierra Leone.

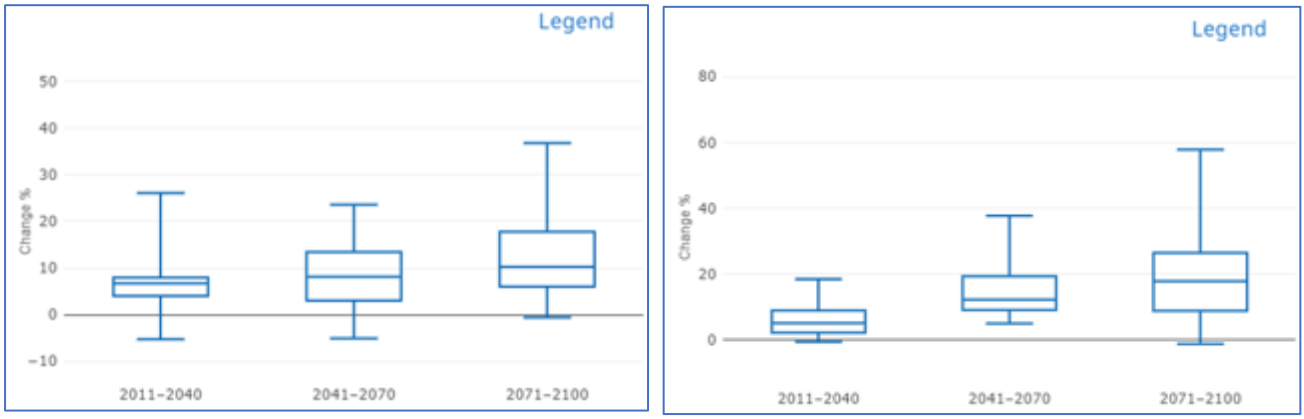


Figure 31. Precipitation (annual mean)
Time period: 2011–2040, 2041-2070 and 2071-2100, Historical period: 1981–2010, RCP 4.5 (left) and RCP 8.5 (right), Model: CORDEX Africa Ensemble Mean, Model results for an area covering the location: Bonthe, Southern.

Sea level rise and oceans

Regionally, it is estimated that the level of the Atlantic Ocean and along regions of the Sierra Leone coastline could rise by between 0.1 and 0.56 meters by 2100 (relative to 1980–1999 levels).[234] According to the models utilized to inform the IPCC Sixth Assessment Report, sea levels are expected to increase on average by 0.1 meters by 2040, under mid-emissions scenario (SSP 2-4.5), relative to baseline 1995 to 2014. The rate of sea level rise in the North-eastern Atlantic is expected to continue close to the global rate[235] of ~3.4 mm per year with the rate of SLR accelerating at 0.084 mm/year.[236]

[234] Available Online: https://pdf.usaid.gov/pdf_docs/pa00mtz3.pdf
[235] https://unfccc.int/sites/default/files/resource/FinalThird%20Nat.%20Com.%20document%20111.pdf
[236] https://www.pnas.org/doi/abs/10.1073/pnas.1717312115

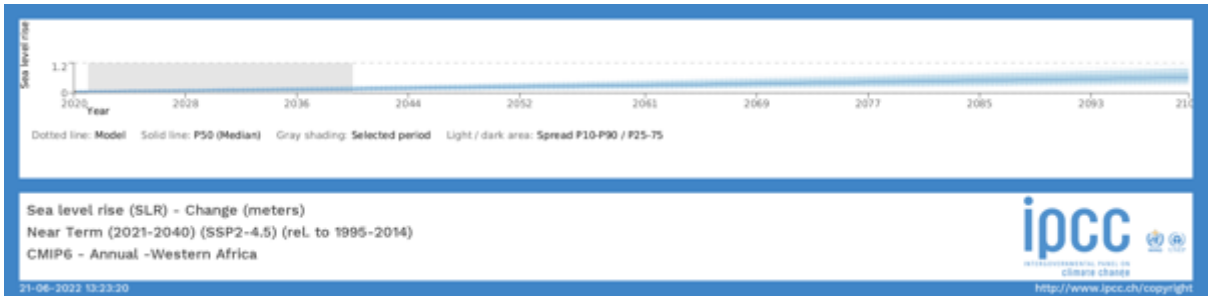


Figure 32: CMIP6 – Sea level rise. Change in meters, Western Africa. Near Term (2021-2040). SSP2-4.5 (rel. to 1995-2014)
Source: IPCC[237]

Local-level data on projected sea-level rise is presented in Figure 27. Due to data availability, projected changes in sea level are presented for two 20-year periods from 2046 to 2065 and 2081 to 2100 to be consistent with the reference period from 1986 to 2005. Projected changes are shown separately for each of the three emission scenarios: low (RCP2.–) - orange bars; medium (RCP4.–) - red bars and high (RCP8.–) - dark red bars. The bars do not present the full range, but a measure of uncertainty. The blue lines crossing the bars represent the ensemble mean.

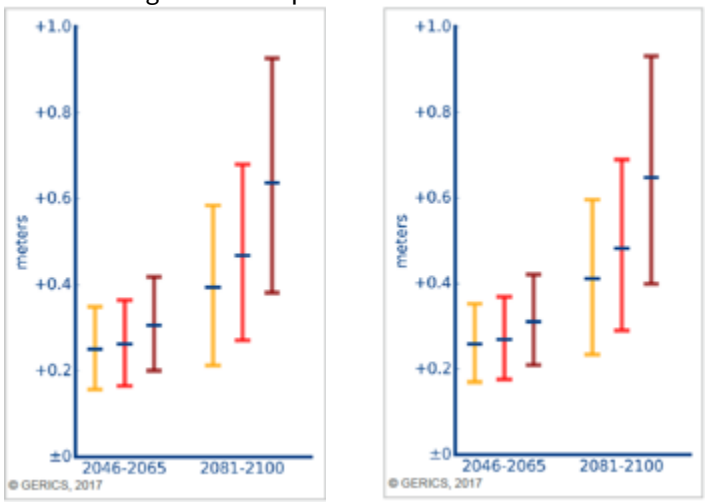


Figure 33. Projected sea level rise (Western Africa coast)

Above, projected sea level rise near Monrovia (6.31 °N, 10.82 °W) (left) and near Conakry (9.50 °N, 13.71 °W) (right). For Monrovia by 2056 a mean sea level rise is expected between 0.26 m (RCP2.6) and 0.31 m (RCP 8.5), increasing further in 2090 to a range between 0.41 m (RCP2.6) to 0.65 m (RCP 8.5). For Conakry by 2056 a mean sea level rise is expected between 0.25 m (RCP2.6) and 0.31 m (RCP 8.5), increasing further in 2090 to a range between 0.39 m (RCP2.6) to 0.64 m (RCP 8.5).
Source: GERICS, 2015, Climate-Fact-Sheet Guinea - Guinea Bissau - Liberia - Sierra Leone

Ocean surface temperatures along Sierra Leone's coast are likely to increase by 0.5°C by 2040 and by 1.7°C by 2100 under mid-emissions scenario (SSP 2-4.5). It is likely that under a mid-emissions scenario (SSP 2-4.5) average ocean pH along Sierra Leone's coast will decrease by 0.1 by 2040 and by 0.2 by 2100.[238]

2.2.3 Observed climate impacts across Sierra Leone

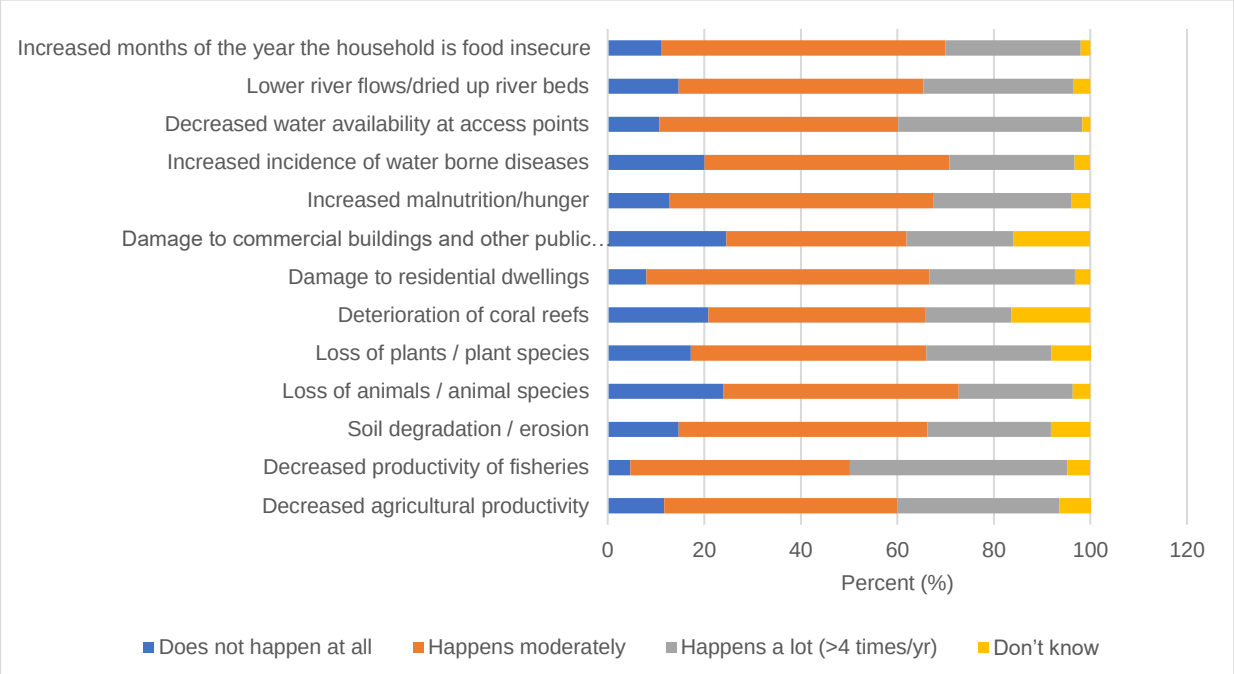
Sierra Leone is particularly exposed to the impacts of increasingly frequent and intense extreme weather events, including heat waves and heavy rainfall events. Heavy rainfall following dry spells often results in extensive flooding throughout the country. These events often come in the form of tropical storms,

[237] Ibid.
[238] Available Online: https://interactive-atlas.ipcc.ch

which bring lightning and high winds, are a recurring extreme weather event that affect Sierra Leone in the pre-monsoon season (April to June).[239] The effects of these events on communications, transportation, infrastructure, agriculture, water supply and sanitation, as well as biophysical impacts such as coastal erosion, are evident in various parts of Sierra Leone.[240] Extreme rainfall-related floods accounted for 90% of those affected by disasters in the country in 2018.[241]

Geographically, the incidences of flooding, storms and landslides have historically been concentrated along the country's coastline. Overall impacts of these events include a loss of livelihoods, damage to crops, increased livestock mortality, as well as damage to transport infrastructure, homes and ports. Concerning secondary data sources for the occurrence of climate change impacts within subnational areas of Sierra Leone, most published sources focus on urban and peri-urban areas within and adjacent to Freetown and the peninsula, with references to more rural areas comparatively scarcer. While some of the areas referred to below and in other parts of this report are not within the target districts, those references have been retained as evidence of broader trends and the occurrence of impacts in specific areas of Sierra Leone. Areas outside and within the project's target districts have been indicated as such for ease of reference. The results of the quantitative household survey undertaken during 2022 in target districts have been used to supplement secondary data sources that do provide information on more rural areas.

The regions which have been identified as vulnerable to flooding and landslides within the Western Urban and Rural districts (i.e., not within the target districts) include: Kroo Bay, Susan's Bay, Granville Brook and Lumley Beach. Areas vulnerable to flooding that are within the project's target districts include parts of the Port Loko and Kambia districts, the Newton catchment area, Pujehun and Moyamba districts.[242] Anecdotally, climate change impacts[243] were reported on average by the quantitative household survey[244] mostly as moderate occurrence (~50%), followed by frequent occurrence (~28%), and absence (~15%). Approximately 6% of respondents reported uncertainty regarding climate change impacts. The figure below summarises perceptions of individual climate change impacts in the target communities.



[239] https://climateknowledgeportal.worldbank.org/country/sierra-leone/vulnerability
[240] https://www.adaptation-undp.org/sites/default/files/downloads/ews_sleone_project_brief_guidelines_fact_sheet_pdf.pdf
[241] https://reliefweb.int/report/sierra-leone/restore-energize-empower-wfps-climate-action-sierra-leone-november-2022
[242] http://www.harpis-sl.website/index.php/hazard-assessment/natural/flood/fldhazard-assessment
[243] Such as food insecurity, decreased water availability, and decreased agricultural productivity.
[244] Undertaken as part of the stakeholder engagement process in 2022, comprising 402 respondents in the target coastal districts.

Figure 34: Perceptions of the occurrence of climate change impacts in the target coastal districts of Sierra Leone.

Source: Household Survey, CMDA-SL (2022)

Flooding

Between 1980 and 2010, floods due to intensified rainfall events directly affected approximately 221,204 people across Sierra Leone, meaning that the social, economic, environmental and human welfare impacts of flooding across Sierra Leone have been extensive.[245] Since 2010, major floods affected numerous districts in the years 2015 and 2017. In 2015 alone it is estimated that 30,000 people were affected and 12 killed because of wide scale flooding due to riverbanks being breached and coastal flooding in the region of Freetown. In the Pujehun district, 800 people were affected and 16 homes destroyed.[246] In the same year floods ravaged the city of Freetown causing extensive damage to infrastructure, property, loss of livelihood and displacing over 14,000 people.[247] During 2017, the Freetown region, including Karningo, Kamayama, Dwarzark, Kroo Bay, Congo Town, Kissy Brook, and Culvert community in Granville Brook, was impacted by torrential rains and flooding. This event resulted in damage to roads, bridges, a medical centre and school.[248,249] Flash floods in Freetown in 2019 resulted in 7 deaths and affected 10,381 people, while in 2022 repeated flooding events killed 12, injured 79 and affected almost 13,000 people.[250] Flooding has been exacerbated by changes in rainfall patterns and erratic precipitation across Sierra Leone. In conjunction with intensified precipitation events due to climate change, flooding has also been interspersed with a greater number of dry days and days of extreme heat. Flooding has also intensified landslides and have adversely affected human health due to water and healthcare infrastructure damage.[251]

Landslides

In the last few decades, landslides due to torrential rain and flooding have affected numerous communities across Sierra Leone and have caused extensive economic losses. Between 1990 and 2014, landslides constituted 42.7% of nationally reported geohazard mortalities. In 2017, severe landslides affected 50,000 people in Freetown and resulted in 500 deaths and 600 people missing presumed dead.[252] Economic losses from the 2017 landslides totalled US$ 31.7 million.[253] In Regent and Lumley Creek, 300 homes were destroyed. Prior to this, between 2009 and 2016, it is estimated that landslides affected 250 people, resulting in 57 deaths, 50 people being injured and damage to 20 homes.[254] [255]

[245] http://www.harpis-sl.website/index.php/hazard-assessment/natural/flood/fldhazard-assessment
[246] Source: https://documents1.worldbank.org/curated/en/821161549318730387/pdf/130797-v1-FInal-Report-Volume-1-of-5-Technical-Methodology-and-SoR.pdf
[247] https://reliefweb.int/report/sierra-leone/sierra-leone-proposal-grant-us-1-million-emergency-humanitarian-relief
[248] http://www.harpis-sl.website/index.php/hazard-assessment/natural/flood/fldhazard-assessment
[249] http://www.harpis-sl.website/index.php/hazard-assessment/natural/flood/fldhazard-assessment
[250] Source: https://www.pdc.org/wp-content/uploads/NDPBA_SLE_Final_Report.pdf
[251] https://unfccc.int/sites/default/files/resource/FinalThird%20Nat.%20Com.%20document%20111.pdf
[252] https://reliefweb.int/report/sierra-leone/disaster-strikes-freetown-over-400-dead-and-600-still-missing
[253] Source: https://www.pdc.org/wp-content/uploads/NDPBA_SLE_Final_Report.pdf
[254] www.harpis-sl.website/index.php/hazard-assessment/natural/landslide-hazard-profile/hazard-assessment
[255] https://www.bbc.co.uk/news/world-africa-40926187

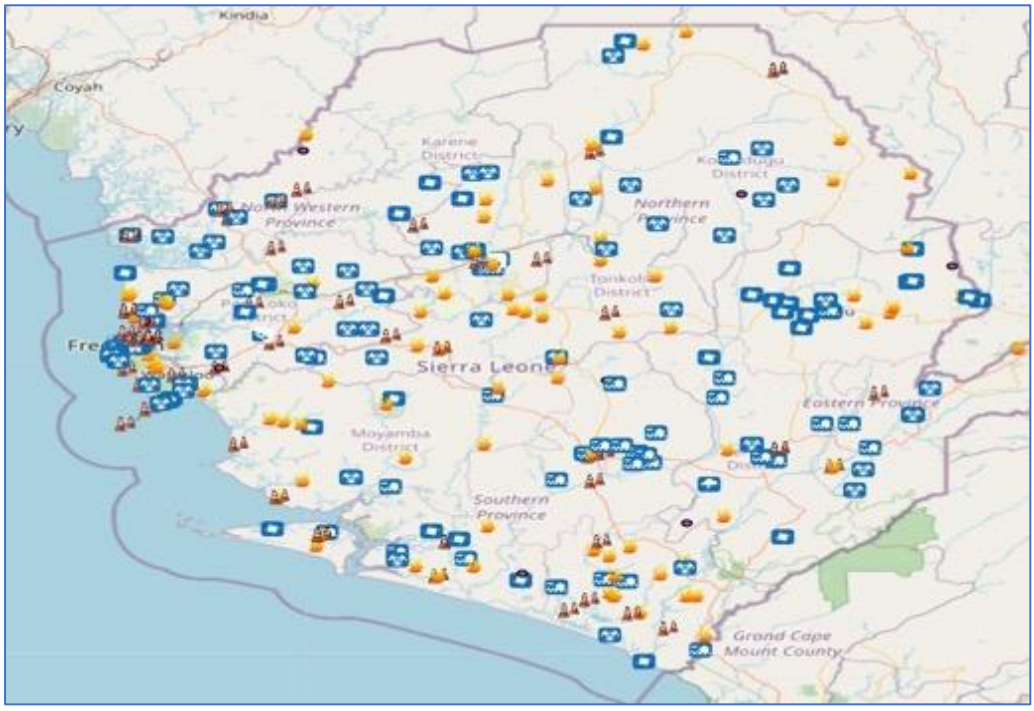


Figure 35: HARPIS Summary of historic disaster events across Sierra Leone
Source: HARPIS[256]
(Icons denote the type of event that has occurred, e.g. tropical storm, epidemic, floods, droughts - https://integemsgroup.maps.arcgis.com/apps/webappviewer/index.html?id=fa1d29cbfec74b25bea5c6e2f2d29db6_)

Sea-level rise and other climate-related hazards

Sea level rise has intensified along Sierra Leone's coastline. The widespread impacts of sea-level rise induced by climate change are already visible along the entire coastal region of the country and include areas such as Yeliboya, Kortimor, Shenge and Plantain Island. Extensive coastal erosion is evident in regions such as Adonkia, Mahera Beach in the Lungi area, Conakridee and Eureka, as well as in some of the areas mentioned above, for example Shenge. In certain regions such as Konakridee, Lumley, Lakka and Hamilton, coastal erosion has increased by as much as 4 to 6 meters per year because of intensified storm surges and sea-level rise in some of these locations.[257] Numerous ecosystems have been damaged as a result and infrastructure impacted due to coastal erosion. Beyond ecosystem damage, coastal erosion processes require interventions, including low-level protection systems and/or relocating of structures and buildings, which impose a significant burden on already stretched local communities. Health is another major concern, and records indicate that malaria, diarrhoea and acute respiratory infections account for 33%, 29% and 14% of mortality in children under five years of age, respectively.[258] The prevalence of disease outbreaks, including water-borne and zoonotic diseases, has already increased across the country. This has also been evident across districts such as Western Area, Kambia, Pujehun, Bonthe, Moyamba and Port Loko. Outbreaks of Lassa Fever as well as Ebola Virus have increased in frequency across these districts. The 2014 Ebola outbreak occurred during a prolonged drought period which is likely to have increased encroachment into wildlife habitats because of exacerbated poverty and food insecurity.[259]

[256] https://www.harpis-sl.website/index.php/hazard-profiles/sierra-leone-hazard-profile
[257] www.harpis-sl.website/index.php/hazard-profiles/sierra-leone-hazard-profile
[258] Ibid.
[259] Maya K Gislason (2015) Climate change, health and infectious disease, Virulence, 6:6, 539-542, DOI: 10.1080/21505594.2015.1059560

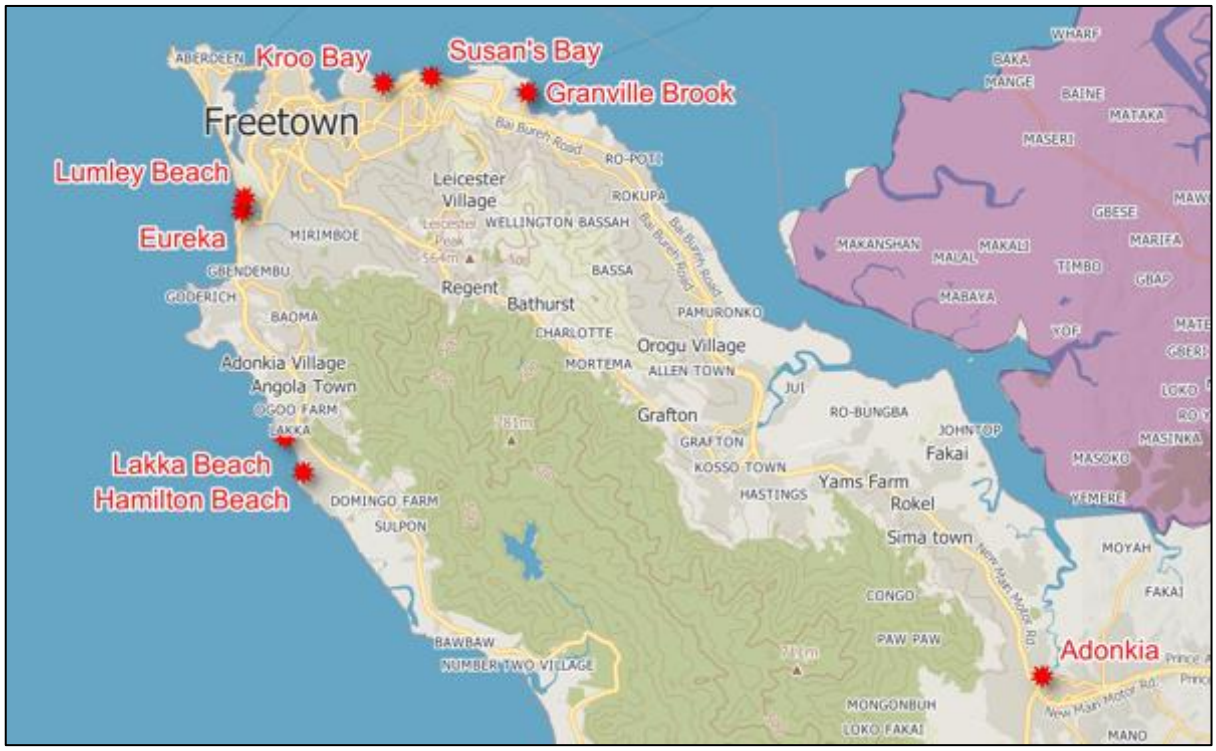


Figure 36. Location of sea-level rise and coastal erosion hotspots within the Freetown peninsula (not within the target districts)

Beyond ecosystem and infrastructural damage, addressing acute climate change impacts such as coastal erosion requires interventions, including low-level protection systems and/or relocating of structures and buildings, which impose a significant burden on already stretched local communities. Health is another major concern that arises from infrastructural damage, and records indicate that malaria, diarrhoea and acute respiratory infections account for 33%, 29% and 14% of mortality in children under five years of age, respectively in Sierra Leone.[260] The prevalence of disease outbreaks, including water-borne and zoonotic diseases, has already increased across the country. This has also been evident across districts such as Kambia, Pujehun, Bonthe, Moyamba and Port Loko. Outbreaks of Lassa Fever as well as Ebola Virus have increased in frequency across these districts. The 2014 Ebola outbreak occurred during a prolonged drought period which is likely to have increased encroachment into wildlife habitats because of exacerbated poverty and food insecurity.[261]

Regarding some of the more chronic impacts of climate change on the ecosystem services provided by coastal and marine ecosystems in the West African context, climate changes[262] can lead to substantive reductions in marine fish production and a subsequent decline in fish protein supply.[263] When combined with socioeconomic parameters, the anticipated changes in distribution and maximum fisheries catch potential, projections for coastal West Africa suggest a 21% reduction in annual landed value along with a 50% decline in fisheries-related jobs and annual losses to the regional economy of ~ USD 300 million.[264] Analyses in Sierra Leone have shown a direct correlation between marine temperature distribution and commercially-important pelagic fish abundance, where warmer waters at the 10m and

[260] www.harpis-sl.website/index.php/hazard-profiles/sierra-leone-hazard-profile
[261] Maya K Gislason (2015) Climate change, health and infectious disease, Virulence, 6:6, 539-542, DOI: 10.1080/21505594.2015.1059560
[262] Such as increased sea-surface temperatures (SSTs), wind-induced mixing, and ocean acidification.
[263] La, V.W.Y., Cheung, W.W.L., Swartz, W., and Sumaila, U.R. 2012. Climate change impacts on fisheries in West Africa: implications for economic, food and nutritional security. *African Journal of Marine Science*, 34(1): 103-117. Available Online: https://doi.org/10.2989/1814232X.2012.673294
[264] La, V.W.Y., Cheung, W.W.L., Swartz, W., and Sumaila, U.R. 2012. Climate change impacts on fisheries in West Africa: implications for economic, food and nutritional security. *African Journal of Marine Science*, 34(1): 103-117.

20m isotherms as well as nearshore and offshore salinity increases resulted in decreasing pelagic fish abundance.[265]

2.2.4 Projected climate impacts across Sierra Leone

Overview

Modelling indicates that flooding, thunderstorms, and tropical storms are likely to increase in frequency across Sierra Leone, while climate-induced epidemics are likely to increase in magnitude.[266] Climate change impacts such as increased flooding, drought, landslides, thunderstorms, epidemics and coastal erosion pose a considerable threat to the regions of Bonthe, Kambia, Port Loko, Western Urban, Western Rural, Moyamba and Pujehun in the future.[267]

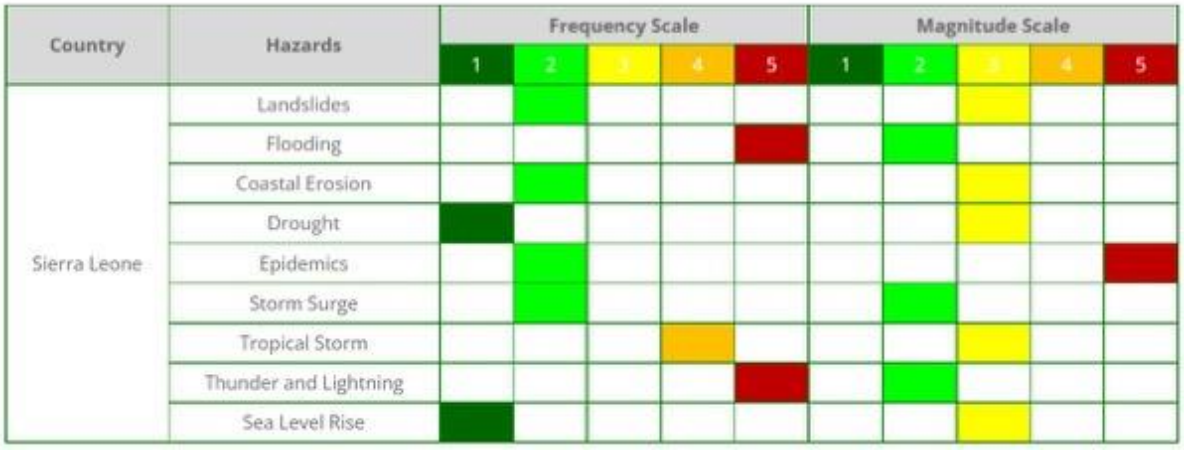
The likelihood of more severe droughts, heatwaves, floods and storms under future climate conditions threatens agriculture, fisheries, as well as infrastructure and hydroelectric power production. Urban and rural seasonal flooding, recurrent flash flooding, and coastal flooding are the most frequently observed disasters, occurring primarily as a result of extreme weather events, such as tropical storms. Extreme weather events are expected to increase in intensity and continue affecting areas such as Kroo Bay, Susan's Bay and Lumley in Western Urban district. Increases in the observed frequency in extreme weather events were indeed mentioned by local respondents during stakeholder consultations in Sierra Leone. Port Loko, Kambia, Western Rural, Pujehun, Bo, Kenema and Moyamba districts and the coastal beaches of the Western Area Peninsula are also vulnerable. There are also transboundary risks of overflows at the Great Scarcies and Little Scarcies rivers from Guinea and Mano from Liberia. Floods overwhelm existing systems, contaminating drinking water, creating sewage overflows and damaging roads.[268] Extreme heat is also recognised as a climate-related hazards in Sierra Leone. For example, in Freetown, the majority of days are hot and most nights warm, with many residents not having access to air conditioning. This means that the capital's workforce is continuously exposed to high temperatures, and heat wave. Such extreme temperature events are expected to increase in frequency and intensity under future climate scenarios. Without corrective measures, by 2050, economic losses resulting from decrease productivity related to extreme heat, will rise to the equivalent of USD 150 million.[269]

Table 6 below summarises the frequency and magnitude of projected climate-related impacts at country level, while Table 7 overleaf summarises the frequency and magnitude of projected climate-related impacts at the district level in Sierra Leone. In this context it is important to note that while individual risks maybe rated seemingly low in terms of impact, this needs to be considered in the context of the high levels of vulnerability/low levels of resilience in the target communities.

Table 6: HARPIS Summary of predicted climate-related impacts across Sierra Leone

[265] Sei, S., O'Donell, C., and Sarre, A. 2022. Assessing climate change driven variations in pelagic fish species distribution and abundance in the North East Atlantic fishery of Sierra Leone (conference abstract). *Species on the Move*. Available Online: https://pwd.aa.ufl.edu/sotm/2022/01/25/assessing-climate-change-driven-variations-in-pelagic-fish-species-distribution-and-abundance-in-the-north-east-atlantic-fishery-of-sierra-leone/
[266] www.harpis-sl.website/index.php/hazard-profiles/sierra-leone-hazard-profile.
[267] Ibid.
[268] https://reliefweb.int/report/sierra-leone/restore-energize-empower-wfps-climate-action-sierra-leone-november-2022
[269] https://reliefweb.int/report/sierra-leone/restore-energize-empower-wfps-climate-action-sierra-leone-november-2022

Frequency Scale		Magnitude Scale	
1	Very Rarely	1	Trivial
2	Rarely	2	Small
3	Sometimes	3	Moderate
4	Often	4	Large
5	Frequently	5	Very Large



Source: HARPIS[270]

Table 7: HARPIS selected climate-related hazards by district as well as frequency and magnitude (impact)

Hazards	Landslides		Flooding		Coastal erosion		Droughts		Sea-level rise	
	Frequency scale	**Impact**	**Frequency scale**	**Impact**	**Frequency scale**	**Impact**	**Frequency scale**	**Impact**	**Frequency scale**	**Impact**
Target Coastal Districts										
Bonthe	Very Rarely	Small	Sometimes	Moderate	Often	Large	Rarely	Trivial	Rarely	Very large
Kambia	Very Rarely	Small	Sometimes	Small	Rarely	Small	Very rarely	Moderate	Rarely	Large
Moyamba	Rarely	Small	Sometimes	Small	Rarely	Trivial	Rarely	Moderate	Very rarely	Trivial
Port Loko	Rarely	Moderate	Sometimes	Moderate	Sometimes	Small	Rarely	Large	Rarely	Large
Pujehun	Very rarely	Moderate	Sometimes	Small	Rarely	Small	Very rarely	Small	Very rarely	Large
Other coastal districts										
Western Urban	Sometimes	Large	Frequently	Large	Often	Large	Very rarely	Trivial	Very rarely	Very large
Western Rural	Sometimes	Large	Frequently	Large	Often	Large	Very rarely	Trivial	Very rarely	Very large

Source: HARPIS[271]

Flooding

Large-scale, frequent flooding is prominently reported in urban and peri-urban areas that are outside the target districts of this project, i.e. the Western Area Urban and Rural districts within and adjacent to Freetown. These areas are likely to be adversely impacted by flooding due to sloping terrain and increased precipitation received during the wet season, as well as the higher population densities relative to rural districts.[272] Flood impacts are reported less frequently in the target coastal districts of Bonthe,

[270] Available Online: www.harpis-sl.website/index.php/hazard-profiles/sierra-leone-hazard-profile.
[271] www.harpis-sl.website/index.php/hazard-profiles/sierra-leone-hazard-profile
[272] Ibid.

Kambia, Moyamba, Port Loko, and Pujehun, although in this context it is important to note that while individual risks may be rated seemingly low in terms of impact, this needs to be considered in the context of the high levels of vulnerability/low levels of resilience in the target communities. Similarly, even in the less populated areas which will have a more limited number of people exposed to flooding, other climate impacts remain which can critically alter people's livelihoods, in particular on the agricultural sector.

Table 8: HARPIS summary of the population exposed to flood-related impacts according to district

District	Male	Female	Total	Percentage	District Population
Bo	19,641	21,451	41,092	7.1	575,478
Bombali	21,162	21,356	42,518	7.0	606,544
Bonthe	11,538	11,452	22,990	11.5	200,781
Kailahun	12,983	12,856	25,839	4.9	526,379
Kambia	16,849	18,756	35,605	10.3	345,474
Kenema	23,199	23,451	46,650	7.6	609,891
Koinadugu	2,819	2,901	5,720	1.4	409,372
Kono	22,508	22,209	44,717	8.8	506,100
Moyamba	7,149	7,889	15,038	4.7	318,588
Port Loko	15,385	17,000	32,385	5.3	615,376
Pujehun	10,683	11,361	22,044	6.4	346,461
Tonkolili	8,152	8,465	16,617	3.1	531,435
Western Area Rural	60,527	62,748	123,275	27.7	444,270
Western Area Urban	180,470	180,139	360,609	34.1	1,055,964
National	413065	422,034	**835,099**	**10.00**	**7,092,113**

Source: HARPIS[273]

Landslides

Large-scale landslides are expected across the Western Area districts in the future (Table 7). Hills and sloping terrain in the Western Area, especially in Leicester, Regent, Granville Brook, Cline Town, Moa Wharf, Hill Court Road, Kissy Brook, Dwarzark, and Charlotte in the Mountain Rural District of the Western Area are vulnerable to landslides due to sloping terrain and increased precipitation received during the rainfall season.[274] Table 7 below indicates that 63.8% of the Western Area Rural population is vulnerable to the impacts of landslides, which indicates the highest exposure and vulnerability of all districts. Areas of interest in terms of climate-change interventions are highlighted.

Table 9: HARPIS summary of the population exposed to landslide-related impacts according to district

[273] Available Online: http://www.harpis-sl.website/index.php/hazard-assessment/natural/flood/fldexposure-vulnerability-and-risk-assessment
[274] Available Online: www.harpis-sl.website/index.php/hazard-profiles/sierra-leone-hazard-profile

District	Male	Female	Total	Percentage of Population	District Population
Bo	57,060	59,325	116,385	20.2	575,478
Bombali	147,578	154,105	301,683	49.7	606,544
Bonthe	19,218	20,250	39,468	19.7	200,781
Kailahun	60,791	61,676	122,467	23.3	526,379
Kambia	27,617	28,942	56,559	16.4	345,474
Kenema	114,908	118,380	233,288	38.3	609,891
Koinadugu	73,205	73,460	146,665	35.8	409,372
Kono	120,196	120,825	241,021	47.6	506,100
Moyamba	39,497	42,918	82,415	25.9	318,588
Port Loko	100,847	107,223	208,070	33.8	615,376
Pujehun	81,339	85,694	167,033	48.2	346,461
Tonkolili	119,469	122,893	242,362	45.6	531,435
Western Area Rural	150,742	152,594	303,336	68.3	444,270
Western Area Urban	151,242	153,039	304,281	28.8	1,055,964
National	**1,263,709**	**1,301,324**	**2,565,033**	**36.2**	**7,092,113**

Source: HARPIS[275]

Extreme heat and heatwaves

The extreme heat hazard in Sierra Leone is classified as high (see figure 36 below)[276] and drives multiple climate-related threats. Heat magnifies drought during the dry season while intensifying the impacts of the rainy season. During Sierra Leone's dry season, higher temperatures contribute to drought by boosting moisture evaporation from the soil while exacerbating hazards such as freshwater shortages and wildfires. In the rainy season, higher temperatures sustain the proliferation of vector-borne diseases such as malaria due to consistent heat, rainfall, flooding and humidity, creating the perfect conditions for biting insects to breed. Agricultural labour demand increases during Sierra Leone's rainy season and compounds these hazards, making farmers and other outdoor labourers more susceptible to heat stress, while affecting the potential for preserving produce and fish without a functioning cold chain.

[275] Online: http://www.harpis-sl.website/index.php/hazard-assessment/natural/landslide-hazard-profile/hazard-assessment
[276] Source: https://thinkhazard.org/en/report/221-sierra-leone/EH

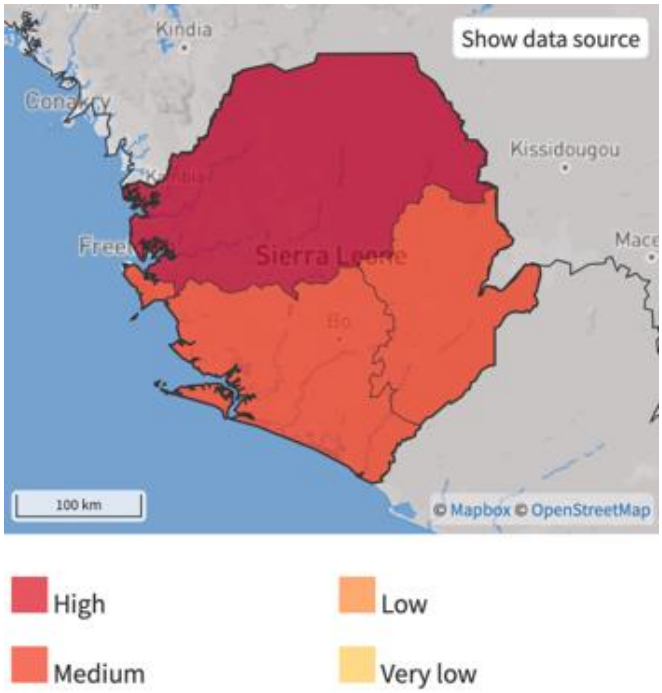


Figure 37. Extreme heat hazard classification across Sierra Leone
Source: ThinkHazard![277]

Figure 37 below summarises the perceived frequency of heat-related climate change impacts within the project's target districts, including shorter rainy seasons, higher incidences of hot days and heatwaves, as well as longer dry season and/or droughts. Roughly 60% of respondents perceived shorter rainy seasons and longer dry seasons as occurring moderately, while ~40% of the households surveyed viewed higher incidences of heatwaves and high temperatures as occurring frequently (more than four times per year).

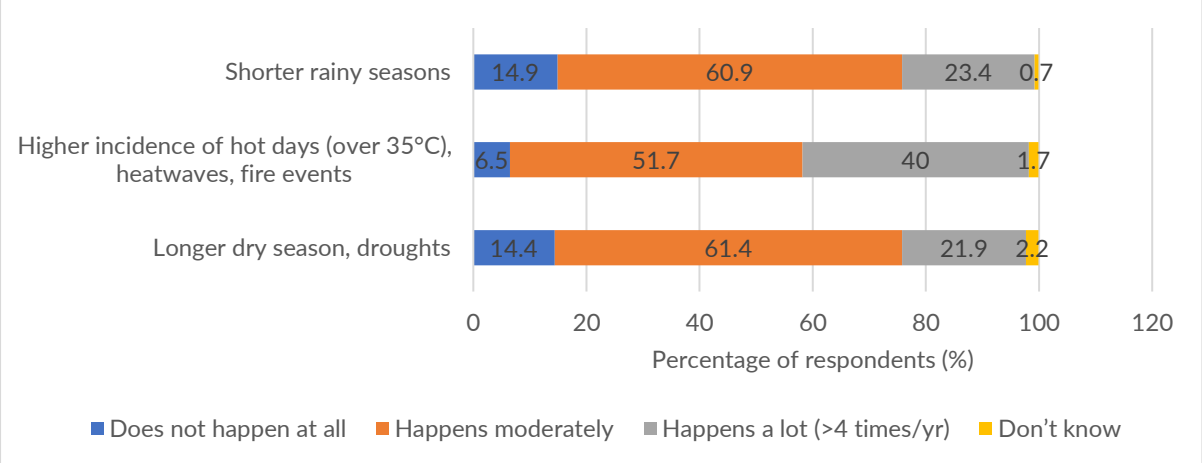


Figure 38: Community perceptions of the frequency of heat-related impacts in the target districts
Source: Household Survey

Sea level rise and other climate-related hazards

The potential for impact (magnitude) of sea-level rise across coastal regions such as Kambia, Freetown, Pujehun, Port Loko and Bonthe is likely to be large to very large.[278] Sea level rise is expected to be limited across the other districts. The impacts of sea-level rise, including coastal erosion, are likely to

[277] Source: https://thinkhazard.org/en/report/221-sierra-leone/EH
[278] www.harpis-sl.website/index.php/hazard-profiles/ sierra-leone-hazard-profile

intensify, with signs of erosion presently evident along coastal regions such as Krim area, Shenge, Plantain Island, Katta and Bunce Island, Adonkia, Mahera beach in Lungi area, Bullom shores, Moa wharf, and Man of War Bay. Consequential impacts, such as increased food insecurity and/or water insecurity, reduced income generating activities, increases sickness among the communities (people, children, livestock), pests and disease increases will also follow sea-level rise and coastal erosion.

Furthermore, the magnitude of epidemics is expected to increase in the future across these regions. Drought across Moyamba, Port Loko, Pujehun, Bonthe and the Western region is expected to be rare. However, drought across the Port Loko region is likely to be large in magnitude.[279]

[279] Ibid.

3. Project Rationale – Climate Impacts, Adaptation and Livelihoods Analysis

The content of this section is drawn from country visits, in-country consultations, qualitative and quantitative surveys, and iterative dialogue with national institutions and local communities.

3.1 Ocean and coastline vulnerability to climate change

It is estimated that the level of the Atlantic Ocean will rise by as much as 0.56 m by 2100, relative to 1980–1999 levels. Storm surges are also expected to intensify from June to September and it is estimated that up to 2,315,860 people, or about 30% of the population living along Sierra Leone's coast are at risk of the impacts of rising sea levels.[280] Climate change has already had negative impacts on Sierra Leone's coastline, considering that the coastline has been receding by 4 to 6 m per year in some sections, putting coastal infrastructure and the communities that are dependent on coastal and marine resources for their livelihoods at risk. The combination of adverse climate change effects, such as intensified storm surges, rising sea levels and increasing ocean temperatures and acidity are expected to result in considerable loss to biodiversity, community infrastructure and livelihoods.

Furthermore, saltwater intrusion into coastal aquifers due to rising sea levels is likely to exacerbate water scarcity along the country's coastline due to adverse effects on water quality. Saltwater intrusion and intensified coastal erosion are likely to adversely impact coastal agriculture as well as cause extensive degradation to Sierra Leone's sensitive coastal and marine ecosystems. During community consultations in May 2022, the majority of respondents in the coastal and estuarine area of the Bonthe and Western Rural districts indicated that saline intrusion into freshwater resources is indeed a substantive issue. Such degradation is also likely to be exacerbated by intensified flooding and increased runoff as well as sedimentation of coastal wetlands, mangroves and estuaries. The productivity of fisheries is likely to be adversely impacted by rising sea levels and saltwater intrusion of estuaries and mangroves.[281]

Rising sea levels, ocean temperature increases as well as ocean acidification, are also expected to adversely impact marine and coastal biodiversity. Marked reductions in the productivity of marine ecosystems and the ecosystem services provided by estuaries, mangroves and wetlands, are expected due to climate change, putting livelihoods at risk in the coastal districts.[282] In conjunction with rising sea level, increasing ocean temperatures and acidity are likely to adversely affect marine fisheries due to changes in fish migratory patterns and abundance. The increased occurrence of algal blooms because of climate change is also expected to negatively impact this sector.[283] As a warmer Atlantic Ocean contributes to toxic algal blooms with high surface water temperatures, this can lead to increased cases of food poisoning from consumption of shellfish and reef fish, as was experienced in Freetown during 2011 and 2012.

Sea level rise and flooding due to intensified rainfall events poses a notable threat to low-lying, coastal regions in Sierra Leone. The Kambia district communities are particularly vulnerable to climate change with the expected magnitude of sea-level rise. Near Freetown, the magnitude of sea-level rise is expected to exacerbate the deterioration of water resources and infrastructure and to exacerbate the degradation of mangrove and estuary ecosystems, and field observations indicate that this is a widespread challenge along the coastline. Enhanced salinity of aquifers is expected to adversely impact water quality and security for household use as well as use by the industrial and tourism sectors.[284]

The climate change-induced impacts are likely to adversely affect fisheries production in the region. Furthermore, accelerated degradation of mangroves and estuaries in these districts due to saltwater intrusion and sea-level rise is likely to have adverse impacts on local marine biodiversity.[285] The vulnerability to this particular threat is further exacerbated by population growth, industrialization, and pollution, and extends beyond impacts on human populations. For example, Aberdeen creek in the

[280] Available Online: http://www.harpis-sl.website/index.php/hazard-assessment/natural/sea-level-rise/hazard-assessment
[281] Available Online: https://unfccc.int/sites/default/files/resource/Second%20national%20communication.pdf
[282] Available Online: https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf
[283] Available Online: https://pdf.usaid.gov/pdf_docs/PA00WJRG.pdf
[284] Available Online: https://unfccc.int/sites/default/files/resource/Second%20national%20communication.pdf
[285] https://unfccc.int/sites/default/files/resource/Sierra%20Leone%20INC.pdf

Western Urban district is listed as a Ramsar site, with the sensitive wetland ecosystems in this region playing an essential role in ensuring water security and maintaining biodiversity in the region.

3.2 Livelihoods in Sierra Leone

While climate change is a global phenomenon, its negative impacts manifest most acutely for poor people[286] and poor countries because of their geographic exposure and high dependence on natural resources, and their limited financial and technological capacity to cope with climate variability and extremes.[287] Climate change phenomena such as reduced or increased rainfall volumes and greater spatial variability translate to tangible and sometimes existential threats to climate-sensitive livelihoods and economies. This is of particular relevance to marginalised groups within the already vulnerable coastal communities, including children, women, pregnant women, elderly and people with disabilities. Beyond being more vulnerable due to their lack of resilience, these groups are often excluded from formal decision-making while often being the most sensitive and exposed to climate change impacts. High levels of vulnerability and low adaptive capacity in Sierra Leone have been linked to, among other things, poverty, as the target beneficiaries in this project tend to live in poorly constructed homes, often in communities exposed to environmental hazards such as floods, landslides or droughts, and in areas lacking basic health services or infrastructure.[288] They also tend to have fewer assets to use and/or sell to cope in the aftermath of an environmental or natural disaster, with limited recourse to social safety nets.

Sierra Leone is no exception to this scenario, aggravated by the fact that farmers and fishers (the two dominant livelihood sectors) are underprepared for climate change as they have limited capacity and access to improved seed varieties, equipment, fertilizers, cooling/drying/storage facilities, insurance, or other climate-responsive resources. Furthermore, products from the agriculture and fisheries sectors are not sold to high-value markets, leaving considerable room for expansion of the country's export market.[289]

Desk research has been validated through views from respondents to the household survey (2022) conducted by CMDA-SL. The CMDA-SL household survey confirms that fishing (29.4%) and farming / agriculture (43.3%) are the primary sources of income for the 402 respondents, followed by petty trading (16.7%). In the survey, the

Table 10: Overview of livelihood types in urban and rural Sierra Leone

Livelihood Type	Rural	Urban	Overall
Production and sale of food crops	80%	28%	72%
Petty trading-street vendor	26%	50%	30%
Trading, Seller, Commercial activity	11%	35%	15%
Salaries, Wages	5%	23%	8%
Production and sale of cash crops	31%	12%	28%
Unskilled wage labour agriculture	18%	7%	17%
Unskilled wage labour non-agricul-ture	12%	15%	12%
Skilled wage labour	8%	14%	9%
Wood cutting/coal burning	12%	4%	11%
Palm oil extraction	11%	2%	10%
Livestock rearing and/or selling	9%	4%	9%
Production and sale of vegetables and/or fruits	8%	4%	8%
Gifts	8%	8%	8%
Mining of minerals	6%	2%	6%
Fishing	6%	2%	5%
Handicrafts / Artisan	4%	6%	4%
Others (specify)	3%	2%	3%
Gathering and selling of wild food	2%	1%	2%
Palm wine selling	2%	1%	2%
Remittances/ Migrating labour	2%	1%	2%
Hunting and selling bush meat	1%	0%	1%
Begging	1%	1%	1%
Mining of sand and stone	1%	2%	1%
Extraction of palm wine (poyo)	1%	0%	1%
Aid	1%	2%	1%
Salt extraction	0%	2%	1%
Cart puller/push cart	0%	0%	0.2%

Source: WFP, 2021

[286] Those engaged in subsistence livelihood activities and in the informal economy are particularly vulnerable. Women are often disproportionately vulnerable for several reasons, including bearing additional burdens when their husbands migrate in search of employment.

[287] *Agwu, E.A., Amadu, F.E., Morlai, T.A., Wollor, E.T., and Cegbe, L.W. 2021. Agricultural Innovations for Climate Change Adaptation and Food Security in West Africa: the Case of Nigeria, Sierra Leone and Liberia. African Technology Policy Studies Network, Working Paper Series: No. 61, Nairobi.*

[288] Kempe Ronald Hope Sr. (2009) Climate change and poverty in Africa, International Journal of Sustainable Development & World Ecology, 16:6, 451-461, DOI: 10.1080/13504500903354424

[289] https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Sierra%20Leone%20First/210804%202125%20SL%20NDC%20(1).pdf

majority of respondents (72%) stated that they have knowledge of climate change, that they considered wood burning (28% of respondents) and unregulated forest clearing and deforestation (21% of respondents) to be the primary causes of climate change, and that they feel that their community are highly affected by climate change (81.6% of respondents).

The following sections provide an overview of the climate change vulnerabilities of the fisheries and agricultural sectors in Sierra Leone. According to the World Food Programme (WFP), the highest percentage of food-insecure Sierra Leoneans are those involved in agriculture-based livelihoods, such as production and sale of cash crops such as palm oil (66% food-insecure), fishing (66% food-insecure), production and sale of vegetables and fruits (64% food-insecure), production and sale of food crops (61% food-insecure), and unskilled wage labour (60% food-insecure).[290]

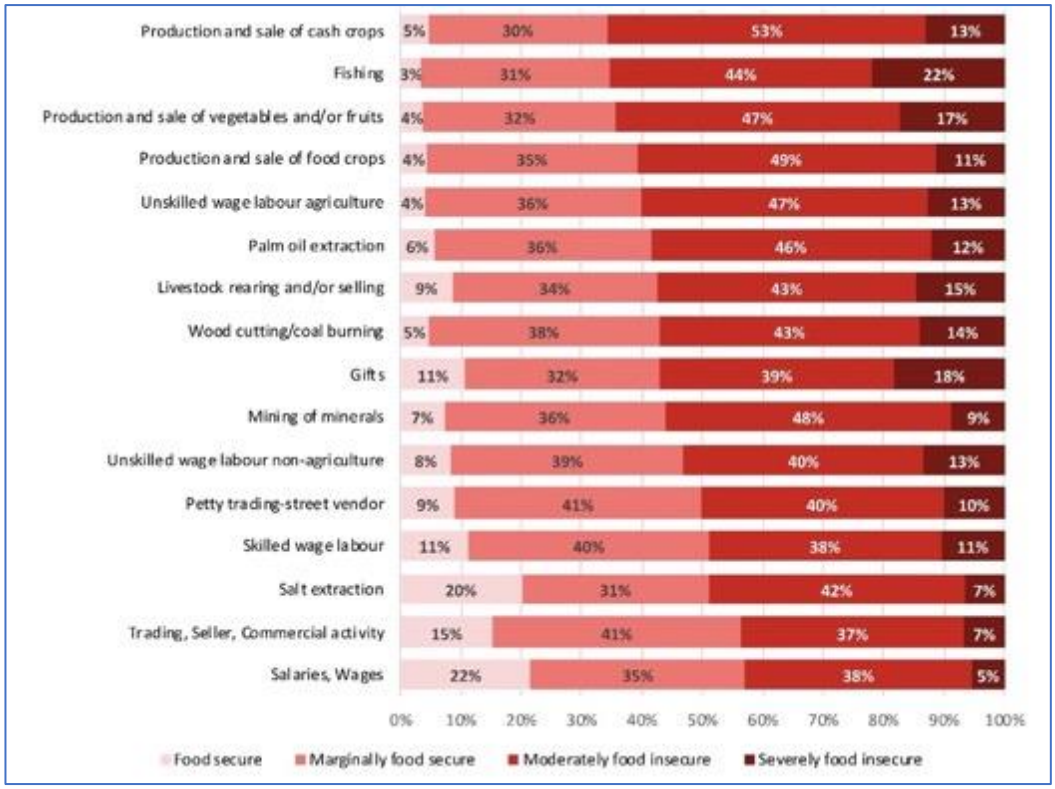


Figure 40: Distribution of livelihood types in Sierra Leone
Source: WFP

[290] Ibid.

Figure 41: Selected pictures, subsistence and livelihood activities, Sierra Leone
Source: Subsistence production of pineapples in the Shenge area, Moyamba District.

Source: Oyster drying on Tasso Island, Western Urban District.

Source: Mango harvesting for subsistence purposes and petty trading at Tissana, Western Rural District.

Small-scale salt harvesting on Tasso Island, Western Urban District, Sierra Leone.

3.3 Agriculture, Livestock and Fisheries sectors' vulnerability to climate change

Climate change is expected to have considerable adverse impacts on Sierra Leone's agriculture and fisheries value chains. Changes in rainfall patterns, extreme heat and flooding are expected to cause marked variability in agriculture supplies, negative trade balance as well as yield deficits. In addition to ecosystem degradation due to coastal erosion, increased salinity and sedimentation of estuaries, are expected to adversely impact the marine fisheries sector. Reduced productivity of estuaries and marine ecosystems could threaten the food security of coastal communities.[291] In addition, storm surges, erratic rainfall and flooding pose considerable risks to the fisheries and agriculture value chains. Such extreme weather events could cause damage to transport, manufacturing facilities, industries, ports and other infrastructure. Tombo and Lakka are situated within the Western rural district and

[291] Available Online: https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf

have frequently been affected by storm surges and flooding in the past. Such impacts have adversely impacted the communities which are primarily dependant on fishing as a main livelihood.[292]

Shifting regional and international trade will likely ensue as a result of disruption to logistics, adversely affecting a diversified agricultural sector and value chain. For example, fish from regions such as Moyamba are often transported to Freetown and neighbouring countries. Infrastructure damage due to flooding and landslides as well as climate-related temperature increases could contribute to post-harvest/transport losses. Land suitability for crop production is also likely to be altered across Sierra Leone due to climate change, which could prove favourable for trade in certain commodities, while deficits may ensue for other crops.[293] Reduced surface recharge due to variable rainfall patterns could adversely affect Sierra Leone's hydroelectrical power generation capacity, putting further strain on a power system that is already unable to supply the needs of the country. This would in turn continue to have considerable impacts on the fisheries and agriculture value chain, due to processing and handling interruptions, e.g., affecting secure cold storage. Fresh produce risks being spoilt due to interruptions in the cold chain, decreasing product quality, affecting food safety and increasing post-harvest losses.[294]

Increased moisture and heat as a result of climate change impacts are expected to adversely affect the quality of such agricultural products produced in districts such as Kambia[295], as well as Port Loko, where the incidence of extreme heat is likely to intensify.[296] Such impacts are expected to intensify due to climate change impacts such as flooding and extreme heat. Post-harvest losses in groundnuts have also increased due to fungal spoilage and poor storage techniques. In addition to climate change, crop diseases and pests markedly impact supply chains and increase pre-harvest losses. The regions where cowpeas and groundnuts are produced, such as Kambia, have already experienced considerable losses due to rodent invasions and crop pests.

Mangrove ecosystems in Sierra Leone play a critical role in the provision of several vital ecosystem services to the fishing sector[297] including but not limited to provision of: i) habitat, feeding and breeding sites, and refuge for important fish species and the broader marine ecosystem; and; ii) a ready energy source for preserving fish through smoking.[298] The status quo and prognosis of the Sierra Leonean mangrove ecosystem as well as the complex interrelationship between mangroves, livelihoods, culture, and sense of place are discussed in the section on Coastal Ecosystems below. Sierra Leone depends on rain-fed agriculture, making rural livelihoods and food security highly vulnerable to extreme heat, drought and erratic rainfall patterns due to *inter alia* resultant shifts in growing seasons. Furthermore, farming is largely subsistence-based, and women constitute the greatest proportion of farm labour. There are considerable opportunities for the development of agricultural technologies and institutional structures to achieve the resilience needed to slow climate change impacts, while also meeting needed food security, livelihood and sustainability goals. Furthermore, innovative development with regard to land, water, soil nutrients and genetic resource management is required to address the challenges of meeting food security in the country. Access to equipment, improved seeds and fertilizer have been additional challenges for subsistence farmers in Sierra Leone. Also, food supplies are placed under additional strain because of climate change, population growth and migration. The favourable conditions for rain-fed agriculture in Sierra Leone are expected to shift under climate scenarios (such as SSP2/RCP4.5), with climate modelling projections for 2050 demonstrating increased temperatures (approximately 0.26 to 1.30°C) and reduced rainfall (approximately -6%).[299] 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

[292] Available Online: https://unfccc.int/sites/default/files/resource/FinalThird%20Nat.%20Com.%20document%20111.pdf
[293] Available Online: https://www.nepad.org/file-download/download/public/16077
[294] Available Online: https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf
[295] Available Online: https://edepot.wur.nl/298067
[296] https://thinkhazard.org/en/report/221-sierra-leone/EH
[297] Njisuh, Z.F., and Sainge, M.S. 2022. *A Preliminary Assessment of Ecosystem Services in the Sherbro River Estuary, Southern Sierra Leone*. Consultancy Report for the Sierra Leone National Protected Area Authority Conservation Trust Fund, funded by the European Union. [Online]. Available: https://www.eeas.europa.eu/delegations/sierra-leone/preliminary-assessment-ecosystem-services-sherbro-river-estuary-southern_en?s=119
[298] Up to 90% of the artisanally harvested fish from Sierra's rural coastal areas are smoked because of remoteness, and the absence of a stable electricity source and other energy sources.
[299] Government of Sierra Leone. 2021 National Adaptation Plan. [Online]. Available: https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf

scenario is compounded by persistent rural poverty and high levels of vulnerability. Among the effects of increasingly acute climate change impacts on the agricultural sector in Sierra Leone are increasing crop water needs[300], competition for water resources and the incidence of pest and disease outbreaks.[301] Reduced water availability is expected to intensify due to changes in rainfall patterns, water shortages, and extreme heat.[302] Water shortages could also lead to the loss of food production and the necessity to import, compounded further by fluctuating world commodity prices and poverty, these climate impacts could further increase vulnerability, hunger, and malnutrition.[303] The impact of climate change on crop yield is, however, likely to vary depending on crop type. For example, it is estimated that the productivity of rainfed rice could increase with climate change, with yield gains of 5 to 25% throughout the country. However, as the nutritional density of crops like rice is likely to be reduced, increased rice yields may not significantly reduce nutrition insecurity. In certain areas of the country where rainfall is not notably increased, losses in rice yield could, however, be incurred. This could be balanced by the area of land on which rice is produced increasing by 15%, as expected, this would in turn put additional pressure on natural areas, including wetlands, and increase competition for productive land. Furthermore, an increase in cassava yield is likely, amounting to up to 75% and the area under cassava production is likely to increase by 4%. Some increase in exports of cassava is expected up until 2030, with a plateau in trade likely from 2030 until 2050. In contrast, groundnut yields are projected to decline by 5 to 25% across Sierra Leone.[304]Climate impacts which include erratic rainfall and flooding, are likely to alter seasonal growth and planting of crops as well as water requirements. In addition, increased crop failures could ensue as well as greater competition for water resources. It is also expected that climate change could lead to an enhanced prevalence of weeds as well as crop pests and diseases.[305] Furthermore, flooding and waterlogging of agricultural land are likely to exacerbate crop losses as well as soil erosion. Sierra Leone has fertile soils with a high organic matter content, considering the tropical climate of the country. However, decreased soil health and a loss in productive topsoil have become prevalent due to more intense rainfall and flooding, which is expected to have a considerable impact on the agriculture sector.[306] Such climate change impacts are also expected to adversely affect livestock production due to reduced forage and pasture availability. Sierra Leone has a distinctly tropical climate and hence impacts on livestock production are not expected to be as severe as in semi-arid and arid regions of Africa. Yet, reduced water availability and heat stress could still have adverse effects on livestock production. Warm, wet weather is conducive to the spread of vector-borne diseases such as Rift Valley Fever and trypanosomiasis.[307] Climate change is likely to exacerbate changes in the prevalence and distribution of livestock diseases as well as other transboundary animal diseases and zoonosis such as the peste des petits ruminants (ovine rinderpest), brucellosis, avian influenza, rabies and African swine fever[308] among others. Furthermore climate change is also affecting the quality and productivity of forage, which could also decrease livestock productivity.[309] Frequent flooding (all coastal districts[310]), and thunderstorms (Kambia, Pujehun, Bonthe, Western Rural and Western Urban districts), as well as the increased magnitude of sea-level rise (Kambia, Port Loko, Pujehun, Bonthe, Western Rural and Western Urban districts), are also expected to adversely affect livestock and crop production[311] in particular the production of crops such as groundnuts and cowpeas, as well as result in higher livestock mortalities.

[300] Wadsworth, R., Jalloh, A., and Lebbie, A. 2019. Changes in Rainfall in Sierra Leone: 1981–2018. *Climate*, 7 (144), 1-15.
[301] Government of Sierra Leone. 2021 National Adaptation Plan. [Online]. Available: https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf
[302] Government of Sierra Leone. 2021 National Adaptation Plan. [Online]. Available: https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf
[303] Ibid.
[304] Available Online: https://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/127302/filename/127513.pdf
[305] Available Online: https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf
[306] Available Online: https://pdf.usaid.gov/pdf_docs/PA00WJRG.pdf
[307] Leach, M., Bett, B., Said, M., Bukachi, S., Sang, R., Anderson, N., Machila, N., Kuleszo, J., Schaten, K., Dzingirai, V., Mangwanya, L., Ntiamoa-Baidu, Y., Lawson, E., Amponsah-Mensah, K., Moses, L.M., Wilkinson, A., Grant, D.S. and Koninga, J. 2017. Local disease–ecosystem–livelihood dynamics: reflections from comparative case studies in Africa. Philosophical Transactions of the Royal Society B 372(1725): 20160163.
[308] https://reliefweb.int/report/sierra-leone/sierra-leone-fao-s-review-reveals-evidence-previously-unconfirmed-endemic
[309] Rhodes. Edward R., Tambi N. Emmanuel, Bangali Solomon; FARA (2015). State of Knowledge on CSA in Africa: Case Studies from Burkina Faso, Senegal and Sierra Leone Forum for Agricultural Research in Africa, Accra, Ghana
[310] https://thinkhazard.org/en/report/221-sierra-leone/
[311] Available Online: www.harpis-sl.website/index.php/hazard-profiles/

It is likely that climate change could exacerbate the expansion of land brought into cultivation, due to a reduction in crop yield, reduced forage availability and poor soil health. Such changes may in turn increase the rate of deforestation and risk releasing the carbon reserves stored in forests and wetlands, as well as reducing the supply of other important ecosystem services. There are however opportunities for sustainable intensification and diversification of agriculture and promotion of soil health, which could lead to increases in crop yield with little or no expansion of agricultural land. Furthermore, an increasing population density favours smaller-sized farms and requires farmers to intensify production as well as diversify income sources.[312] The saltwater intrusion of coastal aquifers is expected to adversely impact water security and quality. This could reduce the amount of water available for irrigation and livestock production in these regions. In addition, crop and livestock production in these regions are vulnerable to the impacts of climate change considering the extensive degradation of wetlands and estuaries which would otherwise naturally reduce the impacts of flooding and sea-level rise.[313]

3.4 Food and nutrition security

In Sierra Leone, food value chains including those of the livestock sector are already affected by weak storage and transportation systems and lack of investment in food system components such as agro-processing and food fortification. Post-harvest losses stand at 30% of total agricultural production.[314] A recent national food security assessment found that 48% of people in Sierra Leone are food insecure, of which the majority are poor smallholder farmers living in the rural areas.[315] The country remains a net importer of food and is hence particularly vulnerable to climate change, due to climate change and international supply chain disruption threatening food security.[316] In addition, while food security has been at the forefront of concerns, so too has the need to protect the sensitive ecosystems in and around agricultural areas that are rich in biodiversity and provide various ecosystem services.[317] The expansion of cultivated land, slash-and-burn agriculture and logging have contributed to deforestation and forest degradation in Sierra Leone and are hence a concern both for climate change adaptation as well as mitigation.[318]Almost half of the population of Sierra Leone is not consuming a sufficiently nutritious diet to live a healthy life, of which the majority are poor smallholder farmers who live in rural areas. In addition, food insecurity is more visible in households headed by women, especially during the leanest months of August to October. Women form 50% of the agricultural workforce.[319] Thus, women's livelihoods are especially vulnerable to climate change and changes in precipitation. Persistent rural poverty is exacerbated by a lack of farming insurance, limited access to finances to invest in irrigation and other agricultural technologies. The proportion of households spending over 65% of their household expenditure on food increased from 53% in February 2019 to 59% in January 2020[320] and is expected to increase further in the wake of the disruption to global food chains in 2022. A more cross-cutting approach is thus required to ensure that all groups in a population achieve both food and nutrition security. The household survey in the target districts undertaken by CMDA in 2022 shows that among the 402 interviewees, 68.4% have responded that their household did not have enough food in the preceding three months. In this same respondent group, 57.2% stated that in the preceding three months, there have been times when there was no food to eat of any kind in your household because of lack of resources to get food. Disproportionately vulnerable groups such as children already face high levels of undernutrition — while Sierra Leone is considered by the Global Nutrition Report to have made some progress towards achieving the target for reducing stunting, a large proportion (~30%) of children

[312] Available Online: https://www.nepad.org/file-download/download/public/16077
[313] Available Online: https://pdf.usaid.gov/pdf_docs/PA00WJRG.pdf
[314] World Food Programme. 2019. Sierra Leone country strategic plan (2020–2024). Report WFP/EB.2/2019/7-A/7. [Online]. Available: https://docs.wfp.org/api/documents/WFP-0000108572/download/
[315]Government of Sierra Leone and the Food and Agriculture Organisation (FAO) of the United Nations. 2020. *Findings of Sierra Leone January 2020 Food Security Monitoring*. Joint report for Statistics Sierra Leone, the Japanese International Cooperation Agency (JICA), the World Food Programme (WFP), and Welthungerhilfe. [Online]. Available: https://docs.wfp.org/api/documents/WFP-0000114371/download/
[316] Available Online: https://pdf.usaid.gov/pdf_docs/PA00WJRG.pdf
[317] Available Online: https://www.nepad.org/file-download/download/public/16077
[318] Available Online: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Sierra%20Leone%20First/210804%202125%20SL%20NDC%20(1).pdf
[319] Available Online: https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf
[320] Ibid.

under 5 years of age are still affected.[321] Similarly, Sierra Leone has also made some progress towards achieving the target for reducing wasting but 5.4% of children under 5 years of age are still affected, below the average for the Africa region (6.0%).[322] Likewise, women, who comprise a large part of the agricultural sector but own and control little of the land, will face increased vulnerabilities negatively impacting their income, time, health and ability to engage with opportunities (e.g., child school attendance and disruptions). Girls are especially vulnerable to dropping out of school in order to contribute to family income and labour.[323] The Household Survey also showed for the population living near the coast that women are more affected by food insecurity. To the question: *In the past three months, were you worried that your household would not have enough food?* 43% of the male-headed households answered yes, compared to 65% of the female-headed households.[324]

3.5 Sierra Leone's Agriculture and Fisheries value chains

The fisheries and agriculture sectors in Sierra Leone form the bedrock of the country's food and nutrition security, economy and assurance of rural livelihoods across the country. The secure access to food that is necessary for food security must be complemented with access to health services, education, sanitary environments, and safe water sources, among other resources, to achieve nutrition security.[325] There are numerous barriers preventing the development of the fisheries and agriculture value chains in Sierra Leone. These include market and credit constraints, reduced crop productivity and export of cash crops as well as subsistence farmers having reduced access to finance. In addition to addressing poor productivity in the agricultural sector, there is also considerable room to develop and diversify the agricultural sector in terms of product diversification and mixed farming, such as agroforestry. Such climate-resilient agricultural techniques aim to increase crop yield by restoring soil health, increasing soil organic matter content as well as water holding capacity.[326] Despite growth in certain commodities, agricultural exports are limited however and undiversified. For example, cocoa and coffee exports have shown considerable expansion as international demand has increased. Hence, these commodities, produced in Sierra Leone for the export market, have shown an increasing export trend of 105% and 220% respectively, between 2007 and 2011. There are thus also marked opportunities for value-addition to these commodities.[327]Numerous value-added agricultural industries such as breweries, malt, furniture and knitted goods have grown after the period of conflict in Sierra Leone. Furthermore, rural communities have become increasingly involved in village craft products such as cloth, rope, sail canvas, boats, wood carvings, baskets, and leather goods. There are marked opportunities for expansion of such industries, however, numerous obstacles inhibit such development. Access to manufacturing and storage facilities as well as markets is limited in rural areas of the country. Furthermore, transport infrastructure is poorly developed due to lack of maintenance and previous conflict in these regions.[328] It is likely that recent fuel price inflation will exacerbate this challenge. In this context it is important to note that distance to market plays an increasingly important role across Sierra Leone. This factor is relevant when considering cowpeas and groundnuts are frequently produced in the Kambia district. However, the distance to market in Freetown is 86 km, which is a major inhibiting factor within the present value chain. Soybeans, which are produced in the Kambia district are utilized within the poultry industry and processed into feed which aids in reducing reliance on imports.[329] In low-lying regions such as Kambia, rice is the primary agricultural produce and staple diet with the majority of rice being sold locally. However, long distances to processors and markets and poor infrastructure, have greatly hampered the rice value chain in this region. Processing includes threshing, winnowing, steaming, parboiling, drying, and milling. However, the need to increase access to drying and storage as well as milling facilities in these rice-production regions of Sierra Leone is crucial. Furthermore, rice being a staple diet has marked potential of combatting nutritional deficiency by means of consuming vitamin and nutrient-rich rice. Hence, the opportunities for value addition in terms of producing high-quality rice are noteworthy and could be encouraged by introducing enhanced crop varieties, improving fertilizer

[321] Global Nutrition Report. 2021. Sierra Leone Country Nutrition Profile. Available: https://globalnutritionreport.org/resources/nutrition-profiles/africa/western-africa/sierra-leone/
[322] Ibid.
[323] Ibid.
[324] Household Survey, CMDA-SL (2022).
[325] Ibid.
[326] Available Online: https://unfccc.int/sites/default/files/resource/FinalThird%20Nat.%20Com.%20document%20111.pdf
[327] Available Online: https://unfccc.int/sites/default/files/resource/FinalThird%20Nat.%20Com.%20document%20111.pdf
[328] Available Online: https://unfccc.int/sites/default/files/resource/FinalThird%20Nat.%20Com.%20document%20111.pdf
[329] Available Online: https://edepot.wur.nl/298067

utilization and the uptake of sustainable agricultural practices.[330] Small-scale and subsistence fisheries utilize smoking as a method of value addition and minimizing spoilage. Fish smoking is widely spread.[331] According to the Fisheries Division of Sierra Leone, 58 official fish landing sites are located along the coast of Sierra Leone. Nineteen are found in Port Loko District, nine in Kambia, three in Western Area, eight in Moyamba District, and the remaining nineteen in both Bonthe and Pujehun districts. These landing sites are often associated with small-scale smoking facilities, utilizing traditional smoking methods as a means of preserving surplus harvest from artisanal fisheries.[332] The Western Urban district and towns such as Freetown also play a crucial role in the country's fisheries sector, with central ports and infrastructure located in this region. Fish exports consist of fish products manufactured by industrial fishing trawlers operating offshore. The absence of local industrial fishing vessels and land-based infrastructure, as well as processing facilities, limits the ability of the fisheries sector to optimize benefits from value addition within this sector. Furthermore, a lack of vessel maintenance, as well as the handling of fresh fish and poor access to landing facilities have hampered the fisheries value chain. Challenges in meeting fish hygiene standards have hampered the fish export market. Fresh fish spoilage and post-harvest losses have been exacerbated due to a lack of value addition activities and poor access to storage and cooling facilities, and a lack of power to run these.[333]

3.6 Agriculture sector (Crops and livestock)

Sierra Leone lies within the agro-silvo-pastoral belt of West Africa and the agriculture sector is central to economic growth, food security and development in the country. It is estimated that approximately 74.2% of the total land area is suitable for agricultural production. The climate-sensitive agricultural sector has been the backbone of the Sierra Leonean economy for several decades.[334] The sector contributes between 40 and 50% of GDP, ~10% of exports, and provides employment to approximately two-thirds of the population.[335] Most agriculture is practised by small farmers, using traditional subsistence approaches, particularly bush fallow.[336] This is a practice where a piece of covered land or forest is cleared through burning, common in the upland areas of the country. After a period of cultivation, the land is left 'fallow' for a period of two to three years – in some cases up to fifteen years - without fertilizer input, thus leaving the land under natural fallow vegetation to restore soil fertility.[337] Current estimates suggest that Sierra Leoneans cultivate just 10%[338] of the country's arable land, with an overwhelming reliance on rain-fed crops such as rice[339,340], beans, maize sugarcane, banana, citrus, pineapple, cocoa, as well as cassava, yams, groundnut and other root crops. Agriculture employs more than half of the country's formal and informal workforce, with a high share of women who do nevertheless lack control over the sector at every level.[341] The two figures below present responses to two selected questions (402 respondents) from the household survey carried out by the Conflict Management and Development Associates (CMDA-SL) as part of the stakeholders' engagement. The first question details the types of agricultural activities practiced by the households interviewed, the second is on food crop cultivated.

[330] Available Online: https://www.fao.org/3/as566e/as566e.pdf
[331] Available Online: https://pdf.usaid.gov/pdf_docs/PA00WGWH.pdf
[332] Available Online: https://academicjournals.org/journal/JSPPR/article-full-text-pdf/57564F863192
[333] Available Online: https://www.fao.org/3/ae703e/ae703e00.pdf
[334] Government of Sierra Leone. 2021 *National Adaptation Plan*. [Online]. Available: https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf
[335] Mattai, J. 2017. *Update of Sierra Leone Hazard Profile and Capacity Gap Analysis Report*. Consultancy for Integrated Geo-Information and Environmental Management Services (INTEGEMS), funded by the United Nations Development Programme (UNDP). [Online]. Available: http://88.208.202.41/images/reports/SECURED_FULL%20REPORT%20FINAL%20(09-11-2017)%20-7777%20SIERRA%20LEONE%20HAZARD%20PROFILE%20AND%20CAPACITY%20GAP%20ANALYSIS.pdf
[336] Allowing natural revegetation for 5 to 10 years after each cropping period
[337] See: Kamaa and al., Extent of Reduction of the Fallow Period and Its Impact on Upland Rice Production in the Nongowa Chiefdom of Kenema District in Eastern Sierra Leone. 2016. Available: https://www.scirp.org/journal/paperinformation.aspx?paperid=72181
[338] Government of Sierra Leone. 2021. *Updated Nationally Determined Contribution for Sierra Leone*. [Online]. Available: https://unfccc.int/sites/default/files/NDC/2022-06/210804%202125%20SL%20NDC%20%281%29.pdf
[339] Mondal, P., Trzska, S., and de Sherbinin, A. 2017. Landsat-Derived Estimates of Mangrove Extents in the Sierra Leone Coastal Landscape Complex during 1990–2016. *Sensors*, 18 (12). [Online]. Available: 10.3390/s18010012
[340] Rice and fish are staples, yet both are vulnerable to climate change impacts. Rice is sensitive to increased humidity, rainfall intensity, pests and, in the coastal areas, is at risk of increased intrusion of saline water due to the projected sea level rise.
[341] Government of Sierra Leone. 2021 *National Adaptation Plan*. Available: https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf

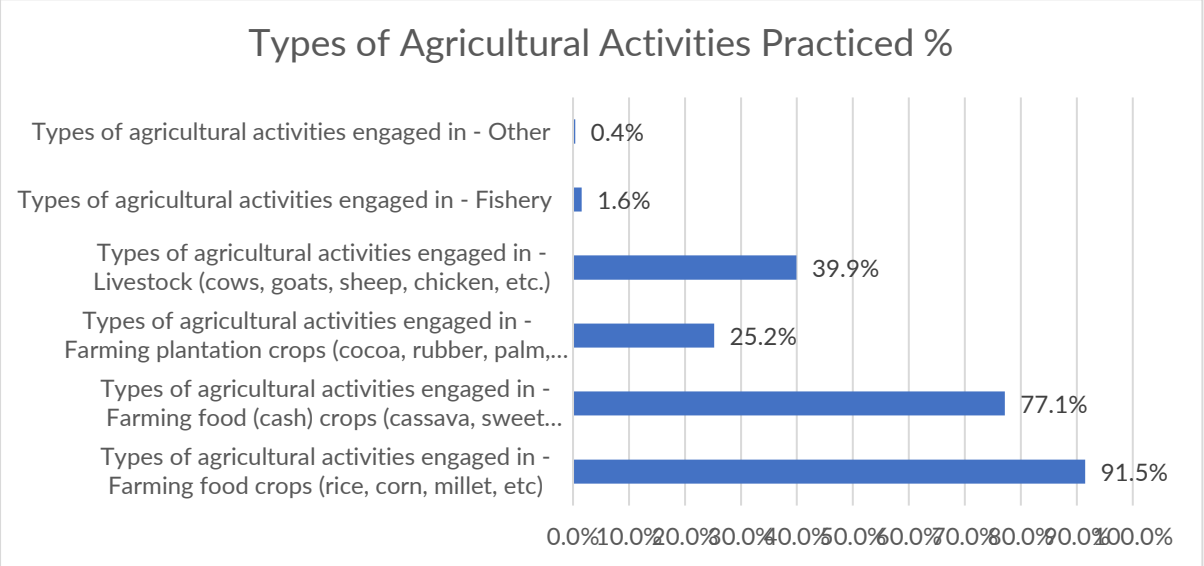


Figure 42: Types of Agricultural Activities Practiced
Source: Household Survey, CMDA-SL (2022)

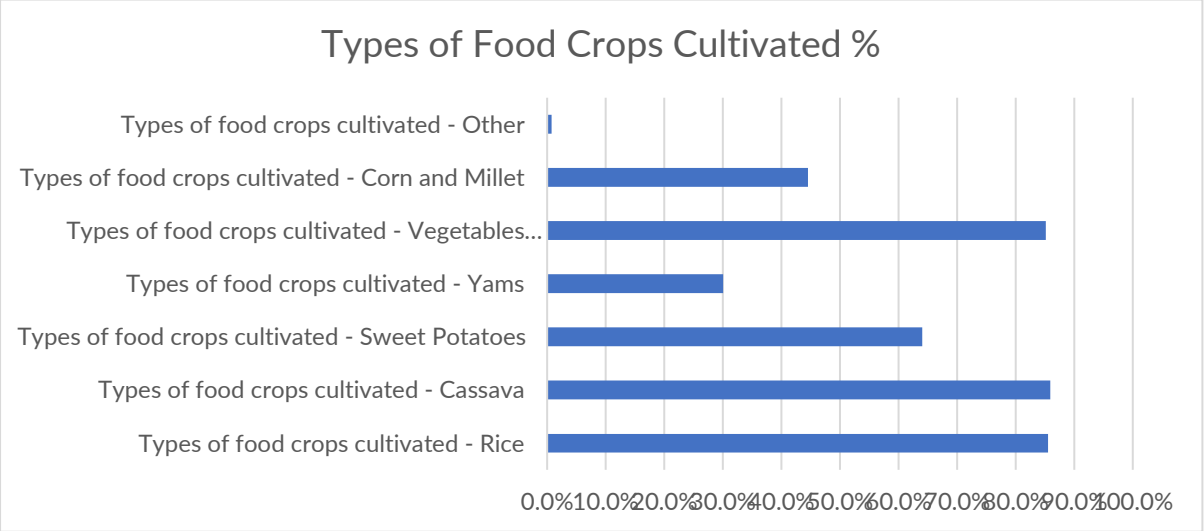


Figure 43: Type of food crop cultivated
Source: Household Survey, CMDA-SL (2022)

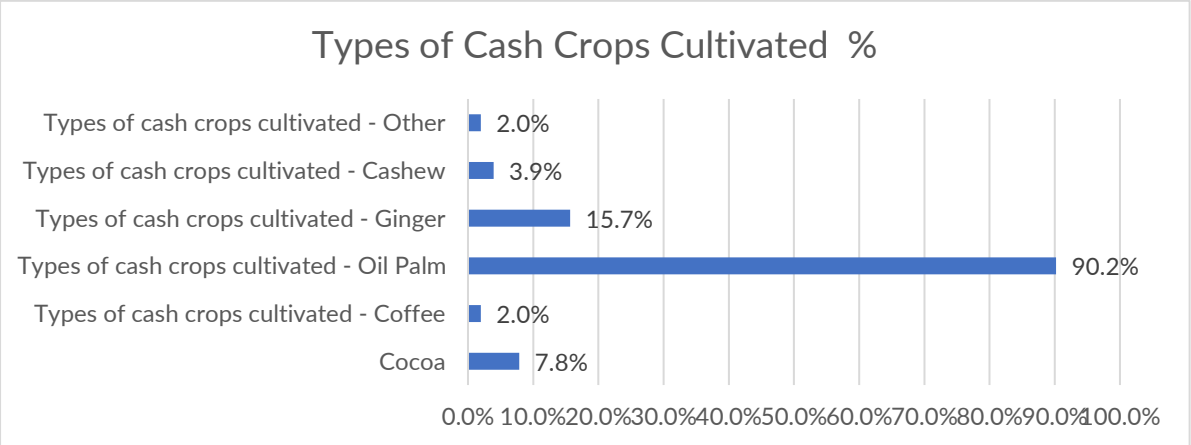


Figure 44: Type of cash crop cultivated

Source: Household Survey, CMDA-SL (2022)

In recent years, efforts have been made to introduce mechanized farming practices, through the provision of tractors, power tillers and other agricultural tools to farming communities[342] although the sector remains extremely climate sensitive. The reason for this is that agriculture in Sierra Leone is overwhelmingly rain-fed[343], and there is little modern irrigation.[344] For these reasons, the period from the middle of March to the end of May is critical[345] for farmers in Sierra Leone.[346] The country's agricultural sector relies heavily on rice production and fisheries, both contributing extensively to food security. Furthermore, cacao and coffee are export commodities whereas cassava, sweet potato, millet, sorghum, maize, groundnuts, cowpeas and beans are also produced as additional staple crops.[347] Domestic production of staple foods, such as rice, has increased in recent years. However, the proportion of rice that Sierra Leone imports as a percentage of total rice consumed remains high. The production of traditional export crops such as cocoa and coffee also increased by 217% and 60%, respectively. The production of cassava, sweet potato, as well as poultry, pigs, goats and cattle, have also increased.[348] Livestock is primarily kept in the transitional forest, savannah lowlands/woodlands and interior plateau of the country. In 2015 it was estimated that 74% of agricultural households across Sierra Leone were involved in subsistence livestock production.[349] Within the subset of the interviewed 402 households from the household survey carried out by CMDA-SL in 2022, 87.4% of respondents mentioned that they keep livestock for commercial (revenue generating purposes); 55.3% for their own household consumption (subsistence); and 51.5% for ceremonial use. Pastoral production and pastureland management form a crucial part of Sierra Leone's agricultural sector. Pastoralists move over long distances, from one region to another and also utilize urban and peri-urban farming systems which involve supplementary feeding.[350]

The coastal districts of Western Urban, Western Rural, Kambia, Moyamba and Pujehun are important contributors to the country's agricultural GDP. In the coastal districts of Kambia, Western Rural, Western Urban, Pujehun, Port Loko, Bonthe and Moyamba, crop and livestock production form an important part of subsistence livelihoods. Livestock production occurs primarily on a rainfed basis with livestock such as poultry, small stock, pigs and cattle being kept for egg, meat, milk, fibre and dairy production. Within the districts of Kambia, Western Rural, Western Urban, Pujehun, Port Loko, Bonthe and Moyamba, most cattle are kept in the Port Loko district where pig rearing is also common. Similarly, pig rearing is also more common in the western area and in the Bo and Moyamba districts. When considering poultry production in Sierra Leone, meat and eggs are primarily produced on a subsistence basis. Poultry production comprises the largest percentage of livestock numbers across these districts, whereas rice production is of primary importance across Kambia and Moyamba.[351]

Agro-climatically, Sierra Leone is approximated into four distinct agro-climatic regions, as well as a fifth 'transitional' region, namely coastal plains, savannah woodland, transitional rainforest, savannah woodland, and rainforest.

Table 11. Overview of Sierra Leonean agro-climatic regions

Agro-climatic Region	Description
Coastal plains	The agro-climate of this region of Sierra Leone is dominated by its proximity to the sea, strong temperature regimes, humidity, and rainfall. The boundary of the region is approximated and taken to coincide with the specific drainage and edaphic characteristics. The coastal plains cover an area of some 11,000 km^2 or about 15% of

[342] Ibid.
[343] Sometimes referred to as 'dry-land agriculture'.
[344] Wadsworth, R., Jalloh, A., and Lebbie, A. 2019. Changes in Rainfall in Sierra Leone: 1981–2018. *Climate*, 7 (144), 1-15.
[345] If farmers plant too soon, there is the risk of a dry period and seedlings dying; and if they wait too long, weeds can become established, and newly emerged seedlings can be damaged by heavy rain.
[346] Wadsworth, R., Jalloh, A., and Lebbie, A. 2019. Changes in Rainfall in Sierra Leone: 1981–2018. *Climate*, 7 (144), 1-15.
[347] Available Online: https://pdf.usaid.gov/pdf_docs/PA00WJRG.pdf
[348] Available Online: https://unfccc.int/sites/default/files/resource/FinalThird%20Nat.%20Com.%20document%20111.pdf
[349] Available Online: https://www.statistics.sl/images/StatisticsSL/Documents/Census/2015/sl_2015_phc_thematic_report_on_agriculture.pdf
[350] Available Online: https://unfccc.int/sites/default/files/resource/Second%20national%20communication.pdf
[351] Available Online: https://unfccc.int/sites/default/files/resource/Second%20national%20communication.pdf

Agro-climatic Region	Description
	the country's land surface. The plains comprise estuarine swamps, alluvial plains, beach ridges and coastal terraces. The dominant factor influencing the agricultural utilization of this region is the exceptionally high rainfall and an excess of precipitation over evapotranspiration demands, exposing the region to excessive leaching, prolonged flooding, and swampy conditions. An average water budget account for the region shows that there is ~2,100 mm of surplus rainfall which together with the seasonal flooding reflects the extreme conditions of a humid environment. There are distinct contrasting periods of the year generally referred to the rainy and dry seasons. The average duration of rain-fed growing period averages some 260±10 days. The dry season therefore averages some 105 days, but for specific agricultural purposes it could be extended for several weeks to include comparatively dry periods of the rainy season in November and December. Temperature is however not a limiting factor for crop growth in this region. Major crops grown include cabbage, carrot, lettuce, and potatoes.
Rainforest	Rainforests in Sierra Leone and the region are influenced by a unimodal distribution of annual rainfall resulting in high reliability of moisture supply to vegetation. However, the receipt of annual rainfall is substantively in excess of evapotranspiration demands and consequently about half of the annual precipitation (1,460 mm) finds its way to ground water or runoff resulting in stream and river flow. The distribution of rainfall is prolonged, lasting from the beginning of May to the end of November, a rise in the level of ground water table occurs and may adversely affect draining conditions particularly in the lower parts of the topography. Another agronomical important aspect of this large climatic water supply is its effect on soil nutrients and land management. The drainage is poor in some areas, especially where there is low elevation — nutrients are leached from the forest. The major crops grown here are both perennial and annual, but the most common types are perennials (plantation). cassava, yams, rice, foliage crops, maize, cabbage, carrot, and lettuce are major crops found in this region.
Savanna Woodland	This region covers about 30% of Sierra Leone and extends from the interior lowland to the interior plateaus of the north and northwest. Rainfall and water surplus are slightly lower here than the other agro-climatic regions. The region is characterized by less verdant savanna vegetation and has a dry season that lasts for between 100 and 130 days, with a substantive annual water deficit. In this agro-climatic region, wildfire, crop cultivation, and overgrazing were identified as the major biotic influences. Poor drainage, shallowness, and infertility are the main edaphic influences. These two factors result in a savanna mosaic landscape, which consists mainly of deciduous woodland tree species and grasses. The rainy season commences in mid-April and tends to extend to January. This result is suitable for annual crop production. The average growing period for the Savanna Woodland region is about 255 days and rainfall is unimodal. There is large water surplus which drives humid conditions and consequently environmental stress for arable crops. This produces pests, diseases, weeds, leaching of nutrients, increased flooding, and soil erosion. In the dry season, the region experiences a high-water deficit with the season prolonging to between 160-170 days at times. Since there is a marked over supply of water in the rainy season and a water deficit in the dry season, there is a need to conserve water in the rainy season for dry seasons. Groundnut, cowpea, maize, millet, sorghum, beans, rice, cocoa, banana, oil palm, rubber, pineapple, sisal, cassava, yams, and sugarcane are major crops grown in this zone.
Transitional Rainforest/ Savannah Woodland	This region shares similar characteristics with the rainforest and savannah woodland agro-climatic regions. Major crops grown include coffee, cocoa, citrus, banana, avocado, oil palm, cassava, yams, and rice.

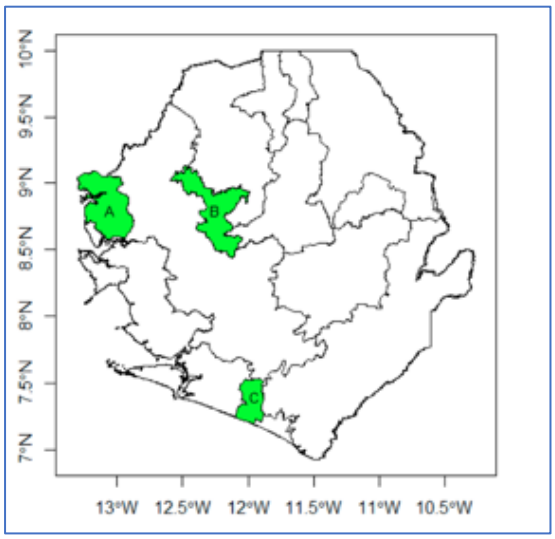
Source: Agwu, E.A., Amadu, F.E., Morlai, T.A., Wollor, E.T., and Cegbe, L.W. 2021[352]

The overall trends and impacts referred to above were confirmed in a 2021 study[353] that considered *inter alia*, the problems encountered by farmers in adapting to the effects of climate change in Nigeria, Sierra Leone, and Liberia.[354] Identified challenges included:

- poor access to information relevant to adaptation and inadequate knowledge on how to cope adequately
- inadequate financial resources
- poor/low extension services
- lack of access to weather forecasts
- high cost of improved crop varieties
- limited knowledge on adaptation measures
- non-availability of credit facilities
- poor response to crises related to climate change by the government agencies and interest groups.

Figure 45. Women selling agricultural produce in Mania village, Bonthe District, Sierra Leone

Figure 46. Germinating rain-fed maize crop on Bonthe Island, Bonthe District, Sierra Leone



[352] Adapted from: Agwu, E.A., Amadu, F.E., Morlai, T.A., Wollor, E.T., and Cegbe, L.W. 2021. *Agricultural Innovations for Climate Change Adaptation and Food Security in West Africa: the Case of Nigeria, Sierra Leone and Liberia*. African Technology Policy Studies Network, Working Paper Series: No. 61, Nairobi.

[353] Agwu, E.A., Amadu, F.E., Morlai, T.A., Wollor, E.T., and Cegbe, L.W. 2021. Agricultural Innovations for Climate Change Adaptation and Food Security in West Africa: the Case of Nigeria, Sierra Leone and Liberia. African Technology Policy Studies Network, Working Paper Series: No. 61, Nairobi.

[354] It is noteworthy that many of the challenges identified by Agwu et al are not directly attributable to climate change.

Figure 47: Location of Sierra Leone's main rice growing regions, i.e., 'rice bowls' at Rokuppr (A), Boli Swamps (B), and Torma Bum (C)
Source: mdpi.com

In 2015, cassava constituted 29% of total food production across Sierra Leone and was a second primary staple to rice. The southern regions of the country have the highest amount of land under cassava production. Sweet potato, and groundnut and maize constituted 5% of total crop production in 2015. Maize is produced across all regions of Sierra Leone, however on a small-scale.[355] Regions such as Port Loko, Moyamba and Kambia produce a large component of the country's rice. The main variety of rice grown in Kambia is upland rice, with minor production of swamp and riverine rice varieties. 62% of households engaged in crop production produce upland rice and 32% lowland rice. In Port Loko, lowland rice production is primary importance compared to other varieties.[356] Enhanced seed varieties have ensured that productivity has been enhanced, however, population growth has continued to place strain on the availability of this staple food.[357] In addition, a considerable portion of groundnuts is also grown in Kambia, Port Loko and Moyamba. Port Loko also has a considerable number of crop producers cultivating cassava in addition to rice.[358] Bonthe and Pujehun districts have a comparably lower proportion of farmers cultivating groundnuts and sweet potato compared to Port Loko and production occurs primarily on a monoculture basis.[359]

3.7 Fisheries

Sierra Leone has an extensive coastline and large continental shelf fed by substantial rivers and abundant rainfall, providing favourable biophysical conditions for productive marine fisheries that contribute substantively to the national economy.[360,361] Pelagic[362] and demersal[363] fisheries are prevalent in the sector (figure below), which also includes stocks of oysters, crab, shrimp, lobster, cuttlefish, and squid that are important for artisanal and industrial fishing activities.

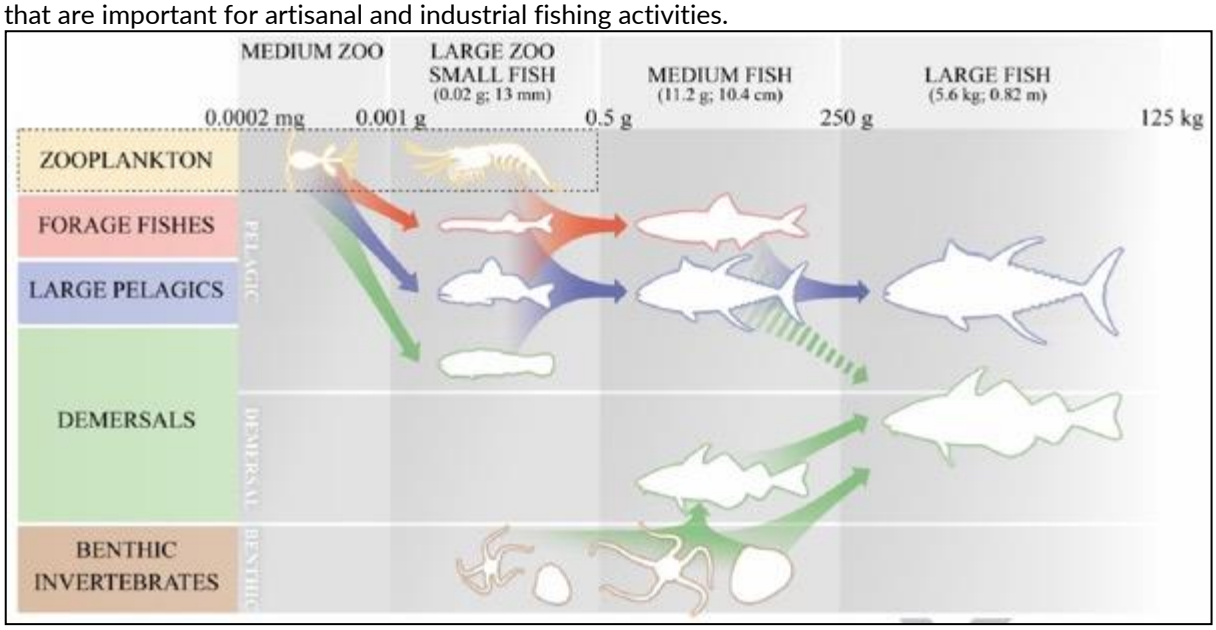


Figure 48: Marine structure denoting habitat, prey categories, and feeding interactions
Source: Petrik, C.M, Stock, C.A., Andersen, K.H., van Denderen, P.D., and Watson, R.J. 2019

[355] https://www.statistics.sl/images/StatisticsSL/Documents/Census/2015/sl_2015_phc_thematic_report_on_agriculture.pdf
[356] https://www.statistics.sl/images/StatisticsSL/Documents/Census/2015/sl_2015_phc_thematic_report_on_agriculture.pdf
[357] Online: https://www.fao.org/3/as566e/as566e.pdf
[358] https://www.statistics.sl/images/StatisticsSL/Documents/Census/2015/sl_2015_phc_thematic_report_on_agriculture.pdf
[359] Available Online: https://edepot.wur.nl/298067
[360] Mattai, J. 2017. *Update of Sierra Leone Hazard Profile and Capacity Gap Analysis Report*. Consultancy for Integrated Geo-Information and Environmental Management Services (INTEGEMS), funded by the United Nations Development Programme (UNDP). [Online]. Available: https://www.harpis-sl.website/images/reports/SECURED_FULL%20REPORT%20FINAL%20(09-11-2017)%20-%20SIERRA%20LEONE%20HAZARD%20PROFILE%20AND%20CAPACITY%20GAP%20ANALYSIS.pdf
[361] Blinker, L. 2006. Country Environment Profile: Sierra Leone. European Union Report. [Online]. Available: https://europa.eu/capacity4dev/file/32962/download?token=49VpV7Nw
[362] Refers to fish that occupy the water column, rather than the surface or benthic marine environment.
[363] Demersal fish live on or near the benthic (sea floor) marine environment.

The fishing sector is central to the coastal economy of the country, providing a source of income and livelihood for fishers, fish processors and fish traders, and is directly accounting for approximately 10% of the national gross domestic product. Furthermore, boat building, woodcutting, fish transportation, basket weaving, fishing gear sales, and trading have also become important contributors to the coastal economy. The production of industrial fisheries is estimated at 20,000 tonnes, which is mainly exported with little or no local value addition. In contrast, artisanal fish production is estimated at approximately 120,000 tonnes, which caters primarily to the local market, again with little or no value addition. Inland fisheries are primarily subsistence-based with the use of scoop-net fishing.

In Sierra Leone, ~40,000 artisanal fishers and their families operate ~12,000 fishing boats leading to direct employment of ~50-100,000 people and indirect employment of ~500,000 people.[364,365] Marine fisheries along Sierra Leone's coastline, are centred around small pelagic fish, tuna, billfish, shrimp and demersal fish resources. More specifically, in Sierra Leonean coastal areas, an estimated 25% of the male population of working age are reported to be involved in fishing at least part-time.[366] It is estimated that wide-scale improvement of fisheries activities and the sector's value chain, could increase the sector's employment levels close to one million people, with a revenue-earning potential of USD 60 million annually.[367]

Moyamba district, Western Rural, as well as Freetown, in the Western Urban district, is central to the country's marine fishing activities. Tombo and Shenge ports supply most of the fish consumed in Freetown. Many commercial and artisanal fishers utilize the ports and infrastructure to process and market the daily catch. Such ports and processing facilities have played a crucial role in providing livelihoods for Moyamba, Western Urban and neighbouring communities. Trawlers are often foreign-owned, and these comprise demersal, pelagic and shrimp trawlers as well as purse seine vessels fishing for tuna and herrings. Joint venture arrangements have, however, allowed for greater involvement of local fishers in the profits of Sierra Leone's fishing sector.[368] Data from 2016 indicates the split between the abovementioned fishing modalities disaggregated by rural and urban typologies at the household level in Sierra Leone. Artisanal fishing prevails, accounting for almost 90% of households that participate in the fishing industry, while and inland fishing and aquaculture and industrial are undertaken by ~8% and ~6% of households, respectively.[369]

Table 12 Typology of primary fishing activities in Sierra Leone

Modality	Description
Artisanal fishing	In Sierra Leone, artisanal fishing occurs in estuaries and coastal waters extending from the shoreline to depths of between 15 and 45m. This activity comprises a variety of watercraft, including but not limited to dugout and planked canoes which employ a range of fishing gear. This includes cast nets, ring nets, driftnets, set net, beach seines and hooks. This fishery accounts for ~80% of the national fish catch. Most of the artisanal fishing activities in Sierra Leone occur around the estuaries of three primary rivers, the Scarcies, Sierra Leone, and Sherbro, as well as around Yawri Bay.
Industrial fishing	Commercial-industrial fishing takes place in deep waters outside Sierra Leone's Inshore Exclusive Zone (IEZ[370]) and is characterized by multinational fleets including trawlers, shrimpers, long liners, canoe support vessels and carriers. It is largely export-oriented.

[364] Mondal, P., Trzska, S., and de Sherbinin, A. 2017. *Landsat-Derived Estimates of Mangrove Extents in the Sierra Leone Coastal Landscape Complex during 1990–2016*. Sensors, 18 (12). DOI: 10.3390/s18010012
[365] Available Online: https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf
[366] Mattai, J. 2017. *Update of Sierra Leone Hazard Profile and Capacity Gap Analysis Report*. Consultancy for Integrated Geo-Information and Environmental Management Services (INTEGEMS), funded by the United Nations Development Programme (UNDP). [Online]. Available: https://www.harpis-sl.website/images/reports/SECURED_FULL%20REPORT%20FINAL%20(09-11-2017)%20-%20SIERRA%20LEONE%20HAZARD%20PROFILE%20AND%20CAPACITY%20GAP%20ANALYSIS.pdf
[367] https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Sierra%20Leone%20First/210804%202125%20SL%20NDC%20(1).pdf
[368] Available Online: https://www.fao.org/3/ae703e/ae703e00.pdf
[369] Source data adapted from: Mattai, J. 2017. *Update of Sierra Leone Hazard Profile and Capacity Gap Analysis Report*. Consultancy for Integrated Geo-Information and Environmental Management Services (INTEGEMS), funded by the United Nations Development Programme (UNDP).
[370] Industrial fishing vessels are prohibited from entering the IEZ, which is protected for artisan fleets. Nonetheless, trade between artisanal and industrial vessels occurs frequently.

Modality	Description
Inland fishing & aquaculture	Undertaken in rivers, a few lakes, flood plains and swamps. Aquaculture is mostly practiced in inland valley swamps and wetlands and has potential for further development.

Source: Mattai, 2017.

Figure 49. Artisanal fishing boats at Mania village, Sierra Leone

Figure 50. Industrial fishing operation off the coast off Freetown, Sierra Leone[371]

Figure 51. Artisanal fishing activities on Plantain Island, Sierra Leone

Figure 52. Fish smoking using mangrove fuelwood at Mania village, Sierra Leone

[371] Reuters. Available: https://theconversation.com/over-fishing-is-strangling-a-key-protein-source-for-west-africans-64498

Figure 53. Repair of fishing nets on Tasso Island, Tasso Island, Western Urban District, Sierra Leone Leone

Figure 54. Boat repairs in progress on Western Urban District, Sierra

In Sierra Leone's fishing sector, the primary areas of concern are overexploitation[372], ecosystem degradation[373], declining stocks due to climate change impacts[374,] inadequate storage and transformation capacities, and structural and socio-cultural inequalities — as seen, for example, in levels of access to markets and credit.[375] From a resource management and governance perspective, like many developing countries, the Sierra Leonean fisheries sector is often data poor and evidence-based decision-making is subsequently a substantive challenge. Similarly, management of fisheries through monitoring, control and surveillance of the industrial and artisanal fishing activities is often inadequate, although post-war gains in this area have been realised.[376] Figure 54 below illustrates the number of rural and urban Sierra Leonean households in 2016 participating in artisanal, industrial, and inland fishing and aquaculture, respectively.

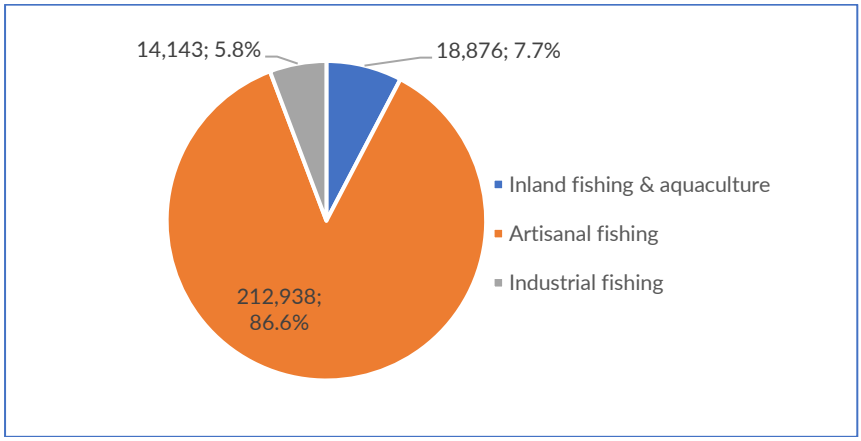


Figure 55: Number of rural and urban Sierra Leonean households in 2016 participating in fishing
Source: Mattaj (2017)

[372] Predominantly from illegal, unreported, and unregulated (IUU) fishing activities.
[373] For example, upstream mining activities causes heavy siltation of riverbeds and tidal creeks, reducing the ecological function and productivity of these ecosystems and ultimately, the populations of fish and other marine organisms that feed and breed in these systems.
[374] Fish may respond to warming temperatures by migrating deeper into the ocean, while inland fishponds may suffer nutrient shifts, e.g., algal blooms, and changes in water quality due to increasing temperatures and variable rainfall.
[375] World Food Programme. 2019. *Sierra Leone Country Strategic Plan (2020–2024).* Report WFP/EB.2/2019/7-A/7. [Online]. Available: https://docs.wfp.org/api/documents/WFP-0000108572/download/
[376] Blinker, L. 2006. Country Environment Profile: Sierra Leone. European Union Report. [Online]. Available: https://europa.eu/capacity4dev/file/32962/download?token=49VpV7Nw

Alternative livelihoods

The Conflict Management and Development Associates (CMDA-SL) quantitative household survey conducted in 2022 in five districts, with a total of 402 households being interviewed on a range of topics, including perceptions and level of knowledge of climate change, access to food and water, potential for alternative livelihoods. Of the respondents, 96% were either household heads or the spouse of a household head. This survey is the most recent and wide-ranging quantitative assessment of the market potential in the target districts of the SLCRP.

Economic structure in the target districts

Of the interviewed households, almost 71% gave farming or fishing as the main occupation of the head of the household. Another 13% were engaged in petty trading, while only 4% worked in services provision. Asked about household income, these percentages were roughly confirmed, with 73% of households indicating that farming and fishing generated their main income, while 17% noted this for petty trading. Less than 3% of households noted that their main income stems from services, which would indicate that trades and transport providers are dependent on alternative livelihoods. Across all households, 64% were involved in agricultural activities in some form.

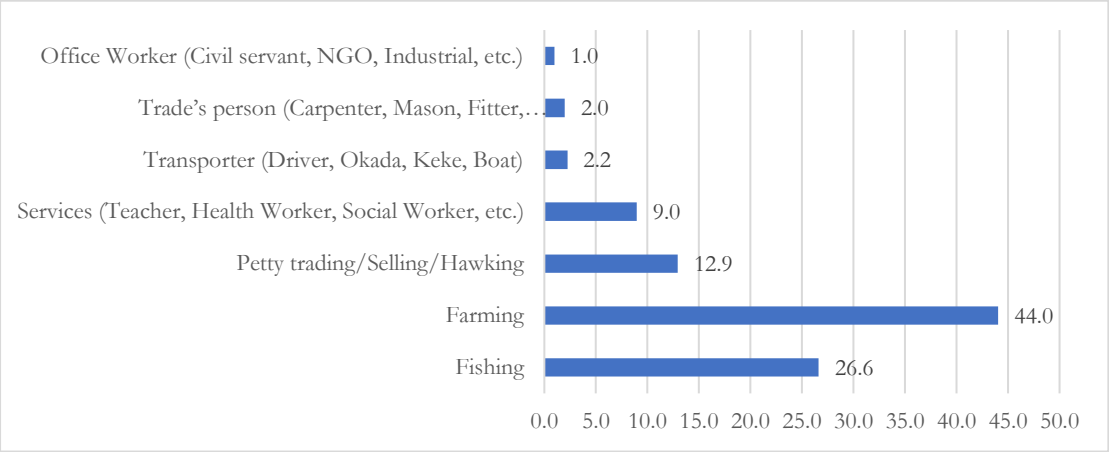


Figure 56 Household Head's Main occupation in %

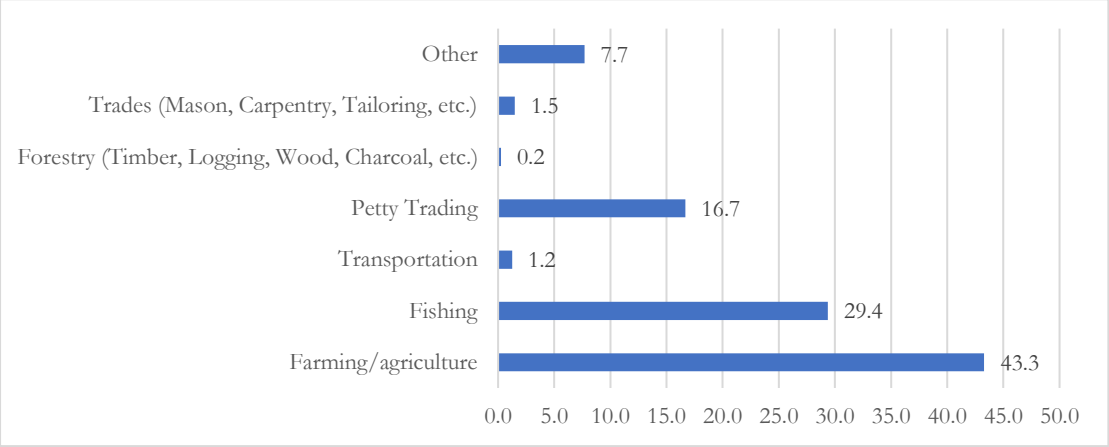


Figure 57 Household Head's Main Income in %

Of high relevance is the relatively low income of the surveyed households, with 36% receiving less than the minimum wage of Le 500,000 every month[377] (approximately USD 33[378]). Food is a high expenditure

[377] https://www.minimum-wage.org/international/sierra-leone
[378] Xe.com on 25 Sep 2022; 1 SLL = 0.0000657706 USD; 1 USD = 15,204.4 SLL

item, with over 40% of responding households indicating that they spend over 30% of their monthly expenditure on food.

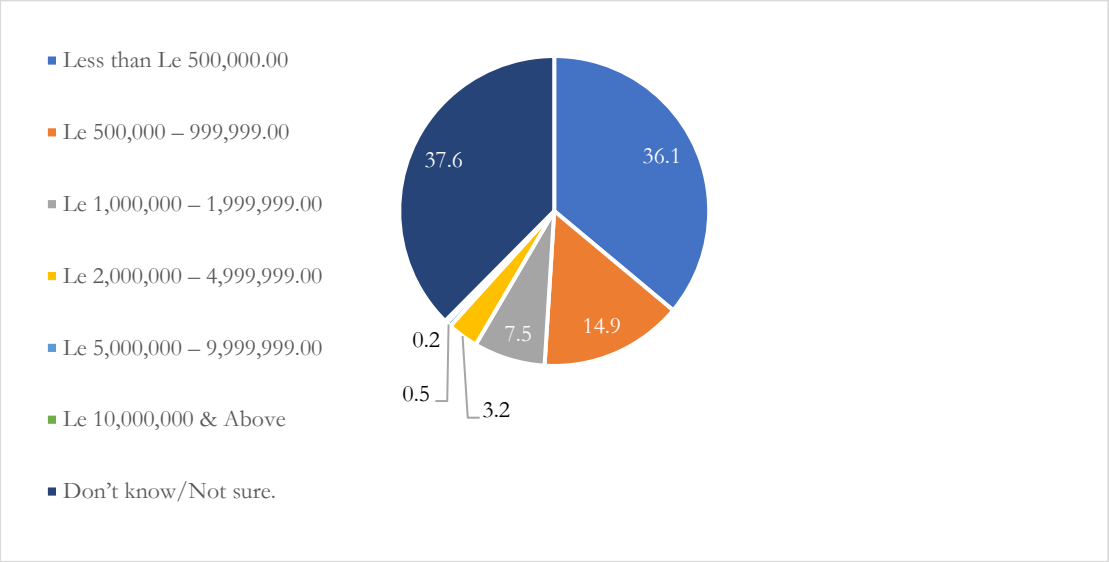


Figure 58 Household total average monthly income by income bracket

It is important to note that the household-level livelihoods are complex and show considerable flexibility, with over 64% of households reporting alternative ways of generating income that are being pursued alongside the main income of the household. Amongst these, petty trading is the most important one, reported by 36% of all households, and 54% of those engaged in an alternative livelihood. A number of households are engaged in more than one alternative livelihood. Considering the findings of the survey, it is likely that there will be substantial demand for activities that support:

- Additional income generation from enhanced farming/fishing results and the introduction of alternative livelihood options
- Are focused on farming, fishing and trading
- Increase service provision related to farming and fishing from the current low levels.

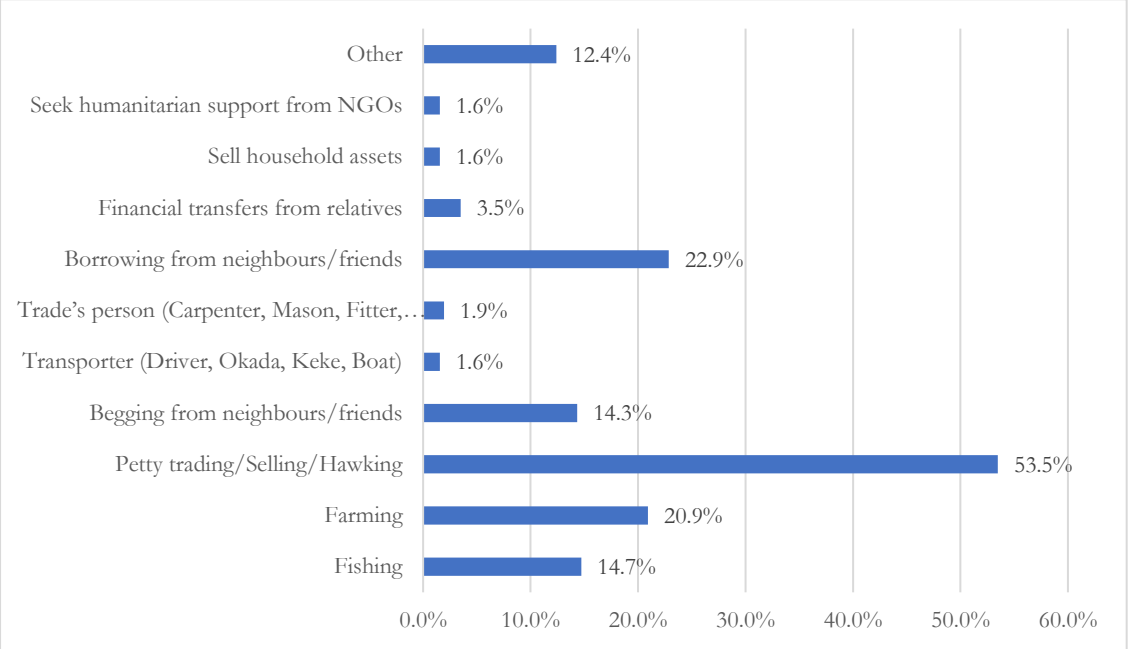


Figure 59 Alternative livelihoods, share of households reporting they are engaged in one

Limited access to finance in rural areas is one of the barriers for people to undertake alternative livelihood activities and to establish and grow small businesses related to farming, fishing and other coastal products. Access to finance is a substantial issue amongst the respondents in the above-mentioned household survey, with over 80% describing it as 'poor' or 'very poor'. This is not surprising given the very low levels of reported incomes. Nevertheless, based on discussions with several communities, Village Savings and Loan Associations have been operating successfully in some of the target areas by past projects[379] and there is a strong willingness for this locally-owned model to be scaled up.

There is no substantial differentiation based on gender in access to finance based on the survey responses. Slight divergences, overall negative for female clients of finance providers, would need to be further researched to validate them statistically.

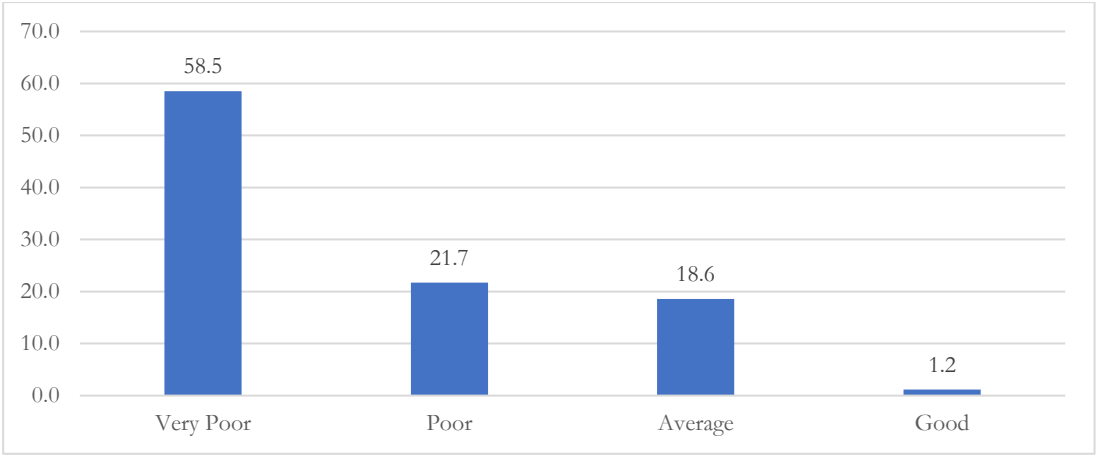


Figure 60 How easy or hard is it for you to access loan/credit facilities from bank or farmers cooperatives

[379] WABiCC project mid-term evaluation and final reports also indicate that VSLAs was a successful approach in the target areas

In addition to access to financing, for entrepreneurs in Sierra Leone to establish and grow climate-resilient small businesses they also requires development of general business and financial skills and industry specific skills through TVET, and support to develop business models. [380]

3.8 Water, sanitation, and health

At the national level, ~67% of Sierra Leoneans access drinking water from improved sources such as protected wells, piped water, or water sachets.[381] This scenario is markedly different between rural and urban dwellers, where ~87% of urbanites have access to improved water sources, while only ~53% of rural households source their drinking water from improved sources, with the remainder relying on unprotected surface water sources.[382] Risks for the water sector are already being observed with vulnerable coastal communities impacted. The supply and demand balance for water is coming increasingly under threat due to variability of rainfall, increased frequency of intense rainfall and rising temperatures. Stream flows have been decreasing since the 1970s, for example, the Mano River fell by 30% between 1971 and 1989.[383] This issue was perceived by communities surveyed in May 2022 as happening a lot (31%) and happening moderately (50%) on an annual basis (Figure 53 below).

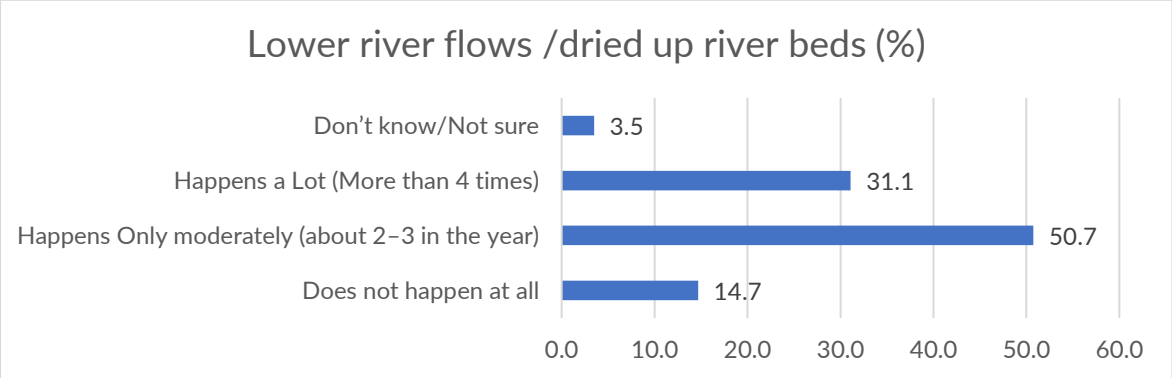


Figure 61. Perceptions of changes in river flow at the household level in coastal Sierra Leone
Source: Household Survey, CMDA-SL (2022)

Seasonal variations in river flows impacted by increased temperatures, increased evapotranspiration, and variable rainfall, are significant with minimal discharges occurring during the dry season and water shortages in the dry season are now common with 40% of the country's protected water points being impacted negatively. Also at the household level, 38% of respondents surveyed in May 2022 indicated that decreased availability of water is evident more than four times per year, while ~50% indicated that this scenario occurs between two and three times per year.

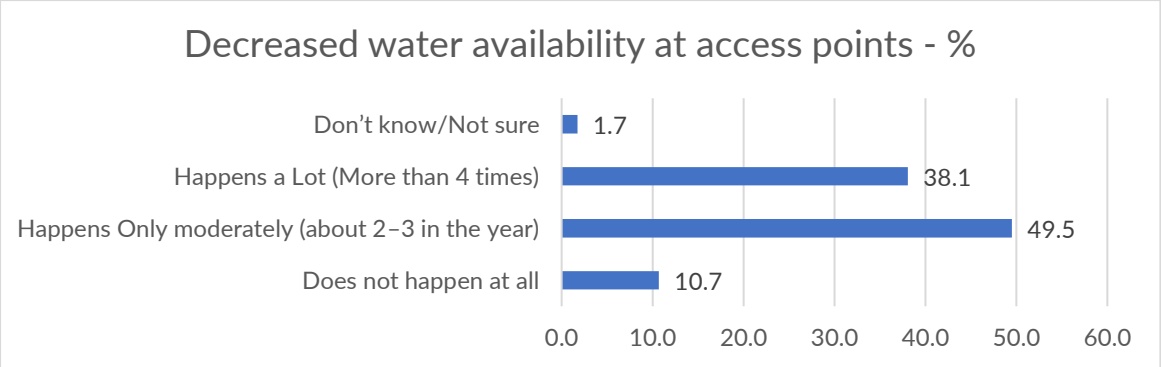


Figure 62. Perceptions of water availability at the household level in coastal Sierra Leone
Source: Household Survey, CMDA-SL (2022)

[380] Simmons, A. (2022). Climate Change Adaptation Framework and Youth Entrepreneurship in West Africa. Springer.
[381] Statistics Sierra Leone. 2018. *Sierra Leone Multiple Indicator Cluster Survey 2017: Survey Findings Report*. Available: https://www.statistics.sl/images/StatisticsSL/Documents/sierra_leone_mics6_2017_report.pdf
[382] Ibid.
[383] USAID, 2016, Climate Change Risk Profile Sierra Leone.

Similarly, 30% of community respondents when surveyed on the need for improved water sources and rain harvesting in coastal Sierra Leone indicated that there was a 'very high' need for such interventions, as illustrated below.

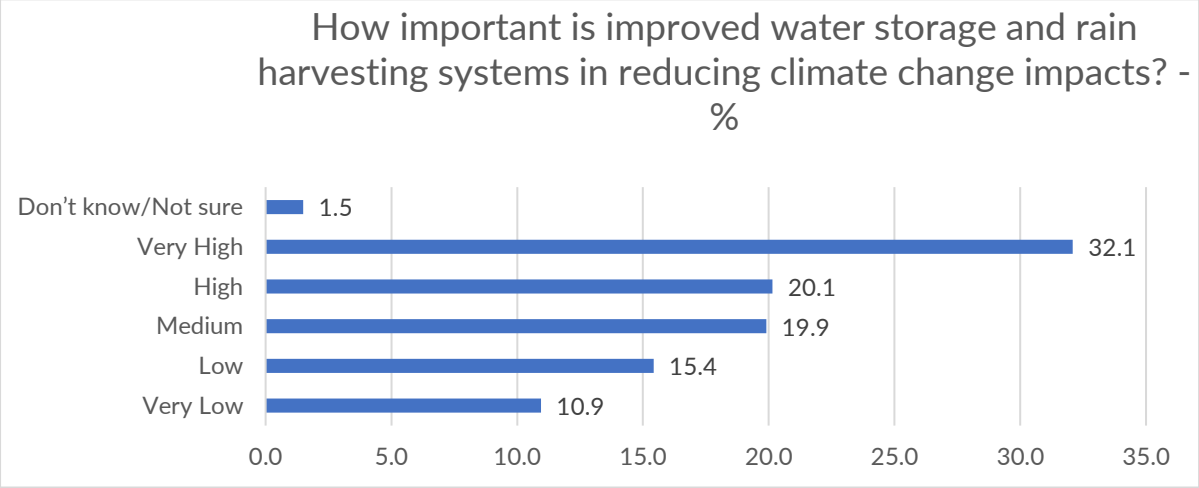
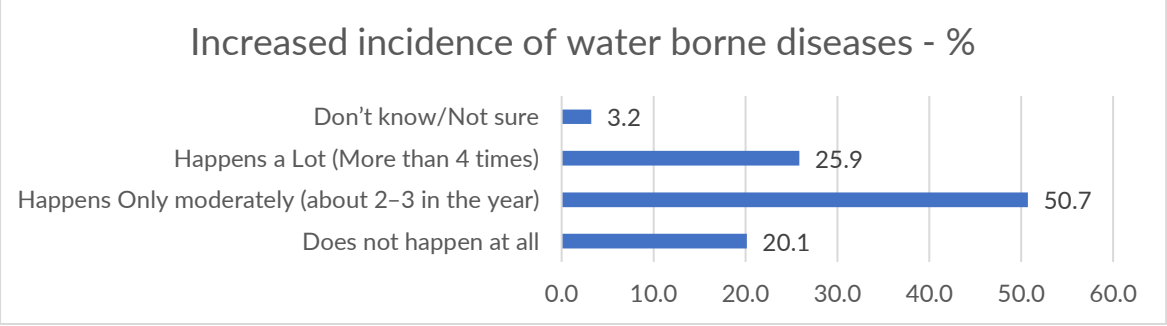


Figure 63. Community perceptions of the need for improved water storage and rain harvesting
Source: Household Survey, CMDA-SL (2022)

The abovementioned climate-related impacts undermine the overall food production system and also other consumption types, such as industry and domestic use. There is also a strong adverse gender aspect, as women and girls are typically responsible for collecting water, as it becomes scarcer, they face longer journeys, more risks of harassment and less time for education and other tasks.

Sanitation in Sierra Leone is far below the reasonable SDG target of 66% for the country and the budget allocation for the sector is less than 0.02% of GDP. Almost 30% of the rural population practice open defecation due to lack of sanitation facilities, while waterborne diseases are expected to increase with more frequent and intense flooding under climate change conditions. For example, a major cholera outbreak in 2012 caused 300 deaths and affected more than 20,000 people. More intense dry seasons (with increased temperatures) in the north and west of the country have been linked to reduced water quality and disease outbreaks. Heavy rains also increase the likelihood of the outbreak of communicable diseases. There is therefore an urgent and increasing need to invest in building climate resilience in the water, sanitation, and health (WASH) sector.[384] Among other WASH-related impacts, climate change is expected to alter the distribution and incidence of climate-related health impacts including greater mortality and illness associated with floods, droughts, and heat stress. Regarding perceived changes in the occurrence of waterborne diseases at the household level, ~26% of survey respondents indicated that the incidence of waterborne diseases is happening frequently (more than four times per year); 50% responded that such diseases are evident between two and three times annually, while roughly 20% believed that waterborne diseases didn't occur at all in their communities.



[384] United Nations Children's Fund (UNICEF). 2020. *Guidance Note: How UNICEF Regional and Country Offices can shift to climate-resilient WASH Programming*. [Online]. Available: https://www.unicef.org/documents/unicef-guidance-note-climate-resilient-wash

Figure 64. Perceptions of the incidence of waterborne diseases at the household level in Sierra Leone *Household Survey, CMDA-SL (2022)*

Responses to the same survey showed that treatment of water for domestic purposes is not common (36% said the water was 'unsafe' for drinking, but only 20% of the respondents said they do anything to the water to make it safer) which is likely a contributing factor to the prevalence of waterborne disease in coastal Sierra Leone.

Figure 65. Utilisation of groundwater resources in Tengisa Village, Bonthe District, Sierra Leone

Figure 66. Handpump within a homestead on Bonthe Island, Bonthe District, Sierra Leone

Figure 67. Floodplain on Bonthe Island with anecdotal evidence of spikes in waterborne diseases

Figure 68. Village street on Bonthe Island showing rudimentary stormwater infrastructure which is consistently overwhelmed in the rainy season

Beyond water quantity impacts induced by climate change, water quality issues will also escalate. More rainfall leads to increased surface runoff, risking polluting coastal waters with nitrogen, phosphorous, sediments and toxic contaminants that affect dissolved oxygen levels. This presents issues of water quality as well as water quantity. While, as rainfall is more variable with larger drier periods, combined with higher temperatures, the salinity gradient of freshwater will increase leading to land degradation and health issues. On the coast this is further hampered by sea level rise and saline intrusion into fresh surface and groundwater supplies, which is increasing the demand for freshwater.[385]

[385] Government of Sierra Leone. 2021. *Updated Nationally Determined Contribution for Sierra Leone*. [Online]. Available: https://unfccc.int/sites/default/files/NDC/2022-06/210804%202125%20SL%20NDC%20%281%29.pdf

Another health risk impacting poor coastal communities is linked to climate-related mental health issues and stresses from being at risk and vulnerable to climate change impacts. Mental health issues related to climate change and its effects might be triggered by a variety of factors, including lost income, undernutrition, physical injury and/or illness, homelessness, or lost assets (seeds, livestock, equipment).

3.9 Coastal and marine ecosystems

3.9.1 The coastal zone

The coastal zone of Sierra Leone is highly vulnerable to the increased frequency and severity of coastal erosion, flooding and storm surges which severely impact social wellbeing, livelihood security, water resources and major economic sectors such as fishing, tourism and agriculture. Coastal communities are already experiencing considerable repercussions of these impacts, notably on their livelihoods with reduced fishing productivity, ecosystem degradation and low farming outputs.

In Sierra Leone, coastal erosion is already a significant challenge in several coastal areas where the coastline is shifting by about 4 to 6 meters a year.[386] Sea-level rise further decreases the quality and quantity of groundwater resources otherwise caused by human activities. With rising sea levels, 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. If no action is taken, a total of 26.4 km^2 is estimated to be lost to the sea. It is estimated that by 2050, sea-level rise will lead to USD 46.8 million in infrastructural damage with 1,881 buildings affected[387] in particular around the area of Freetown which is more densely populated and built up.[388] Data for coastal districts outside Freetown is not available in detail, but this is understood to be a substantial risk and burden in the target districts.

While coastal erosion and accretion are generally the result of natural processes and can be the result of human actions, these processes are exacerbated under extreme weather and climate change conditions. Erosion due to the regular waves of tropical storms are likely to drive chronic (long-term) hazards. In Sierra Leone's coastal areas, there are acute (short-term) erosion incidents, which are due to storm surges and sand mining. Macro-scale events are also active with climate change impacts that may significantly alter sea-levels, beach / shore profile (morphology of beach including the slope towards the sea) and cause coastal land subsidence. Human-induced erosion can occur due to the extraction of sand and mineral resources from coastal areas and improperly sited maritime structures. The application of ill-planned countermeasures often exacerbates the issue, resulting in maladaptation.

Figure 69. Acute coastal erosion Mania Village, Bonthe District, exposing mangrove roots

Figure 70. Community efforts to combat coastal erosion at Tengisa Village, Bonthe District, Sierra Leone

[386] Government of Sierra Leone. 2021 National Adaptation Plan. Available: https://unfccc.int/sites/default/files/resource/SierraLeone_iNAP_Final.pdf
[387] Ibid.
[388] https://unfccc.int/sites/default/files/200609_sierra_leone_coast.pdf

Figure 71. Mature mangrove forests near Bonthe Island play a crucial role in mitigating against coastal erosion

Figure 72. Mangrove forests providing shoreline protection at Shenge, Western Rural Area, Sierra Leone

3.9.2 Mangrove ecosystems

Coastal mangroves provide crucial ecosystem services and are important in carbon sequestration. Mangroves have, however, been placed under considerable strain due to land degradation, pollution, urbanization and climate change.[389] They are the most important ecosystem in Sierra Leone. The characteristics and features of mangrove ecosystems in general are described below, followed by a baseline summary at national level of mangrove ecosystems in Sierra Leone, including an analysis of degradation and loss over time. Mangrove forests occur in the intertidal zone along tropical and subtropical coastlines, primarily between 30° N and 30° S latitudes, covering ~81,000 km^2 across 105 countries.[390] Although this amounts to less than 1% of global tropical forest cover, mangroves are one of the most productive and biologically complex ecosystems that store three to four times more carbon per equivalent area compared to tropical forests.[391] Mangrove ecosystems include 60 species of trees across 12 genera that are adapted to high salinity and fluctuating water levels and are fundamental to the food security and livelihoods of communities in surrounding areas. This is because mangroves provide essential ecosystem services such as: i) spawning grounds and nurseries for fish, crabs, shrimps and other forms of marine life; ii) protection against extreme weather events such as storm winds and marine and terrestrial floods; iii) preservation of coastlines by reducing erosion from storm surges, currents, waves, and tides; and iv) provision of food, medicine and wood and non-wood forest products. Mangrove ecosystems are, however, under threat globally, with their geographical area having declined by up to 50% during this century.[392] In addition, mangrove forests provide protection to coastal communities from natural disasters, especially storm surge and small to moderate tsunamis. However, due to increasing land competition for agriculture, aquaculture, tourism, and infrastructure development, in Sierra Leone these forests have declined by almost 50% from 184,000 hectares in 1979 to 145,000 hectares in 1990 and further to 95,000 hectares in 2010.[393] This degradation of mangrove ecosystems has been driven by *inter alia*: i) clearing for aquaculture; ii) fuelwood harvesting; and iii) encroachment linked to urbanisation. Furthermore, sea-level rise associated with climate change is projected by climate scientists to inundate mangroves in many parts of the world, exacerbating the degradation of these ecosystems.

[389] Online Available: https://unfccc.int/sites/default/files/resource/Second%20national%20communication.pdf
[390] Extrapolated value for 2014. From: Hamilton, SE, & Casey, D. 2016. Creation of a high spatiotemporal resolution global database of continuous mangrove forest cover for the 21st Century (CGMFC-21). Available at: https://arxiv.org/abs/1412.0722
[391] Mondal, P., Trzska, S., and de Sherbinin, A. 2017. Landsat-Derived Estimates of Mangrove Extents in the Sierra Leone Coastal Landscape Complex during 1990–2016. *Sensors*, 18 (12). DOI: 10.3390/s18010012
[392] WWF. 2020. Mangroves. Available at: https://www.worldwildlife.org/biomes/mangroves
[393] https://www.fao.org/3/al624E/al624E.pdf and https://some.grida.no/sierra-leone-2015/2-major-marine-ecosystems/23-biological-systems.aspx

3.9.3 Mangrove ecosystems in Sierra Leone

In Sierra Leone, the five most dominant mangrove species in the region are *Avicennia germinans*, *Rhizophora racemosa*, *Rhizophora harrisonii*, *Laguncularia racemosa*, and *Rhizophora mangle*.[394] In Sierra Leone people are heavily dependent on fuelwood for domestic energy, mostly for cooking. Mangrove wood is additionally used for fish processing, building construction poles, and household furniture. While both the Scarcies and Sierra Leone River Estuaries have all five dominant mangrove species, Yawri Bay and Sherbro have only three of them. The *Rhizophora* species have been heavily harvested for fuelwood for fish smoking, whereas the *Avicennia* species is primarily harvested for fuelwood for salt processing.[395]

Figure 73. Harvested mangrove wood at Delken, Bonthe District, Sierra Leone

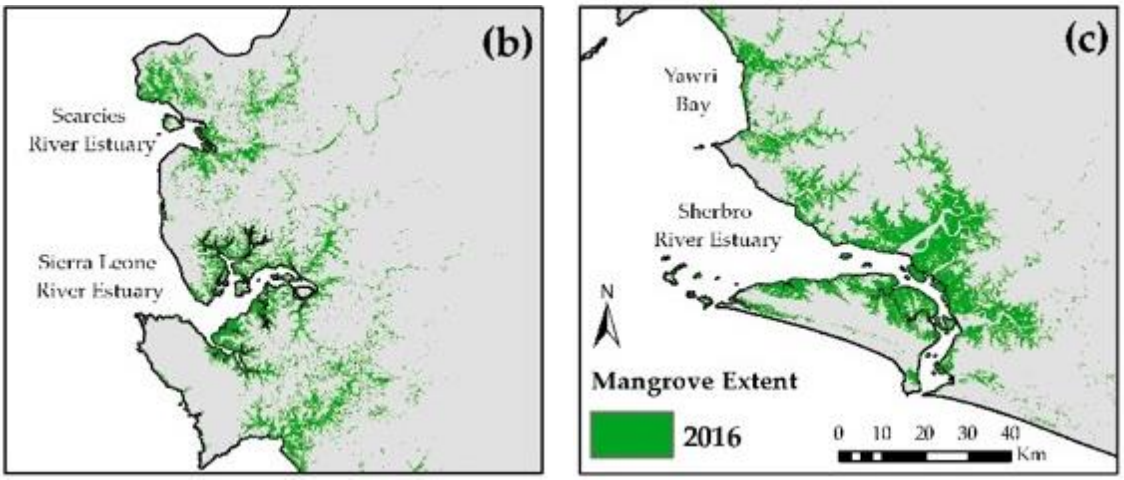


Figure 74: Mangrove extent in Sierra Leone in 2016

3.9.4 Mangrove loss and degradation

Despite the multiple benefits of mangroves and their role in promoting a climate-resilient landscape for Sierra Leone's coastline, they are disappearing at an alarming rate. This scenario exacerbates the impacts from climate events, thereby making coastal communities who depend on the mangroves even more exposed and vulnerable to tropical storms, flooding, seawater intrusion into surface and ground water sources, damage to property, and loss of life. As mangroves degrade, their corresponding ability to continue providing ecosystem services fail. The immediate consequence of this failure is the resulting negative socio-economic impacts on the environment and society—for instance, the release of

[394] Ibid.
[395] Ibid.

greenhouse gas emissions into the atmosphere, the loss of fish-breeding sites[396], loss of biodiversity (including algae, green turtles, hawksbills, Olive Ridleys, leatherbacks, loggerheads and crocodiles[397]) resulting in a reduction of the functioning of the mangrove ecosystem, reduced protection from catastrophic events, such as tsunami, tropical cyclones, tidal bores and shoreline erosion.[398] There is also evidence to suggest increasing coastal erosion and an increasing frequency of storms and dwindling fish catch in Sierra Leone are due to mangrove forest change.[399] The combination of increasing human-induced and environmental stress may lead to unsustainable conditions for mangroves and ultimately their decline. Total mangrove cover in Sierra Leone is estimated to have decreased by approximately 25% since 1990, but very unequally among regions: the decrease reaches 46% in the Scarcies River Estuary, due to widespread conversion of the land to rice farms.[400] In the specific case of the Bonthe and Sherbro districts, the estuary mangroves make up the greatest concentration in Sierra Leone or 58.2% of the country's total mangrove cover, with large trees of *Rhizophora racemosa* reaching up to 40 metres in height.[401] Approximately 8% of the mangroves of this region have been lost since 1990 at a rate of about 0.2% per year. The Sherbro River Estuary's ecosystems faces many threats including habitat destruction, mangrove deforestation, climate change (coastal erosion, flooding and droughts), hunting, the collection of sea turtle eggs and other endangered species products, and land-use change as a result of agriculture, settlement development, firewood extraction and fish stock overexploitation.[402]

Overall, analysis of historical satellite imagery reveals that Sierra Leone lost about 14,000 ha of mangrove forests over 34 years (see below), i.e., 411 ha (0.06%) of mangrove forests each year.[403] There is evidence to suggest that the intensity of pressures driving the degradation of mangroves is increasing when the 2016 values are compared to the estimates of a 2022 study[404]. Amongst community members, there is a general perception that mangroves have declined by up to 20% from 15 years ago.[405]

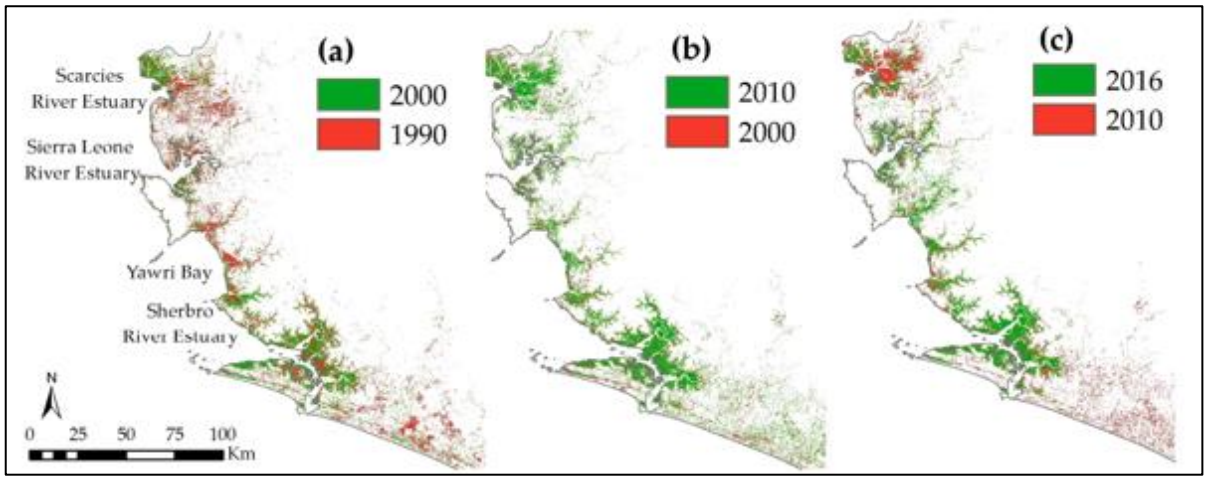


Figure 75: Decadal changes in mangrove extent in the Sierra Leone coastal landscape complex between (a) 1990-2000, (b) 2000-2010, and (c) 2010-2016 (red are areas of mangrove loss in the relevant decade)

[396] Njisuh, Z.F., and Sainge, M.S. 2022. *A Preliminary Assessment of Ecosystem Services in the Sherbro River Estuary, Southern Sierra Leone*. Consultancy Report for the Sierra Leone National Protected Area Authority Conservation Trust Fund, funded by the European Union. [Online]. Available: https://www.eeas.europa.eu/delegations/sierra-leone/preliminary-assessment-ecosystem-services-sherbro-river-estuary-southern_en?s=119
[397] https://www.wabicc.org/wp-content/uploads/2018/08/The-Bonthe-Sherbro-River-Estuary.pdf
[398] https://www.nature.com/articles/s41598-018-31683-0
[399] https://www.wabicc.org/wp-content/uploads/2018/08/The-Bonthe-Sherbro-River-Estuary.pdf
[400] WA BiCC, 2019 Climate Change Adaptation Plan: A Priorities Plan for the Sierra Leone Coastal Landscape Complex.
[401] https://www.wabicc.org/wp-content/uploads/2018/08/The-Bonthe-Sherbro-River-Estuary.pdf
[402] Ibid.
[403] Mondal, P., Trzska, S., and de Sherbinin, A. 2017. Landsat-Derived Estimates of Mangrove Extents in the Sierra Leone Coastal Landscape Complex during 1990–2016. *Sensors*, 18 (12). DOI: 10.3390/s18010012
404 Njisuh, Z.F., and Sainge, M.S. 2022. *A Preliminary Assessment of Ecosystem Services in the Sherbro River Estuary, Southern Sierra Leone*. Consultancy Report for the Sierra Leone National Protected Area Authority Conservation Trust Fund, funded by the European Union. Available: https://www.eeas.europa.eu/delegations/sierra-leone/preliminary-assessment-ecosystem-services-sherbro-river-estuary-southern_en?s=119
[405] Ibid.

Source: Mondal, P., Trzska, S., and de Sherbinin, A. 2017[406]

Mangrove wood is extensively harvested by men and women for subsistence and commercial purposes in Sierra Leone. Most community members harvest and sell the wood to support households for cooking/ feeding, fuel, schooling, healthcare, and house construction. According to a 2022 study[407] undertaken in the Sherbro Estuary, wood harvesters remove an average of 30± 23.5 dozen poles of wood per month.[408] The study found that based on average estimates, a single household in the Sherbro Estuary is likely to harvest 6.34 m^3 ± 4.95m^3 of wood monthly. Of this quantity, ~60% is used as energy (fish smoking and cooking) and 29% for construction. This rate equates to 0.08 ha ± 0.77 ha of mangrove forests harvested by a single household per month. Community members sell the wood to supplement their household needs (livelihoods) and make an average of USD 360 per month from selling mangrove wood.[409] The household survey conducted in 2022 by CMDA-SL found a very high dependence on Mangroves as a resource. Households responded that 94.5% of them use wood as the main source of fuel for cooking, 80% use it for fish smoking for personal or commercial use, and 37% use it for construction.

3.9.5 Spatial and temporal trends in mangrove coverage and biomass

The ecosystem services provided by mangroves in Sierra Leone are essential to the maintenance of climate-sensitive livelihoods and protection from physical hazards such as coastal erosion and inundation. Given the degradation trends described in the preceding sections, a quantification of mangrove extent and degradation hotspots is essential for prioritisation of potential areas to inform the proposed restoration and protection interventions under Component 3 of the proposed project. To this end, a global dataset developed by Global Mangrove Watch[410] (GMW) was used to assess the extent of mangrove degradation in Sierra Leone between 1996 and 2020.[411] The following sections provide an overview of observable trends extracted from a spatial-temporal analysis of this data for Sierra Leone in terms of changes to biomass, coverage, and land productivity.

3.9.6 Changes in mangrove biomass – Normalized Difference Vegetation Index (NDVI)

The normalized difference vegetation index (NDVI) is an indicator of vegetation greenness which has a strong correlation with green biomass, which is indicative of the growth and health of vegetation. The baseline case of 2001-2005 has the highest NDVI values in the central areas of the clusters, further away from the edges of the mangrove areas. Areas of negative NDVI tend to be those near the edge of the mangrove areas where biomass loss is more likely. The changes over time show a general decrease in NDVI from the base case of 2001-2005. These decreases are small in the years from 2006-2010, moderate in 2011-2015, and more severe from 2016-2020. This is most noted in areas 1 and 4. There are some small areas where there are increases in NDVI over time, these are, however, noted in areas where the baseline scenario had low or negative NDVI values. The decreases in NDVI values are most prevalent along the edges of the mangrove clusters. Losses in biomass through mass harvesting or smaller-scale coppicing activities are likely the driver of this loss. These trends are well noted in the areas around Kortimaw in Area 1, south of Freetown in area 2, along the coast west of Sembehun in area 3, and along the coast in area 4 overleaf.[412]

[406] Excerpted from: Mondal, P., Trzska, S., and de Sherbinin, A. 2017. Landsat-Derived Estimates of Mangrove Extents in the Sierra Leone Coastal Landscape Complex during 1990–2016. Sensors, 18 (12). DOI: 10.3390/s18010012
[407] Njisuh, Z.F., and Sainge, M.S. 2022. A Preliminary Assessment of Ecosystem Services in the Sherbro River Estuary, Southern Sierra Leone. Consultancy Report for the Sierra Leone National Protected Area Authority Conservation Trust Fund, funded by the European Union. [Online]. Available: https://www.eeas.europa.eu/delegations/sierra-leone/preliminary-assessment-ecosystem-services-sherbro-river-estuary-southern_en?s=119
[408] Ibid.
[409] Ibid.
[410] Global Mangrove Watch. 2020. 2010 Baseline Released Version 1.2. [Online]. Available: https://www.globalmangrovewatch.org/.
[411] Bunting P, Rosenqvist A, Hilarides L, Lucas RM, Thomas N, Tadono T, Worthington TA, Spalding M, Murray NJ, Rebelo L-M. Global Mangrove Extent Change 1996–2020: Global Mangrove Watch Version 3.0. Remote Sensing. 2022; 14(15):3657. https://doi.org/10.3390/rs14153657
[412] Global Mangrove Watch. 2020.

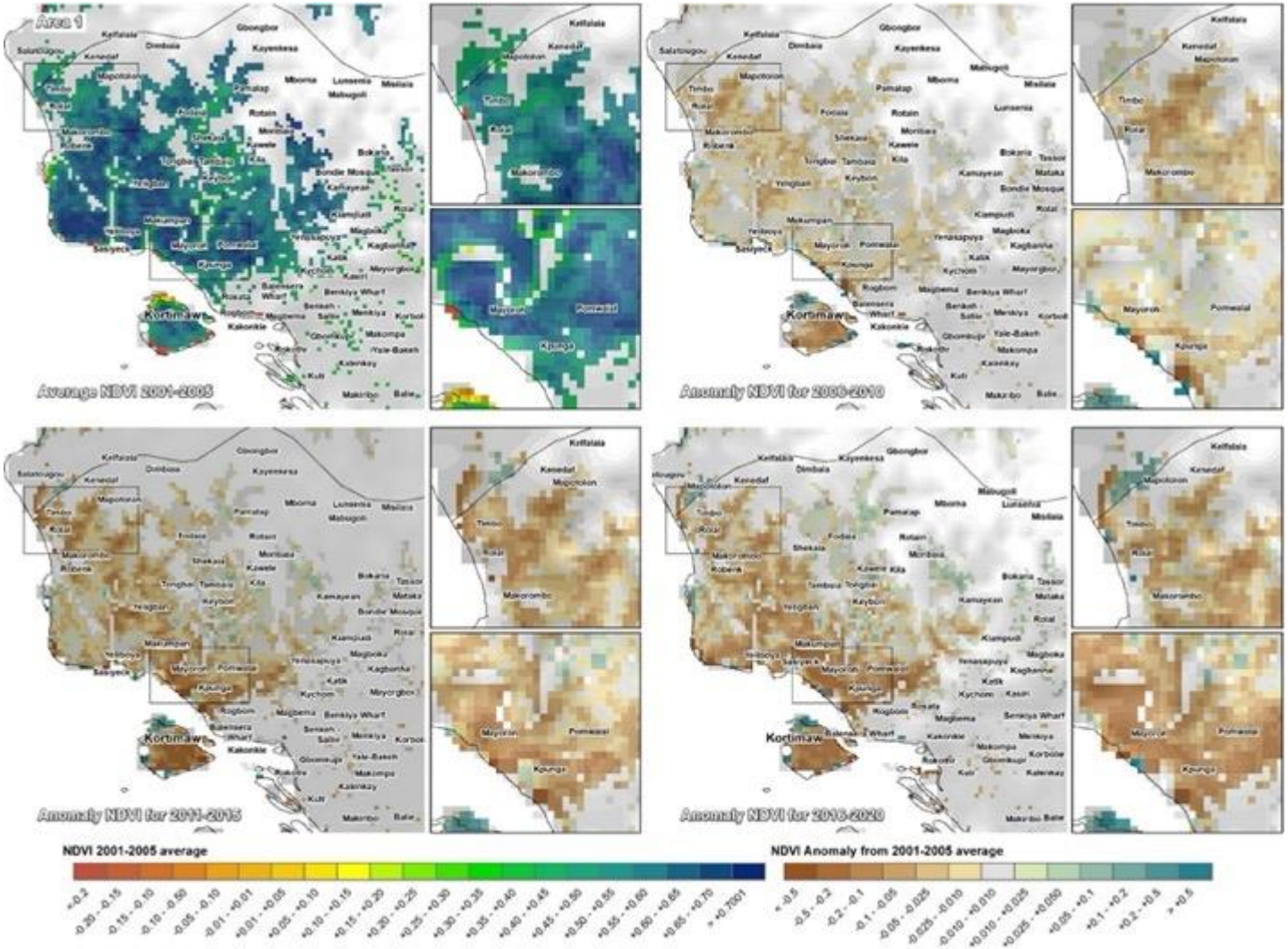


Figure 76. NDVI changes over time in Area 1

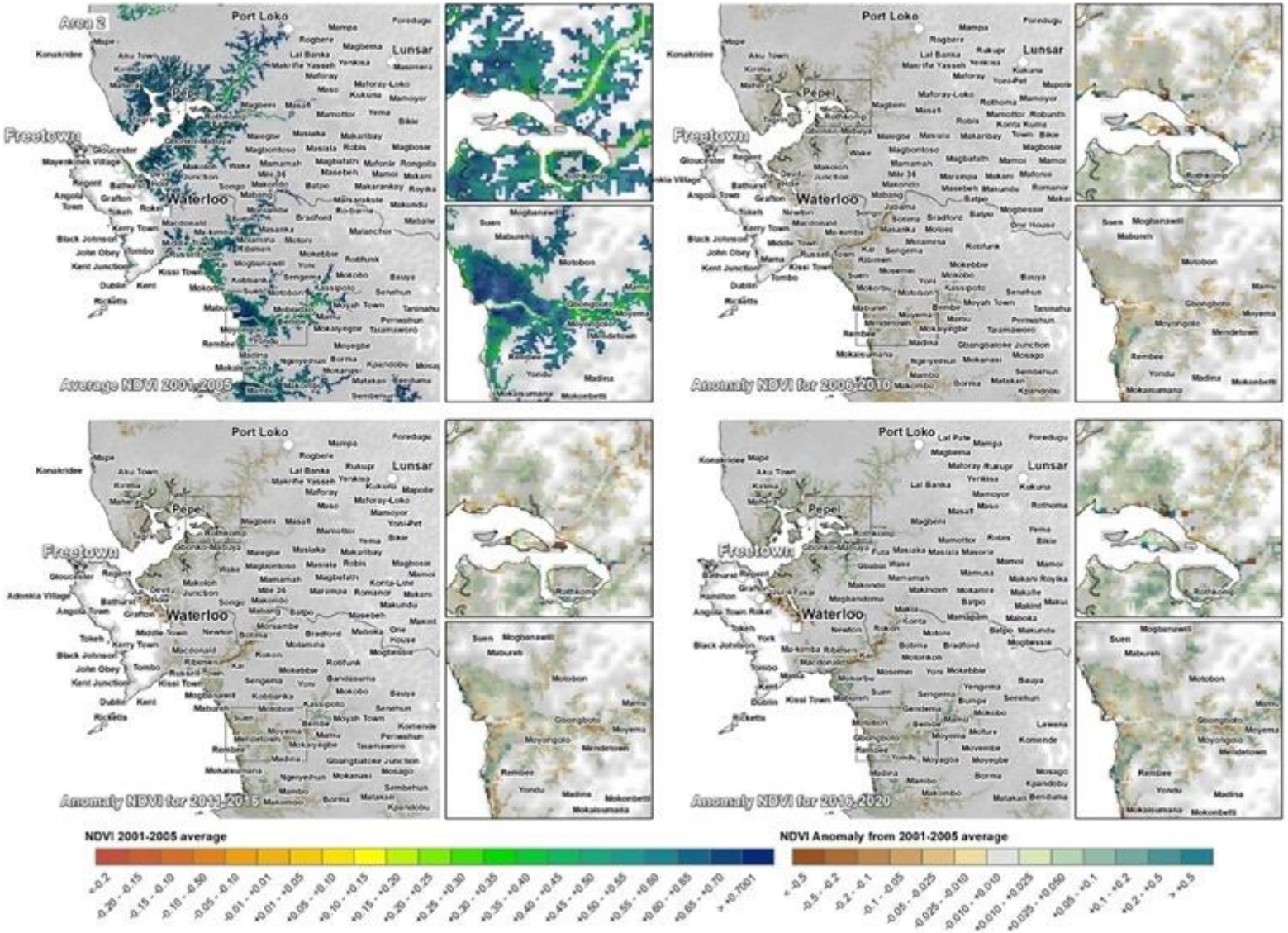


Figure 77. NDVI changes over time in Area 2

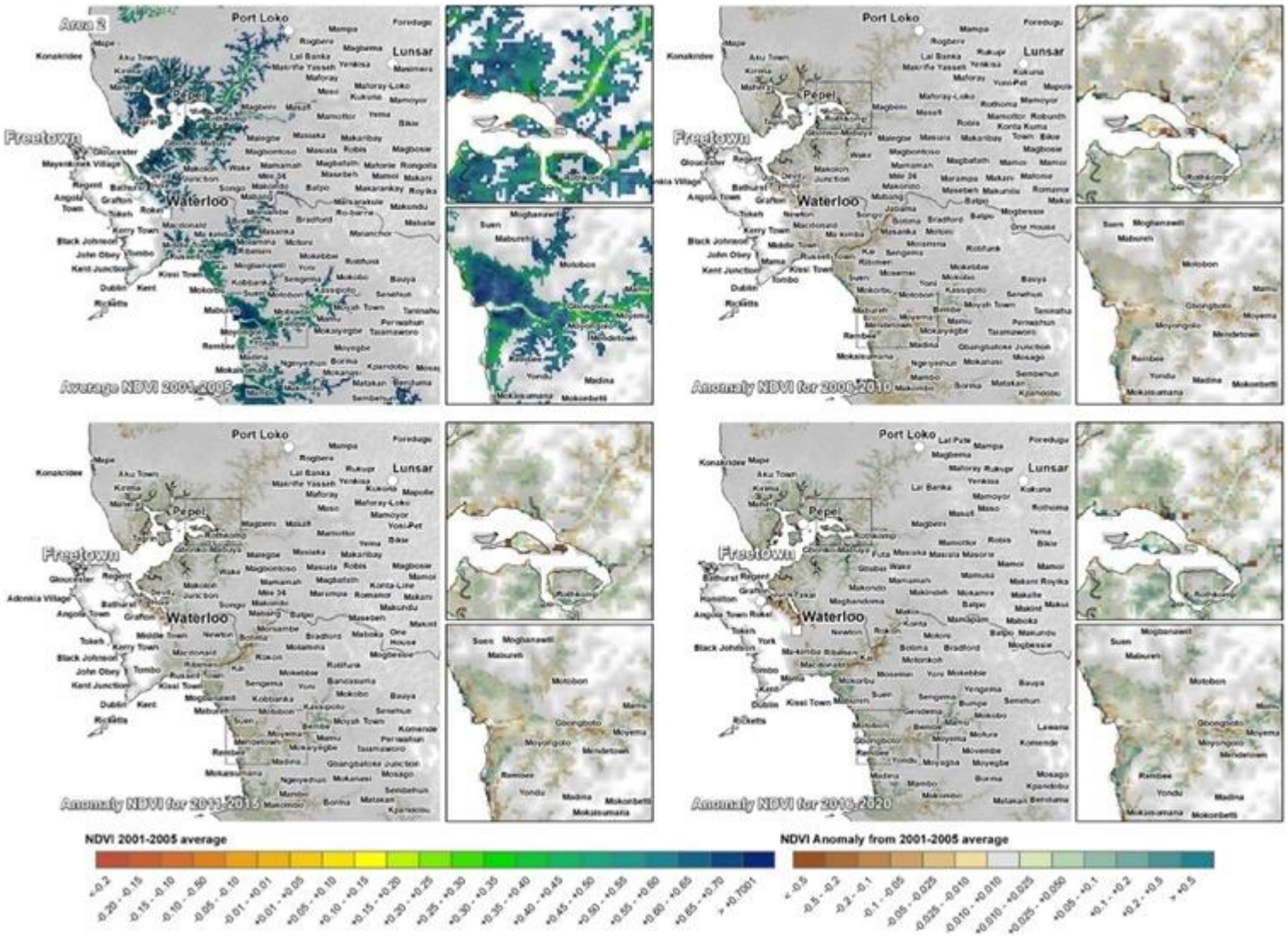


Figure 78. NDVI changes over time in Area 3

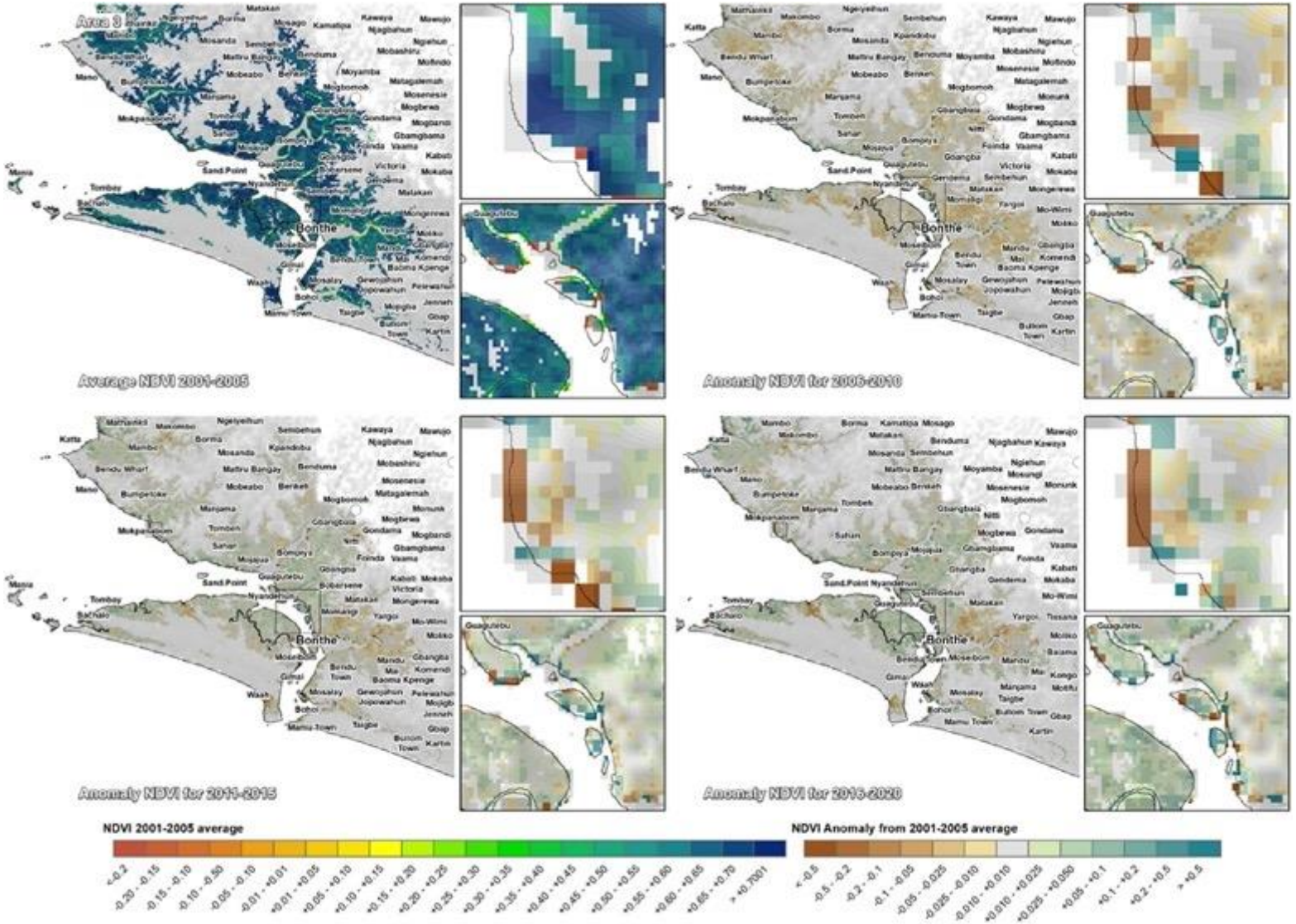


Figure 79. NDVI changes over time in Area 4

There is a long-term undulation in the NDVI in the mangrove areas but there is a general downward trajectory. The strongest decrease is noted in the Western province of Western Urban. There are some increases in the NDVI trends in some of the areas with the largest increases noted in Southern province, Pujehun district, Gallinas Peri and Kpaka chiefdom.

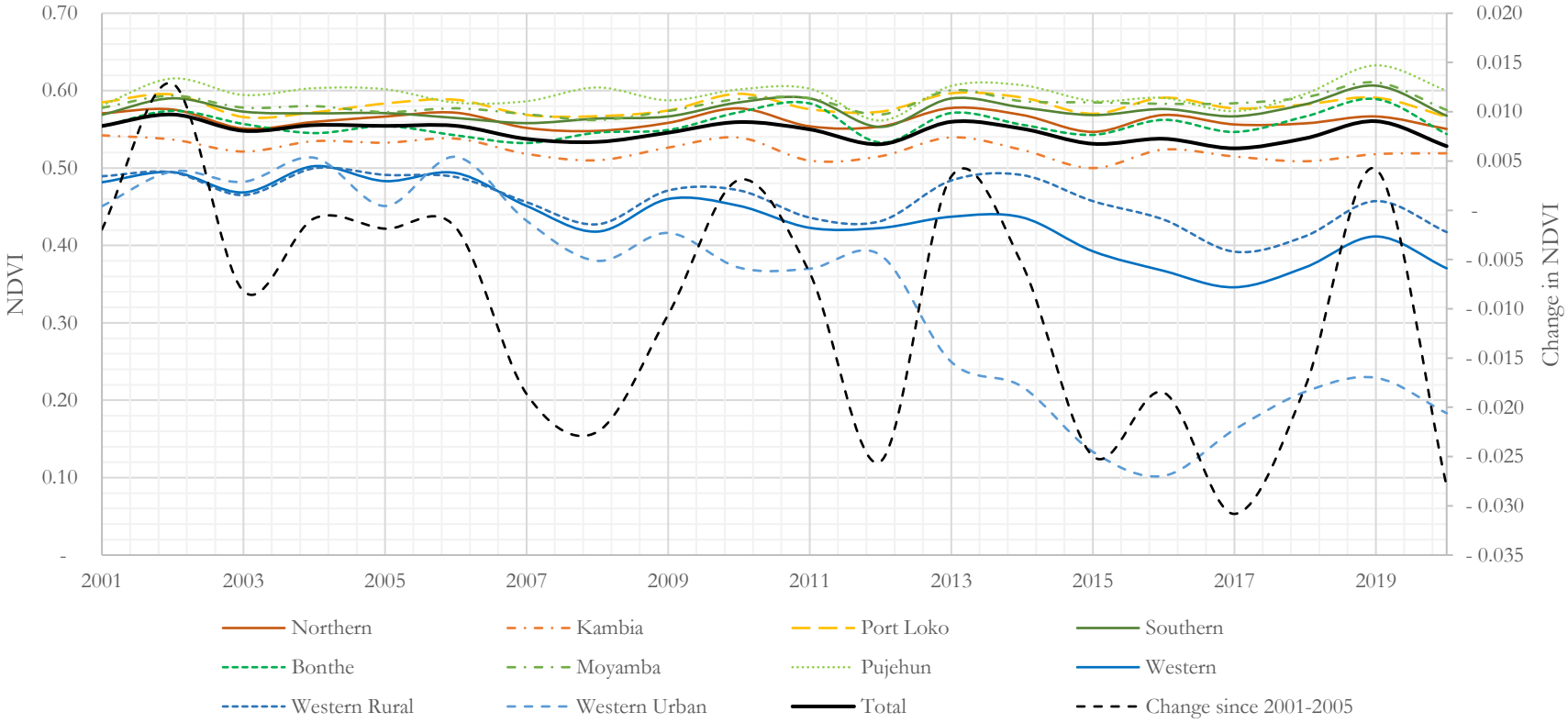


Figure 80. District-level NDVI Changes over time

Table 13. NDVI Trends by Chiefdom

			Trend change per year (NDVI)	
Province	District	Chiefdom	2001-2020	2011-2020
Northern	Kambia	Magbema	- 0.000	0.001
Northern	Kambia	Mambolo	- 0.000	0.001
Northern	Kambia	Samu	- 0.003	- 0.002
Northern	Port Loko	Bureh	+ 0.001	+ 0.003
Northern	Port Loko	Kaffu Bullom	+ 0.000	- 0.003
Northern	Port Loko	Koya	+ 0.000	- 0.001
Northern	Port Loko	Loko Massama	+ 0.001	+ 0.001
Northern	Port Loko	Maforki	- 0.000	- 0.000
Northern	Port Loko	Masimera	- 0.002	- 0.001
Southern	Bonthe	Bendu Cha	- 0.000	- 0.003
Southern	Bonthe	Dema	+ 0.000	- 0.000
Southern	Bonthe	Imperi	+ 0.001	+ 0.001
Southern	Bonthe	Jong	+ 0.000	+ 0.001
Southern	Bonthe	Nongoba Bullom	- 0.000	+ 0.000
Southern	Bonthe	Yawbeko	+ 0.002	+ 0.000
Southern	Moyamba	Bagruwa	+ 0.000	+ 0.000
Southern	Moyamba	Banta Gbangbatote	+ 0.001	+ 0.002
Southern	Moyamba	Bumpe	+ 0.001	+ 0.002
Southern	Moyamba	Kagboro	+ 0.001	+ 0.001
Southern	Moyamba	Ribbi	+ 0.000	- 0.001
Southern	Moyamba	Timdel	+ 0.001	- 0.001
Southern	Pujehun	Gallinas Peri	+ 0.001	+ 0.004
Southern	Pujehun	Kpaka	+ 0.000	+ 0.003
Southern	Pujehun	Mano Sakrim	- 0.001	- 0.001
Western	Western Rural	Freetown2	+ 0.000	- 0.002
Western	Western Rural	Freetown3	- 0.003	- 0.006
Western	Western Rural	Freetown4	- 0.012	- 0.007
Western	Western Rural	Freetown5	+ 0.000	- 0.000
Western	Western Urban	Freetown1	- 0.021	- 0.019

3.9.7 Land productivity around mangrove areas

The productivity state is an index with the combination of Vegetation productivity, Land cover, and Soil organic carbon changes over time. These systems are highly correlated and therefore follow the one-out all-out rule where if an area was identified as potentially degraded by any of these sub-indicators, then that area will be considered potentially degraded regardless of the others. This is to ensure the mutually reinforcing relationship is properly represented. There are noted long-term local scale productivity state degradation in the recent years (2018-2020) when compared against the earlier period (2001-2017) in the coastal areas of Area 1 and 2. Degradation is less prevalent in areas 3 and 4 over time. These changes tend to follow NDVI trends as described above.

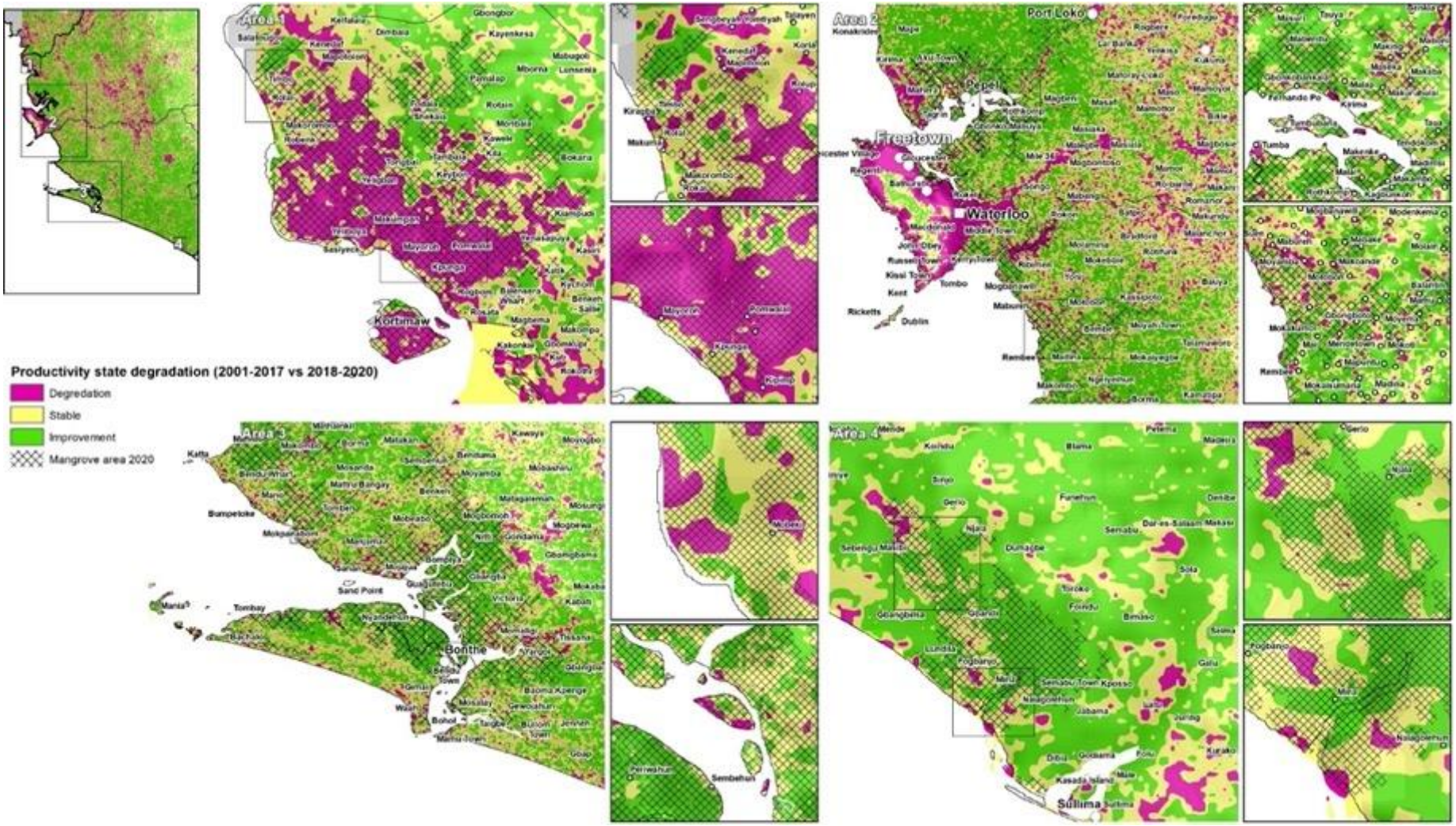


Figure 81. Productivity state degradation (2001-2017 vs 2018-2020)

3.9.8 Recommended spatial areas for mangrove protection and restoration

The Figures and Table above provide a spatial-temporal overview of the changes in mangrove extent in Sierra Leone over the 24-year period between 1996 and 2020. The following trends are observable which could inform the prioritisation of areas for mangrove protection:

- More than 70% of Sierra Leone's mangroves occur in Bonthe (~37%) and Moyamba (~34%) districts.
- Mangrove extent has declined overall in all seven districts in Sierra Leone.
- While the overall trend is a decrease in extent, at the chiefdom level, some areas showed marginal increases in mangrove extent of ~3 ha, particularly between 2015 and 2020. The outlier to this trend is Mambolo Chiefdom in Kambia District, which increased by ~200 ha in this time (Figure 66). Based on discussions with district officers, community representatives and previous officers working on the WA BiCC project, it is more probable that this is a data error rather than a genuine 200ha increase. WA BiCC staff estimated that they successfully restored around 100 ha of mangroves across the entire coastal landscape complex during the project, however this will be further explored in the mangrove assessments during project implementation.
- Between 1996 and 2020, Moyamba District experienced the largest loss of mangrove coverage (~4000 ha), but when percentage change over time is considered, Western Urban District lost over one quarter (25%) of its mangroves during this time.
- Degradation hotspots occur more frequently in estuarine (i.e., upriver) areas rather than ocean-facing mangrove areas, with the exception of the areas between Rembee and Mokakumor.
- The greatest increase in mangrove coverage occurred between 2015 and 2020 in Bumpetoke and Mobeke.

The high-level desktop analysis undertaken in the preceding section shows that approximately 8600 ha of mangroves have been lost between 1996 and 2020 in Sierra Leone. The analysis suggests that opportunities exist for mangrove protection and restoration in several coastal and estuarine areas. Regarding the rationale to restore/replant mangroves vs. protecting existing forests, the concept of self-repair[413] and restoration are important to consider. Mangrove areas should be considered eligible for self-repair if: i) the tidal regime has not been disrupted; and ii) seedling availability is not limited or blocked.[414] Conversely, restoration is recommended when: i) there is limited waterborne propagules due to lack of nearby parent trees or hydrological connection which inhibit dispersal; ii) there is a need to introduce valuable specific species which have been lost in the area (enrichment planting); iii) research is being undertaken for educational and cultural purposes; or iv) planting for production forestry.[415]

Concerning the preliminary rationale for quantification of mangrove restoration or protection in the absence of the systematic conservation assessment which will be undertaken under Activity 3.2.1, a dual approach is proposed to identify areas where mangrove loss can be halted or slowed by restoration in degradation hotspots, complemented by protection of areas where mangrove coverage has increased or where mangroves are shown to be productive and healthy. This approach will provide a baseline for verification during the systematic conservation plan, which will include ground-truthing of desktop analyses to ensure accuracy and appropriateness of the proposed interventions.

To this end, **a consolidated target of 1,500 ha of mangroves is proposed for restoration and/or protection.** This figure represents roughly 1% of the total extent of mangrove forests in Sierra Leone in 2020 (~150 000 ha), and approximately 17% of the mangroves lost between 1990 and 2020 (~8600 ha). This relatively modest target strikes the appropriate balance between cost-effectiveness/economies of scale of restoration and protection within the proposed project's budget but still covers a sufficient area to create entry points for deriving lessons learned to inform upscaling and replication in future initiatives. Concerning spatial prioritization for protection and restoration, respectively, the 1500 ha target should be dispersed over the areas of highest mangrove productivity, and areas where degradation hotspots (i.e., restoration is recommended when a mangrove ecosystem has been altered to such an extent that

[413] i.e., natural recolonization.
[414] Ellison, A.M., Felson, A.J., Friess, D.A. 2020. Mangrove Rehabilitation and Restoration as Experimental Adaptive Management. Frontiers in Marine Science, 7(327). [Online]. DOI: https://doi.org/10.3389/fmars.2020.00327.
[415] Ibid.

it can no longer self-correct and/or self-renew[416], while protection is recommended when the likelihood of self-repair is high) have been identified as per the spatial analysis above.

[416] Western Indian Ocean Marine Science Association. 2020. Guidelines on Mangrove Ecosystem Restoration for the Western Indian Ocean Region. [Online]. Available: https://www.nairobiconvention.org/CHM%20Documents/WIOSAP/guidelines/GuidelinesonMangroveRestorationForTheWIO.pdf

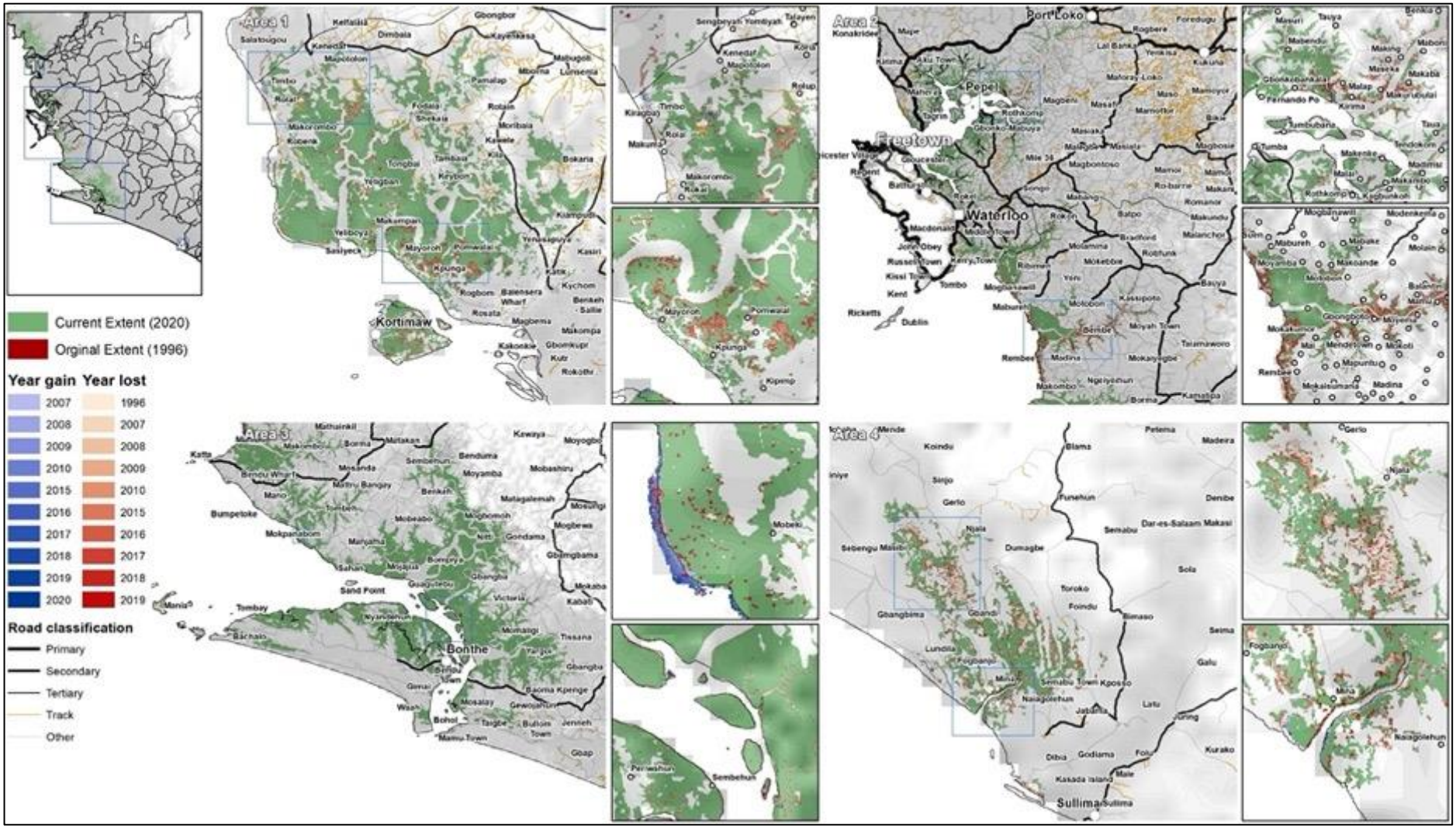


Figure 82: Spatial analysis of changes in mangrove extent between 1996 and 2020 in Sierra Leone, including net gain and loss
Source: by Global Mangrove Watch[417]

[417] Global Mangrove Watch. 2020.

Table 14: Time-series mangrove extent in Sierra Leone by district 1996-2020

District	1996	2007	2008	2009	2010	2015	2016	2017	2018	2019	2020
Kambia	12,447	12,232	12,368	12,283	12,385	12,049	12,141	11,845	11,536	11,658	11,658
Port Loko	27,007	26,418	26,920	26,783	26,932	26,886	27,096	26,984	26,144	25,619	25,619
Bonthe	57,006	56,793	56,652	56,464	56,266	56,128	56,165	56,076	55,812	55,282	55,282
Moyamba	54,314	53,606	53,732	53,808	54,146	54,099	54,128	53,674	51,863	50,388	50,388
Pujehun	2,303	2,224	2,210	2,181	2,142	2,089	2,062	2,019	1,966	1,877	1,877
Western Rural	5,891	5,790	5,798	5,775	5,832	5,813	5,848	5,792	5,649	5,492	5,492
Western Urban	11	11	11	11	7	5	5	4	5	8	8
Total	158,978	157,074	157,691	157,305	157,709	157,069	157,445	156,395	152,975	150,324	150,324

Source: Source: Bunting P et al. (2022)[418]

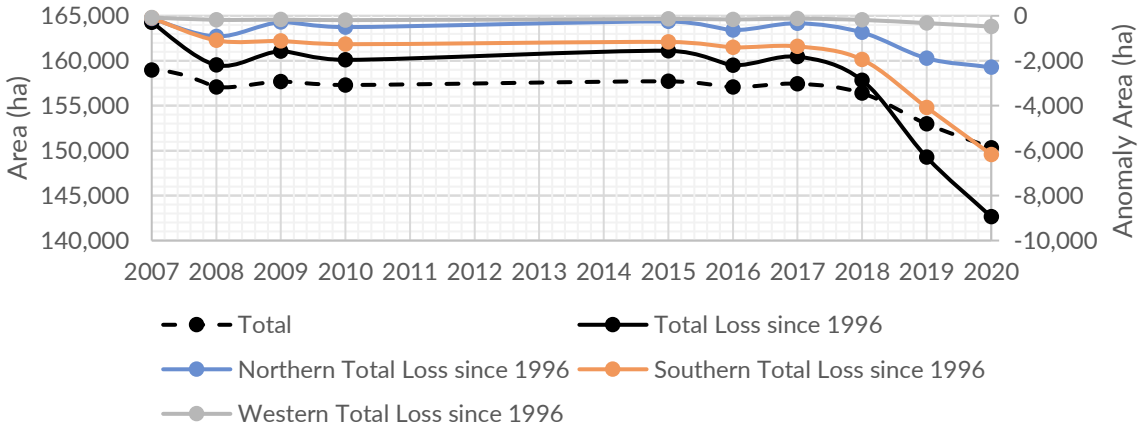


Figure 83. District-level mangrove area changes over time

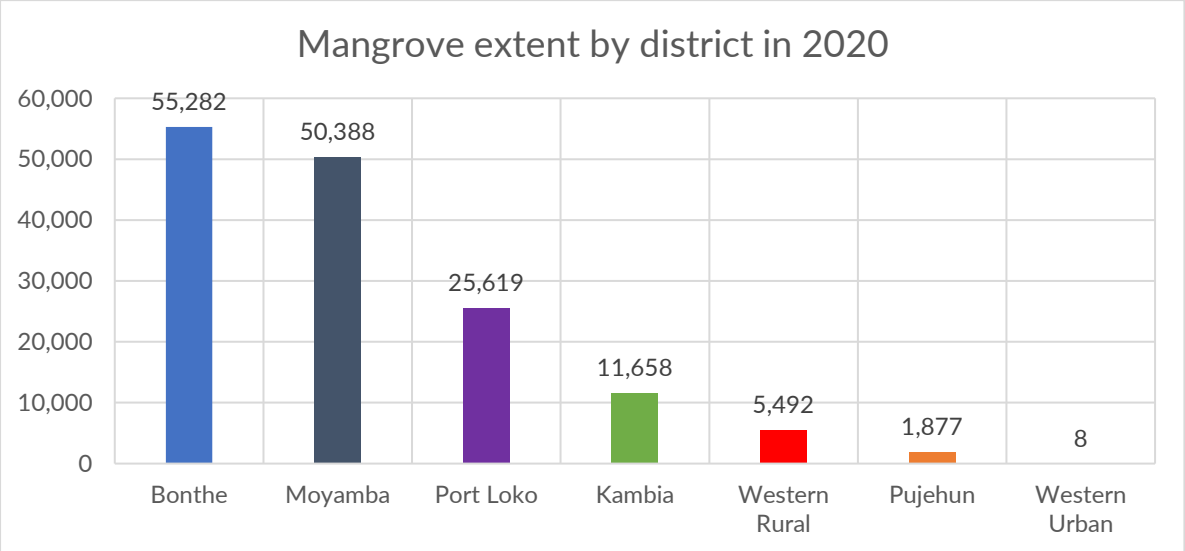


Figure 84: Breakdown of mangrove extent in hectares by district in Sierra Leone in 2020
Source: Bunting P et al. (2022)[419]

[418] Source data from: Bunting P, Rosenqvist A, Hilarides L, Lucas RM, Thomas N, Tadono T, Worthington TA, Spalding M, Murray NJ, Rebelo L-M. Global Mangrove Extent Change 1996–2020: Global Mangrove Watch Version 3.0. Remote Sensing. 2022; 14(15):3657. [Online]. Available: https://doi.org/10.3390/rs14153657

[419] Ibid.

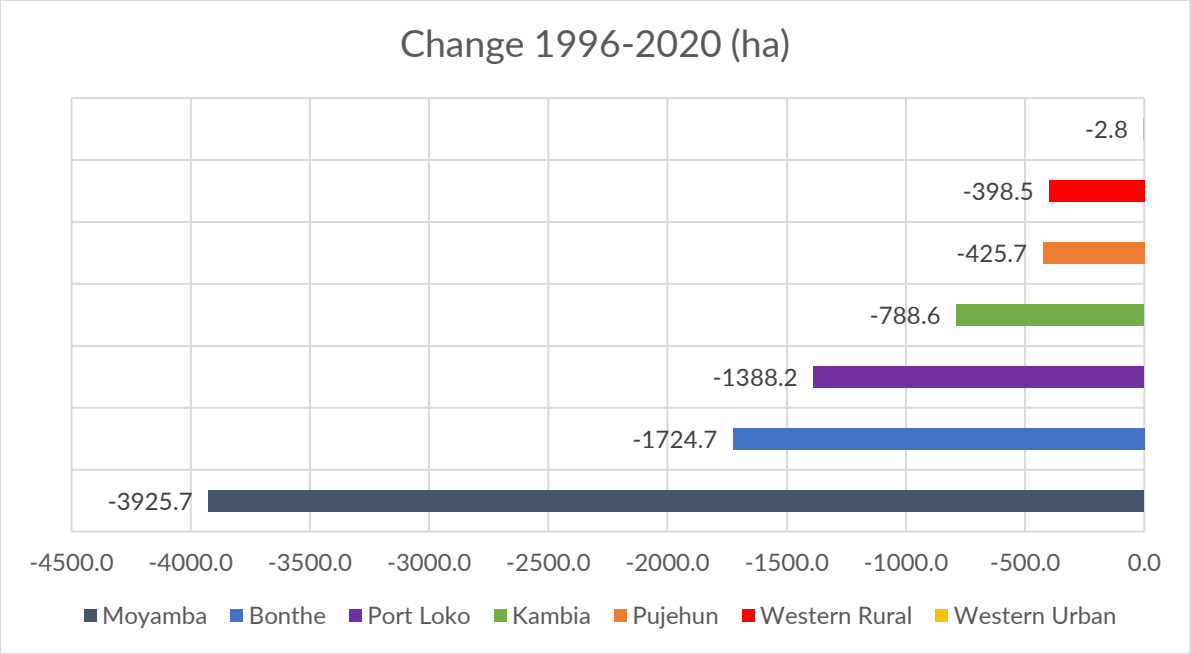


Figure 85: Change in mangrove extent in hectares between 1996 and 2020 by district

Source: Bunting P et al. (2022)[420]

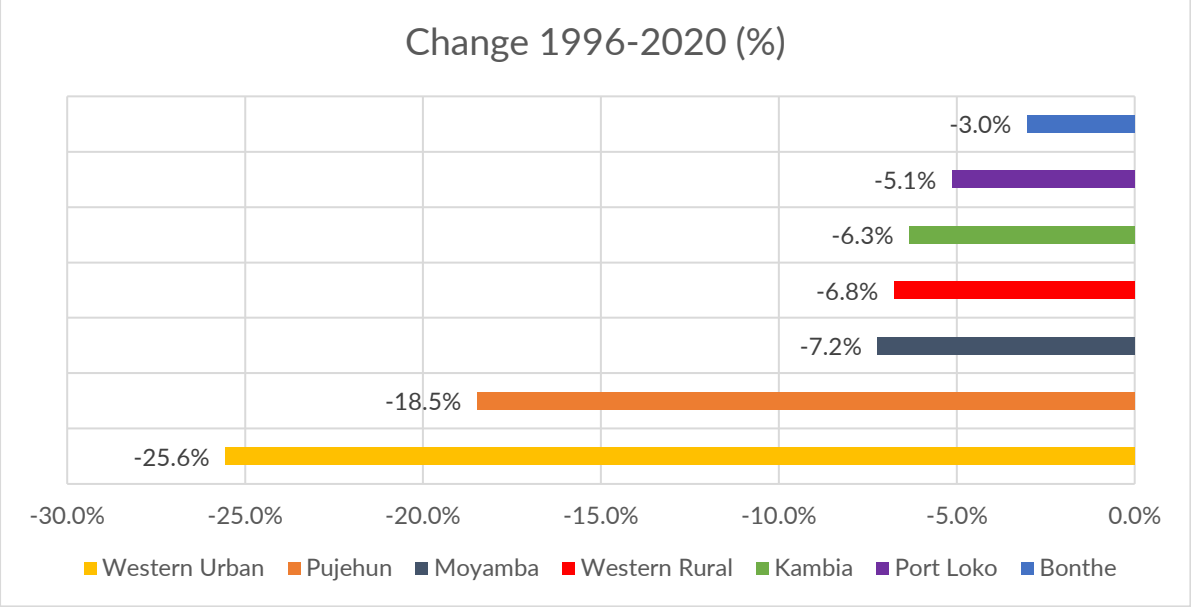


Figure 86: Percentage change in mangrove extent between 1996 and 2020 by district

Source: Bunting P et al. (2022)[421]

[420] Ibid
[421] Ibid

Table 15: Summary of trends in mangrove extent in Sierra Leone between 1996 and 2020

			Trend change per year (ha)		Area Maintained	
Province	District	Chiefdom	1996-2020	2015-2020	Area (ha)	Area (%)
Northern	Kambia	Magbema	- 0.80	- 1.75	31.12	63%
Northern	Kambia	Mambolo	- 7.98	- 43.54	479.41	83%
Northern	Kambia	Samu	- 29.68	- 147.87	10,999.90	93%
Northern	Port Loko	Bureh	- 0.36	- 0.78	9.46	65%
Northern	Port Loko	Kaffu Bullom	- 2.05	- 23.19	3,411.85	96%
Northern	Port Loko	Koya	- 12.77	- 101.51	10,945.21	94%
Northern	Port Loko	Loko Massama	- 20.32	- 176.28	9,272.43	91%
Northern	Port Loko	Maforki	- 5.26	- 31.27	1,416.97	89%
Northern	Port Loko	Masimera	- 0.04	- 0.09	1.36	60%
Southern	Bonthe	Bendu Cha	- 6.39	- 16.75	4,832.32	96%
Southern	Bonthe	Dema	- 27.84	- 84.95	19,716.02	96%
Southern	Bonthe	Imperi	- 26.70	- 88.75	24,898.29	97%
Southern	Bonthe	Jong	- 5.90	- 12.99	5,321.15	97%
Southern	Bonthe	Nongoba Bullom	- 3.08	- 0.84	190.56	74%
Southern	Bonthe	Yawbeko	- 0.15	0.02	2.11	43%
Southern	Moyamba	Bagruwa	- 10.75	- 38.35	12,627.14	98%
Southern	Moyamba	Banta Gbangbatote	- 1.67	- 4.55	1,553.20	97%
Southern	Moyamba	Bumpe	- 64.35	- 465.96	5,082.38	71%
Southern	Moyamba	Kagboro	- 25.54	- 154.18	13,245.70	94%
Southern	Moyamba	Ribbi	- 20.15	- 192.59	7,871.62	90%
Southern	Moyamba	Timdel	- 9.05	- 46.77	9,386.47	97%
Southern	Pujehun	Gallinas Peri	- 0.55	- 2.33	39.64	73%
Southern	Pujehun	Kpaka	- 15.72	- 42.14	1,633.61	80%
Southern	Pujehun	Mano Sakrim	- 2.08	- 3.09	155.31	79%
Western	Western Rural	Freetown2	- 0.69	- 6.15	515.57	94%
Western	Western Rural	Freetown3	- 6.40	- 30.99	2,918.66	94%
Western	Western Rural	Freetown4	- 0.97	- 3.23	129.97	85%
Western	Western Rural	Freetown5	- 4.82	- 40.19	1,900.29	91%
Western	Western Urban	Freetown1	- 0.27	0.80	5.29	49%

Source: Bunting P et al. (2022)[422]

3.10 Community artificial coastal protection efforts

Some communities along the coast of Sierra Leone that are being impacted by flooding and coastal erosion have erected barriers in an effort to protect their homesteads and villages. These barriers are typically made from wood and other locally available materials. Woven wooden fences are a typical design that were observed during this Feasibility Study (Figure 70 above showing community efforts to combat coastal erosion at Tengisa Village, Bonthe District, Sierra Leone) as well as by the WA BiCC project (Figure 84). While mangrove protection and restoration are vital for coastal protection in general, there are specific locations around homes and villages where mangrove restoration will not meet coastal protection needs fully. In such locations, the use of artificial coastal protection measures can play an important role in protecting people from flooding and coastal erosion.

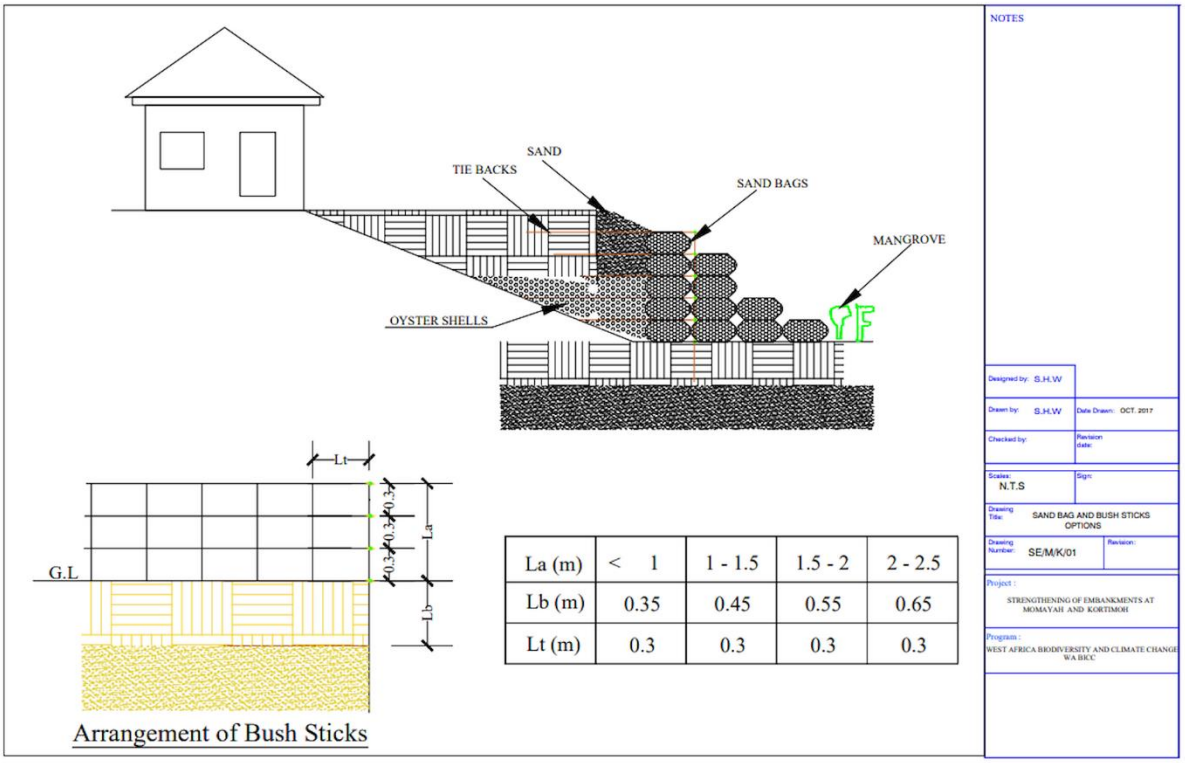
This was also identified by the Sierra Leone Coastal Vulnerability Assessment conducted as part of the WA BiCC project in 2018, which recommended: "Support or facilitate implementation of locally designed infrastructures such as drainage systems, higher embankments, and wind barriers (tree planting) to lower exposure to weather and climate disasters and their impacts, taking into account and sensitizing populations about future changes in disaster frequency and/or amplitude".

Following this assessment, the WA BiCC project explored the use of low-cost and locally available materials in order to design infrastructure that is affordable and replicable and that uses engineering design to improve upon the typical barriers that communities have installed previously. The project reports[423] on this intervention as follows: *"As result of consultations with locals in target villages, WA BiCC designed a natural embankment concept that would increase resilience to climate change by buffering sea*

[422] Ibid.
[423] https://www.wabicc.org/mdocs-posts/final-closeout-report-of-the-wa-bicc-program/

level rise, reducing erosion, and catalyzing mangrove rehabilitation and growth. Oyster shells, a locally available material, can serve two important functions at once: strengthening the shoreline when mixed with sand or soil and preventing flooding by allowing water to flow through. The program worked with in collaboration with the NPAA and a representative of the Coastal Chiefdoms Natural Resources Management Network. With tools and training, four communities constructed sand and oyster shell embankments, protecting more than 5,000 people from unexpected flooding and storms. Each community established an embankment committee, which faced challenges to recruit local workforce and maintain the barriers."

Figure 84. An example of woven wooden fences erected by communities themselves in an effort to combat coastal erosion and reduce flooding. Source: WA BiCC[424]



La (m)	< 1	1 - 1.5	1.5 - 2	2 - 2.5
Lb (m)	0.35	0.45	0.55	0.65
Lt (m)	0.3	0.3	0.3	0.3

Figure 85. Engineering design of community micro-scale artificial coastal protection measure that improves on typical structures communities were installing previously, while using local materials[425]

[424] https://wabiccnews.wabicc.org/from-coping-to-adaptation
425 https://wabiccnews.wabicc.org/from-coping-to-adaptation

Figure 86. Example of community micro-scale artificial coastal protection measure built with support of the WA BICC project using local materials of wood, oyster shells and sand bags[426]

A number of important lessons were learned from this WA BiCC intervention, as outlined in the independent mid-term review[427] of the WA BiCC project:

- *Embankments that use low-cost and locally available materials can play an important role in coastal resilience. Design considerations remain paramount, and replication and scale-up will require site-specific engineering consultation in virtually every location.*
- *The decision to construct an embankment requires site analysis and solid understanding of the coastal dynamics at play. Communities should not be encouraged to take this initiative on their own without credentialed technical assistance from a coastal engineer. Embankments must be properly located and installed, taking into account biophysical factors and with care not to augment erosion at either end.*
- *The engineer responsible for design should re-visit the communities and evaluate if any modifications are needed.*
- *Sand bags used to reinforce the embankment started falling apart from exposure to the sun.*

The importance of maintenance via locally-organised maintenance committees that have sustainable funding for maintenance is also highlighted by a media report[428] in 2022 which found that in one of the communities supported by the WABiCC project the sand bags within the artificial coastal protection measures had disintegrated after one year and although communities had wood and sand available they lacked money to buy new sandbags for repairs.

Given these lessons learned from the WABiCC interventions, the implementation of micro-scale artificial coastal protection measures in the proposed SCLRP should consider the following:

- Ensuring adequate technical design, location, installation and maintenance of micro-scale artificial coastal protection measures
- Situating the micro-scale artificial coastal protection measures within strong and sustainable broader community adaptation committees, community-owned land use zoning, and

[426] https://wabiccnews.wabicc.org/from-coping-to-adaptation
[427] WABiCC Mid-Term Evaluation, 2019. Available at: https://pdf.usaid.gov/pdf_docs/PA00WF5R.pdf
[428] https://news.mongabay.com/2022/12/in-sierra-leones-fishing-villages-a-reality-check-for-climate-aid/

maintenance committees that can facilitate community ownership and sustainable financial and technical capacity for the maintenance of micro-scale artificial coastal protection measures
- Using sand bags that are made from a material that is longer-lasting and more resistant to exposure to the elements
- Sourcing local materials in a responsible and sustainable manner within the framework of strong and community-owned land use zoning and mangrove management plans.

4. Barrier analysis

The barriers and root causes for the most climate vulnerable districts and coastal communities in Sierra Leone that the SLCRP will address include those listed below. The proposed SLCRP will apply best practices and scale up proven approaches that will address these barriers and root causes in order to enable coastal communities to enhance their food and water security, livelihood opportunities, wellbeing and management of healthy ecosystems.

Barrier 1. Limited use of climate risk information for local adaptation planning and actions

Coastal communities and their local governments have limited access to accurate and actionable information and insufficient capacity to assess climate risks, vulnerabilities and impacts for local policies, planning and actions. This prevents the establishment of climate risk-informed community planning that prioritize adaptation measures based on local adaptation needs, for integration into local development planning and District Development Plans, in alignment with national priorities. In terms of last-mile dissemination of early warnings to communities, the chiefdom-level disaster management committees established by the government are not always able to send information to remote communities. In addition, when communities do receive such information, many communities have limited capacity to take the necessary actions to reduce the impacts of climate events.

Barrier 2: Limited institutional capacity and coordination for climate adaptation and participatory governance

There is limited institutional capacity among government ministries/agencies, NGOs, CBOs and coastal communities to undertake climate change adaptation and participatory governance in coastal areas. This includes limited capacity to support community leadership structures for locally-led adaptation to climate change. In some cases, the community structures that can undertake locally-led adaptation are not in place, while in other cases these structures exist but do not have sufficient capacity. Limited coordination across government, CBOs/NGOs and communities also presents a barrier to effective climate change adaptation in the coastal zone, which by its nature requires collaboration among various stakeholders and both vertical and horizontal coordination. Different ministries/agencies do not always collaborate as much as needed, both across ministries and within ministries. For example, within the Ministry of Environment there could be stronger collaboration on some areas of work among the Environmental Protection Agency (EPA), National Protected Area Authority (NPAA) and Sierra Leone Meteorological Agency (SL Met), as well as with the Forestry Division that falls under the Ministry of Agriculture. Within agencies such as the EPA, there are also opportunities for closer collaboration between the Climate Change Secretariat and other parts of the EPA such as the Natural Resources Management Unit which has significant mangrove expertise. Interpretations of departmental mandates among staff could also be clearer. An example is the stated responsibility of the Ministry of Environment's District Forestry Officers and its chiefdom/community level 'Forest guards' for mangrove forests and not only for timber trading, compared to the National Protected Area Authority's responsibility for all wetlands and Marine Protected Areas (MPAs), which include most mangroves in Sierra Leone. Limited institutional capacity to reach coastal communities – especially remote communities – is also a barrier for some government agencies, for example the NPAA lacks district-level officers and community-level offices except for their staff contingents in specific protected areas. In terms of enforcement and monitoring of environmental compliance, there is often limited compliance with environmental laws and by-laws, in part because the coordination and responsibility-sharing between different government ministries, departments and agencies, their capacity, as well as the capacity of community stewardship groups, need to be strengthened.

Barrier 3: Unequal access of women and youth to opportunities, decision-making and resources

Common cultural attitudes and behaviour in Sierra Leone include patriarchal and customary discrimination against women, youth and other marginalised groups such as people with disabilities. As a result, women and youth do not have the same access as men to opportunities, decision-making and resources, which limits their adaptive capacity and impedes effective and equitable climate change adaptation at the community level. Women and girls in Sierra Leone typically have less access than men to educational opportunities and therefore attain lower levels of education. There is also limited

participation of women and youth in community and government decision-making, which means that community plans and actions may not address the different needs and priorities of women and youth. In coastal Sierra Leone, the structures that make most decisions at the community level are overwhelmingly male. This includes the town chief, deputy chief, a youth leader and the women's leader, who is usually the only woman represented in community decision-making structures. Besides the women's leader, other women often may not attend or participate. Although women usually do have clear groups (sometimes village savings and loan associations, sometimes more general 'women's groups') where they gather to discuss and decide on issues affecting them, more broadly these groups do not often have any final decision-making power within the wider community structures. There are clear gender roles in coastal communities in Sierra Leone, which reflect both the overarching views and culture on gender in the country, and some specific factors unique to coastal fishing and agricultural communities. In many fishing communities, gender roles are strongly delineated, with men responsible for fishing and women playing key roles in fish preservation and market trading. Farming in coastal communities is somewhat more gender-balanced, but more farming is done by women than by men. Harvesting mangrove wood is typically men's role, with men using the timber for construction or passing/selling the wood to women in their family or close circle for cooking or fish smoking. Despite this division of labour, women have limited say over household finances. While women are mainly responsible for fish preservation and trading, it is often the husband of the family who controls the finances. Similarly, in agricultural communities, women most often process and sell crops at local markets, but pass on the profits to their husbands. Beyond household finances, women typically also have less access to formal economy capital such as micro-financing than men. Further analysis of the gender context in the coastal communities of Sierra Leone will be provided in the Gender and Social Inclusion Annex in the Funding Proposal package.

Barrier 4: Limited alternatives to unsustainable mangrove use available to communities

Coastal communities in Sierra Leone obtain wood from mangroves for various purposes and use mangrove land for rice farming and salt production in some areas. This often leads to degradation and loss of mangroves through unsustainable use. Although certain communities are aware of some of the benefits of intact mangroves (e.g., for fishing and coastal protection), short-term subsistence needs take precedence over long-term stewardship of mangroves in many areas. Coastal communities depend strongly on mangroves and have limited access to knowledge, technology, planning, management approaches and institutional capacity to manage mangrove ecosystems sustainably. For example, mangrove wood is harvested for fish and oyster smoking, charcoal-making, fuelwood for domestic use, fuelwood for salt processing, as well as timber for construction, fencing and boat building. Communities typically lack access to solutions that will reduce mangrove wood demand, e.g., efficient cookstoves and fish smokers, alternative fish preservation techniques, alternative non-mangrove wood sources. Some community members also depend directly on mangrove wood harvesting for their livelihoods and have few alternative options. In terms of land use for rice farming, communities lack access to more productive climate-resilient farming practices that require less land and the means to establish and maintain zones for different land uses, as well as lacking alternative livelihood options.

Barrier 5: Lack of locally-appropriate technical knowledge of climate-resilient farming, fishing and alternative livelihoods

Coastal communities have limited knowledge of many of the technologies and practices required for climate-resilient farming, fishing and alternative livelihoods. This limits the quantity and quality of goods community members and local enterprises can produce and the services they can provide, thus limiting income and the expansion of value chains. For example, in terms of agriculture, communities have limited knowledge of aspects such as improved climate-resilient crop varieties, conservation agriculture, agroforestry, integrated pest management and techniques to reduce post-harvest loss. In terms of fishing, many communities have limited knowledge of, for example, efficient or alternative fish processing technologies and sustainable mangrove oyster harvesting techniques. A key reason for knowledge gaps in communities is the limited capacity of extension services in terms of reach and climate adaptation skills, i.e., the district-level agricultural officers and the "block agricultural extension officers" who work at community-level.

Barrier 6: Insufficient investments and low access to financing and markets to support diversified climate-resilient livelihoods, products and value chains

Coastal communities and small businesses have limited access to savings and credit facilities and limited financial literacy, business skills and knowledge of financing options, which constrains their access to finance for climate-resilient livelihoods and enterprises. This barrier is especially significant for women and youth, given societal norms and unequal access to education and resources. In addition, there is insufficient investment from public and private sector investors in rural coastal areas, in particular investment from national/district level private investors in coastal businesses. Coastal communities and small businesses often lack the networks and skills needed to unlock such investment. The growth of businesses in farming, fishing and related industries is also constrained by barriers in terms of equipment, storage and access to markets, which require knowledge and investment to be overcome. In terms of market knowledge, small-scale farmers and fishers in rural areas often do not have access to up-to-date market information and are thus not able to negotiate fair prices for their goods.

Barrier 7: Limited technical capacity for coastal ecosystem-based adaptation

Coastal communities, CBOs and NGOs, and sub-national/local government have limited technical capacity to conserve, restore and sustainably manage mangrove ecosystems so that these ecosystems can help people adapt to the adverse effects of climate change. At sub-national and local government level this includes district-level environment officers, district-level forest officers and district-level forest guards. Many coastal communities have limited knowledge of climate change impacts, the full range of ecosystem goods and services provided by healthy mangrove ecosystems, and how these support their livelihoods and provide coastal protection in the face of climate change. In certain areas, the perception that mangrove resources are vast and essentially cannot be depleted contributes to unsustainable mangrove use practices. In general, communities, organisations and local government have limited technical capacity for mangrove conservation and restoration on critical aspects such as: i) land-use planning; ii) community-based forest management; iii) site selection for restoration in terms of appropriate biophysical conditions such as soil and hydrology; iv) appropriate seasonal timing of mangrove planting; v) requirements of different species of mangroves; vi) facilitating the right biophysical conditions for natural regeneration; and vi) monitoring of mangrove state to assess results of conservation, restoration or natural regeneration results and undertake adaptive management.

5. Activities

5.1 Theory of change

The SLCRP intends to create a paradigm shift in Sierra Leone's coastal communities by strengthening their resilience to climate change through interventions focused on food and water security, livelihoods, wellbeing and ecosystem health. As such, it clearly contributes to the GCF Fund-level impacts on adaptation, namely:

- A1) Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions
- A2) Increased resilience of health and well-being, and food and water security
- A4) Improved resilience of ecosystems and ecosystem services.

The project's **Theory of Change (ToC)** diagram is presented further below. Separately, Annex 2a containing the Logical Framework is annexed to the Funding Proposal package. The Logical Framework incudes a description of the activities and sub-activities, and their related indicators that will then inform the project monitoring and evaluation framework.

Specifically, the project interventions will support a paradigm shift through: i) capacity building at community and institutional levels; ii) strengthening of local policies, plans and participatory governance structures; iii) strengthening the ability of women and children to use climate resilient WASH practices; iv) improving education on climate change for children; v) identifying new partnerships and innovations for resilient local economies; vi) adopting climate resilient agricultural and fishery practices; vii) and restoring and conserving mangrove ecosystems for coastal protection and sustainable resource use. The proposed project will directly support 260,000 beneficiaries and will adopt a strong gender and youth focus to ensure those most vulnerable have their needs met as their communities increase their resilience to climate change through adaptation approaches. A fundamental aim of the project is to support communities to determine their own adaptation pathways. This will be achieved by comprehensively enhancing adaptive capacity through information, skills, practices, policies, tools/technologies, while reducing sensitivity to climate risks and impacts, such as floods, droughts, and extreme events (tropical storms, heatwaves).

The ToC goal statement is:

IF Sierra Leonean coastal communities and their government are able to implement locally-led adaptation by applying climate-informed knowledge and practices to livelihoods and mangrove ecosystem management, **THEN** vulnerable coastal communities - especially women, youth and children - will have greater adaptive capacity and resilience to climate impacts, **BECAUSE** they will plan for climate risks and take actions that enhance their livelihoods, food and water security and coastal protection.

This goal will be achieved by delivering three interlinked outcomes, namely:

- Outcome 1: Coastal communities and institutions have governance structures, plans, knowledge, skills and solutions in place to undertake local adaptation to climate change.
- Outcome 2: Coastal communities have climate-resilient farming, fishing and alternative livelihoods and businesses.
- Outcome 3: Mangroves are conserved and restored for coastal resilience and communities have increased capacity to co-manage mangroves with government institutions

The ToC centres community-level actions that promote inclusion in governance, livelihoods, and ecosystem management and increases equitable access to green and resilient employment opportunities in agriculture, fisheries and the broader rural economy. Longer term change will be achieved by building learning capacity, promoting the deployment of climate resilient practices and technologies and amplifying the voices of those less heard. The sequence of activities proposed will ensure equitable opportunities to share, generate and understand new knowledge – including in schools – while improving local climate responses and economic benefits. The ToC supports transforming harmful social norms that are amplified through climate vulnerabilities, while promoting the social and economic

empowerment of women and youth throughout, with proactive interventions to enable women to access decision-making spaces whilst building their capacity to participate. Overall, the project results will contribute to the GCF's goal of promoting a paradigm shift towards climate-resilient development by reducing the impacts of climate change on livelihoods and ecosystem good and services in coastal communities while catalysing transformational change for the next generation. Throughout, the project will consider environmental and social vulnerability, including disability and gender inequality; considering differential access to power, knowledge, and resources as essential for building resilience in coastal communities where women, men, girls and boys (with and without disability) are impacted by climate change differently, and have varying access to the resources needed to adapt. The SLCRP will focus on all of the coastal landscapes that comprise the SLCLC, namely the Sierra Leone River Estuary, Yawri Bay, Scarcies River Estuary (SRE), and Bonthe-Sherbro River Estuary, as well as coastal and riverine communities in Pujehun district.

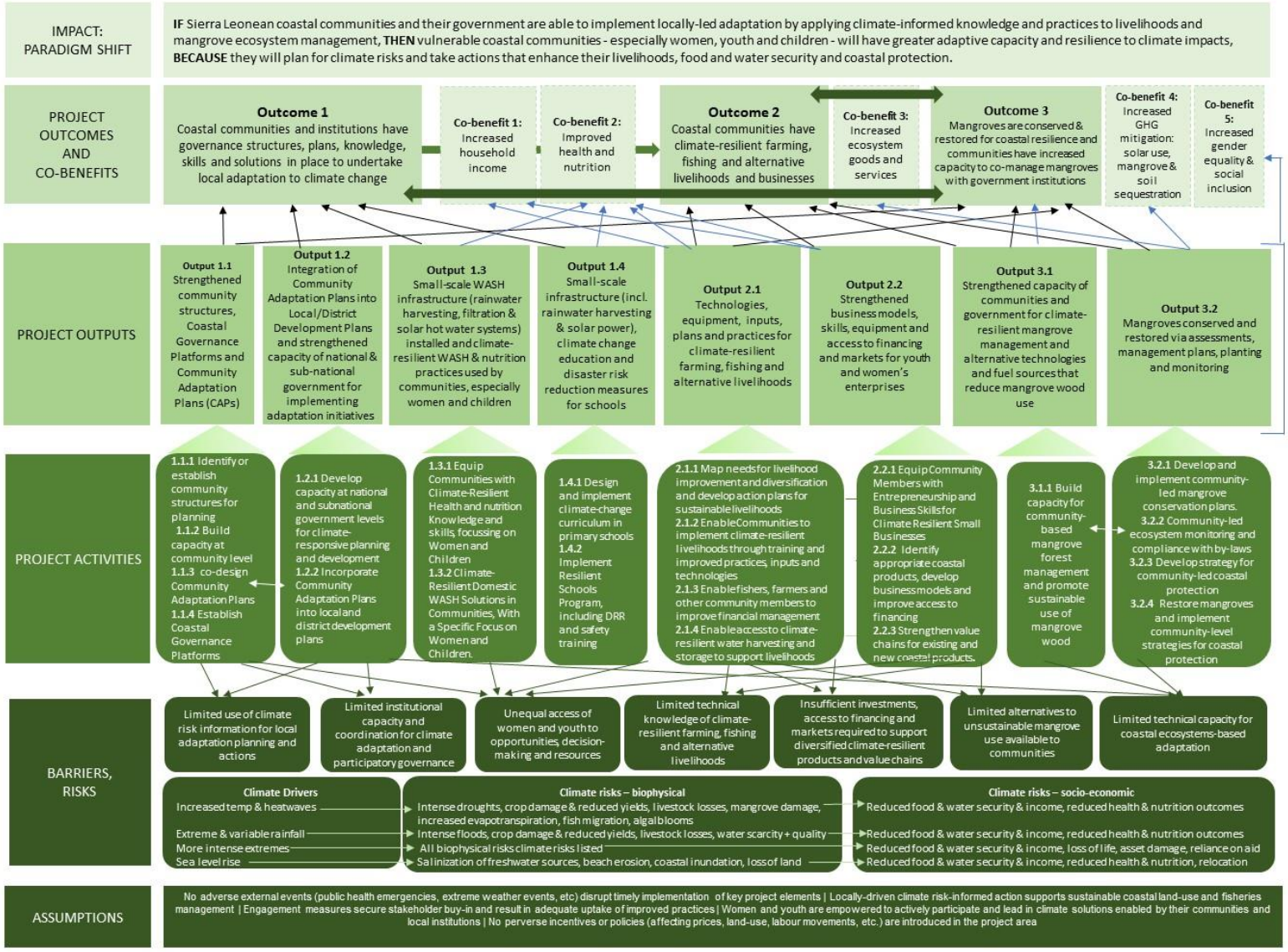
The SLCRP will achieve its overall goal by implementing three interlinked components:

1) Community mainstreaming of climate change adaptation through governance, and partnerships, education and training
2) Enhanced climate resilience of food production systems and value chains to secure food and livelihoods, especially for women, youth and children
3) Ecosystem-based adaptation for coastal protection and natural resources.

These components are closely aligned with the country priorities, in particular those expressed in the latest NDC, including:

- Promote climate-smart agriculture and climate-resilient food security practices to ensure climate-resilient agriculture
- Improve climate change adaptation infrastructure across priority sectors
- Develop local institutional capacity to support coastal resources management
- Management of coastal and fisheries resources
- Increase human (social) development through technology transfer and livelihood support
- Improve Natural Resources Management in critical biodiversity hotspots
- Establish early warning systems to improve local understanding of risks.

5.2 Diagram Theory of Change



5.3 Component overview and activities

The project will reduce the vulnerability of coastal communities to climate change risks and impacts by supporting climate resilient livelihood practices for farmers and fishers, enhancing food-value chains, protecting coastal ecosystems, promoting sustainable resource use and strengthening locally led participatory governance processes to mainstream climate change responses. There are three main components:

1) Component 1: Community mainstreaming of climate change adaptation through governance, partnerships, education and training
2) Component 2: Enhanced climate resilience of food production systems and value chains to secure food and livelihoods, especially for women, youth and children
3) Component 3: Building capacity for community-based co-management of coastal ecosystems, to support ecosystem-based adaptation for coastal protection and natural resources

The measures set out in the proposed project align well with the key vulnerabilities experienced in the target regions. The aim of the project is to holistically address these vulnerabilities through a range of measures that will overall leave the communities in a more resilient state than they were prior to the project interventions. As no single measure can address the wide variation of climate-driven vulnerabilities experienced in the target communities, the programme adopts a multi-measure approach.

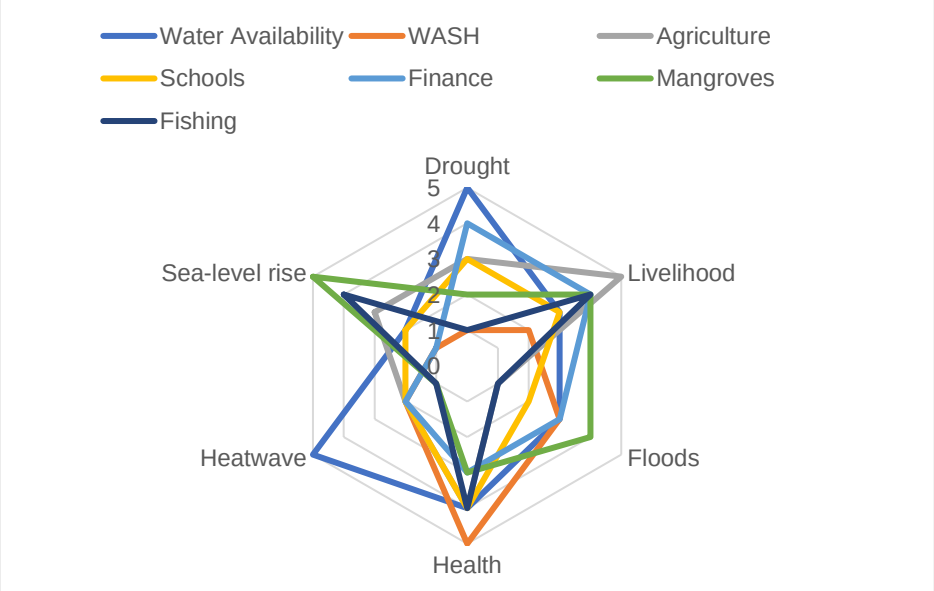


Figure 87. Activity/Vulnerability Match
Source: Globalfields

While the scaling of the impact that any particular measure has on a particular vulnerability is numerical, the underlying assessment is qualitative, based on the experience and expertise of the team developing the project, and underpinned by the statistical survey of coastal communities undertaken as part of the project preparation. The assessment is explicitly not just considering the technical potential of a measure, but also considers the likely uptake and longer-term impact of those measures, based on the survey undertaken for the project and the expertise of the subject specialists.

Key climate-related hazards are set out in Section 2 and **include sea-level rise, coastal erosion, droughts, heatwaves, landslides, and floods**. Those hazards lead to **loss of livelihoods, loss of ecosystem, risks to health, food security, and the security of access to clean water and natural resources**. The Sierra Leone Coastal Resilience Project will address these climate-related hazards and the consequences of those hazards in the following ways:

- **All hazards:** the technical assistance and capacity-building to be provided to communities, in particular, the support in Output 1.1 in establishing Community Adaptation Plans (CAPs) will support them in weighing risks, identifying appropriate actions and pathways to mitigate these risks, and roadmaps to implement the actions that will lead to mitigation, including clear objectives and success indicators. This will be a bottom-up approach, with activities 1.1.1 and 1.1.2 laying the necessary

groundwork, and 1.1.3 supporting the development of CAPs, while 1.1.4 will ensure that the structures created will be maintained over the longer term. Output 1.2 will link these into the national planning framework, creating the capacity to do so in activity 1.2.1 and specific actions for this embedding of bottom-up plans in the national framework in activity 1.2.2. Similarly, output 1.4 will lay the foundation to integrate climate considerations in the education sector, by integrating it in the national curriculum through activity 1.4.1 and directly supporting school authorities in the implementation of the Resilient Schools programme in activity 1.4.2

- **Sea-level rise, coastal erosion, flooding; impacts on loss of ecosystems:** Component 3 will address these risks by delivering enhanced coastal protection, by protecting / restoring degraded mangroves and putting in place community-led management and protection strategies. The conservation and restoration efforts will provide long-term coastal protection against increased sea-level rise, coastal erosion and the risk of saline water intrusion into coastal agricultural land and aquifers. Output 3.1 will deliver increased capacity for the management of mangrove forests through activity 3.1.1 while 3.1.2 will provide a better awareness for sustainable use of mangrove communities. Based on this, Output 3.2 will deliver community-led mangrove conservation plans, which will be maintained through community-led monitoring and enforcement of by-laws under activity 3.2.2. Physical protection measures will be delivered under activity 3.2.3 which will define the relevant strategies, while 3.2.4. will support the implementation of appropriate coastal protection measures at community level.
- **Heatwaves, droughts, floods, sea-level-rise:** Activity 2.1.4 will support communities in accessing new solutions for climate resilient water-harvesting and storage which will support them in locations where access to water is under threat. This will enhance community resilience in the face of increased water stress due to permanent climate impacts such as salination of wells, and temporary impacts driven by heatwaves, droughts and floods which lead to e.g., well pollution.
- **Impacts on loss of livelihoods:** The focus on addressing these challenges is in Component 2, where in output 2.1, activity 2.1.1 will lay the foundation for a highly localized understanding of needs, on which sustainable livelihoods action plans will be based. Activity 2.1.2 will then provide the required training to communities to take actions to safeguard their livelihoods. Activity 2.1.3 will address financial management capacity with a focus on livelihood support. Output 2.2 will address the absence of a strong value chain by supporting community members in developing business skills for small business creation and growth, enabling them to engage in livelihood diversification. Activity 2.2.2 will identify the most appropriate business models in the coastal sector, while activity 2.2.3 will help coastal businesses in particular with access to resources in the form of public and private finance. This will be further supported by activity 2.2.4 which will specifically target the creation of value chains that reach into the coastal districts, enabling these districts to gain a wider range of potential customers.
- **Impacts on health:** Output 1.3 will focus on the health and nutrition of the most vulnerable, women and children, by supporting them through specific training related to nutrition, WASH and health in activity 1.3.1, while activity 1.3.2 will finance local solutions for enhanced WASH with a focus on the most vulnerable. This will deliver improved water supply, which will limit the spread of water-borne disease, as well as educating the community members on the spread of such diseases, leading to increased preventative care. Beyond health impact, increased understanding of the need and financial support for increased access to safe water will also enable the beneficiaries to cope better with heatwaves and droughts.

Detailed descriptions of the activities that will be implemented are presented in table 16 below.

5.4 Costs and Benefits of Selected SLCRP Interventions

Intervention	Avoided costs	Added benefits
Rainwater harvesting	Avoided costs of human health impacts from improved quality of drinking water. Avoided costs of buying drinking water.	• Increased productivity due to avoidance of water collection. No risk of income loss due to contaminated water within the household.

Solar panels for schools	Avoided costs of buying energy from the national grid (where relevant, keeping in mind that most targeted villages are not connected to the grid); avoided cost of purchasing diesel/petrol for generators.	• Energy security/access • Potential for increased income thanks to better energy access.
Climate resilient seeds	Avoided health cost due to malnutrition and avoided costs from improved food security.	• Additional income creation from improved crop yield. Increased food security.
Solar dryers	Avoided fuel cost/time cost from collection of wood as a result of the use of solar energy and avoided costs from improved food security. Avoided costs of electricity purchase from the national grid.	• Additional income creation from the sales of dried food. Increased food security.
Efficient fish smoking ovens	Avoided costs of buying electricity from the national grid, avoided loss of ecosystem services from mangroves, and avoided impacts on human health.	• Additional income creation from the sale of dried fish. • Additional fishing opportunities from nursery protection. • Positive environmental impacts through decreased deforestation of mangrove wood. • Impacts on health.
Mangroves planting	Avoided loss of value from ecosystem services provided by mangroves. Coastal protection (avoided damage to infrastructure).	• Additional income creation from ecosystem protection of fishing stock and nurseries. • Environmental impacts through improved coastal protection.
Coconut tree planting	Avoided loss of value from ecosystem services provided by mangroves. Coastal protection (avoided damage to infrastructure).	• Income creation from coconut harvest. • Environmental impacts through improved coastal protection.

Table 16. Overview and description of activities and sub-activities

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
Component 1: Community Mainstreaming of Climate Change Adaptation Through Governance, Partnerships, Education and Training This Component aligns with the GoSL's NDC, NAP, National Climate Change Policy, National Framework for Climate Services, National Communications and the Integrated Coastal Zone Management Plan. It will focus on identifying and supporting a broad range of community actors (farmers, fishers and related livelihoods, female headed households, NGOs and CBOs, health and nutrition workers, , school teachers, mayors, Chiefs, agricultural extension officers, , disaster management officers, women, youth, children, people with disabilities, etc.) to build public awareness and understanding of local climate risks, impacts and responses, in order to develop Community Adaptation Plans (CAPs). A participatory governance structure in the form of a Coastal Governance Platform (CGP) will be established in each target district, or strengthened where already in existence, to enable climate adaptation, led by selected and gender inclusive community representatives, in partnership with local government, agencies and others, e.g., Chiefdoms, to engage community stakeholders and drive the process of the CAPs forward. The CAPs will engage across the communities including the key sectors of agriculture, water, DRR (including EWS) and coastal resources (fisheries, ecosystems) to identify priority measures for implementation to increase climate resilience and sustainable development outcomes. The CAPs will therefore reflect coastal communities' climate resilience needs and priorities and will be linked with the government's local-level development planning at Chiefdom Level and incorporated in District Development Plans (DDPs). The Coastal Governance Platform will be used to create links between the communities and their CAPs, and local government structures. As climate resilience will not be achieved through local action alone this project component will also engage national and sub-national actors to support local decision-making and action in adapting to climate change and building resilience. The goal is to influence national-level policy change while effectively taking measures that equitably respond to the needs of those most vulnerable at the community level, which will incentivise ownership and sustainability of the project. In addition to the governance structures created or strengthened at community and broader levels, Component 1 will deliver health and nutrition training for women and children and work closely with the Ministry of Basic and Senior Secondary Education (MBSSE) to develop a module on climate change and disaster risk management for the school curriculum. This module will incorporate existing content around climate change and disaster risk management – particularly the 'disaster risk handbook' developed by MBSSE – and expand on elements of climate change. The health and nutrition training will focus specifically on the impacts of climate change on women's health. This will be followed by WASH activities within communities, which will be identified at a community level.			
Outcome 1: Coastal communities and institutions have governance structures, plans, knowledge skills and solutions in place to undertake local adaptation to climate change.			
Output 1.1: Strengthened Community Structures, Coastal Governance Platforms and Community Adaptation Plans (CAPs) The activities under this output address coastal communities' existing low adaptive capacity, high exposure and sensitivity to climate hazards, and their lack of access to climate services, compounded by low levels of risk awareness and minimal support for locally appropriate adaptation action. A locally-led coordinated response will bring decision-making under the control of those affected by, and leading ongoing responses to, climate-related events to avoid predetermined and unrepresentative solutions. The CAPs, with the support of the Coastal Governance Platform comprising representatives from Community Adaptation Committees			

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
(CACs) from target communities, will provide an effective, practical, and integrated mechanism for planning – informed by knowledge of climate hazards, risks and impacts. To ensure the proposed approach is effective, climate information and data will be used in an equitable manner along with the knowledge of marginalised groups to develop capacities in response to coastal climate hazards, risks and impacts, and provide stakeholders with the skills and knowledge needed to assess and respond to climate change. Stakeholders in Sierra Leone have identified the need for urgent implementation or enhancement of weather and climate observation networks, including the need for more weather stations, which will enable prediction, monitoring and assessment of extreme events. Building on the expansion of weather and climate observation infrastructure, the value of Climate Information Services (CIS) and Early Warning Systems (EWS) are also acknowledged. The SLMet is working to develop CIS and effective tools, however these are at an elementary stage. Proposed projects such as the CIEWS project under the AfDB's "Freetown WASH and Aquatic Environment Revamping Program" will also focus on upgrading/expanding CIS and EWS across Sierra Leone. The SLCRP's interventions will complement these ongoing and planned projects by establishing a foundation to employ CIS as it becomes more and more available. The CAPs will also incorporate the CIS needs and priorities of stakeholders and work with local governments and the SLMet, and other relevant stakeholders, to better disseminate reliable and timely impact-based forecasting to coastal communities, in particular focusing on the "last mile". The CAPs will also outline Disaster Risk Reduction (DRR) activities. These will involve working with the community-based committees on the CGP, to build knowledge about risks, co-monitoring and understanding of how risks and vulnerabilities change over time. Communities would therefore be able to develop monitoring information for actionable, targeted early warning messages to support decision-making in agricultural or fishery production activities, and build appropriate response capabilities to reduce risks. Inclusive community-based committees will ensure the participation of all climate vulnerable people, including children, youth and women in leadership positions along with men. Where necessary, female-only committees will be established to ensure climate needs and vulnerabilities are captured in a safe space free from discrimination and to ensure that the gendered impacts of climate change on vulnerable women are identified and elevated. DRR planning at the community level will empower individuals and institutions to make their own collective decisions on actions to adapt to climate change while increasing climate resilience. Final CAPs will be based on participatory community analysis and planning discussions, reflecting the differential needs and preferences of people. The activities under this Output are essential for addressing the full range of climate risks faced by people on the coast of Sierra Leone and will enable not only the physical climate risk reduction activities in Components 2 and 3 of this project, but also enhance people's general adaptive capacity for the long-term.			
Activity 1.1.1: Identify Existing or Establish New Community Structures for Participatory Climate	Addressing all climate impacts	First comprehensive mapping will be done in beneficiary communities to assess which groups, structures and governance currently exist. This will be specifically focused on climate change and disaster risk reduction / management, but also take into account other relevant community structures and groups. The current capacity of community groups and stakeholders to respond to climate change impacts will also be assessed, including the needs of the most vulnerable groups such as women, youth and people with disabilities. In addition, the mapping exercise will determine which organisations (e.g.,	1.1.1.1 Conduct mapping in beneficiary communities to assess existing community groups, structures and governance systems and their capacity to respond to climate change impacts, as well as CBOs and NGOs active in each community. 1.1.1.2 Strengthen existing groups and structures where needed, including existing structures that are able to fulfil the functions of Community Adaptation Committees (CAC) and their Community Mangrove Stewardship Sub-Committees.

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
Responsive Planning		CBOs) are working in communities already – especially related to climate change or disaster risk reduction, but also across different thematic areas – and facilitate connections between communities and CBOs where appropriate. Existing structures will be strengthened and integrated further into wider communities to fulfil the role of Community Adaptation Committees. Where no appropriate structures exist, communities will be enabled to establish Community Adaptation Committees (CACs). The CACs will include sub-committees for: i) WASH infrastructure maintenance; ii) sustainable livelihoods; iii) mangrove stewardship and iv) coastal protection. The Community Adaptation Committees will lead the development of Community Adaptation Plans (Activity 1.1.3.), which will include planning for: i) sustainable livelihoods (Output 2.1), ii) mangrove management , (Output 3.2); and iii) coastal protection (Output 3.2)	1.1.1.3 Establish new Community Adaptation Committees (CAC) and their Community Mangrove Stewardship Sub-Committees where needed, working closely with community authorities, incorporating women and youth representatives, and linking with relevant CBOs and NGOs.
Activity 1.1.2: Build Capacity at Community Level for Climate-Responsive Planning and Development	Addressing all climate impacts	Based on findings from the mapping and assessments in Activity 1.1.1, the SLCRP will work with communities to build their capacity for climate-responsive planning and development, including through gender-sensitive dialogues (using a social accountability approach), including with participation of women and youth. The ability of youth to adapt to climate change will further be strengthened by establishing and supporting out-of-school clubs for adolescent girls and boys. Training will focus on identifying community-level vulnerabilities and the most important responses to climate hazards, which may be different for different communities.	1.1.2.1 Conduct community capacity needs assessments, including specific needs of women, girls, boys, men and people with disabilities to assess knowledge of climate change and how to respond to extreme climate events. 1.1.2.2 Hold gender-sensitive community dialogues about gender norms and roles in climate response, and community governance, using the social accountability model, utilising existing and expanding representative women's and girls groups. 1.1.2.3 Conduct training for communities (based on capacity assessment) ensuring representation of women and youth, on planning for and responding to climate hazards. 1.1.2.4 Establish out-of-school clubs for adolescent girls and boys to build capacity on climate change, including separate

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
			spaces for girls for discussion on WASH, GBV etc, as well as joint activities.
Activity 1.1.3: Develop Community Adaptation Plans (CAPs)	Addressing all climate vulnerabilities	To promote locally-led adaptation, this activity will support communities to develop Community Adaptation Plans that incorporate their current and future needs and priorities and that cover the range of climate responses targeting all vulnerable populations and sub-populations. This will be done by building on communities' access to existing information and with support from: i) groups established or strengthened in Activity 1.1.1; ii) the CBOs / organisations in their communities; iii) the Coastal Governance Platforms established under Activity 1.1.4; and iv) the SLCRP's Project Implementation Unit (PIU) to develop CAPs. Communities will be positioned to feedback to relevant agencies what the current gaps on the ground are at the local level e.g. what is needed for EWS focused on floods, droughts or extreme events and what particular products are necessary from a sectoral perspective. The CAPs will develop a set of prioritised climate responsive measures, based on existing science and local and traditional knowledge to be implemented at the local government level. CAPs will also include long-term adaptation, such as planning for landward migration of mangroves as the sea level rises.	1.1.3.1 Develop Community Adaptation Plans (CAPs), using gender sensitive and participatory approaches that address needs of women and men equally, and address power relations 1.1.3.2 Establish communication mechanisms between different agencies who will be responsible for delivering climate resilience projects, for example. NGOs and CBOs at district or community level, and government agencies – e.g. EPA, NPAA, SL Met, NDMA 1.1.3.3 Ensure communication mechanisms are fully defined and embedded in CAPs 1.1.3.4 Conduct an annual review meeting with each community on CAPs to assess progress and seek solutions to any challenges with fully implementing the plans
Activity 1.1.4: Establish Coastal Governance Platforms	Addressing all climate vulnerabilities	Effective and sustainable local adaptation requires strong coordination among different stakeholders. This activity will establish Coastal Governance Platforms that will support coordination, knowledge sharing, participatory governance and the implementation of the Community Adaptation Plans (developed under Activity 1.1.3). This will involve, community committees, local governments, the Coastal Chiefdoms Natural Resource Management Network (CCNR and Co-management Committees (formed by previous interventions such as WA BiCC) and key agencies, in order to help guide coastal	1.1.4.1 Develop terms of reference for CGPs, ensuring representation of women and youth 1.1.4.2 Establish CGPs that link climate resilience clearly to conservation and ecosystems (Component 3) 1.1.4.3 Establish partnerships and cooperation agreements with CBOs and NGOs identified in Activity 1.1.1, including women and girls' rights organisations

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
		communities through participatory governance, to implement their Community Adaptation Plans. The CGP will provide a forum for information exchange to support the development of the CAPs under Activity 1.1.3. Shared information will also include key national priorities (NDC, NAP, CCAP, IZCMP), results from previous related climate projects and useful resources (e.g., WA BiCC, UNDP, other vulnerable coastal community climate resilient case studies), as well as existing climate information services and products from the SLMet (including DRR and EWS measures) and coastal district vulnerability assessments from the SLCRP design stage. The CGP provides a formal body to continue learning-by-doing, synthesizing knowledge systems, accessing and sharing budgets and ensuring meaningful local involvement and management flexibility. This is critical for project delivery, for scaling up project interventions in the future and for long-term sustainability. The CGP will play an important role in collecting the results from climate resilient applications across the SLCRP and sharing this knowledge within, between and beyond the target communities. There is a precedent in coastal Sierra Leone for such platforms. CGPs will be modelled on the existing and successful Sherbro co-management committee, set up as part of the WA BiCC project. This committee is currently governing the Sherbro River estuary, and was instrumental in developing the Sherbro Co-management Plan. The committee brings together a variety of stakeholders and includes 11 elected members drawn from ten chiefdoms and the municipalities that make up the Sherbro River estuary. The committee also includes an advisory body including members from traditional authorities – including the ten paramount chiefs who govern the chiefdoms that make up the Sherbro River estuary, national	1.1.4.4 CGPs agree action plans, including EWS priorities and mechanisms, prioritising reaching youth, women and marginalised groups 1.1.4.5 Support CGPs to deliver their action plans, including implementing last-mile EWS mechanisms agreed with government agencies, community groups and CBOs / NGOs, that reach the most vulnerable community members who may lack access to regular forms of communication

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
		and district authorities, such as the NPAA and EPA. Stakeholders have reported on the success in this pilot initiative, and that they would welcome additional funding to replicate the model in other protected areas.	
Output 1.2: Integration of Community Adaptation Plans into local/district development plans and Strengthened Capacity of National and Sub-National Government for Implementing Adaptation Initiatives Incorporating CAPs into higher level planning and governance instruments, as well as enhancing government capacity for implementing climate change projects are essential for addressing the full range of climate risks faced by people on the coast of Sierra Leone. The activities under this output will thus enable not only the physical climate risk reduction activities under Components 2 and 3 of this project but also enhance people's general adaptive capacity for the long-term. Project investments under this output will include: i) capacity building of national and subnational government for planning and implementing climate adaptation initiatives such as the SCLRP; and ii) integration of Community Adaptation Plans into local development planning and District Development Plans.			
Activity 1.2.1 Develop Capacity at National and Sub-National Government Levels for Climate-Responsive Planning and Development	Addressing all climate vulnerabilities	This activity will enhance the capacity of key government stakeholders at national and district level to develop, deliver and monitor climate change adaptation projects. The focus will be on the implementation of the SLCRP, and ensuring government departments have the human, technical and financial resources in place to successfully deliver projects such as the SLCRP, as well as building capacity to receive more funding and resources in future projects. This capacity building for the implementation of the SCLRP will also be applicable to other climate adaptation initiatives and will build on the "Green Climate Fund Readiness Support for Sierra Leone" project. The specific capacity development will be based on insights from key stakeholders at national, regional and district levels who work on climate change policy and delivery, and environmental issues, including but not limited to members of the PSC. The capacity building plan, that will be delivered through a series of workshops, individual trainings and other suitable methods, will be based on needs identified in terms of current portfolios, existing climate change knowledge, technical	1.2.1.1 Develop capacity building plan for national and district government agencies to enhance national and district-level capacity for planning, delivering and monitoring climate adaptation projects 1.2.1.2 Strengthen or establish (if not already pre-existing) the coordination mechanisms between national-level government agencies responsible for climate change projects (ensuring connection to district level) 1.2.1.3 Strengthen or establish (if not already pre-existing) coordination mechanisms between district-level government agencies responsible for climate change projects (ensuring connection to national level) 1.2.1.4 Facilitate meetings between national agencies and district offices to sustain coordination mechanisms throughout project lifecycle and beyond 1.2.1.5 Hold capacity development workshops and trainings for national government staff, addressing gaps identified and ensuring women's representation and leadership

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
		expertise, and the ability of national and district government departments to deliver and monitor climate change projects.	1.2.1.6 Hold capacity development workshops and trainings for district government office staff addressing gaps identified 1.2.1.7 Respond to gaps on how EW/CIS information is generated – its nature, and how it reaches populations. (Linked to Activity 1.1.4). Based on gaps, identify and implement solution to last-mile EW/CIS dissemination. This will include hardware support e.g. developing dissemination channels, materials, new technologies, as well as training.
Activity 1.2.2: Incorporate Community Adaptation Plans into Local and District Development Plans	Addressing all climate vulnerabilities	The Community Adaptation Plans (CAPs) developed under Activity 1.1.3 will be embedded into Chiefdom-level decision-making by ward development committees and chiefdom development committees, which will in turn link up to district-level decision-making. This is expected to contribute to a paradigm shift as follows: i) CAPs are institutionalised into the annual planning and budgeting processes and cycles of government at district-level, and therefore are built into strategic and operational plans aligned with central government priorities which is essential for budget and resource allocation; ii) key strategies from CAPs will ultimately be integrated into the five District Development Plans under the NAP process and the Coastal District Development Plans under the ICZMP process, further embedding long-term local climate action through an integrated coastal landscape management approach, and access to central and international funding; and iii) once embedded in policy, such measures can be scaled, replicated and transferred to other coastal communities.	1.2.2.1 Establish mechanisms to enable the CAPs to be recognised, and feed into decisions made by ward development committees and chiefdom development committees 1.2.2.2 Work with ward development committees and chiefdom development committees to integrate key strategies from CAPs into district development plans 1.2.2.3 Support integration of Community Adaptation Plans into policy, working with national government agencies to bring content from DDPs into national policy where relevant 1.2.2.4 Hold events to promote best practices in embedding community plans into local-level planning and into DDPs
Output 1.3: Small-Scale WASH Infrastructure (Rainwater Harvesting, Filtration and Solar Hot Water Systems) Installed and Climate-Resilient WASH and Nutrition Practices Used by Communities, Especially Women and Children Sierra Leone's NDC, NAP and community consultations undertaken by SCI SL emphasise the need for climate change adaptation interventions for food and water security, health and nutrition in the coastal zone. This output will address access to clean water, WASH and nutrition impacted by climate change hazards, as an			

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
important step to increasing the health, wellbeing and climate resilience of people, particularly women and children who are most vulnerable to climate change impacts, on the coast. Increasing temperatures, changing rainfall patterns and extreme events as a result of climate change exacerbate waterborne diseases and undernutrition, therefore it is essential to develop climate-resilient WASH practices for the most vulnerable community members. This output will focus on women and child beneficiaries because women have less access to education and are the primary carers and cooks within the household, often also collecting water from open sources. Children are underrepresented in climate programming generally, yet are most vulnerable to climate related diseases and impacts to food insecurity resulting in undernutrition – this can result in disrupted school attendance which limits their future opportunities and constrains their adaptive capacity. This output will address access to clean water, WASH and nutrition impacted by climate change hazards, as an important step to increasing the health, wellbeing and climate resilience of people on the coast. Project investments under this output will include: i) community WASH needs assessments; ii) community training on climate-resilient WASH and nutrition practices and technologies; iii) rainwater harvesting systems; iv) handwashing facilities; v solar hot water systems; and vi) small-scale technical solutions for safe drinking water such as water filters.			
Activity 1.3.1 Equip Communities With Climate-Resilient Health and Nutrition Knowledge and Skills, With a Specific Focus on Women and Children	Health risks, heatwaves, drought	Since needs differ across communities and within communities, an assessment of climate vulnerability in terms of water, sanitation and health will be undertaken in each community, with a focus on the needs of women, mothers, children and people with disabilities, ensuring the most appropriate local adaptation activities. The assessments will focus at community-level on: i) how WASH links to health and nutrition for women and children; ii) climate vulnerability of schools; and iii) water sources and needs for agricultural purposes. Based on the findings from the assessment, training sessions and workshops will be held tailored for each community, including to promote good practices and change harmful practices, such as open defecation and lack of handwashing. The training and workshops will include how climate change can impact and exacerbate certain health problems and cause an increase in waterborne and vector-borne disease, training on the different foods available in changing weather patterns (linked to Output 2.1) and how climate change impacts what crops can grow. Finally, a train-the-trainers course will be delivered so that training can be scaled out and continue beyond the project period. Trainers will be selected based on engagement in initial	1.3.1.1 Assess climate vulnerability of water, sanitation and health, schools and agricultural water supply at community-level 1.3.1.2 Based on assessment findings, conduct trainings and workshops for each community, promoting good practices (e.g. preventing open defecation, handwashing), and focusing on needs of women, children and people with disabilities and how climate change impacts diseases and the crops that grow. Gender norms will be mainstreamed into training content and recommendations. 1.3.1.3 Conduct training-of-trainers (ToT), selecting male and female participants based on engagement with initial training so that community members can continue to deliver health training in communities (working closely with community health facilities and community health officers at chiefdom level) 1.3.1.4 Roll out first training sessions delivered by community members who received ToTs on WASH and nutrition

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
		training and willingness to participate, and trainers will be eligible for a Diploma in Health and Nutrition so they can continue training after the GCF-funded project has finished. This will be implemented in collaboration with community health facilities, existing community health officers at Chiefdom level and Mother Support Groups in communities. This activity is crucial as it will lead to a prevention of water-related diseases for the beneficiaries, which are strongly linked to the climate vulnerabilities these people are facing. Ensuring beneficiaries are knowledgeable about the causes of disease and how they are linked to good practice with water, health and nutrition – especially in times of increasing uncertainty concerning water availability and water quality, and the associated health impacts, will ensure beneficiaries are more resilient to climate-related water and health impacts	
Activity 1.3.2 Implement Climate-Resilient Domestic WASH Solutions in Communities, With a Specific Focus on Women and Children	Health risks, heatwaves, drought	Using the findings of Activity 1.3.1. and building on the knowledge and awareness of communities, this project activity will work closely with groups established or strengthened in Output 1.1 to develop a set of domestic communal WASH solutions which will be Category C appropriate. These will include: i) rainwater harvesting at a standard safe for human consumption; ii) handwashing facilities; iii) the installation of solar hot water access, facilitated by PV solar panels and solar pumps; and iv) training and small-scale technical solutions for safe drinking water from groundwater sources to address saline intrusion e.g., use of filters. Solutions specific to the needs of each community will be implemented. Workshops and training sessions will be held on the use and maintenance of the WASH solutions and solar technology. To further support long term sustainability, maintenance committees will be established and access to parts will be ensured. In addition, a train-the-trainers approach will be taken focused on participants who are willing	1.3.2.1 Based on assessments in 1.3.1, develop a set of suitable WASH implementation activities for each community. Menu of options: rainwater harvesting systems at community centres; handwashing facilities linked to water systems; solar hot water at existing water pumps; technical solutions to address water-salinity or purity at water pumps - e.g. use of filters. 1.3.2.2 Work with communities to implement gender sensitive WASH interventions identified above (procure and distribute equipment required, and work with communities to build or implement), proactively promoting women's and girls' leadership in implementation 1.3.2.3 Equip communities with new WASH tools available to communities as required, and deliver training on new interventions distributed in the previous sub-activity

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
		and capable to participate and were especially actively involved in the adoption of new technologies. These interventions will directly address the climate vulnerabilities associated with sea-level rise, increased incidence of hot days, and increased flooding caused by more severe and unpredictable weather events, by providing safe and clean water for consumption, and for hygiene purposes for handwashing.	1.3.2.4 Establish, train and equip maintenance committees, with representation of women and men, for WASH interventions to support wider community on using and maintaining new WASH tools as required
Output 1.4: Climate change education, disaster risk reduction measures and small-scale infrastructure (incl. rainwater harvesting and solar power) for schools Improving education outcomes for children is critical to boosting their general capacity to adapt to climate change in the future. This requires both enhancing the climate resilience of schools and incorporating climate change content in curricula. Climate change education in schools often also have wider benefits in communities as children pass on their knowledge and practices to adults. Schools can further be valuable demonstration sites for technologies such as WASH e.g., rainwater harvesting and handwashing facilities, and other solutions such as rooftop solar installations. As natural focal points in communities, schools can also play an important role in community level decision-making and capacity building activities. In this way, the activities under this output help address the full range of climate risks on the coast of Sierra Leone in general by enhancing adaptive capacity, as well as targeting specific climate risks such as safe water supply for schools under drought conditions and school safety in terms of managing disaster risks of increasing extreme events like storms, floods and heatwaves. Project investments at schools under this output will include: i) a climate change curriculum for primary schools designed and implemented; ii) disaster risk reduction planning and training for school staff and students; iv) rainwater harvesting systems; v) kitchen gardens; vi) solar electricity; vii) solar hot water systems; and viii) retrofitting solar-powered water pumps.			
Activity 1.4.1 Design and Implement Climate Change Education Module in Primary Schools	Addressing all climate vulnerabilities	The SLCRP will collaborate with Ministry of Basic and Senior Secondary Education (MBSSE) at national level to review and assess the existing climate change themes in the primary school curriculum, and develop a module on climate change that is locally relevant and aligned with existing school subjects. The project will coordinate with the Teaching Service Commission to cascade the climate change modules through a ToT approach at national and district level. Training will then be cascaded to 75 schools in each target community, equipping 420 teachers and school staff with the skills and knowledge for effective delivery of the module. Further support to 200 teachers will include lesson observations, peer to peer learning and supportive supervision in schools.	1.4.1.1. Assess existing primary school curriculum to determine gaps in terms of climate change education, considering the recent launch of DRR teaching manual 1.4.1.2. Develop module on climate change for primary school curriculum at national level in collaboration with Ministry of Basic and Senior Secondary Education (MBSSE) that is locally relevant, aligned with existing school subjects such as geography/environmental studies/agriculture and considers gender-specific adaptation responses 1.4.1.3. Launch new primary school climate change module at national level

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
			1.4.1.4. Support MBSSE and Teaching Service Commission (TSC) staff and teachers at national and district levels to roll out primary school climate change module to 75 schools 1.4.1.5. Train primary school teachers and community champions to deliver primary school climate change module in 75 schools. 1.4.1.6. Support primary school teachers to use climate change module in their classrooms through peer-to-peer learning and lesson observations
Activity 1.4.2 Support District and School Authorities to Implement the Resilient Schools Programme, Including Climate Change Planning and Disaster Risk Management	Addressing all climate vulnerabilities	This activity will be implemented in close collaboration with existing projects to work with staff and students to implement adaptation interventions, to address the vulnerability of primary, junior secondary, and senior secondary schools in coastal communities (as assessed under Activity 1.3.1). Interventions will include disaster-risk response and preparedness, kitchen gardens, water harvesting and storage, and solar pumps. The Resilient Schools Programme will cover specific climate related themes and associated actions focused on education and capacity building taught through the school curriculum. Schools will develop Resilience Plans and outline the initiatives they will take to further improve their physical and mental wellbeing in a changing climate. Results from the UNDP project will be integrated in this activity and results from Save the Children's global common approaches on Safe Schools will be leveraged. This project activity will align with the international Comprehensive School Safety Framework 2022-2030 For Child Rights and Resilience in the Education Sector. Easily maintained rainwater harvesting units will be installed to capture school rooftop rainwater for handwashing and watering the kitchen gardens, and for drinking during dry spells. Water technology deployment may also provide an opportunity to engage with the private sector. The Resilient Schools	1.4.2.1 Review existing work by MBSSE and others on school climate vulnerability (e.g. environmental impact assessment as part of education sector plan) and determine which schools in SCLRP target communities have previously been involved. 1.4.2.2 Incorporate climate resilience considerations into school safety planning, in collaboration with school leadership in 75 schools (School Management Committees - SMC), in line with MBSSE school safety policy 1.4.2.3 Train School Management Committees (SMCs) and Board of Governors (BOG's) to analyse and respond to climate change risks, including with gender and disability lens 1.4.2.4 Support schools to implement disaster risk reduction planning and mitigation strategies, including drills, and rolling out the DRR manual for schools (already existing – MBSSE 1.4.2.5 Equip schools with climate-resilient infrastructure according to individual school needs (menu of options: rainwater harvesting systems, solar electricity; solar hot water systems, solar-powered water pumps for existing boreholes, kitchen gardens with climate resilient crops) and train school staff on maintenance of infrastructure

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
		Programme will be developed with replicability in mind for transfer to other vulnerable coastal communities. A train the trainers' approach will be taken focused on participants who are willing and capable to participate and were especially actively involved in the adoption of new technologies. This activity will be implemented jointly by school boards at district level, teachers, the PIU and participating children, staff and community champions/experts, in partnership with the Ministry of Education and other relevant national institutions to assist with scaling up the initiative post project.	1.4.2.6 Gather evidence on what has worked, to share with wider school sector for best-practice climate-resilient techniques in education, including use of girl-led approaches
Component 2: Enhanced Climate Resilience of Food Production Systems and Value Chains to Secure Food and Livelihoods, Especially for Women, Youth and Children This component aligns with the GoSL's NDC, NAP, National Climate Change Policy, National Climate Change Strategy and Action Plan, and the National Drought Management Plan. The activities will focus on capacity building for farmers and fishers and provide best practices, proven techniques and small-scale technologies to support climate resilient agricultural and fishing practices, aimed at addressing food and water insecurity, including reducing food loss and improving nutrition, wellbeing and income generation. This will include strengthening of farming and fishing value chains, livelihood diversification, entrepreneurial skills and support to access finance. These interventions will be integrated in the Community Adaptation Plans (CAPs) developed under Component 1 so that the interventions are embedded in local policy and supported by local institutions and in alignment with relevant existing sub-national and national programmes in these sectors. Furthermore, the capacity building of community groups and local institutions under Component 1 will enable the successful implementation of these livelihood and value chain activities. Component 2 is also closely linked to the ecosystem-based adaptation and sustainable natural resource management activities of Component 3, as the local ecosystems underpin many livelihoods, and in turn benefit from more sustainable livelihood practices.		
Outcome 2: **Coastal communities have climate-resilient farming, fishing and alternative livelihoods and businesses**			
Output 2.1: Technologies, Equipment, Inputs, Plans and Practices for Climate-Resilient Farming, Fishing and Alternative Livelihoods. The activities under this output will enhance the climate resilience of people's livelihoods and increase food security and incomes in coastal areas by assessing adaptation needs for livelihoods, promoting improved farming and fishing practices, enabling stronger financial management in communities, and increasing water supply to support livelihoods. This will directly address the climate drivers of increasing rainfall intensity, increasing temperatures and increasing storms impacting livelihoods and food security. Smallholder farmers and artisanal fishers will be equipped to manage natural resources more sustainably and to adopt improved methods and technologies for production, storage and processing of agricultural and fishing products. This will include addressing unsustainable livelihood practices, low productivity and high food losses (particularly post-harvest) impacted by climate change. Climate resilient agricultural and fishing practices will be supported such as improving crop yields, improving water access and water use efficiency, buffering crops against drought, reducing soil erosion, and enhancing sustainable food processing and storage by promoting the use of solar dryers and solar-powered freezers. The activities will be implemented in a manner that addresses the			

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
social and gender norms that traditionally restrict access to capital and resources by marginalised and climate vulnerable community members such as women, youth and people with disabilities. Coastal Livelihood Circles will be set up as spaces for training and demonstration of climate resilient approaches in communities. This will include building on the local and traditional knowledge of community members to improve production systems, access to climate resilient technologies and financial management via Village Savings and Loan Associations (VSLAs). The relationship between nutrition and diversified crop production to enhance dietary diversity (e.g., for better diets for children, lactating mothers and weaning infants) will also be covered. Along with the activities under Output 2.2., the ability of vulnerable farmer and fisher groups to use climate and market information for decision-making will be improved. This will include engaging the Ministry of Agriculture/extension officers, the Ministry of Environment, agricultural/fishery research institutes, in addition to the CGPs to increase communication between local and (sub)national government to facilitate access to services and future flows of climate finance. Output 2.1 will closely align to national priorities and agricultural/fishery extension agencies delivering existing sectoral climate change programming. The activities under this output will build on the results of two past projects in particular and scale up successful interventions with known costs and benefits across the coast of Sierra Leone: i) the WABiCC pilot project in terms of working with coastal communities and livelihoods to build climate resilience; and ii) the UNDP-implemented project "Building the adaptive capacity to catalyse active public and private sector participation to management exposure and sensitivity of water supply services to climate change in Sierra Leone (2012-2018)", in terms of water planning, working with relevant institutions and deploying water harvesting and efficiency technologies. Project investments under Output 2.1 will include: i) Sustainable Livelihoods Actions Plans at community-level as part of overarching Community Adaptation Plans; ii) technologies, equipment and inputs for climate-resilient agriculture (i.e. conservation agriculture, climate-resilient seeds, agroforestry, integrated pest management, reducing post-harvest loss); iii) technologies, equipment and inputs for climate-resilient fishing and fish processing (i.e. oyster cultivation, efficient fish smoking kilns, solar dryers, solar-powered freezers); iv) Coastal Livelihoods Circles as physical places for demonstration and training; v) community training on climate-resilient farming and fishing practices; vi) establishing/strengthening Village Savings and Loan Associations; and vii) installation of water harvesting and storage facilities to support livelihoods (improved farm-level water management via small channels and small water storage facilities, and rooftop rainwater harvesting systems).			
Activity 2.1.1 Map needs for livelihood improvement and diversification in different communities and develop action plans	Risks to livelihoods	People's current livelihood strategies and practices in all beneficiary communities will be assessed, focusing specifically on the livelihoods most vulnerable to climate change and most resilient to climate change. Opportunities to enhance the climate resilience of existing livelihoods and for alternative livelihoods (the latter linked to Output 2.2) will be identified in each community. Working through the community groups established/strengthened under Activities 1.1.1 and 1.1.2, measures will be defined to make livelihoods more climate-resilient and consolidated into a Sustainable Livelihoods Action Plan for each community, which will form part of the	2.1.1.1 Conduct livelihoods profiles using the Household Economy Approach and identify opportunities to enhance the climate resilience of livelihoods and for alternative livelihoods, linked to and combined with the market assessment in Output 2.2 and linked to mangrove livelihood activities in Component 3 2.1.1.2 Work with community groups (with participation of women and men) to define measures to make livelihoods more climate-resilient, and consolidate into sustainable

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
for sustainable livelihoods		overarching Community Adaptation Plans developed under Activity 1.1.3. Participation of both women and men will be ensured, different livelihoods of women and men will be considered and plans will be disability sensitive. The model for Sustainable Livelihoods Action Plans has been tested by the WABiCC project and will thus be scaled up.	livelihoods action plans, and integrate this into Community Adaptation Plans under Output 1.1
Activity 2.1.2: Enable Communities to Implement Climate-Resilient Livelihoods Through Training and Improved Practices, Inputs and Technologies	Risks to livelihoods	Based on the findings of Activity 2.1.1, specific climate resilient livelihoods will be implemented in each community in response to local needs. For agriculture, options will include: i) planting climate resilient seed varieties, sourced nationally or regionally in collaboration with agricultural institutes, ii) conservation agriculture approaches such as crop diversification, intercropping, mulching, organic fertilisers and minimising soil disturbance, iii) agroforestry approaches, iv) integrated pest management, v) reducing post-harvest losses, vi) food recovery following extreme weather events. For fishing, options will include: i) managing by-catch; ii) recognising toxic algal blooms; and iii) using alternative fish-preservation equipment (e.g. efficient fish-smoking kilns; solar driers; cold storage). Community livelihoods learning and support groups will be established/strengthened within or alongside the community groups supported under Activities 1.1.1 and 1.1.2. Coastal Livelihoods Circles will be established as central places in communities for training and demonstration plots, along with farmer field schools, peer-to-peer learning and farm visits that will also be facilitated. Community members will also be equipped to undertake surveys and monitor agricultural yields and fish catches over time, in order to identify resilient local seed varieties, record the most successful local practices and manage resources sustainably. One of the types of community livelihood groups will be the option of supporting women fish smokers to organise into cooperatives that can jointly invest in	2.1.2.1 Strengthen livelihoods by establishing livelihoods circles for women and men to support implementation of new techniques, providing demonstrations of farm plots and fishing techniques, facilitating peer to peer learning and providing community toolbanks with simple hand tools for climate-resilient agricultural activities 2.1.2.2 Train local artisans on fabrication and repair of simple hand tools and then provide each trained artisan with a business start-up kit to enable them to produce hand tools for wider market adoption 2.1.2.3 Develop demonstration plots for farmer field schools on improved climate resilient farming practices, including procurement of new climate-resilient agricultural inputs, including improved varieties of seeds and seedlings, hermetic bags, and pest traps / bait stations for Integrated Pest Management 2.1.2.4 Train lead farmers and fishers / fish preservation practitioners on peer to peer extension services. Training modules on climate smart agricultural practices may include: soil and water conservation; soil fertility improvement; adoption of improved crop varieties; agroforestry; integrated pest management; post-harvest management; household gender visioning. For fishing, training may include: managing by-catch; recognising toxic algae bloom; using alternative

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
		shared improved fish-smoking kilns. Sustainability of these interventions will be achieved through a train-the-trainer approach, training on maintenance of technologies and infrastructure and establishing maintenance mechanisms and access to replacement parts. The coastal livelihood circles are similar in practice to the farmer field schools, which is an established methodology promoted extensively by FAO. Save the Children has also recently implemented a project in Sierra Leone, funded by the IFC, where lead farmers were trained in good agricultural practices (including improved seed varieties – climate resilient seeds), and conducted peer-to-peer learning for further farmers. The Coastal Livelihood Circles, however, will encompass more than just agricultural plots, and will encompass training for all the technological interventions that the beneficiaries receive. For example, for efficient fish-smoking ovens and solar dryers, there will be peer-to-peer learning on use, including demonstrations of these and the benefits.	fish-preservation equipment (e.g. efficient fish-smoking kilns; solar driers; cold storage) 2.1.2.5 Procure equipment for fishing and fish-preservation (e.g. improved nets; efficient fish smoking kilns; solar driers; solar-powered cold freezers) for lead fishers / fish-preservation practitioners and other community members, with the community to pay a small percentage of the initial cost. 2.1.2.6 Through livelihoods circles, facilitate lead farmers to demonstrate new livelihoods technologies to wider community farmers (demonstration plots). Train farmers on 1) cultivation of new seed varieties, 2) how to make organic fertilizers using biomass, 3) mulching so farmers can adopt in their farms, 4) integrated pest management, 5) reducing post-harvest losses. 6) soil and water conservation 7) agro-forestry 2.1.2.7 Conduct training for community members on monitoring agricultural yields and fish catches over time, to assess suitability of new seeds, fishing techniques 2.1.2.8 Conduct training of trainers for farmers and fishers to cover: maintenance of technologies and infrastructure, establishing maintenance mechanisms; accessing supply chain for replacement parts 2.1.2.9 To ensure sustainability, train local technicians to fabricate and repair replacement parts for new technologies (e.g. solar driers). This ensures a steady supply and strong maintenance of equipment
Activity 2.1.3. Enable Fishers, Farmers and Other Community	Risks to Livelihoods	Village Savings and Loan Associations will be established/strengthened to support livelihoods development and help buffer community members against climate events,	2.1.3.1 Establish and train new VSLA groups in communities, and train existing groups where required using EA$E model 2.1.3.2 Coaching and monitoring of VSLA groups

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
Members to Improve Financial Management to Develop Their Livelihoods		using the gender-transformative EA$E model[429]. Based on preliminary discussions with several communities, Village Savings and Loan Associations have been operating successfully in some of the target areas by past projects and there is a strong willingness for this locally-owned model to be scaled up. Community members will receive training on personal financial management, management of Village Savings and Loan Associations as well as how to access other existing sources of local financing - such as banks and micro-financing - to develop their livelihood activities. This activity will include a focus on financial inclusion of women and youth via VSLAs, 'last mile' banking - facilitating authorised representatives of local financial institutions to reach communities - and, mobile phone access to financial services. Strengthening of VSLAs will include support to register with Ministry of Social Welfare. Alongside the focus on VSLAs, other existing community-level small loan groups (*osusus*) that have been established by specific fisher and farmer groups – as well as women and youth who are not members of VSLAs or *osusus* – will also benefit from the financial management training and linkages to local FIs. This activity will align with Activity 2.2.2. which will focus on building entrepreneurial skills and access to financing for developing small businesses and alternative livelihoods.	2.1.3.3 Conduct training with community members on personal financial management and accessing existing finance (e.g. microfinance, bank loans), focusing on women and youth and mobile last-mile banking
Activity 2.1.4: Enable Access to Climate-Resilient Water Harvesting and Storage to	Health risks, heatwaves, drought	Water supply supports agricultural and fishing livelihoods via irrigation and enabling sustainable food processing, food safety/handling, and storage at the "farm gate" and on the boat/shoreline (linked to Activity 2.1.2). To this end, communities will receive training and support to implement climate-resilient water harvesting and storage approaches to support livelihoods, such as: i) rooftop rainwater harvesting and	2.1.4.1 Agree with community authorities about the priority water needs for agricultural use, including space for women's voice and leadership 2.1.4.2 Procurement and distribution of new tools / equipment that has been decided at community level. For example: rooftop rainwater harvesting; rainwater harvesting

[429] This will include coaching and mentoring for VSLA members. The EA$E Implementation Manual is available here.

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
Support Livelihoods		storage; and ii) improved farm-level water management such as rainwater harvesting and storage via small channels and small water storage facilities (within the ESS Category C for which Save the Children Australia is accredited). This will be based on community-level vulnerability assessments of water sources and needs for agriculture (Activity 1.3.1). Sustainability of these interventions will be achieved through a train-the-trainer approach, training on maintenance of technologies and infrastructure and establishing maintenance mechanisms (e.g., committees) and access to replacement parts.	at the farm level via irrigation and water storage facilities for use in dry season 2.1.4.3 Conduct training to support communities to implement climate-resilient water harvesting and storage approaches to support livelihoods, including: rooftop rainwater harvesting; improved farm-level water management 2.1.4.4 Conduct training of trainers on using these new techniques, including maintenance of equipment, access to supplies and establishing maintenance mechanisms
Output 2.2: Strengthened business models, skills, equipment and access to financing and markets for youth and women's enterprises This output will take a participatory and inclusive approach, ensuring marginalised and climate vulnerable coastal women and youth are equipped with adaptation leadership skills. Proposed activities will diversify livelihood strategies, enabling access to new skills and technologies to deliver climate resilient coastal products and services. These interventions will address the climate risks resulting from changing rainfall and temperatures impacting food and water security as well as storm damage to assets for farming and fishing businesses. It will do this by boosting local economic productivity, food production and incomes through climate-resilient approaches. In addition, the activities under this output will facilitate more sustainable business practices (e.g., reducing food loss and need for mangrove wood to smoke fish by increasing access to cold storage), which will contribute to mangrove conservation that buffers communities against the impacts of increasing storms and sea-level rise. Working with market actors, including government, private and public vocational training institutions, private sector enterprises and micro-finance institutions, the project will enhance skills and financial inclusion to support climate-resilient livelihoods - including alternative livelihoods to traditional farming and fishing - for women and youth. The proposed activities will focus on strong local buy-in and include measures to ensure long-term sustainability of project results whilst also contributing to poverty reduction, which is a critical feature of increasing climate resilience. This Output will also explore opportunities to contribute to recommendations in national policies e.g., strengthening public-private partnerships (PPPs). The ideas and practice that form the basis of this set of interventions, have been implemented in several countries globally, for example in the recent IFAD-funded 'Rural enterprise program (REP)' in Ghana, which is now in its second phase after a successful first phase, and aims to target the entrepreneurial poor who will be able to convert capacity-building support from REP into assets, with little or no additional support. The objective is to boost and improve the livelihoods of micro and small entrepreneurs. Specifically, REP seeks to increase the number of rural enterprises that generate profit, growth and employment opportunities. The project has many alignments with the proposed Sierra Leone interventions, including: facilitating market access for small business owners; and training beneficiaries (69% female) in technical and business management skills. SCLRP investments under this output will include: i) community training on entrepreneurship and business skills; ii) market assessments, business models, and Resource Mobilization Plans for coastal product businesses to access financing,; iii) practical support to micro-, small and medium-sized businesses to access financing by organising matchmaking/incubator events; iv) engagement with microfinance providers and banks to			

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
advocate for inclusion of climate risk terms and conditions; and v) addressing key barriers in value chains for selected coastal products by facilitating access to and providing small-scale equipment for improved production, local processing, as well as improved storage facilities.			
Activity 2.2.1: Equip Community Members With Entrepreneurship and Business Skills for Climate Resilient Small Businesses	Risks to Livelihoods	Community members – especially women and youth, people with disabilities and older people – will receive training on vocational and entrepreneurship skills to support the development of alternative livelihoods. Technical Vocational Education and Training (TVET) will be delivered through collaboration with market actors, including government, private and public vocational training institutions, private sector enterprises and micro-finance institutions. TVET will include elements such as how to generate the most value from products, how to start and manage a small business, how to interact with customers effectively, how to reach markets, the value chain of each product, and sustainability of the small business based on aspects of marketing and financial literacy (including budgeting, forecasting and contingency). In addition to livelihoods associated with farming and fishing, such as being a market seller, transporter or fish net repairer, this activity will focus, in particular on, alternative livelihoods. Alternative livelihoods have been explored in the community consultations by raising specific examples of such alternatives, including the experience and interest of respondents with them, to better understand the scope for such an approach. They will be explored further in market assessments under the project implementation, but could include: boat making, craft products (e.g.: cloth, rope, sail canvas), eco-tourism operations, artisanal crafts (e.g.: wood carvings, baskets, leather goods), oysters, salt harvesting, fishing products and seaweed products. This links to Activity 2.1.1 where alternative livelihoods will be identified and Activity 3.2.1 with sustainable products from mangrove forests.	2.2.1.1 Using results from market assessments in 2.2.2, identify sectors with green and emerging jobs, and identify institutions, organisations or individuals to co-deliver Training of Trainers for vocational training (e.g. alternative and climate-resilient livelihoods of carpentry, tailoring, fish smoking) for community members. 2.2.1.2 Deliver ToTs alongside industry experts, to these community practitioners (training held at district level), so they can deliver training to women and youth within their communities 2.2.1.3 Enrol youth for TVET courses under sectors and TVET institutions prioritized in the labour market assessment, and deliver training led by market actors identified in 2.2.1.1. Training for alternative and climate-resilient livelihoods includes broad entrepreneurship techniques (e.g. product value chains, path to market, developing business models, market research) and sector-specific techniques (e.g. designing and building a boat for boat-making)

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
Activity 2.2.2: Identify appropriate coastal products, develop business models and improve access to financing	Risks to Livelihoods	This activity will work with existing livelihoods structures in communities to identify existing marketable coastal products, conduct relevant market assessments and where possible, identify new products (as provided in examples at Activity 2.2.1 and also Activity 3.2.1 with sustainable products from mangrove forests), that can be profitable or a sustainable source of income for community members. Once existing and new products have been identified, the project work closely with community members to develop business models for the products, including the full value chain and how community members will sell products. The coastal product businesses will be supported to identify and access financing according to existing Resource Mobilization Plans from the WA BiCC project as well as additional new Resource Mobilization Plans where such plans are not yet in place. Community members will put the training they received in Activity 2.2.1 into practice and receive clear guidance on how to operate small businesses effectively. A strong focus on the operationalization and sustainability of the business models will be built into the TVET with an expectation that the initial resource mobilization and Income Generating Activities (IGA) will allow for re-investment and possible scale-up beyond the lifecycle of the project. Direct engagement with a sample of coastal communities, particularly with women and youth, have demonstrated a willingness to create and invest in alternative livelihoods that are climate resilient.	2.2.2.1 Conduct gender-sensitive market assessment in communities on product prices, value chains for specific products and possible alternative livelihoods (linked to 2.1.1 and 3.2.1), that may include but not limited to: boat making; craft products; eco-tourism; oysters; salt-harvesting; fishing products; seaweed products; 2.2.2.2. Enable community members – especially women and youth – to develop business models for products, including detailing value chains and where products will be sold, and provide follow-up support. 2.2.2.3 Work with communities to identify financing sources for coastal product businesses, based on current options, new and existing resource mobilisation plans, and gender analysis of barriers to equitable financing 2.2.2.4 Hold matchmaking or incubator events organised by the Coastal Governance Platforms with relevant public and private sector partners, to connect business owners to sources of financing; 2.2.2.5 Engage directly with microfinance providers and banks to advocate for inclusion of climate risk terms and conditions and development of products tailored to rural communities; 2.2.2.6 Adopt learnings from Save the Children's Green Mindset Framework and the pilot results from Youth Incubation Labs.
Activity 2.2.3 Strengthen Value Chains for Existing and New	Risks to Livelihoods	Building on the business skills, market assessments, business plans and access to finance developed under Activities 2.1.1 and 2.2.2., this activity will enable the growth of coastal product businesses by addressing key barriers such as equipment, storage or access to market in value chains for selected coastal products. This will include supporting coastal	2.2.3.1 Identify key barriers in value chains for selected coastal products, and identify plan to strengthen value chains, building on Activities 2.2.1-2.2.2 2.2.3.2 Support coastal product businesses to access small-scale equipment, improve storage facilities, and access new and more distant markets. This includes a toolkit for small

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
Coastal Products		product businesses to i) access small-scale equipment to enable improved, sustainable production or local processing; ii) improve existing storage facilities; and iii) facilitate access to new and more distant markets (e.g., encouraging organisation of services of transport-sharing, or increasing access to mobile technologies). Preliminary engagement with vulnerable coastal communities has demonstrated that community ownership is important to local populations and there is a strong willingness from communities to make contributions to the success of their selected interventions, this could include small cash/savings and in-kind contributions. It is important to note that communities are highly aligned to seasonal changes and climate impacts, the leaner months are usually associated with the four-months of the rainy season, outside of these months and pending no major disruptions, current income generating activities have more opportunities.	physical solutions, and training maintenance committees on repair / upkeep of solutions.

Component 3: Ecosystem-based adaptation for coastal protection and natural resources

Through this component the proposed project will focus on protecting and restoring mangroves and coastal ecosystems by implementing ecosystem-based adaptation (EbA) measures that support climate-resilient livelihoods and provide coastal protection to local communities. This will safeguard the wide range of ecosystem goods and services provided by mangroves on which coastal communities depend, and be the foundation for community-level coastal protection strategies. Ensuring the persistence of mangrove forests and restoring mangrove forests in strategic locations will protect communities against the impacts of climate change, because mangroves reduce coastal erosion and shelter coastlines during storm events by reducing water flow pressure, surge height, flooding levels and durations, wind velocity, and saline water intrusion.[430],[431] The activities under this component will first build capacity for community-based co-management of coastal ecosystems.[432] This will be followed by on-the-ground implementation of mangrove conservation, restoration and sustainable use. In addition, the proposed project will also put measures in place to reduce anthropogenic pressure on mangrove ecosystems. By reducing this pressure, the health of the ecosystems will be improved and their resilience to sea-level rise (SLR) and the impacts of climate change will increase, so increasing the resilience of the coastal communities that rely on these ecosystems for their livelihoods.

[430] Gijsman, Rik, et al. "Nature-based engineering: a review on reducing coastal flood risk with mangroves." Frontiers in Marine Science 8 (2021).
[431] Hochard, J. P., Hamilton, S., & Barbier, E. B. (2019). Mangroves shelter coastal economic activity from cyclones. Proceedings of the National Academy of Sciences, 116(25), 12232-12237.
[432] Community-based management approaches are strongly associated with mangrove gains. Hagger, Valerie, et al. "Drivers of global mangrove loss and gain in social-ecological systems." Nature communications 13.1 (2022): 1-16.

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
In addition, reducing mangrove degradation and restoring mangroves will increase the likelihood that the mangroves will persist in the long-term and themselves be more able to adapt to climate change. The capacity building for, and implementation of, mangrove conservation, restoration and monitoring for coastal resilience in the project areas will contribute to ongoing and planned initiatives (outside the SCLRP) that are aimed at developing national capacity and systems for monitoring and reporting of forest carbon in Sierra Leone (relevant initiatives described in Section 1.17 - Relevant projects and programmes).This will include feeding mangrove monitoring data from the SCLRP target areas into these initiatives and into the existing national environmental data systems, to enable the SCLRP's mitigation co-benefits to be accounted for under the future National Forest Monitoring System. Component 3 aligns with the GoSL's NDC, NAP, National Climate Change Policy, Coastal Climate Change Adaptation Plan, National Biodiversity Strategy and Action Plan, Land Degradation Neutrality Target Setting and the international Abidjan Convention.			
Outcome 3: Mangroves are conserved and restored for coastal resilience and communities have increased capacity to co-manage mangroves with government institutions			
Output 3.1: Strengthened Capacity of Communities and Government for Climate-Resilient Mangrove Management and Alternative Technologies and Fuel Sources That Reduce Mangrove Wood Use The activities under this output will focus on enhancing the value and benefits of mangrove forests which provide a vast array of ecosystem services that underpin coastal climate adaptation including: i) protecting and stabilising the coastline; ii) reducing beach erosion; iii) reducing saline intrusion and contamination of land and fresh water sources; iv) reducing inundation events and therefore health and waterborne disease outbreaks (particularly given open defecation rates in Sierra Leone); v) providing nurseries for fish, crustaceans and other marine life; vi) providing critical habitat for many other species (birds, invertebrates); vii) sequestering carbon and vii) food, medicine, wood and non-timber forest products. Maintaining and enhancing these mangrove ecosystem services will directly address the climate risks resulting from changing rainfall and rising temperatures as well as extreme events such as storms and impacts from sea-level rise such as salinisation of water resources, coastal erosion and coastal inundation. Ecosystem-based adaptation measures will be implemented by coastal communities through a participatory governance model across 1,500 ha of coastal mangrove forest, including a mix of conservation of intact mangroves, natural regeneration and active restoration to protect the coastline and allow for sustainable harvest of vital resources for livelihoods. The essential economic role of mangroves in these communities, their efficiency in coastal protection against extreme events and their biological diversity provide both a source of learning and increased action for adaptation to climate change. Mangrove conservation and restoration activities will blend scientific and traditional approaches to reduce prevailing climate and socio-economic stressors, facilitate adaptive co-management and promote equitable access and sustainable use of resources. The proposed activities will build on and scale up proven interventions that have been piloted by the WA BiCC project in terms of restoration and governance of mangrove ecosystems, using existing cost-benefit information. Project investments under this output will include: capacity building of communities, NGOs and government staff, awareness raising campaigns, community-led mangrove assessments, knowledge sharing mechanisms, woodlots and alternative technologies that reduce reliance on mangrove wood.			
Activity 3.1.1: Build Capacity for	Floods, sea-level rise, coastal erosion	Successful co-management of mangrove forests for climate resilience requires technical capacity, awareness, understanding of mangrove ecosystem health and the socio-ecological factors	3.1.1.1. Build technical capacity of communities (Community Mangrove Stewardship Sub-committees, Community Climate Adaptation Committees, Coastal Livelihoods Circles), NGOs,

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
Community-Based Mangrove Forest Management		determining it, appropriate technologies and strong awareness and knowledge sharing. This activity will lay the foundation for the on-the-ground implementation of mangrove conservation, restoration and sustainable use covered by other activities in this project. Activity 3.1.1. will be implemented by the EPA and the PIU with additional technical inputs from the procured technical advisory organisation (see Implementation arrangements and governance section above . A social and behavioural change (SBC) approach will be used to influence positive behaviours around sustainable use of mangrove wood , following a gender-inclusive process and tailored to differing needs in different communities. Awareness raising and SBC activities will support access to information for women, men and communities on existing legislation and policies on land use and land tenure, as key issues to be addressed. An analysis of the gendered dimensions of land use in Sierra Leone can be found in Annex 4, p.13-14. Dialogues and demonstrations will be held in communities on alternatives to traditional mangrove use - such as the popular use of green mangroves for the perceived improved flavour of smoked fish - to be replaced by solar fish dyers or alternative fuelwood sources such as from woodlots.	CBOs and district and national government officials for community-based mangrove forest management that enhances climate resilience, through national and community workshops: national training that includes district staff will be followed by community-level training delivered partially by trained officials, technical consultancy, and facilitators. 3.1.1.2. Undertake community-led assessments of mangrove state, diversity, threats, recovery potential and norms around mangrove use, working through Community Adaptation Committees (Output 1.1.) and dedicated Community Mangrove Stewardship Sub-committees (Output 1.1.), using gender transformative approaches that promote women's and girls' leadership in community-led processes. 3.1.1.3. Identify alternative context-appropriate technologies to reduce mangrove wood demand, including the options of solar fish drying, efficient fish smokers, alternative wood sources for smoking, efficient cookstoves, alternative non-wood fuel cookstoves, efficient salt production methods, and woodlots for timber or charcoal. This will be done collaboratively by communities, local government and technical experts via the Coastal Governance Platforms (Output 1.1.) and selected options will be implemented under Outputs 2.1 and 2.2. 3.1.1.4. Co-design and implement an awareness-raising campaign and social and behavioural change (SBC) process on mangrove conservation, restoration, sustainable livelihood practices around mangroves and land use zoning (linked to Activity 2.1.2. and Activity 3.2.13.1.1.5. Establish knowledge sharing mechanisms such as exchange visits between communities to demonstrate local successes, linked to the Coastal Governance Platforms (Activity 1.1.4) and Coastal Livelihoods Circles (Activity 2.1.2) This will include designing

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
			and delivering a radio campaign on sustainable mangrove-use, including voices of women and girls.
Output 3.2: Mangroves Conserved and Restored Via Assessments, Management Plans, Planting and Monitoring Communities will have improved their knowledge on sustainable mangrove use through Output 3.1. Building on this, Output 3.2. will equip communities with tools to monitor, protect and restore their mangrove ecosystems, and include community-led coastline protection using ecosystem-based solutions. Project investments under this output will include: i) collecting and analysing data on mangrove state and cover; ii) mangrove management plans; iii) ecosystem monitoring; iv) mechanisms to increase compliance with by-laws; v) assessments of community coastal protection needs; vi) engineering designs of micro-scale, artificial coastal protection measures at selected sites; vii) community training on coastal protection methods; viii) mangrove restoration protocols; ix) demarcation of mangrove areas; x) conservation and restoration of 1,500 ha of mangroves; xi) installation of micro-scale, artificial coastal protection measures at selected sites; and xii) coconut tree planting.			
Activity 3.2.1: Develop Community-Led Mangrove Management Plans	Floods, sea-level rise, coastal erosion	Mangrove management plans that cover conservation, natural regeneration and restoration will be co-developed by communities, local and national government and technical experts, using a participatory land-use planning approach. This will combine findings from community-led scoping assessments under Activity 3.1.1 with remote sensing spatial data, scientific field ecological assessments of mangroves and technical conservation planning tools. Important technical aspects for the resilience of mangroves themselves to climate change will be considered, such as salt tolerance of different species and interactions between mud dynamics, mangrove substrate behaviour, and sea-level rise. The mangrove management plans take into account cross cutting issues of land tenure (including the gendered dimensions of land tenure, see Annex 4, p.13-14 for additional context), local zoning, existing resource use, by-laws and the differing needs of women, men, girls and boys, including people with disabilities; and will fall under the Community Adaptation Plans developed under Output 1.1. and also be embedded into local development planning and District Development Plans (Output 1.2). The Project Implementation Unit and the procured technical advisory organisation will lead the work with the spatial data, in collaboration with relevant	3.2.1.1. Assess and map mangroves via remote sensing, ground-truthing and expert ecological fieldwork, building on community-led mangrove assessments (Activity 3.1.1.) and including training on geographic information systems (GIS) for national and district government and PMU staff. 3.2.1.2. Develop mangrove management plans via participatory land-use planning, considering land tenure, local zoning, existing resource use and by-laws, gender, and the maps and options from sub-activity 3.2.1.1, in order to define areas and targets for conservation, restoration, sustainable use and establishment of woodlots. 3.2.1.3. Advocate and explore opportunities for Payment for Ecosystems Services (PES) among different levels of government and private sector

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
		government experts and experts from universities (Institute of Marine Biology and Oceanography, University of Sierra Leone and Njala University) and will work with the community groups to socialise the findings and use the data to co-develop the conservation plans – in full partnership and led by the community groups established or strengthened in Output 1.1. The detailed mapping of mangrove state will serve as a baseline for monitoring conservation and identifying suitable areas for restoring degraded mangroves. The baseline data on mangrove cover and state gathered under this activity and the data from monitoring mangroves in the project areas over time under Activity 3.2.2 will be shared with existing national environmental data systems, the national forest inventory of the EU-funded FAO-supported initiative and the planned work towards establishing a national Forest Reference Level and National Forest Monitoring System in Sierra Leone. This data sharing and collaboration will enable the mitigation co-benefits of the SCLRP's mangrove conservation and restoration to be accounted for under the future National Forest Monitoring System. Activity 3.2.1. will be implemented by the EPA and the PIU with additional technical inputs from the procured technical advisory organisation.	
Activity 3.2.2 Community-Led Ecosystem Monitoring and Compliance with By-Laws	Floods, sea-level rise, coastal erosion	Adaptive management of complex mangrove ecosystems to enhance climate resilience requires robust monitoring by communities, relevant government staff and technical experts, in terms of data collection and analysis of mangrove state, as well as in terms of compliance with relevant laws and by-laws around mangrove use. Technical experts (from government, Sierra Leonean universities (and international experts) will develop a data collection approach, including determining what data can be partly collected by communities. There will be ongoing scientific on-the-ground data collection by technical	3.2.2.1. Develop protocol for mangrove monitoring and data collection (ecological condition and human interactions), defining what data will be collected by technical experts and what by community members 3.2.2.2. Train and support community members (including Community Mangrove Stewardship Sub-committees) to monitor mangroves and collect specific data, including via mobile phones.

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
		experts of mangrove state (ecological condition, human pressures). This scientific monitoring will be supported by monitoring done by trained community members to collect certain data. Communities will be trained on using mobile data collection to record the state of mangroves, as is already happening in some pilot communities in the Sherbro estuary. These monitoring activities will inform adaptive management of areas conserved and restored by the project, as well as further build the evidence base for cost-efficient coastal ecosystem-based adaptation in Sierra Leone. Monitoring findings will be reported to the CGP for alignment with local development planning provisions and other relevant government agencies and NGOs. This monitoring of mangrove cover and state in the SCLRP project areas will feed into existing national environmental data systems managed by the EPA, NPAA and Ministry of Environment, as well as the national forest inventory of the EU-funded FAO-supported initiative and the planned work towards establishing a national Forest Reference Level and National Forest Monitoring System in Sierra Leone. Where by-laws exist already around mangrove use, they will be fully embedded in the Mangrove Management Plans (Activity 3.2.1.) and in the CAPs designed under Output 1.1. Where no by-laws exist, there will be collaboration with the community groups strengthened/established in Output 1.1 to develop community-led, gender and youth focused by-laws that are integrated into the CAPs. The conservation targets and local by-laws will be embedded into the subnational laws/by-laws and monitoring protocols through the mechanisms established in Output 1.1 and 1.2. To increase compliance with by-laws, community eco-guards will be established/supported to patrol mangrove areas, receiving basic equipment and a cash stipend	3.2.2.3. Expert monitoring of mangroves through on-the-ground data collection by technical experts (at least once a year) 3.2.2.4 Assess existing by-laws on mangrove use, support development of new by-laws as needed, and embed by-laws in Mangrove Management Plans (Activity 3.2.1) and local and district development plans under Output 1.2., in close collaboration with community structures. 3.2.2.5. Conduct awareness raising and training on by-laws to ensure full community buy-in 3.2.2.6. Establish and support designated community eco-guards to patrol mangrove areas for compliance with by-laws, and pilot incentives for ecoguards to protect mangroves

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
		for conducting patrolling work[433]. Activity 3.2.2 will be implemented by the EPA and the PIU with additional technical inputs from the procured technical advisory organization.	
Activity 3.2.3 Develop Community Level Coastal Protection Plans	Floods, sea-level rise, coastal erosion	Community-level strategies for low-impact, sustainable and climate-resilient coastal protection measures will be developed. This will be done with the communities and using the findings from Activity 3.2.1, as well as the by-laws and monitoring data from Activity 3.2.2. The project implementation unit and technical team will lead on the assessments, working closely with the community groups established or strengthened in Output 1.1 to ensure the plans are gender and youth inclusive, and incorporate community views. Community ownership and commitment to ensure effective and regular maintenance will further be secured by incorporating maintenance along with the overall community-level coastal protection strategies into community groups and CAPs.	3.2.3.1 Undertake coastal protection needs assessments (by technical team and community) at the community-level to identify and map erosion and inundation hotspots and understand frequency and severity of inundation, in order to identify areas where micro-scale artificial coastal protection measures could be considered, areas where mangroves can be restored to provide coastal protection to communities, as well as potential areas where managed retreat should be considered. This information will be used for CAPs 3.2.3.2 Conduct site-specific engineering assessments for design of micro-scale, artificial coastal protection measures at selected sites using low-cost, locally available materials and for considering practices that can support coastal protection such as planting coconut trees. This will be done after and informed by the coastal protection needs assessment. 3.2.3.3 Based on assessments, work with community groups to develop coastal protection plans and establish knowledge sharing mechanisms (including socializing mangrove restoration protocols determined in 3.2.4)
Activity 3.2.4 Restore Mangroves and Implement	Floods, sea-level rise, coastal erosion	Under this activity mangrove restoration and other community-level strategies for coastal protection will be implemented, as identified in the preceding activities and contained in the Community Mangrove Management Plans, community-level	3.2.4.1 Work closely with community, including women and men, to embed knowledge from previous interventions and ensure understanding of coastline protection measures to

[433] This will build on international best practices of community-based forest management and existing models in Sierra Leone, e.g. community eco-guards that receive incentives are in place in some protected areas managed by the NPAA and in some forest areas through initiatives of the Conservation Society of Sierra Leone (See here), and using lessons from past projects such as WABiCC that highlight importance of comprehensive measures for community buy-in (as will be facilitated by the SCLRP) andthat cash incentives alone should not be the primary motivation for taking part in e.g. meetings or project planting days. For community eco-guards the cash stipend will in effect be for longer term continual work conducted, in contrast to short term collective community engagements where cash incentives may be less appropriate.

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
Community-Level Coastal Protection		coastal protection strategies and CAPs (and aligned with relevant sub-national and national policies and plans as described above). The strategy developed in Activity 3.2.3 will ensure that the coastal protection interventions are low-impact and can be co-delivered by communities in line with the Accredited Entity's ESS accreditation of Category C. Facilitating natural regeneration of mangroves will be the preferred approach, as it is proven to be ecologically sound and cost-effective. Ecological Mangrove Rehabilitation (EMR) principles seek to maintain or reconstruct the right biophysical and socio-economic conditions for mangroves to grow back naturally. In addition, active restoration (planting mangroves) will be undertaken in carefully selected and strategically located sites using a mix of local species. In these cases, mangroves will only be planted where they occurred previously and where significant earth-moving or major drainage modification is not required for successful restoration. Activity 3.2.4. will be implemented by the EPA and the PIU with additional technical inputs from the procured technical advisory organisation.	facilitate successful shoreline protection strategy through ongoing discussions 3.2.4.2 Develop mangrove restoration protocol, based on local knowledge, assessment findings, lessons learned from past initiatives such as the WABiCC project and international best practice (including how to do appropriate site selection, facilitating favourable biophysical conditions, identification and use of different mangrove species, planting methods, monitoring methods.). This will be developed at national level and applied across all target areas in line with local conditions. 3.2.4.3 Provide communities with sets of equipment, tools and materials for conservation, restoration, maintenance of micro-scale artificial coastal protection measures, establishment and management of woodlots and coconut trees. 3.2.4.4 Demarcation and sign-posting of mangrove conservation areas, natural regeneration areas and mangrove planting areas selected under Community Mangrove Management Plans (Activity 3.2.1) 3.2.4.5 Restoring mangroves in selected areas, including site preparation, seed/wildling/seedling collection from adult mangroves and planting as well as monitoring restored areas via Activity 3.2.2. 3.2.4.6 Implement micro-scale, artificial coastal protection measures designed under Activity 3.2.3. at selected sites 3.2.4.7 Complementing mangrove restoration and micro-scale, artificial coastal protection measures with supporting measures such as coconut tree planting where technically appropriate 3.2.4.8 Establish community woodlots based on sites selected in 3.2.1, to provide alternative wood sources, so that the

Activities	Climate impact(s) / vulnerability addressed	Description	Sub-activities
			reliance on mangrove wood is reduced and mangrove ecosystems are protected

6. Vulnerability assessment and beneficiary targeting

6.1 Coastal focus and selection of target districts

Coastal communities in Sierra Leone will bear the brunt of the climate change impacts in the country – such as sea-level rise, increased storm surges, increased flooding; and increased severity of tropical storms – and are often the most socially vulnerable and remote communities. Sierra Leone's National Communications (NC) highlight the importance of climate change adaptation and mitigation interventions in the coastal districts of Kambia, Port Loko, , Western areas, Pujehun, Moyamba and Bonthe.[434,435,436.] These districts are specifically mentioned in the INC, second NC and third NC. The adaptation strategies mentioned for these coastal districts are in line with the overall national adaptation priorities. Key priorities identified are: i) enhancing the climate resilience of economies, agriculture, food security, water availability, community development, and the conservation of forests, mangroves and wetlands. In light of this, the Government of Sierra Leone (particularly the Environmental Protection Agency as the National Designated Authority), Save the Children Australia (Accredited Entity) and Save the Children Sierra Leone engaged and committed to develop a coastal resilience project. A comprehensive assessment of climate hazards in Sierra Leone is provided in Section 2 above and for further information on stakeholder consultations undertaken, see Section 6.5 below and Annex 13: Summary of stakeholder consultations.

The coastal focus was validated via a series of stakeholder consultations with government officials, NGOs and multilateral partners in 2021, with all the coastal districts of Sierra Leone (except the Freetown peninsula) selected as priority areas. These are from North to South: Kambia; Port Loko; Moyamba; Bonthe and Pujehun districts (see Figures 1 and 2 at the start of this document).

The overall intervention area for the project was determined as the Sierra Leone Coastal Landscape Complex (SLCLC), which includes the marine protected areas of the Scarcies River estuary, the Sierra Leone River estuary, Yawri Bay and the Sherboro River Estuary. The overall intervention area that was selected also includes Turner's Peninsula, a long stretch of coastline and associated riverine and delta areas in the south of the country. Turner's Peninsula includes smaller areas of mangrove and wetland ecosystems than the above-mentioned parts of the coastline, but it is home to a high proportion of rural fisherfolk who are subject to some of the most severe climate change impacts. While the Western Urban Area and Western Rural Area - that make up the Freetown peninsula - are also contained within the Sierra Leone River Estuary, they were not selected due to their distinct characteristics in terms of population density, economic activities, environmental conditions and coverage by other planned and ongoing initiatives.

6.2 Direct Beneficiaries

The project interventions will increase the resilience of 260,000 people in Sierra Leone's coastal regions in priority sectors aligned with the NDC and the NAP. Within the five coastal target districts, the project will specifically intervene in 75 communities across 23 chiefdoms, and the project will directly reach 30% of the population of the target chiefdoms (11 % of the total coastal population of the country). The coastal chiefdoms are shown on the map in Figure 1, ranging from Samu in the North West (in Kambia district), to Sorogbema in the South West (in Pujehun district). The process used for selection of target areas (Chiefdoms and Sections) and beneficiaries is described in Section 6.4 below.

Table 17: Population in coastal districts of Sierra Leone (2015 census) (in bold, targeted districts)

District	Male	Female	Total	Target Chiefdoms	Target Chiefdoms population	Of which direct beneficiaries
KAMBIA	165 541	179 933	345 474	Magbema, Mambolo, Samu	194 907	74 802

[434] GoSL, 2018, *Third National Communication of Sierra Leone to the United Nations Framework Convention on Climate Change*. Available: https://unfccc.int/sites/default/files/resource/FinalThird%20Nat.%20Com.%20document%20111.pdf
[435] Ibid
[436] Ibid

PORT LOKO	255 030	275 835	530 865	Bureh, Kaffu Bullom, Koya, Bakeh Loko, Lokomasama, Maforki	356 390	70 655
BONTHE	99 014	101 767	200 781	Bendu Cha, Dema, Imperri, Jong, Nongoba Bullom, Bonthe Urban, Sittia	133 271	49 157
MOYAMBA	153 699	164 889	318 588	Bagruwa, Bumpeh, Kagboro, Ribbi	133 095	52 714
PUJEHUN	168 869	177 592	346 461	Gallinas, Kpaka, Mono Sakrim	52 671	12 672
WESTERN RURAL	221 351	222 919	444 270		444 270	n/a
WESTERN URBAN	528 207	527 757	1 055 964		1 055 964	n/a
Total	1 591 711	1 650 692	3 242 403		2 370 569	
Total (Non-Western Area)	842 153	900 016	1 742 169		**870 334**	**260 000**

The SLCRP will adopt a gender and youth focus, and of the 260,000 direct beneficiaries, 156,000 will be women (representing 60%) and 104,000 will be men (representing 40%). Approximately 25% of direct beneficiaries will be children.

6.3 Indirect Beneficiaries

This programme will also indirectly benefit an estimated additional 1,000,000 individuals, which comprises the remaining 610,000 from coastal chiefdoms in Sierra Leone, and approximately 490,000 individuals from wider coastal districts who will benefit from strengthened institutional governance at district and national levels, through improved climate-change and adaptation policies. The total direct and indirect beneficiary number is therefore 1,260,000, which represents 12% of the national population.[437] Table 17 shows that the population of the target coastal chiefdoms is around 870,000, meaning that there are 610,000 inhabitants of these chiefdoms that are not included in the direct beneficiary count of 260,000. This group of 610,000 is classed as indirect beneficiaries, as residents of these chiefdoms will benefit from: strengthened governance structures at chiefdom-level to enable better planning between communities and district; improved knowledge of climate change and adaptation options via radio and mobile phone dissemination,; improved early warning systems mechanisms to benefit chiefdom residents. In addition to the 610,000 residents of the target coastal chiefdoms, it is estimated that there are approximately 490,000 additional individuals who will benefit. The 490,000 is approximately 50% of the remaining population of the coastal districts (total coastal district population not including Western Area = 1.74m, total population of coastal chiefdoms = 0.87m, so remaining population = 0.87m – Table 17). The 490,000 individuals from coastal districts (not already included in the coastal chiefdoms) will indirectly benefit from the strengthened institutional governance at the district and national levels, through improved climate-change and adaptation policies. Particularly, the district inhabitants will benefit from strengthened capacity of the district council technical team, including agricultural officers and extension workers, environmental officer and forestry extension officers who cover the whole district, not only the direct coastal inhabitants. The total direct and indirect beneficiary number therefore reaches 1,260,000, which represents almost 12% of the national population.[438]

6.4 Vulnerability Assessment

Within the target districts, the spatial areas for intervention were prioritised based on climate vulnerability combined with potential for ecosystem-based adaptation, i.e. mangrove restoration priority and mangrove conservation priority. The two geographical levels below chiefdom, namely section and enumerator area

[437] Population data for beneficiary numbers is taken from the 2015 Census of Sierra Leone due to availability of chiefdom-level population data.

(EA) from the national census Sierra Leone were used as they are officially recognised boundaries, with verified demographic data such as population. Sierra Leone uses the following geographical units, in descending order in terms of size: Province (four provinces and an 'area'); District (16 districts); Chiefdom (190 chiefdoms); Ward (446 wards) and Section (1,350 sections).[439] A 'Section' is the smallest geographical unit used and named, and each Section has a section chief, but Section is not one of the political or administrative levels of government in Sierra Leone, which start from Chiefdom level upwards.

The smallest geographical unit used for any official purpose is the Enumeration Area (EA), defining the population to be 'enumerated' by one data collector during censuses. An EA may consist of one or several small villages, and Sections consist of anywhere from one or two, to ten or more EAs depending on the Section.

The socio-economic parameters used to assess climate vulnerability included child dependency ratio, infant mortality rate, sub-national human development index, accessibility (Figure 85D), poverty, household wealth (Figure 85 B) and maternal education (Figure 85 A).

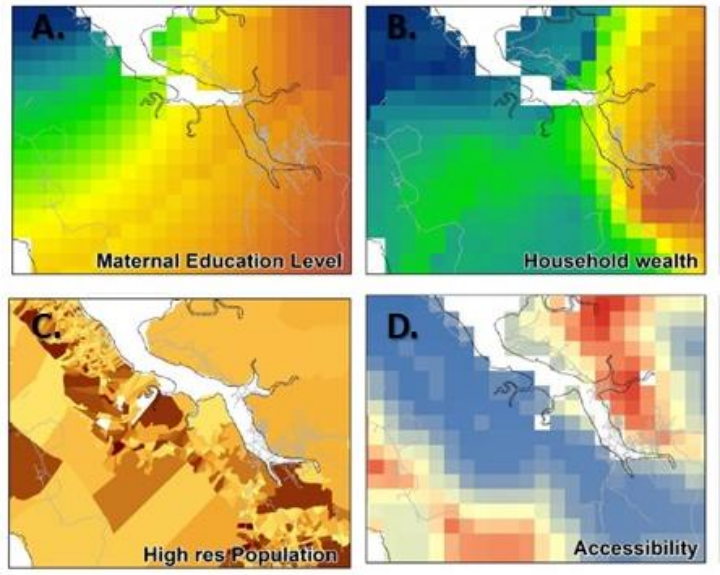


Figure 88: Selected socio-economic parameters used for target area prioritisation

[439] For example, see the 2017 electoral commission report, which includes information about different administrative boundaries and population

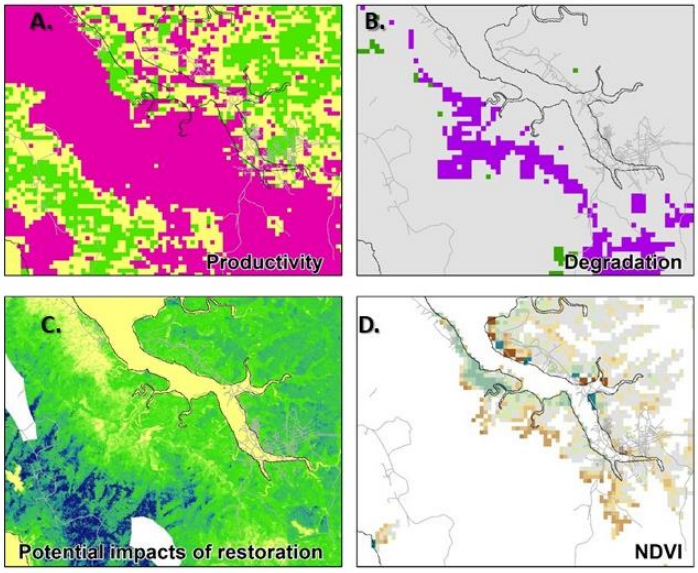


Figure 89: Selected biophysical parameters used for target area prioritisation

Target areas (sections) were also screened to ensure the presence of schools, using a point-file of schools to inform the Resilient Schools Programme (Activity 1.4.2). The figure below shows an example of the location of schools within EAs of the Bonthe and Moyamba districts.

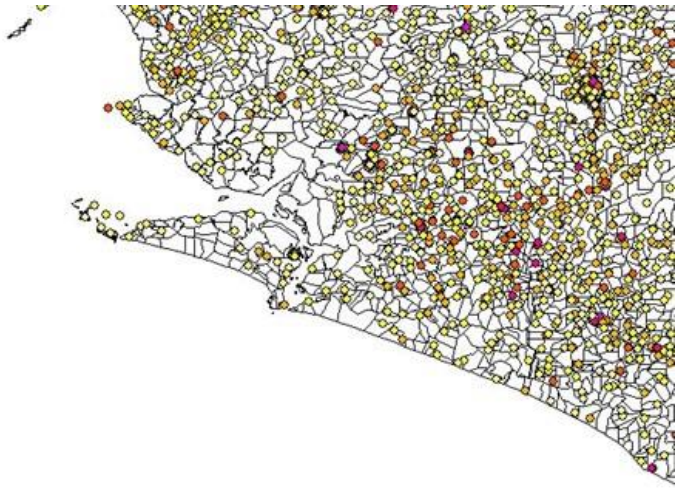


Figure 90: Analysis of school locations in Bonthe and Moyamba districts

6.4.1 Data availability and data limitations for vulnerability assessment

The analysis presented here used the best available appropriate data to assess climate vulnerability and to propose priority areas for intervention for the Sierra Leone Coastal Resilience Project. Compared to many other contexts, relatively limited climate data is available in Sierra Leone. One of the major reasons for this is that Sierra Leone suffered from a civil war between 1992 and 2002 where weather stations were destroyed, and only as recently as 2016, were 8 automatic weather stations installed across the country, as part of the 'Climate information, Disaster management and Early Warning Systems – CIDMEWS', a GEF and

UNDP funded project.[440] Data limitations in terms of exposure to climate hazards at fine scale in Sierra Leone are discussed further Section 2.1.1 above.

This vulnerability assessment therefore relies on a range of indicators available from authoritative global sources, in particular data sources developed by the University of Colombia Earth Science department (CIESN), in addition to 2015 census data made available to the design team by Statistics Sierra Leone.
Various other data sources were evaluated for potential use in this vulnerability assessment, however, they were not appropriate for the aims and fine-scale of this analysis. For example, Sierra Leone has some large-scale administrative surveys that are aligned to global studies (e.g. Multiple Indicator Cluster Survey – MICS, and the Demographic and Health Survey – DHS), but given that these surveys only contain a sample of data points, results from the surveys were not suitable to use for a vulnerability assessment that considered all the coastal areas in the country. However, some results from these surveys have been used in the CIESN combined global datasets.

In recent years, some other vulnerability assessments in Sierra Leone across different sectors have been undertaken, including:

- Integems, 'Update of Sierra Leone hazard profile and capacity gap analysis' (2017)[441]
- West Africa Biodiversity and Climate Change project (WABiCC) 'Climate change vulnerability assessment in mangrove regions of Sierra Leone' (2018)[442]
- World Food Program (partnership with Government of Sierra Leone), 'Comprehensive food security and vulnerability analysis: Sierra Leone' (2021)[443]

To a varying degree, these assessments use data at sub-national and smaller geographical levels, but they are not suitable to conduct an assessment to select priority intervention areas at a suitable granularity for the SLCRP.

Ideally, this vulnerability assessment would have used fine-scale data on additional exposure and hazards indicators besides what is included below, but such data was unavailable at a scale sufficient to conduct the analysis (e.g. Integems) or was limited to a small number of communities in small locations (e.g. WABiCC).

Data on the number of people living in different geographical areas (such as total population per Section or population density) were not included as an indicator in this vulnerability assessment, as it would skew results in favour of denser urban areas and away from more sparsely populated rural areas where people are particularly vulnerable to climate change, which would also not be appropriate given this project's overall rural focus. For the calculation of beneficiary numbers following this vulnerability assessment, population data from Sierra Leone's 2015 census are used as it was available down to the Chiefdom and Section level, while the 2021 fine-scale census data were not available.

6.4.2. Vulnerability assessment of coastal Sections

Within the target coastal districts of Sierra Leone, the available data is analysed to propose priority intervention areas. The geographical unit of Section is used for this analysis, as it is well-suited to the locally-led adaptation focus of the proposed project. The Section-level is small enough that the suite of adaptation measures provided by the SLCRP will reach a high proportion of the population in the priority Sections, and large enough that there are distinguishing features between them in terms of socio-economic vulnerability and mangrove or vegetation cover.

The following data sets were used:

Vegetation data (exposure / hazards / sensitivity)
The vegetation status index seeks to highlight areas that are either in poor condition and primarily need restoration or in good health and primarily need conservation. Given that there is limited reliable vegetation data in Sierra Leone, this analysis is undertaken through the use of standard vegetation indicators, namely:

[440] UNDP Climate Information and Early Warning Systems project. Further information available here.
[441] INTEGEMS, 2017. Update of Sierra Leone hazard profile and capacity gap analysis, 2017. Available here.
[442] WA BiCC, 2018. Climate Change Vulnerability Assessment in Mangrove Regions of Sierra Leone: Full Report. Available here.
[443] World Food Program, 2021. Comprehensive food security and vulnerability analysis: Sierra Leone. Available here.

i) Restoration potential, which is defined as areas that were previously vegetated but have since lost their vegetation. The degree of restoration potential is based on the previous vegetation density. Higher restoration potential indicates there has previously been vegetation losses and that an area may benefit from restoration activities.

ii) Normalised Difference Vegetation Index (NDVI) trend from 2001-2020 is used to quantify vegetation greenness and is useful in understanding vegetation density and assessing changes in vegetation health. Negative trends indicate a decrease over time of vegetation greenness and indicate a deterioration in vegetation health. Positive trends indicate an increase in vegetation health.

iii) Degradation Trajectory, which measures the rate of change in primary productivity over time in vegetation and combines productivity, land cover and soil organic carbon indicators. Lower productivity indicates that an area may require restoration while higher values indicate areas that should be conserved.

This vegetation status index provides a robust assessment of vegetation status and trends, using standard indicators. It incorporates both mangroves as well as other types of vegetation cover (e.g. upland forest, shrubland). The use of NDVI is in line with standard approaches, with NDVI being the most widely used index globally for studies of mangroves[444]. The other underlying indicators, namely vegetation density, productivity, land cover and soil organic carbon, are also standard and from global datasets (Table 18) Along with the vegetation status index described above, the location of mangroves and changes in mangrove cover were assessed using Global Mangrove Watch (1996 - 2020)[445] data. Mangrove cover was used to select only Sections that either currently have mangrove cover or previously had mangrove cover.

Socio-economic data (sensitivity and adaptive capacity)

Socio-economic indicators are used to assess the sensitivity/adaptative capacity of areas to cope with impacts. Areas with higher sensitivity/lower adaptive capacity will be less able to adapt to impacts on livelihoods (these people also tend to have higher reliance on climate sensitive livelihoods) or suffer from diminished ecosystem goods/services through losses of the natural resource base (in the case of more rural areas). The indicators were selected to ensure there was no strong bias towards the urban areas of higher population density. These indicators include:

iv) Infant mortality rate, the number of deaths in children under 1 year per 100 live births. Higher values here indicate poor prenatal and early life resources. This is a proxy indicator for healthcare and access to services.

v) Subnational Human Development Index (SHDI) assesses human well-being through a combination of education, health, and standard of living indicators. Lower SHDIs imply higher deprivation.

vi) Accessibility is a measure of a location's spatial isolation, with areas further away from urban centres considered to have higher isolation. Poor access to the economic opportunities, goods and services provided by urban centres, is a major impediment to improved livelihoods and overall development. Accessibility is calculated based on distance, transportation infrastructure and networks, and city spatial distribution. The data is validated by triangulating socioeconomic datasets, which show that greater isolation increases exposure to climate stressors and stratifies people's economic, educational, and health status.

vii) Poverty, based on an index of purchasing power parity and international poverty lines. Higher poverty indicates lower adaptive capacity and that people are less able to defend themselves from both acute and long-term shocks.

viii) Household wealth - The household wealth index is a composite measure of a household's cumulative living standard. This index comprises assessment from household surveys indicating the ownership of household appliances such as radios and TVs, house building

[444] Tran TV, Reef R, Zhu X. A Review of Spectral Indices for Mangrove Remote Sensing. Remote Sensing. 2022; 14(19):4868. https://doi.org/10.3390/rs14194868

[445] Bunting P., Rosenqvist A., Lucas R., Rebelo L-M., Hilarides L., Thomas N., Hardy A., Itoh T., Shimada M. and Finlayson C.M. (2018). The Global Mangrove Watch – a New 2010 Global Baseline of Mangrove Extent. Remote Sensing 10(10): 1669. doi: 10.3390/rs1010669

material, water, and sanitation access. Lower household wealth indicates a weaker adaptive capacity.

ix) Maternal education – The mother's education is strongly correlated to a children's language, cognitive, and academic development. Education can directly influence risk perception, skills and knowledge and indirectly reduce poverty, improve health, and promote access to information and resources. When facing natural hazards or climate risks, educated individuals, households, and societies are assumed to be more empowered and more adaptive in their response to, preparation for, and recovery from disasters.

Table 18 Indicators used in the vulnerability analysis

Indicator	Explanation	Values	Source	Link
NDVI index	Standardised measure of greenness and vegetation health	1-100	Trends.Earth	Available here
Degradation	Standardised measure of the rate of change in primary productivity over time in vegetation	1-100	Trends.Earth	Available here
Restoration potential	Standardised measure of the degree of restoration possible based on the previous vegetation density	1-100	Trends.Earth	Available here
Mangrove cover - loss, gain, stable	Mangrove cover was used in combination with the vegetation status index, in order to select only Sections that either currently have mangrove cover or previously had mangrove cover.	Ha lost or gained between 1996 and 2020	Global Mangrove Watch	Available here
Child dependency ratio	Number of children (aged 0-14) per 100 people aged 15-64	1-100	Center for International Earth Science Information Network	Available here
Infant mortality rate	Number of children who die before their first birthday for every 1,000 people	1-100	Center for International Earth Science Information Network	Available here
Sub-national human development index	Assesses human well-being through a combination of education, health, and standard of living	1-100	Center for International Earth Science Information Network	Available here
Accessibility	A measure of the spatial isolation	1-100	West Africa Coastal Vulnerability Mapping	Available here
Poverty	A measure of defencelessness of populations	1-100	West Africa Coastal Vulnerability Mapping	Available here
Household wealth	A composite measure of a household's cumulative living standard	1-100	West Africa Coastal Vulnerability Mapping	Available here
Maternal education	A measure strongly correlated to academic development	1-100	West Africa Coastal Vulnerability Mapping	Available here

6.4.3 Vulnerability assessment method and results

This analysis prioritises the areas most vulnerable to climate change that are additionally also suitable for both mangrove restoration and mangrove conservation. The aim of the SLCRP in terms of ecosystems-based adaptation to climate change is to both conserve existing and healthy mangroves, as well as restore mangroves in degraded areas. The intention is not to completely separate out geographical areas (Sections)

for either only 'conservation' or only 'restoration' during project implementation, because conservation and restoration go hand in hand. For example, restoration requires intact mangrove areas in the vicinity to obtain seeds/seedlings for planting in restoration plots, and restored plots will be protected better when conservation approaches are also established in the same geographical area. Similarly, restoration aids conservation of intact mangroves, for example when restoration increases the size of a mangrove patch and therefore the patch's ecological resilience and chance of being conserved successfully. The vulnerability assessment, therefore, aimed to determine Sections that would be suitable for both conservation and restoration. A Section in Sierra Leone consists of several Enumeration Areas (EAs) and an EA may contain a large swathe of mangrove. This vulnerability assessment assigned an overall 'vegetation vulnerability' score to each EA, which determined whether the EA overall would be most suited for mangrove conservation or for mangrove restoration.

Section is an appropriate geographical unit for intervention, and it allows the assessment to combine socio-economic factors (sensitivity and adaptive capacity), with exposure and sensitivity factors, to select the most vulnerable areas that are additionally suitable for both mangrove conservation and restoration interventions. Targeting clusters of EAs or villages in specific Sections across the coastline, also makes sense from a practical perspective, given the challenges in moving around the remote coastal communities in the country. It is furthermore helpful from a coastal protection perspective and it will allow for upscaling and replication of interventions across Sections. The West Africa Biodiversity and Climate Change project took a similar approach to selecting clusters of communities.[446]

The quantitative methodology relied on two discrete analyses - vegetation and socio-economic - and summarizes this into Enumeration Area extents.

The vegetation analysis combined NDVI, Degradation, and Restoration Potential equally weighted to create a standardized composite vegetative vulnerability score, with higher values indicating an area is in relative good health and should be conserved, and lower values indicating relatively poor condition where intervention should focus on restoration.

The socio-economic analysis used the indicators of Child dependency ratio, Infant mortality rate, Sub-national human development index, Accessibility, Poverty, Household wealth, and Maternal education in equal weighting to create a standardized social vulnerability index, as a measure of climate vulnerability. Effectively areas of high Child dependency ratio, Infant mortality rate and Poverty, and lower Household wealth, lower Maternal education, lower Sub-national human development index and lower accessibility were classified as more vulnerable. The best available data for these socioeconomic indicators varies in granularity, but tended to be at a lower resolution than the mangrove data which is at 30 m resolution. To achieve the finest-scale analysis possible, the socio-economic data were overlaid at Enumeration Area level, to give each EA a relative score for the different socio-economic indicators, and thus a composite 'social vulnerability' score, with each separate factor weighted equally, was calculated.

To determine the priority Sections for intervention, the analysis used the combination of the social vulnerability index and the vegetation index. Enumeration Areas were assessed on social vulnerability and priority for conservation or restoration in terms of the vegetation index. The combined standardized score was ranked to select the Enumeration Areas that fell within the top 100 [447] based on social vulnerability and ecosystem priority ranks (either top 100 for restoration priority or top 100 for conservation priority).

The Sections were thus ranked based on the total number of EAs they had in the top 100 for social vulnerability coupled with conservation priority, and the top 100 for social vulnerability coupled with restoration priority. The Section with the highest overall score, had 10 EAs in the top 100 social vulnerability-conservation list, and 2 in the top 100 social vulnerability-restoration list. Sections with two or more Enumeration Areas within either the top 100 for social vulnerability-restoration priority or top 100 for social vulnerability-conservation priority were then further assessed in terms of current mangrove extent and area

[446] WA BiCC, 2018. Climate Change Vulnerability Assessment in Mangrove Regions of Sierra Leone: Full Report. Available here.
[447] The top 100 (out of the total of 177 EAs) was used as an appropriate cut-off to select approximately the top half of EAs on the ranked list, i.e. the top 56.5% of EAs.

of mangroves lost (Global Mangrove Watch data), to filter out Sections that had lost all mangroves or where only small areas (less than 20 ha) of mangroves remained.

The ranking results and selections are provided in Table 19 below. Shading indicates priority in decreasing order with categories for i) Sections with 5 or more priority EAs, ii) Sections with 3 or 4 priority EAs; iii) Sections with 2 priority EAs; and iv) Sections with 1 priority EAs. The Selection column in the table also provides additional reasons for selection of particular Sections, which are discussed further below. Table 19 therefore shows all the selected Sections, while Appendix 1's Table 1 provides the full ranked list of all Sections in the target coastal districts that contain mangroves.

Table 19 Priority Sections in terms of vulnerability combined with mangrove restoration and conservation priority Shading in "Selection" column indicates the selected Sections.

Rank	District	Chiefdom	Section	Mangrove area lost (ha)	Total mangrove area (ha)	Mangrove % loss	A) # EAs in top 100 for vulnerability & restoration priority	B) # EAs in top 100 for vulnerability & conservation priority	Total # EAs for A) + B)	Selection
1	Pujehun	Kpaka	Sarbah	208.4	699.5	30%	2	10	**12**	Priority
2	Kambia	Samu	Moribaia	386.7	4 337.5	9%	4	2	**6**	Priority
3	Port Loko	Kamasondo	Konta	11.7	15.4	76%	4	2	**6**	Excluded - small mangrove area
4	Kambia	Samu	Kassiri	145.9	637.1	23%	3	2	**5**	Priority
5	Kambia	Samu	Mafufuneh	9.4	77.8	12%	0	5	**5**	Priority
6	Moyamba	Bumpeh	Samu	982.5	2 204.2	45%	0	5	**5**	Priority
7	Moyamba	Kagboro	Mambo	73.9	1 359.8	5%	0	5	**5**	Priority
8	Moyamba	Kagboro	Youndu	445.9	924.9	48%	1	4	**5**	Priority
9	Kambia	Magbema	Bombe	12.7	9.5	134%[448]	2	2	**4**	Excluded - all mangroves lost
10	Kambia	Mambolo	Mayakie	67.0	160.9	42%	4	0	**4**	Priority
11	Kambia	Samu	Makuma	152.2	2 395.6	6%	4	0	**4**	Priority
12	Moyamba	Bumpeh	Bumpeh	139.8	302.7	46%	3	1	**4**	Priority
13	Moyamba	Bumpeh	Moforay	210.6	278.0	76%	0	4	**4**	Priority
14	Pujehun	Kpaka	Jassende Kpeima	306.5	1 036.8	30%	0	4	**4**	Priority
15	Pujehun	Kpaka	Parvu	33.6	75.4	45%	0	4	**4**	Priority
16	Kambia	Magbema	Kargbulor	29.7	55.6	53%	3	0	**3**	Priority
17	Kambia	Samu	Mapotolon	104.5	1 239.6	8%	1	2	**3**	Priority
18	Moyamba	Bagruwa	Benkeh	265.9	10 060.1	3%	3	0	**3**	Priority
19	Moyamba	Bumpeh	Bellentin	351.1	402.9	87%	0	3	**3**	Priority
20	Moyamba	Kagboro	Mofuss	18.2	506.7	4%	0	3	**3**	Priority
21	Port Loko	Bureh	Kalangba	45.5	147.1	31%	3	0	**3**	Priority
22	Port Loko	Koya	Foredugu	10.6	45.3	23%	3	0	**3**	Priority

[448] Mangrove loss proportions exceeding 100% are because of instances of potential measurement inaccuracy in dataset from Global Mangrove Watch.

Rank	District	Chiefdom	Section	Mangrove area lost (ha)	Total mangrove area (ha)	Mangrove % loss	A) # EAs in top 100 for vulnerability & restoration priority	B) # EAs in top 100 for vulnerability & conservation priority	Total # EAs for A) + B)	Selection
23	Port Loko	Koya	Kagbala A	152.9	1 075.0	14%	3	0	**3**	Priority
24	Port Loko	Lokomasama	Gbainty	102.4	59.9	171%	2	1	**3**	Excluded - all mangroves lost
25	Bonthe	Bendu-Cha	Gba-Cha	15.3	508.5	3%	2	0	**2**	Priority
26	Bonthe	Jong	Tucker-Nyambe	40.8	175.9	23%	1	1	**2**	Priority
27	Bonthe	Sittia	Saama	86.7	1 532.2	6%	0	2	**2**	Priority
28	Kambia	Samu	Bubuya	12.3	293.9	4%	1	1	**2**	Priority
29	Kambia	Samu	Kychom	123.1	1 671.7	7%	2	0	**2**	Priority
30	Kambia	Samu	Rokon	2.2	61.5	4%	0	2	**2**	Priority
31	Moyamba	Bagruwa	Benduma	23.2	1 227.9	2%	2	0	**2**	Priority
32	Moyamba	Bumpeh	Mamu	368.8	401.3	92%	0	2	**2**	Priority
33	Moyamba	Kagboro	Moyah	28.6	205.8	14%	0	2	**2**	Priority
34	Moyamba	Kagboro	Tassor	118.2	3 775.9	3%	1	1	**2**	Priority
35	Moyamba	Ribbi	Masanka	107.3	531.1	20%	2	0	**2**	Priority
36	Moyamba	Ribbi	Mobureh	477.3	3 087.3	15%	2	0	**2**	Priority
37	Moyamba	Ribbi	Mokera	11.5	46.5	25%	2	0	**2**	Priority
38	Moyamba	Ribbi	Upper Ribbi	33.0	567.0	6%	2	0	**2**	Priority
39	Port Loko	Bakeh Loko	Sendugu	0.2	9.2	2%	2	0	**2**	Priority
40	Port Loko	Kaffu Bullom	Mamanki	76.9	1 297.0	6%	1	1	**2**	Priority
41	Port Loko	Kamasondo	Katonga	2.5	2.2	111%	0	2	**2**	Excluded - all mangroves lost
42	Port Loko	Koya	Mandoma	11.5	125.4	9%	2	0	**2**	Priority
43	Port Loko	Lokomasama	Yurika	68,4	120,7	57%	0	2	**2**	Priority
44	Pujehun	Galliness	Gendema I	70.5	76.1	93%	0	2	**2**	Priority
45	Pujehun	Mono Sakrim	Massanda Majagbe	0.4	-	NA	0	2	**2**	Included - co-financing
46	Bonthe	Bendu-Cha	Sokenteh	27.9	1 782.4	2%	1	0	1	Included - Bonthe; co-financing
47	Bonthe	Dema	Turttle Islands	26.7	175.4	15%	0	1	1	Included - Bonthe representation

Rank	District	Chiefdom	Section	Mangrove area lost (ha)	Total mangrove area (ha)	Mangrove % loss	A) # EAs in top 100 for vulnerability & restoration priority	B) # EAs in top 100 for vulnerability & conservation priority	Total # EAs for A) + B)	Selection
48	Bonthe	Imperri	Babum	41.6	184.3	23%	1	0	1	Included - Bonthe representation
49	Bonthe	Imperri	Moimaligie	133.2	6 050.5	2%	1	0	1	Included - Bonthe ; co-financing
50	Bonthe	Jong	Basiaka	46.8	881.7	5%	0	1	1	Included - Bonthe representation
51	Bonthe	Jong	Landi-Ngere	10.2	217.3	5%	1	0	1	Included - Bonthe representation
52	Bonthe	Nongoba Bullom	Bohol	56.0	332.8	17%	0	1	1	Included - Bonthe representation
53	Bonthe	Nongoba Bullom	Salon	44.1	29.1	151%	1	0	1	Excluded - all mangroves lost
54	Bonthe	Nongoba Bullom	Torma Subu	50.9	51.4	99%	1	0	1	Excluded - all mangroves lost
55	Bonthe	Sittia	Kamai	128.3	2 259.2	6%	0	1	1	Included - Bonthe representation
92	Port Loko	Maforki	Gberray Thunkara	52.8	389.8	14%	1	0	1	Included - stakeholder options
93	Port Loko	Maforki	Maboni	96.6	175.2	55%	1	0	1	Included - stakeholder options
94	Port Loko	Maforki	Makorobolai	141.4	582.5	24%	1	0	1	Included - stakeholder options
95	Port Loko	Maforki	Old Port Loko	5.5	33.7	16%	1	0	1	Included - stakeholder options
96	Port Loko	Maforki	Pothocase	7.4	74.4	10%	1	0	1	Included - stakeholder options
99	Bonthe	Bendu-Cha	Yallan-gbokie	133.1	4 579.5	3%	0	0	0	Included - co-financing
100	Bonthe	Bonthe Urban	Bonthe Town	22.9	634.2	4%	0	0	0	Included - co-financing
...	...	...	...	...	...	...	...	...	...	
177	Port Loko	Maforki	Massebay	4.7	26.1	18%	0	0	0	Not priority

Following the ranking based on socio-economic vulnerability and the vegetation index, the ranked areas were also screened to exclude Sections where more than 95% of mangroves had been lost and/or where less than 20 ha of mangroves remained, because these areas would be too degraded or contain too small mangrove areas for restoration and conservation to be feasible and worthwhile compared to less degraded and larger mangrove areas. To achieve adequate representation for the district of Bonthe (which has large areas of mangroves, remote populations and is a priority for government stakeholders and has been a focus of previous successful coastal management initiatives), Sections that ranked high in the top 60 overall but not within the top 45 (Sections with two or more priority EAs for either vulnerability-conservation or vulnerability-restoration) were selected for Bonthe. In addition, some Sections were also included because they are critical areas to build on for an ongoing related project funded by JOAC that is providing co-financing for the SCLRP. These Sections which were included for additional reasons are shown in the "Selection" column in Table 19.

Furthermore, some of the areas that ranked high were deemed to be unsuitable. For example, Konto Section in the Kamasondo chiefdom in the Port Loko district, and Bombe Section in the Magbema chiefdom of the Kambia district, were deemed unsuitable due to the low overall extents of mangroves in these areas. These exclusions are shown in the "Selection" column in Table 19.

The rankings here align with findings from stakeholder consultations earlier in the design process. For example, the project design team visited two areas in the Kambia district that rank in the top 5 in this assessment (Moribaia Section and Kassiri Section) in April 2022 (see Annex 13, section 'Community mapping – Northern Districts'), and spoke with town chiefs and district authorities, the latter of whom recommended visiting these other vulnerable coastal areas. There was enthusiasm for the SLCRP, and the design team observed first-hand the issues with mangrove deforestation, agriculture, and coastal erosion in these areas.

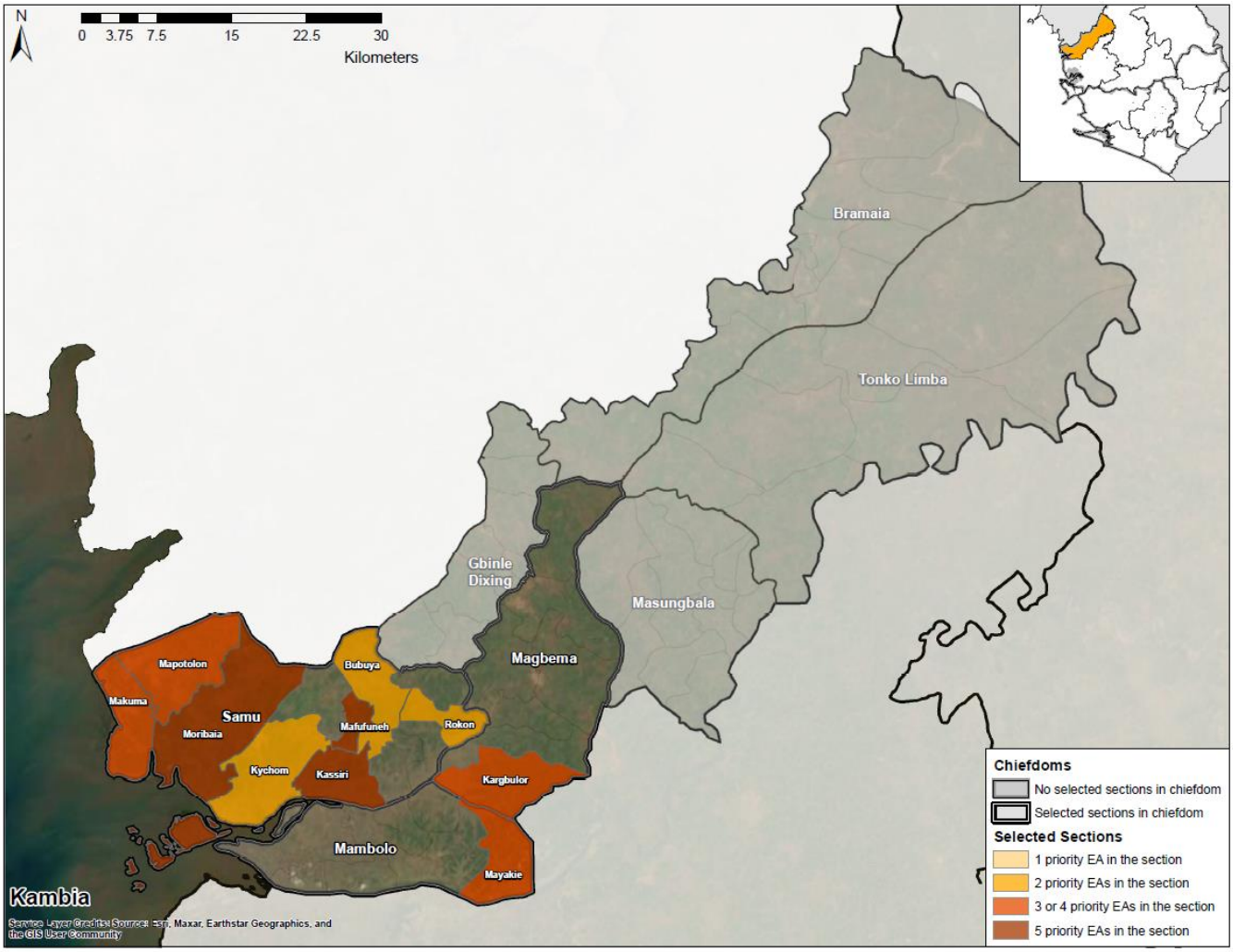


Figure 91 Map of selected Sections and chiefdoms in Kambia district

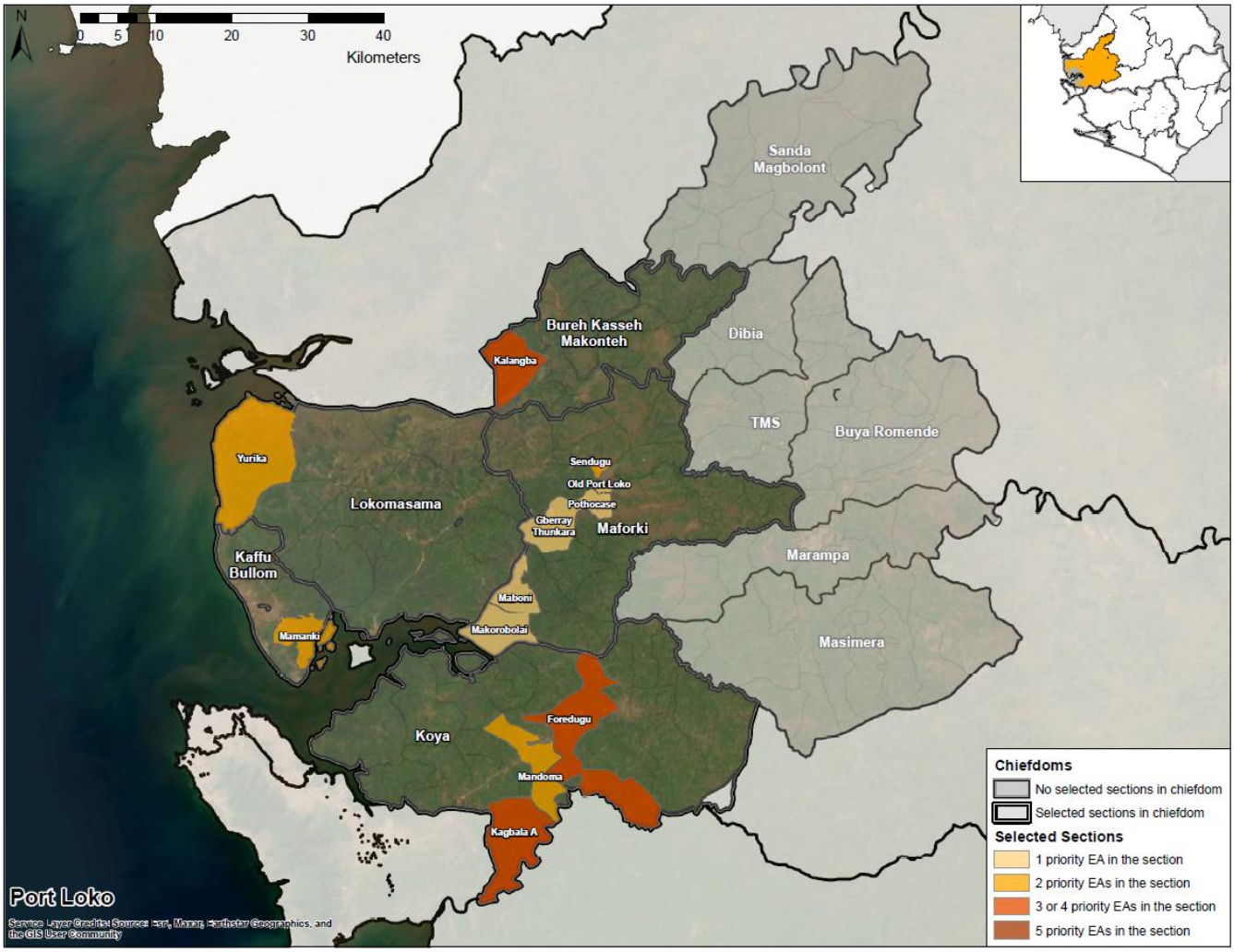


Figure 92 Map of selected Sections and chiefdoms in Port Loko district

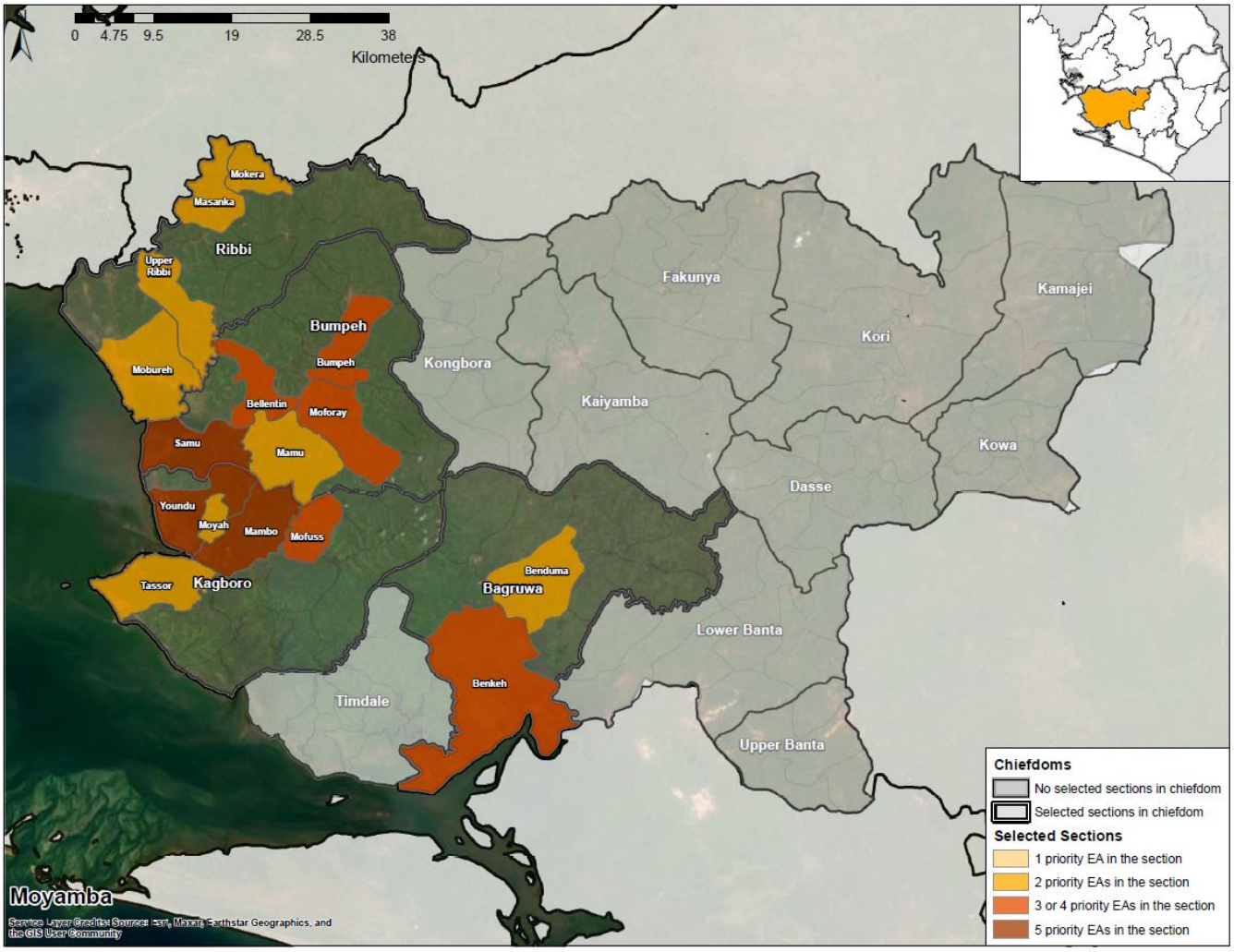


Figure 93 Map of selected Sections and chiefdoms in Moyamba district

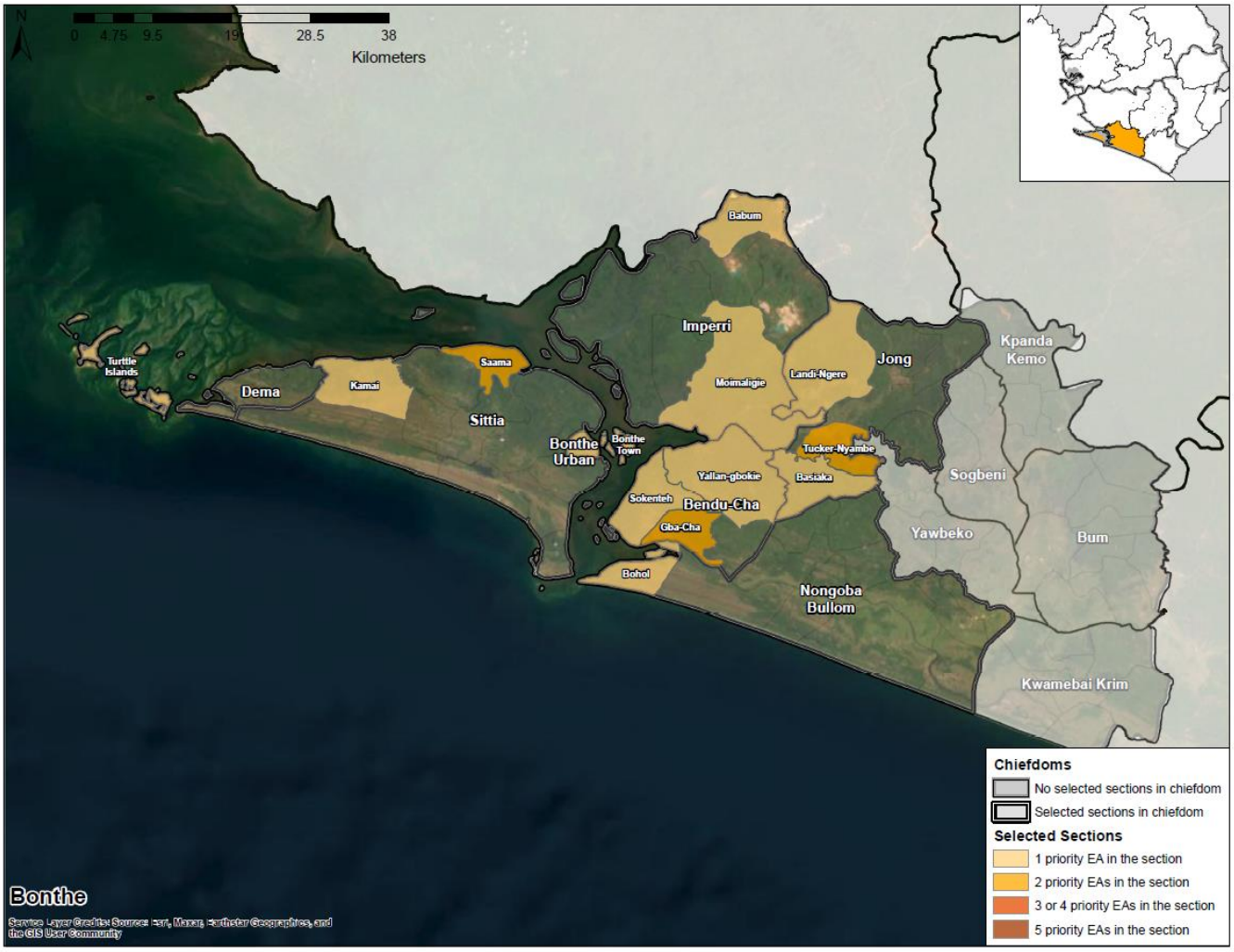


Figure 94 Map of selected Sections and chiefdoms in Bonthe district

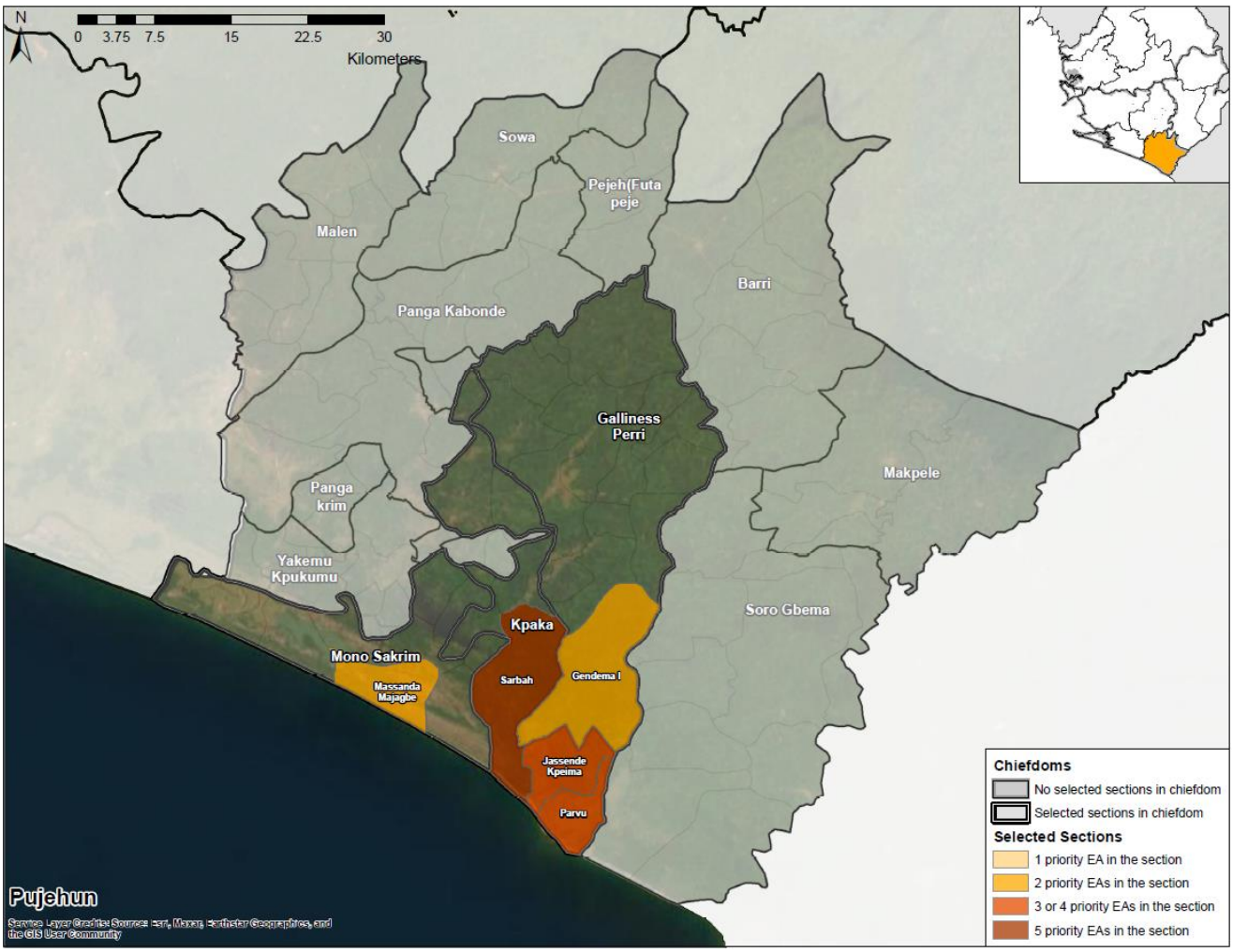


Figure 95 Map of selected Sections and chiefdoms in Pujehun district

Please see Appendix A: Priority Section maps, for detailed maps of each of the Sections prioritized through the quantitative analysis, as well as for the full table with ranked results for all 177 Sections.

Table 20 Populations of the proposed priority sections

Rank	District	Chiefdom	Section	Total population of Section	EAs in top 100 for climate vulnerability & conservation priority and top 100 for climate vulnerability & restoration priority	Selection
1	Pujehun	Kpaka	Sarbah	3 772	12	Priority
2	Kambia	Samu	Moribaia	7 970	6	Priority
4	Kambia	Samu	Kassiri	10 665	5	Priority

5	Kambia	Samu	Mafufuneh	2 936	5	Priority
6	Moyamba	Bumpeh	Samu	4 331	5	Priority
7	Moyamba	Kagboro	Mambo	3 121	5	Priority
8	Moyamba	Kagboro	Youndu	5 576	5	Priority
10	Kambia	Mambolo	Mayakie	3 640	4	Priority
11	Kambia	Samu	Makuma	10 961	4	Priority
12	Moyamba	Bumpeh	Bumpeh	3 552	4	Priority
13	Moyamba	Bumpeh	Moforay	6 184	4	Priority
14	Pujehun	Kpaka	Jassende Kpeima	1 367	4	Priority
15	Pujehun	Kpaka	Parvu	2 404	4	Priority
16	Kambia	Magbema	Kargbulor	9 334	3	Priority
17	Kambia	Samu	Mapotolon	7 375	3	Priority
18	Moyamba	Bagruwa	Benkeh	4 117	3	Priority
19	Moyamba	Bumpeh	Bellentin	2 433	3	Priority
20	Moyamba	Kagboro	Mofuss	1 306	3	Priority
21	Port Loko	Bureh	Kalangba	5 157	3	Priority
22	Port Loko	Koya	Foredugu	16 464	3	Priority
23	Port Loko	Koya	Kagbala A	4 119	3	Priority
25	Bonthe	Bendu-Cha	Gba-Cha	864	2	Priority
26	Bonthe	Jong	Tucker-Nyambe	1 418	2	Priority
27	Bonthe	Sittia	Saama	1 545	2	Priority
28	Kambia	Samu	Bubuya	20 991	2	Priority
29	Kambia	Samu	Kychom	9 891	2	Priority
30	Kambia	Samu	Rokon	2 311	2	Priority
31	Moyamba	Bagruwa	Benduma	3 962	2	Priority
32	Moyamba	Bumpeh	Mamu	3 958	2	Priority
33	Moyamba	Kagboro	Moyah	1 462	2	Priority
34	Moyamba	Kagboro	Tassor	5 673	2	Priority
35	Moyamba	Ribbi	Masanka	3 670	2	Priority
36	Moyamba	Ribbi	Mobureh	6 008	2	Priority
37	Moyamba	Ribbi	Mokera	1 542	2	Priority
38	Moyamba	Ribbi	Upper Ribbi	3 762	2	Priority
39	Port Loko	Bakeh Loko	Sendugu	11 272	2	Priority
40	Port Loko	Kaffu Bullom	Mamanki	7 203	2	Priority
42	Port Loko	Koya	Mandoma	4 202	2	Priority
43	Port Loko	Lokomasama	Yurika	20 014	2	Priority
44	Pujehun	Galliness	Gendema I	5 106	2	Priority
45	Pujehun	Mono Sakrim	Massanda Majagbe	1 933	2	Included - co-financing
46	Bonthe	Bendu-Cha	Sokenteh	2 253	1	Included - Bonthe representation
47	Bonthe	Dema	Turttle Islands	2 756	1	Included - Bonthe representation

48	Bonthe	Imperri	Babum	17 613	1	Included - Bonthe representation
49	Bonthe	Imperri	Moimaligie	6 272	1	Included - Bonthe representation
50	Bonthe	Jong	Basiaka	2 466	1	Included - Bonthe representation
51	Bonthe	Jong	Landi-Ngere	4 475	1	Included - Bonthe representation
52	Bonthe	Nongoba Bullom	Bohol	1 644	1	Included - Bonthe representation
55	Bonthe	Sittia	Kamai	2 691	1	Included - Bonthe representation
92	Port Loko	Maforki	Gberray Thunkara	4 166	1	Included - stakeholder options
93	Port Loko	Maforki	Maboni	2 224	1	Included - stakeholder options
94	Port Loko	Maforki	Makorobolai	2 235	1	Included - stakeholder options
95	Port Loko	Maforki	Old Port Loko	2 472	1	Included - stakeholder options
96	Port Loko	Maforki	Pothocase	1 774	1	Included - stakeholder options
99	Bonthe	Bendu-Cha	Yallan-gbokie	2 492	0	Included - co-financing
100	Bonthe	Bonthe Urban	Bonthe Town	10 075	0	Included - co-financing
Total				**299 179**		

6.4.4 Selection of direct and indirect beneficiaries

The final selection of beneficiaries and communities within Sections is based on factors judged to be important by both the Government of Sierra Leone, District Councils and Paramount Chiefs, and implementing partners of the SLCRP. During consultations throughout the project design process, multiple stakeholders at different levels were involved, and contributed to discussions to determine suitability for the project.

Relevant stakeholders involved included:

- National government officials from climate change and environmental departments (EPA, National Protected Area Authority, SL Met and National Disaster Management Agency, as well as other sectors relevant to the project (Ministry of Education, Ministry of Agriculture, Ministry of Gender etc.)
- Senior district government officials from target districts (e.g. district chairman, district planning officer, district sectoral leads – district agricultural officers, district forestry officers)
- Paramount chiefs (the political leader of a chiefdom, with government responsibility) from a selection of coastal chiefdoms
- Community-level authorities (Section chiefs, town chiefs, women leaders)

The factors determined to be the most important through an iterative process were:

- Access to previous donor-funded interventions
- Community willingness to participate and contribute to the project
- Community authority (e.g. paramount and Section chief) buy-in, and willingness to advocate for the project with community members.

The design process for the SLCRP included community visits across different periods, to many communities across the five coastal districts. Save the Children and implementing partners are already working in the majority of areas covered by this vulnerability assessment, so existing local knowledge of Sections and communities was considered for community visits, and factors included in the vulnerability assessment.

The 260,000 direct beneficiaries shown in Table 17 above will be selected from among the 299,179 people living in the Sections prioritised in the vulnerability assessment (Table 20). This selection will be made via a consultative process involving appropriate national, district and chiefdom-level government stakeholders, implementing partners and other relevant stakeholders, based on government priorities, opportunities to build on relevant past and ongoing initiatives, support from community authorities and implementation efficiency considerations. The 23 target Chiefdoms presented in Table 17 above are based on the locations of the Sections prioritised in the vulnerability assessment. The calculation of the indirect beneficiary number of 1 million is based on the total populations of the 5 target coastal districts and the 23 target chiefdoms, as presented in Table 17 above and discussed in Section 6.3 Indirect beneficiaries.

6.5 Stakeholder Consultation Summary

This section summarises the key findings from the stakeholder consultations that were held in preparation for both the drafting of the Concept Note as well as in preparation for this Feasibility Study and Funding Proposal. The full Stakeholder Engagement is provided as Annex 13. This Annex describes all the stakeholder consultations undertaken to date, presenting a description of consultations and their outcomes. The annex presents in detail all the consultations (in the appendix section), with dates, participants and the specific outcome for every meeting that has been held.

This annex reflects an integral aspect of the development of the SLCRP. They detail the stakeholder engagement process during the design phase, which was carried out in several stages:

1. Stakeholder Identification
2. Stakeholder General Consultations
3. Validation Workshop
4. Institutional Stakeholder Meetings
5. Scoping Survey
6. Field Survey
7. Globalfields/ Save the Children Field Consultation
8. GCF Coastal Communities Stakeholder Workshops

Preliminary Consultations: Early project consultations begun during 2020-21. The initial project concept was supported by a letter from the NDA on 15 September 2020, endorsing the submission of a proposal on 'increasing the climate resilience of Sierra Leone's coastal communities' to the GCF. Extensive consultations have since taken place.

General Consultations took place in the period February to October 2022. Over 40 general consultations were held with NGOs, government authorities, institutional projects and private sector stakeholders. The engagement has been conducted via different methods including online meetings, phone calls and face-to-face meetings. The majority of the feedback obtained was overall positive and valuable to the project design across the range of topics including community methodological approaches, potential partnerships and discussions on mangrove protection in Sierra Leone. These consultations covered key areas of:

- Analysis of stakeholders' roles and experience in Sierra Leone and relevancy in contributing to project design and implementation
- Analysis of previous and ongoing collaborations and climate-related projects in Sierra Leone
- Opportunities for collaborations and funding with different organisations
- SLCRP design and implementation review and feedback.

Validation Workshop 7th April 2022: the validation workshop was hosted by Save the Children and the EPA on 7th April with 42 stakeholders from across eight different groups: INGO; government; consultancy; not-for-profit organizations; institutional donors; national NGOs; multilateral organisations and programmes. The workshop was held to update stakeholders and receive feedback and advice on:

- The suitability of the outputs for the targeted communities
- To ensure the data collection was appropriate

- To understand where the project should focus
- If there were previous successful examples in the country of co-financing.

The feedback of the workshop focused on the need to:

- Clarify the use of languages in terms of capacity strengthening
- Strengthen partners and projects already existing to increase efficiency, improve data collection and optimise the budget
- Present an assessment of the current capacity in the chosen community before the attempts to increase them
- Obtain confirmation for in-kind contributions from the government, primarily the EPA, the Ministry of Environment and possibly the SL Met.

Institutional Stakeholder Meetings: institutional stakeholders were surveyed in different meetings held on 23 to 27 May 2022, for a total of 13 meetings during the consultants' field visit to Sierra Leone, as well as ongoing stakeholder meetings. Stakeholders were of four different types: NGOs, governmental institutions, international organizations, and national organizations. The core of the meetings was to investigate opportunities for project collaborators and funding, as well as to contextualise ongoing similar projects and initiatives, and the successes and shortcomings of these. In every meeting, each stakeholder showed the resources currently available to be employed for the projects, potential existing projects to collaborate with, and the expertise and work experience they can provide for the implementation of the SLCRP project. The main results of the meeting conveyed the need:

- To strengthen the mangrove preservations rather than implement new plantations. This is also consistent with the category C (low to no risk) of the proposed interventions and activities.
- To empower the communities in choosing alternative livelihoods to minimise the overuse and deforestation of mangroves through creating a system of sustainable and suitable options.
- To strengthen climate information and early warning systems.
- To deploy available and current resources for the project implementation.

Community Mapping (Northern districts): A community mapping exercise has been conducted through the communities in the Northern coastal districts of the Sierra Leone Coastline (Kambia and Port Loko), from **April 10th to 13th, 2022.** Save the Children does not currently have an operational presence in the twelve towns and communities visited, where their staff collected information on the geographical conditions and travel time between communities, climate change awareness and perceptions, and livelihood availabilities. In every community, the town or village chief was the main stakeholder from which information was collected. After the arrival in Kambia on the first day, 10th of April, the surveys were undertaken in three days along the coastline and the riverine communities, specifically:

11th of April: four towns were visited in the north part of the coastline: Kambia Town, Mahela, Makuma and Yelibuya Island. The main findings focus on:

- The difficulties in preserving the mangrove forest and stopping the communities from using it for fish smoking
- The awareness of livelihood reductions over time as fish and rice farming
- That women are the main ones responsible for the selling of livelihoods in the markets
- The presence of previous projects and programs by NGOs and WA BiCC to preserve mangroves which are without extensive and durable results.

12th of April: four different riverine communities were visited: Rokupr, Mapagbo, Mambolo and Kawboli. Communities presented different concepts regarding the importance of mangrove preservations, and those that show a higher awareness about its preservations noted a struggle to find suitable livelihood substitutions. Apart from this, the communities have commonalities regarding:

- The need for seed banking
- The general awareness of climate change as dangerous
- The role of women as main sellers in the markets
- The difficulties in rice farming, even though it constitutes fertile soil

- The critical issues of deforestation and droughts in the area.

13th of April: the visits focused on Konakridee and Kafunka Town. These communities witness strong deforestation of mangroves over time even though the WA BiCC program was partially successful in planting new mangroves in the interest areas. In these communities, the main livelihoods are fishing, and farming and efforts have been deployed to find suitable substitutes for the use of mangroves, such as crabs breeding and the planting of coconut trees.

Additional details of the specific visits can be found in Annex 13 on Stakeholders Consultations.

Field Survey: in May 2022, the local contractors "Conflict Management and Development Associates (CMDA-SL)"[449] conducted a field engagement with the main objective of collecting data to inform the funding proposal design. The engagement consisted of 15 focus group discussions (FGDs) and 24 key informant interviews (KII) as well as a quantitative survey of 402 households in total. Topics included the perceptions and level of knowledge of climate change, access to food and water, and the potential for alternative livelihoods.

In particular, the key objectives of the field-based consultations included: a) Establishing the appropriateness of the stakeholders' consultation plan for the beneficiary communities and its suitability in providing the required information including respondents' perception of the activities proposed by Save the Children; b) Ensuring the inclusion of marginalised categories of the population; c) Identifying rural coastal communities from 5 districts in Sierra Leone deemed appropriate for the proposed stakeholder engagements; d) Developing the stakeholder engagement topic guides and quantitative assessment questionnaire appropriate for the engagement; e) Undertaking qualitative and quantitative assessments in the rural coastal communities.

In terms of the methodology used in the field survey and the scope:

- Twenty rural communities were selected (two each from 10 chiefdoms) from across five (5) coastal districts to be part of the engagement.
- The communities were identified based on pre-determined criteria agreed with SCI technical staff combined with the use of Google Earth Professional and ESRI's ArcGIS software application overlaid with shape files obtained from the 2015 National Population Census mapping exercise by Statistics Sierra Leone (SSL). The 20 selected communities, 10 chiefdoms across the five coastal districts are shown below.

For this work, the identification of the rural coastal communities has been accomplished with the use of the ESRI's ArcGIS software version 10.7 and Google Earth Professional which are among the most powerful global mapping software essential for an exercise of this nature. Using specific functionalities of these software, the communities were displayed, identified and visually verified with consultations from persons knowledgeable about the locations, conditions and accessibility of these communities. 10 chiefdoms (2 per study district) and 20 communities (2 communities per chiefdom) were purposively sampled for the study as illustrated in the map below.

Key findings include:

- Variable awareness of climate change with a predominant fatalistic view of God as responsible
- Coastal communities lack adequate support with limited resources
- Inconsistent and insufficient assistance
- All households surveyed engage in farming food crops and noted high incidents of climate change impacting their farming calendar
- Weak enforcement of climate-change-related laws
- Insufficient female representation in decision-making with the need for greater inclusivity in project design

[449] For the full details of this work, see the complete "Stakeholder consultations and Environmental and Social Management plan - Data Collection in Rural Communities in Sierra Leone", by the Conflict Management and Development Associates.

- Men are typically in leadership roles, management decisions, and land conservation and are influential on pregnancy and the number of children born
- Women are inadequately consulted on land management and conservation unless holding household credentials, education or a civic duty
- Women are also primarily responsible for household chores (reduces economic/productive time).

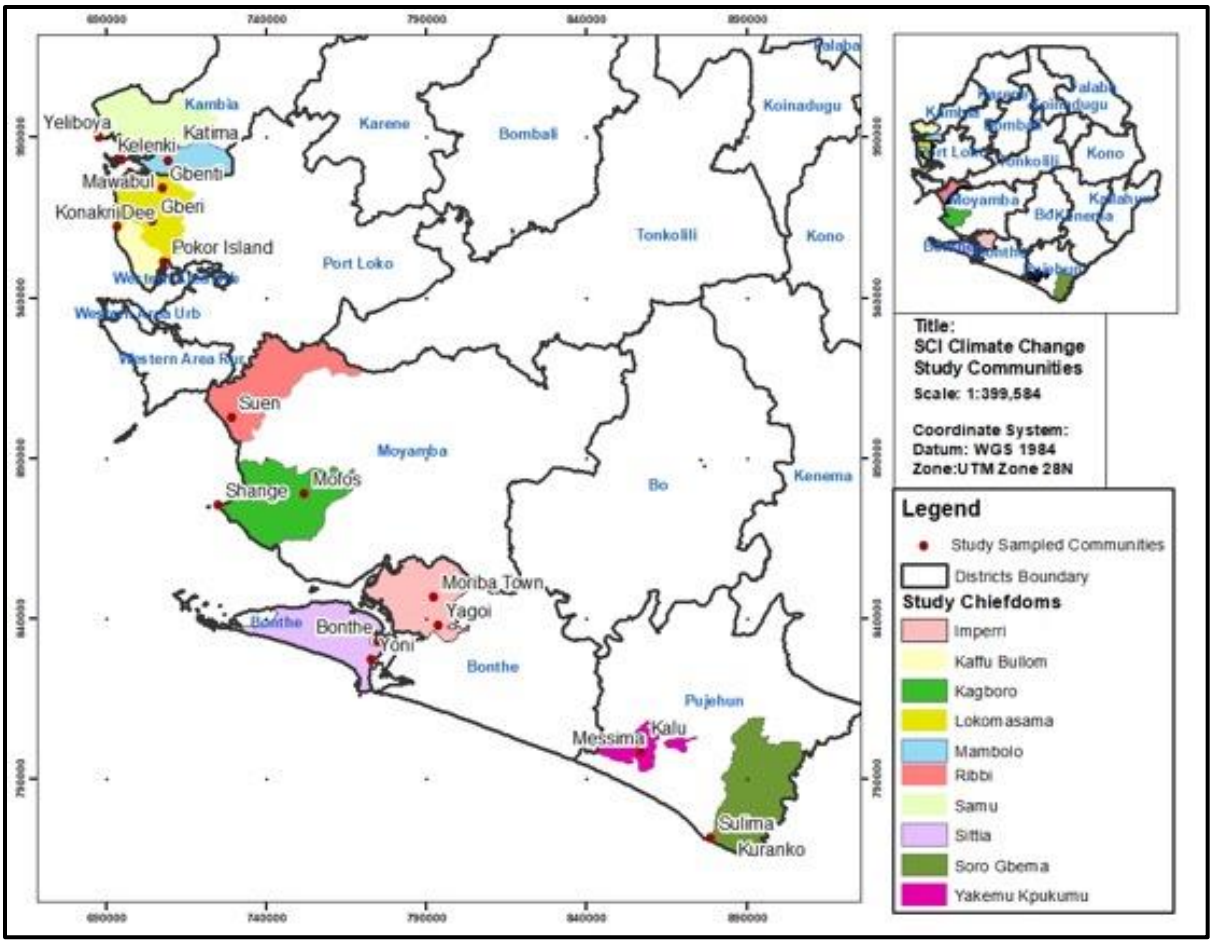


Figure91: Community outreach from CMDA Stakeholders Consultations and Data Analysis
Source: CMDA-SL

Field Mission, including community consultations, consultations with chiefdom and district authorities (16 – 22 May) by Save the Children (supported by consultants Globalfields)

These consultations and site visits covered the coastal districts in the South of the country, excluding Pujeuhn (Moyamba and Bonthe, and some communities in Western rural area). These consultations focused on communities and local organizations with a cross-section of stakeholders including INGOs, community chiefs and members and private organisations. See maps in Figures 84, 85 and 86 on the site visits in the communities. Key findings included:

- Majority of livelihoods depend on fishing, mangroves, rainfed agriculture and crops (cassava, tubers, cash crops, chillies and rice)
- Difficulty securing consistent alternative livelihoods (amidst an awareness of the importance of mangrove perseveration)
- Experience of extreme climate episodes (saline intrusion, excessive or insufficient rainfall, strong wind, high temperatures and pests)

- High food insecurity impacted by unstable weather patterns and extreme climate events
- Considerable need for additional projects to improve social welfare for women, children and girls
- Pervasive WASH issues: open toilets, saline water, unsafe and far distances from clinics and, waterborne diseases (malaria and pneumonia)
- Insufficient funding for schools to provide climate change awareness initiatives or necessary construction materials
- Corruption limiting existing project productivity resulting in only mild environmental effects.

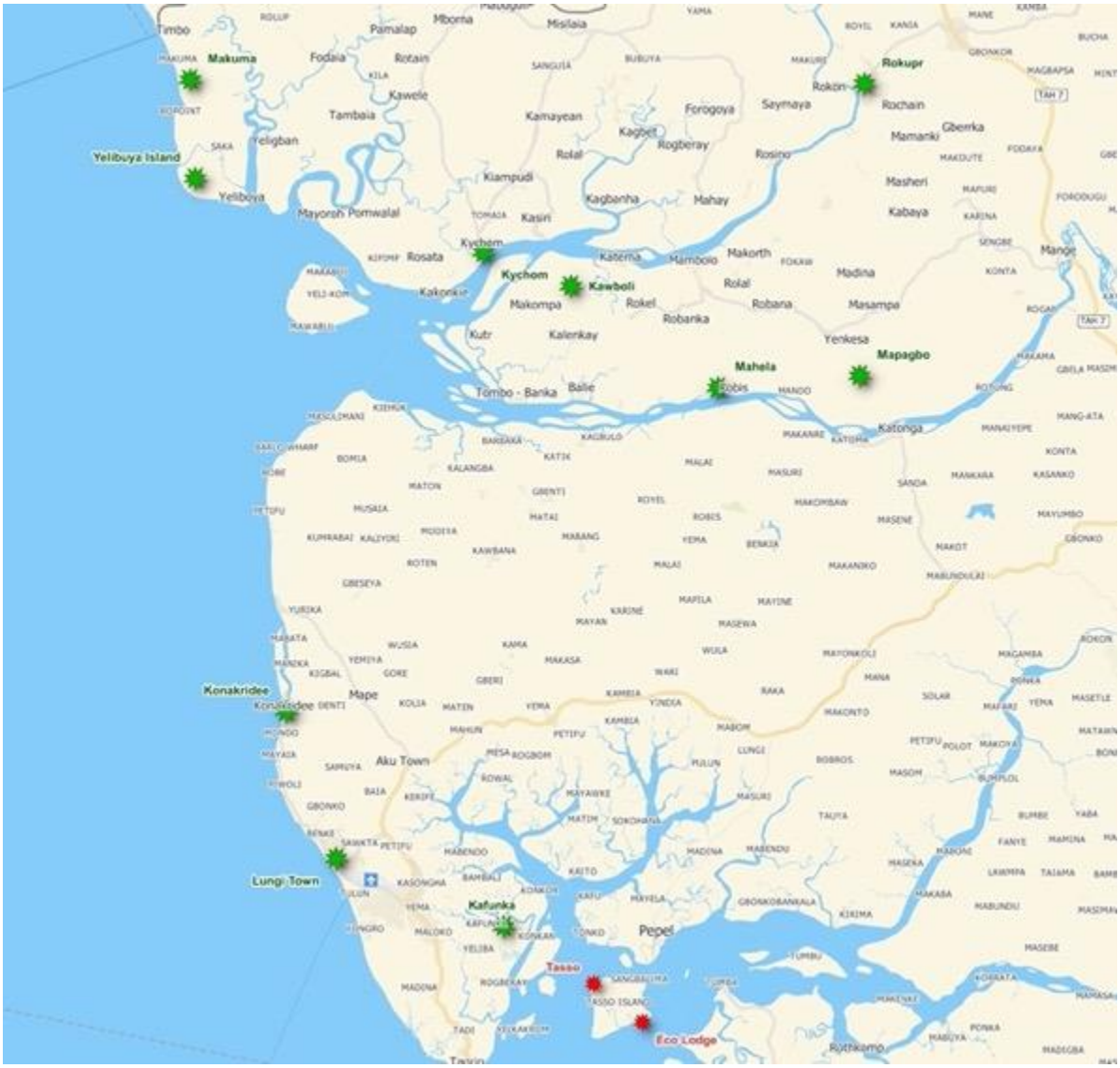


Figure 96: Map of communities visited in northern area
Source: Map elaboration Luke Moore

Figure 97: Map of communities visited Shenge, Bonthe area
Source: Map elaboration Luke Moore

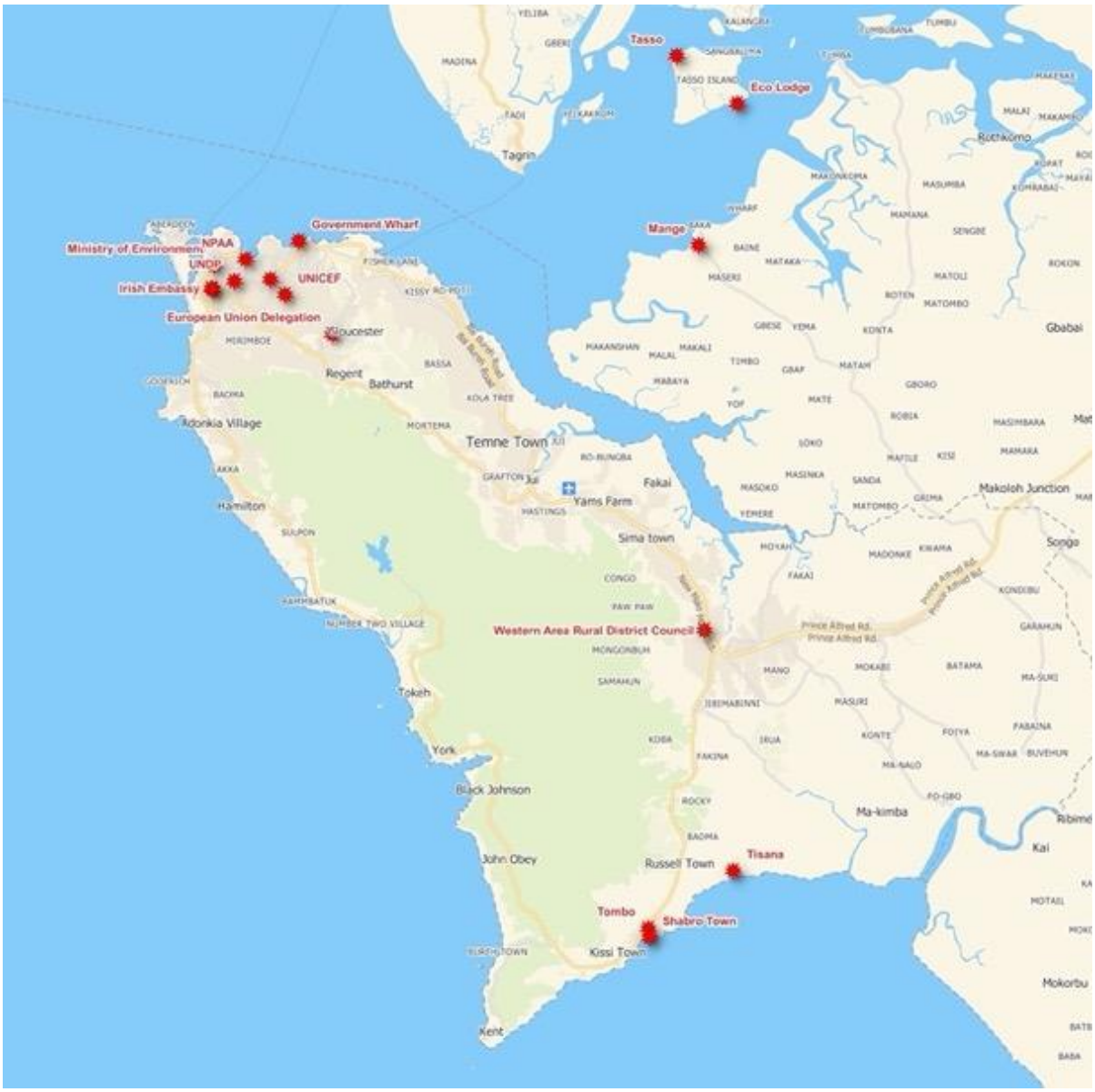


Figure 98: Consultations (Freetown, Western Urban), Western Rural
Source: Map elaboration Luke Moore

Freetown Stakeholder Meetings (23 – 27 May): The second week of consultations consisted of 19 meetings carried out with national NGOs, international organizations, donors, governmental institutions and state agencies with the aim to identify alternative and sustainable livelihoods to mangroves. To do so, the meetings discussed the SLCRP priorities for focus and implementation, as well as an analysis of current and past projects and the level of community engagement herein.

Coastal Communities Stakeholder workshops (26 – 28 July). Two workshops were organised on the 26th and 28th July 2022 for coastal community stakeholders, Districts Councils, Government line Ministries, CBOs, potential project partners. Participants from the southern region converged in Bo city and those from the northwest met in Freetown. The main findings and practical examples from activities' feedback were:

- *Lesson Learnt from previous projects: the community need to be continuously engaged*: Other interventions came into these communities but could not succeed because the community members

were not properly engaged in the design, planning and implementation of the project. Hence, the GCF project must continue working with community members to ensure efficacy.

- *Livelihoods:* There should be an alternative livelihood mechanism to for communities to substitute mangrove harvesting and other climate-related activities to account for their daily sustenance.
- *Capacity Building is key*: There should be a general understanding of climate-resilient farming techniques among youth. The project should educate people on relocation from one business to the other business and create ways to facilitate microfinance access.
- *Specific needs:* The community members asked for more fish storage and they like the idea of preservation such as cooling systems and ovens. There is a need for quality storage in-situ to ensure decent water harvesting, as there is an ongoing problem with water quality.
- *Enforcement of by-laws is a real problem*. The GCF project should work closely with local authorities to enforce the law, as it relates to the project themes. In Moyamba for example, the communities have developed laws to protect the environment. It would be of great assistance to work with the authorities to continue facilitating adherence to these laws.
- *Land use planning – mapping as a key component*. The project should create mechanisms to map out areas in the communities that would be useful for future plans. With mangrove, this could involve a scientific mapping on the various mangrove areas to know which is suitable for cultivation in the communities. The project should also consider drone technology in mapping out these areas in order to understand the communities and to support the restoration process.

Additional specific stakeholder consultations February – April 2023

In response to GCF comments on the SLCRP SAP concept note v3 in February 2023 regarding the possibility of changing the project to a cross-cutting project, the SLCRP design team conducted further external stakeholder meetings with institutional funders, the EPA and Ministry of Environment. The purpose of the additional meetings was to understand the extent to which Sierra Leone was equipped at a national level to undertake mitigation projects; to understand whether there were any prior, ongoing or planned projects to address mitigation in Sierra Leone; and to determine the NDA and other key stakeholders' viewpoints on amending the SLCRP.

The result of these additional consultations was that the confirmation that, as of late March 2023, the European Union (EU) has agreed a 3-year contract with the FAO and GoSL to deliver a forest inventory programme, which will include measurement, reporting and verification tools. This will enable Sierra Leone to engage more strongly under the REDD+ framework and it is expected that at the end of the 3-year project, the EU and FAO will be able to advise GoSL and partners on the future implementation of a sustainable forest management system. As part of this project, FAO will deliver community-level training on ground-truthing for forest monitoring (aligned with Output 3.1 of the SLCRP). The EU have expressed support for strong coordination and collaboration between their project and the SLCRP. The two projects will ensure complementarity of activities at all levels, share lessons and outcomes and ensure national and district level work is well coordinated and mutually reinforcing.

6.6 Stakeholder Engagement Strategy

Relevant stakeholders who are part of the project implementation are consulted and part of the project development and ongoing activities planning and implementation. The Project Implementation Unit (PIU) will be responsible for the ongoing stakeholder engagement during project implementation, either directly or through delegation. The Gender and Social Inclusion Specialist will ensure that gender and social inclusion sensitive approaches are utilised throughout all stakeholder engagement processes and the PIU will ensure culturally appropriate strategies are used. To achieve this, the project will apply methodologies such as focus group discussions (FGD) and key informant interviews, utilising both formal systems and socially established groups. Where appropriate, separate meetings for men and women will be held, and the project will work with women's groups and organisations of people with disabilities to ensure representative input. Data

generated required by this procedure (e.g., consultation, implementation and actions planning, etc.) are recorded and managed by the PIU.

The stakeholder engagement process includes six steps to be employed by Save the Children during the SLCRP project. This process is applicable to planned activities.

1. Inputs – identification of relevant persons
2. Stakeholder Identification – use of a standardised stakeholder mapping method to compile a list of potentially relevant persons, including those involved in design consultations
3. Consultation Activities – vary and ensure inclusivity of engagement techniques to promote participation for all relevant stakeholders
4. Methodology considerations – ensure sufficient information is able to be gathered by using targeted information and language that is easily understood
5. Administration – records generated during a consultation process will be saved in a stakeholder database and kept on file for the duration of the project.
6. Ongoing Consultation – ongoing consultation to provide updates on activity progress; completion of communication commitments made during design-stage consultations; provision of a platform to notify relevant persons of any deviations to the activity details originally provided during initial consultation and opportunity to highlight if the plan is no longer appropriate or effective; and support for the development of open communication channels with key relevant persons.

6.6.1 List of Core Project Stakeholders

Stakeholder Group	Interest and Influence Relevant to the Project	Proposed Role in Project	Engagement Strategy
Environment Protection Agency – Climate Change Secretariat (EPA) The EPA is also the National Designated Authority	The Secretariat has been the NDA (Focal Point) for the GCF and coordinated climate change initiatives in the country since 2015 and has overseen the National Climate Change Policy, as well as the National Climate Change Strategy and Action Plan, in addition to directing and coordinating the NDC and NAP processes and planning. The EPA is responsible for the protection and management of the country's environment, with a primary focus on promoting the safety of human health and ecosystems, and to secure sustainable investment. The EPA has supported and implemented a number of climate change adaptation projects previously and continues to support active projects.	EPA through its Climate Change Secretariat will act as Co-Executive Entity for the project and as Chair within the Project Steering Committee.	• Project planning and design • Chair of the project steering committee that meets regularly during implementation to provide oversight and guidance to the project.

Ministry of Agriculture and Fisheries (MAF)	Interest and influence on impact of climate change to food security and livelihood. Activities relevant to this project will promote adaptive agriculture practices, food security and diversified livelihood.	Member of the project steering committee; oversight and guidance for the project	• Participation in project planning, implementation, technical assessment and livelihood opportunities. • Representation on the project steering committee
Forestry Division of the Ministry of Environment	The Ministry of Environment's District Forestry Officers and its chiefdom/community level 'Forest guards' are responsible for mangrove forests and not only for timber trading, compared to the National Protected Area Authority's responsibility for all wetlands and Marine Protected Areas (MPAs), which include most mangroves in Sierra Leone.	Member of the project steering committee; oversight and guidance for the project	• Participation in project planning, implementation • Representation on the project steering committee
Local NGOs	Interest in project activities that promote local development and resilience.	Execution of specific climate-resilient agriculture interventions (to be decided at project onset for each site) and training/awareness-raising for communities.	• Participation in awareness raising • Consultation on the design of community adaptation plans
CSOs and community networks, including women's networks and disability networks	CSOs and community networks will be consulted during the implementation of the project. They have established networks into communities and are well-known and trusted by local communities. Women's and disability networks will be used to engage especially with the most vulnerable people in the communities that may not otherwise get the chance to take part in activities	Execution of specific climate-resilient interventions (to be decided at project onset for each site). CSOs and community networks are also indirect beneficiaries who will collaborate with communities to support implementation of management plans and conduct	• Participation in awareness raising • Consultation on the design of community adaptation plans • Technical support and training • Representing marginalized groups within communities

		awareness raising activities.	
District Councils and District-Level Technical Officers	Given the project will work predominantly at district and community level, there is strong interest from district councils and district technical officers across all the community and district-level activities implemented under the project. Different technical officers will be directly engaged in specific technical aspects and activities under the project, particularly under component 1 of the project (including activities 1.2.1, 1.3.1 and 1.4.2)	The project will work closely with the district council technical team, including agricultural officers and extension workers, environmental officers and forestry extension officers, as well as education and health officers who cover the whole district in the implementation of activities	• Participation in project planning and implementation • Representation on District-Level Project Management Units
Traditional authorities - religious leaders/ mamie queens/ youth leaders	Provide a voice for their community and laws. Interest is aligned across the project's outputs given the important role such leaders play within the target communities, across target groups (including women and youth).	The traditional authorities in the representative sub-set of communities will be involved in the project design, particularly identifying community needs, local laws and willingness to participate. This is likely to be communities in wards that are rural and vulnerable to climate change impacts.	• Field Mission, including community consultations, consultations with chiefdom and district authorities to build public awareness and understanding of local climate risks, impacts and responses, in order to develop Community Adaptation Plans.
Communities(inclusive of individuals, households and school settings)	Communities have been identified as extremely vulnerable to climate variability and extremes. They receive limited training and support to develop climate-resilient food systems. As a result of climate change and unsustainable management, the productivity of agricultural lands and fisheries are decreasing. This group has a great interest in accessing knowledge and	Direct beneficiaries of project. They will significantly contribute to the design of climate-resilient coastal communities that are suited to their local environmental and socioeconomic conditions through participatory methods to ensure that all proposed activities are	• Consultations to identify key natural resources and climate impacts and develop/revise community adaptation plans • Establish and train community adaptation committees to enforce adaptation plans

	information to foster climate-resilient food systems and enhanced DRR. These climate impacts are exacerbated among the most vulnerable sectors of the community, including women, children, youth and people with disabilities.	entered into voluntarily and with broad community support. Smallholders will drive the identification and implementation of sustainable management of natural resources and be part of enhanced community DRR committees. Vulnerable sectors will advocate for solutions implemented in the community to consider their needs and ensure differential impacts of climate change are considered.	• Awareness-raising on the benefits of sustainable management practices. • Engage vulnerable sectors through relevant networks (e.g. women's groups, disability and youth groups, schools)
Development Partners	Interest in synergies between relevant projects and ensuring project design considers existing and future activities and outputs. Potential opportunities for value-adding activities and co-financing.	Potential for co-financing, parallel support in project activities targeting same provinces. Share lessons and good practices in climate resilience practices and joint monitoring	Invited during project consultation, project visits and monitoring. Discussion and engagement with them will continue during project implementation.
Private Sector	Interest in promoting the development of skills and businesses, and in new market opportunities from strengthened value chains, under Component 2. Potential interest in component 3 related to carbon sequestration outcomes of mangrove restoration/ protection interventions. Private sector firms will be used for procurement of goods and services	Engaged in improving market access for coastal products Engaged in improving access to financing for coastal product businesses, as investors and finance providers Involved in development of business skills in communities and transfer of technologies to communities	Engage in consultation with private sector firms during project planning and mobilisation. Further engagement will be done with them when the project is implemented to establish services and inputs for implementation of relevant outcome and output areas.

		Suppliers of goods and services to project and to communities	

7. Implementation arrangements and governance

7.1 Save the Children Australia (Accredited Entity), Save the Children UK (international channelling Executing Entity) and Save the Children Sierra Leone (national channelling and implementing Executing Entity)

Save the Children Australia (SCA) is the Accredited Entity to the Green Climate Fund that will undertake all key fiduciary and operational responsibilities for the delivery of the programme vis-à-vis the GCF. The accreditation of Save the Children Australia was completed in in November 2019 on behalf of the Save the Children Association and the broader global Save the Children movement, which is the world's leading independent organisation for children. The Accreditation Master Agreement (AMA) was made effective in May 2020. SCA was chosen to lead on the GCF for Save the Children due to their longstanding, child-focused leadership role in climate change and Disaster Risk Reduction. SCA's role is to ensure compliance with the GCF systems and procedures and to be the interface with the GCF Secretariat. To do this Save the Children Australia created a new Division in 2019 (the Climate Change Division) with the sole purpose of overseeing SCA's GCF portfolio currently made up of 11 projects (including one approved) with an estimated value of USD 300 million over the life of the projects.

Besides its child-centred and gender inclusive approach, Save the Children has a broader mandate on development issues including climate-resilient agriculture and food and nutrition security work, with climate change and environmental sustainability integrated across all these areas. Save the Children has already demonstrated capacity to design and implement climate-focused projects, both with GCF as well as with financing from other donors.

The Save the Children Fund (SCUK), based in the United Kingdom, will act as international channelling executing entity and will provide account management support to SCI SL in accordance with the account management system employed by the Save the Children Association to ensure compliance and high-quality delivery of projects.

SCUK is one of 30 national organisations that implement non-domestic operations through a single programme delivery unit, Save the Children International (SCI). With a 2022 total income of $360 million USD (£294 million GBP), SCUK oversees a portfolio of more than 200 awards in 49 countries, financed by corporations, foundations, the private sector and major multi-lateral and bi-lateral institutions, including the UK and Irish governments and the World Bank. SCUK provides technical expertise, funding, strategic and governance support, advocacy, programme management and humanitarian response support across its portfolio of work. SCUK holds specific in-house technical expertise in climate adaptation and resilience, climate resilient livelihoods and nutrition, child sensitive social protection systems, health, WASH, child rights and protection, gender and social inclusion and monitoring and evaluation. SCUK is a trusted partner to governments, NGOs, the private sector, other local actors, and institutions and regularly collaborates with a wide range of local communities to strengthen capacity and accelerate progress towards development outcomes in the countries where we work.

Save the Children has worked in Sierra Leone for 22 years, supported by donors including FCDO (formerly DFID), UNICEF, DANIDA, European Union, Global Affairs Canada, USAID, World Bank and Irish Aid, in addition to multiple philanthropic donors. In Sierra Leone, Save the Children directly implements programmes in Pujehun, Kailahun, Bonthe, Moyamba, Western Area Rural and Western Area Urban districts, whilst also leading a consortium of partners to implement projects in all 16 districts nationwide. Save the Children's programming in Sierra Leone focusses on climate change and DRR, WASH, education, livelihoods, child protection, child rights governance, gender equality, health and nutrition.

Save the Children will lead the delivery of activities at the community level with support from implementing partners, as well as sector-specific 'district officers' (District Council employees) with responsibility for community-based implementation. These will include district agricultural officers, District environment officers, District forestry officers and, where appropriate, district fisheries officers. Environment and Forestry sit under the Ministry of Environment, while agriculture and fisheries is under the Ministry of Agriculture. This is based on Save the Children's extensive experience in working with local councils,

community-based organisations, local civil society partners and private sector entities to design and implement responsive, gender-transformative and child-centred approaches to resilience in high-risk and high-poverty environments. This will ensure country ownership and sustainability of the project.

Over the last three years, Save the Children Sierra Leone has seen an average annual income of USD 11,000,000 per year. For the current strategic plan period 2022-24, Save the Children Sierra Leone is anticipating a total budget of USD 33,000,000 (excluding GCF funds). SCI SL has been working closely with the NDA in development of the SLCRP and agreed the indicative roles for the implementation arrangements.

Table 21: Save the Children's Experience in Sierra Leone

Description	Donor	Value
Sustainable Livelihoods and Community-Led Conservation for Protection of Mangrove Ecosystems in Sierra Leone - 3-year project (referenced in text above). 2022-2025.	Jersey Overseas Aid	USD 1,245,000
Agricultural Livelihoods - 18-month food security and livelihood intervention to improve the livelihoods of 150 households across six communities in the Moyamba and Bonthe districts through improved agriculture and household practices. 2021-2023.	IFC World Bank	USD 400,000
Covid-19 Emergency Education Response - 15-month emergency education project leading a consortium of 7 NGOs providing gender-transformative, disability inclusive targeted support to the most vulnerable girls and boys in 16 districts of Sierra Leone. 2021-2022.	World Bank	USD 3,500,000
Momentum Country and Global Leadership- 3-year project aimed at strengthening the resilience of the health system to respond to Covid-19 and improve maternal, newborn, child and adolescent services, working in 53 health facilities including at the community level in Pujehun, Kailahun, Western Area Urban, Western Area Rural. 2020-2023.	USAID	USD 4,300,000
Building Futures for Children - Three-year project promoting inclusive and gender equal access to quality education for children across 21 schools in Pujehun and Kailahun districts. 2019-2022.	Private donor	USD 2,180,000

Source: Save the Children

7.2 The Environmental Protection Agency (Executing Entity)

The ***Environment Protection Agency (EPA), through its Climate Change Secretariat, will act as co-Executing Entity for this project, alongside Save the Children Sierra Leone.*** The Secretariat has been the NDA (Focal Point) for the GCF and coordinated climate change initiatives in the country since 2015 and has overseen the National Climate Change Policy, as well as the National Climate Change Strategy and Action Plan, in addition to directing and coordinating the NDC and NAP processes and planning. The EPA is responsible for the protection and management of the country's environment, with a primary focus on promoting the safety of human health and ecosystems, and to secure sustainable investment. The EPA has supported and implemented a number of climate change adaptation projects previously and continues to support active projects. The Secretariat also functions as the coordinating office for the interventions on climate change and the environment that are being designed and implemented by different institutions. In this way, it ensures collaborative and transparent decision-making. In this project, the EPA will employ district officers for local delivery.

7.2.1 Capacity assessments and due diligence on the Executing Entities

A Partnership Assessment was conducted on Save the Children UK (SCUK), SCI Sierra Leone (SCI SL) and the EPA in 2023 to ensure all three executing entities have the required experience, capacity and skills required for the respective project oversight, management and implementation. A Financial Management Capacity Assessment (FMCA) was also undertaken on the EPA in October 2022. This assessment evaluated the risks associated with project financial management arrangements, the existence and strength of policies and processes for the efficient and effective use of funds (including audits, banking arrangements, cash handling); the existence and strength of monitoring and reporting systems for the Environment Protection Agency. The Partnership Assessment and FMCA found that the EPA has experience in managing donor-funded activities, they have processes and systems in place to manage resources, as well as having dedicated procedures for procurement and project management. Some capacity weaknesses, however, do remain that would necessitate the implementation of training and capacity-building activities as well as system upgrades as part of the project implementation, to ensure that GCF funds can be handled in line with the obligations usually linked with them.

The Partnership Assessment on SCI SL found that it has strong systems, capacity, and experience to implement the scope of work outlined in the funding proposal, including strong experience managing complex projects involving multiple implementing partners. No red flag risks were identified in the assessment, however, given GCF will be a new donor for SCI SL and will significantly increase their climate change programming portfolio. As such, SCI SL should increase its technical staffing capacity, together with receiving strong compliance guidance and support during project mobilisation from the AE.

The Partnership Assessment on SCUK found that it has a strong set of organisational policies, systems, procedures, and controls in place. SCUK's financial system, policies, and procedures explicitly align with Save the Children Australia's Green Climate Fund (GCF) accredited financial system. No red flag risks were identified.

Risk mitigation measures are expected to be put in place by Save the Children for the implementation of the SLCRP and are included in the risk assessment (Annex 7 to the Funding Proposal package).

7.3 Implementing Partners – Non-Governmental Organisations (NGOs)

Additionally, Save the Children will be working in close cooperation with national NGOs and one other international NGO for the implementation of this project. ***The partners will be: Kambia District Development and Rehabilitation Organisation (KADDRO); Concern Worldwide (international NGO); Conservation society of Sierra Leone (CSSL); the Environmental Foundation for Africa (EFA).*** For these institutions, Save the Children has undertaken specific Partnership Assessments that are structured to appraise details of the organisation's areas of work, key strengths and weaknesses and operational capacity, financial management capacity, legal oversight, procurement and other operational functions. The assessments are both qualitative and quantitative in nature, summarised in a final scoring. The minimum threshold for passing is 75% or 12 points. The assessments have shown the following results: KADDRO – strong capacity assessed with 14 points achieved (88%); Concern Worldwide – strong capacity assessed, with 15 points achieved (94%); EFA – capacity assessed, all minimum thresholds passed at 75%; CSSL scored just below the 'pass' threshold, having achieved 11 points or 69%, due to concern regarding their capacity for procurement and some overall organisational capacity gaps. For CSSL, Save the Children will ensure the partnership agreement and mobilisation support will include specific capacity building exercises designed to strengthen the area of procurement. Where an institution has a particular weakness, Save the Children will work closely to strengthen capacity in that particular area, with the aim of promoting localisation of work.

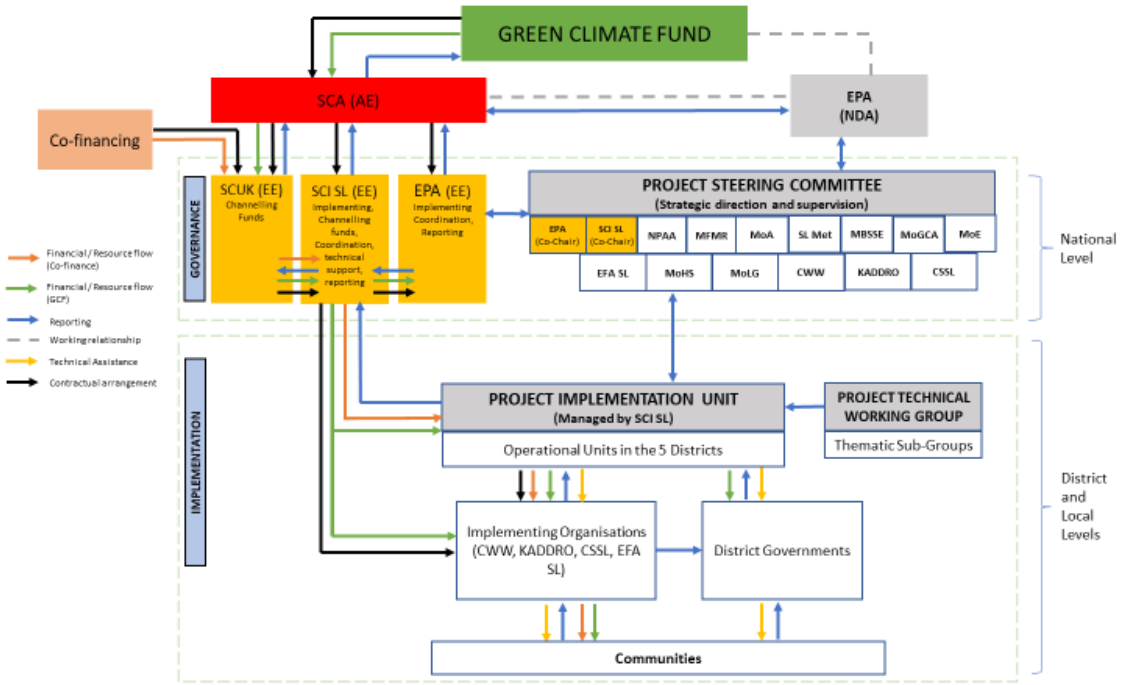


Figure 99: Implementation arrangements

7.4 Project Implementation

A *Project Implementation Unit (PIU) will be established by Save the Children Sierra Leone to manage day-to-day project operations.* The PIU will be chaired by SC SL and manage project implementation, support implementing entities and be staffed by a team including Chief of Party, Senior Programme Manager/ Deputy Chief of Party (both of whom will have a technical specialism in either agriculture, or ecosystems-based adaptation), Gender and Social Inclusion Specialist, Safeguarding Specialist, Education Specialist, Livelihoods and Food Security Advisor, Health and Nutrition Specialist, Monitoring and Evaluation Specialist, Finance manager, and support staff. PIU staff will be employed by Save the Children Sierra Leone. In addition, the PIU will draw on technical expertise from executing and implementing entities, and also include civil society organizations, including those with a strong focus on women and youth. The PIU will be overseen by the project steering committee (PSC).

The project steering committee (PSC) will provide political, strategic and inter-agency coordination for the project's high-level decision making. It will be co-chaired by Save the Children and the Environment Protection Agency (see diagram above). The PSC will include senior officials and will comprise the following members: the Climate Change Secretariat from the EPA, the Ministry of Environment, National Protected Area Authority (NPAA), Ministry of Fishery and Marine Resources (MFMR), Ministry of Agriculture (MoA), Sierra Leone Meteorological Agency (SLMet), Ministry of Basic and Senior Secondary Education (MBSSE), Ministry of Health and Sanitation (MoH&S), Ministry of Gender and Children's Affairs (MoG&CA), Ministry of local and rural development; and Save the Children Sierra Leone, Save the Children UK, as well as the Country Directors from each of the international and national NGO partners.

7.5 Project-level Grievance Redressal Mechanism

The SLCRP Grievance Redressal Mechanism is detailed in Annex 12 Environmental and Social Assessment and Action Plan, as well as in Annex 7a Know Your Customer Due Diligence Assessment.

Any parties wishing to raise grievances caused by or associated with the Project will be able to do so via a well-number of established avenues, including via a toll-free hotline, anonymous feedback boxes, via walk-ins at offices, and via intermittently held focus group discussions. In the first instance grievances will be managed by the SLCRP PIU. The PIU will inform the communities about this GRM early in the stakeholder engagement process and in an understandable format and in the relevant language. This notification will include details of where and how to direct complaints.

The purpose of the GRM is to record and address any complaints that may arise during the implementation phase of the Project and/or any future operational issues that have the potential to be designed out during implementation phase. It should address concerns and complaints promptly and transparently with no impacts (cost, discrimination) for any reports made by project affected people (AP). The GRM works within existing legal and cultural frameworks, providing an additional opportunity to resolve grievances at the local, project level. The key objectives of the GRM are:

- Record, categorize and prioritize the grievances.
- Provide a survivor centred approach to instances of sexual exploitation, abuse and harassment.
- Settle the grievances via consultation with all stakeholders (and inform them of the solutions).
- Forward any cases that sit outside the remit of the project (for example child protection concerns unrelated to the activities or staff, consultants, or representatives of the project) to the relevant authority.

The GRM will be used to address the issues and concerns that an affected party (AP) may have. The key point of contact for the AP will be the PIU, who will receive, and document all matters and issues of concern from the local community.

At all times it is the responsibility of the PIU and Save the Children to record, manage and close all grievances. Management of grievances may include issuing instructions to the relevant party to resolve the matter. Once the PIU receives the grievance and effectively resolves the matter to the satisfaction of the AP, details of actions taken will be recorded in SC's incident reporting and management system.

The AE will also maintain an email-based grievance redress mechanism, so that the public can also lodge grievances directly to the AE, should they wish to do so. Contact details for this GRM will be available to all project stakeholders and included on project websites and materials as appropriate.

The SLCRP GRM does not prevent any affected person from accessing the GCF Independent Redress Mechanism.

8. Monitoring and Evaluation

At the level of the Accredited Entity, monitoring and evaluation (M&E) is a key part of realising Save the Children's theory of change and common values and strategies, inherent in the child rights programming (CRP) framework. The M&E framework enables the design and implementation of rigorous monitoring and evaluations, so that lessons learned can be fed back to improve the design and delivery of current and future projects and programmes. Evidence is routinely collected during project/programme monitoring, including against the agreed set of indicators and, where appropriate, should inform the evaluation process. Evaluations are critical to learn about interventions, whether they have been successful, or whether some changes could be introduced. In this respect, the Grievance Redressal Mechanism informs findings and improvements, as further described below.

8.1 Monitoring

Save the Children defines ***monitoring*** as the continuing assessment that uses systematic collection of data on specified indicators and wider information on the implementation of projects to provide management and the main stakeholders of an ongoing development intervention with indications of the extent of progress and achievement of objectives and progress in the use of allocated funds.

Monitoring procedures at Save the Children are defined under the Project Cycle Management (PCM) and Monitoring, Evaluation, Accountability and Learning (MEAL). The MEAL approach ensures that decision making, accountability and continuous improvement of programming is achieved through data and information gathering. The systematic collection of data on specified indicators as well as wider information (e.g., children's consultation and participation, quality benchmarks monitoring) is undertaken continuously throughout the project cycle in order to provide management and stakeholders information on progress and achievement of results and the quality of our implementation, that in turn they can use to continuously adapt and improve. This is a strong and iterative process.

In Save the Children's project management methodology, MEAL data generation and use is integrated at all four main stages of the cycle:

1. Designing program and project Logical framework (Logframe) with objectives and indicators based on the Country Strategic Plan and Global Results Framework.
2. MEAL planning and budgeting: Projects/programmes should be covered by a MEAL plan in place with appropriate resources budgeted to implement the plan.
3. Implementation and Monitoring for Decision Making and Adaptive Project Management, using indicator tracking tables, accountability mechanisms and Quality Benchmarks monitoring.
4. Learning and Evaluations to improve current and future programmes and projects.

Key accountabilities for the design of a strong MEAL framework resides with the country and regional offices, including in the specific context of the Sierra Leone Coastal Resilience Project.

8.2 Evaluation

In addition to monitoring, described above, Save the Children will undertake routine interim and final evaluations, and annual reports, and will meet the requirements of the GCF and Save the Children's Monitoring, Evaluation and Learning framework. An ***evaluation*** is defined as the systematic and objective assessment of an ongoing or completed project, programme or policy and its design, implementation and results. The aim is to determine the relevance and fulfilment of objectives, development efficiency, effectiveness, impact and sustainability. The decision and timeline to evaluate the project will need to be aligned with both the thresholds set out in Save the Children's Management Operating Standards (see the table below), as well as the donor requirements.[450] To bear in mind, in case of emergencies, evaluation

[450] Evaluation Framework, https://map.lincoln.ac.uk/2021/02/09/save-the-children/

thresholds do not apply. Final project reports are required for all projects. In bold, what would apply for the Sierra Leone Coastal Resilience project.

Table 22: Evaluation Thresholds

Programme/project length and budget	Mid-term evaluation	Final evaluation
Less than 1 year Less than $1 million	Not required	Not required
Less than 1 year More than $1 million	Not required	Required Internal/external
Between 1 and 3 years All budgets	Not required	Required Internal/external
4 years and over ***All budgets***	***Required***	***Required*** ***Internal/external***

Source: Save the Children

9. Alignment with GCF investment criteria

9.1 Impact potential

9.1.1 Overview

The proposed project has high potential to contribute towards the GCF ambition of increasing climate-resilient and sustainable development, in this case with coastal communities where food and water security, livelihoods, health and wellbeing, and ecosystems are under threat from climate change. The SLCRP will adopt a gender and youth focus and directly benefit 260,000 individuals across at least five districts (totalling approximately 17% of the coastal population in Sierra Leone). Of the 260,000 direct beneficiaries, 156,000 are women (representing 60%) and 104,000 men (representing 40%). It will also indirectly benefit an estimated 1,000,000 individuals from coastal districts (representing 12% of the national population). This will be achieved by investing in the mainstreaming of climate change adaptation in locally led plans, policy and partnerships with the aim of empowering communities to make informed decisions on adaptation solutions, while working with government and where possible, the private sector to institutionalise and fund these solutions.

The proposed project will effectively contribute to climate-resilient coastal development by implementing activities that will help vulnerable communities cope with current climate variability and extremes, as well as build the capacity to adapt to future climate change and shocks. The project will also minimise the costs and consequences of climate change, so they do not hamper progress toward development goals by disseminating and utilising appropriate climate information and taking targeted and inclusive actions to reduce climate risks and vulnerabilities. Similarly, the project will contribute to climate-resilient development at the local level by managing risk in an adaptive manner, developing systems that adopt new knowledge, and strengthening institutions that can deliver fair and equitable outcomes.

Impact will also be achieved through the exchange of information and expertise within and between communities, governments, research institutes and other entities to promote and apply adaptation knowledge using context-dependent tools and technologies that support livelihoods, value chains and health and nutrition outcomes for those most vulnerable, such as women and children. This will reduce illness and loss of life caused through climate related water and food borne diseases, and undernutrition. The SLCRP will therefore support effective, equitable climate adaptation actions that benefit marginalised communities, strengthen adaptive institutions and protect and restore coastal livelihoods and resources.

Due to their important economic and cultural role, coastal zones raise specific climate adaptation requirements for the populations living in and depending on them for their livelihoods. Resilient coastal zones can be a primary example of utilizing Ecosystem-Based Approaches to deliver climate adaptation solutions. In the case of the coastal zones of Sierra Leone, EbA hold the potential to deliver substantial impacts through a holistic approach, focused on training and capacity building, to ensure communities manage to better access the value provided to them by ecosystems, and to make them stewards of these ecosystems for the future, assuring sustainable utilisation of their benefits. The impact potential of ecosystems extends across the key livelihood aspects, supporting sustainable fisheries and agriculture, as well as the development of coastal products and value chains.

Fishing is a key aspect of Sierra Leone's culture, accounting for a substantial share of the value created in the economy and delivering substantial contributions to national food production and security, together with products for regional markets and export value. It is an important aspect of the culture and traditions of the coastal regions in the country but has now become highly exposed to the risk of climate change. Specifically, climate changes such as increased sea-surface temperatures and changes in salinity can alter the distribution of marine ecosystems and reduce productivity[451], while analyses in Sierra Leone have shown a direct correlation between marine temperature distribution and commercially-important pelagic

[451] La, V.W.Y., Cheung, W.W.L., Swartz, W., and Sumaila, U.R. 2012. Climate change impacts on fisheries in West Africa: implications for economic, food and nutritional security. *African Journal of Marine Science*, 34(1): 103-117. Available Online: https://doi.org/10.2989/1814232X.2012.673294

fish abundance.[452] Mangrove ecosystems in Sierra Leone play a particularly important role both in providing the ecosystems services that underpin productivity in the nearshore and estuarine environments where fish breed, as well as acting as a buffer against coastal erosion, marine storms, and terrestrial floods. The former provisioning role is based on two parameters: i) the primary productivity of mangroves which is the foundation for the marine and inter-tidal food chains that support fisheries; and ii) the complex physical structure of mangroves ecosystems which provides a suitable habitat for many species that are important for commercial and subsistence fisheries in Sierra Leone.[453] By reducing the intensity of extractive mangrove use in the target districts, the proposed project will maintain (through protection of existing mangrove forests) and enhance (through restoration of degraded mangroves) the abovementioned provisioning ecosystem services. Mangrove conservation and restoration will result in additional impact by maintaining and enhancing the potential of mangroves forests to protect against coastal erosion and inundation.

9.1.2 Adaptation Impacts

The proposed project will support Sierra Leone's coastal population in the Bonthe, Pujehun, Moyamba, Kambia and Port Loko districts to adapt to the anticipated impacts of climate change – in the form of sea-level rise, higher temperatures, adverse weather events, etc.– through active support for their livelihoods and the protection and restoration of mangroves. Specifically, the project will drive mainstreaming of climate change adaptation at the community level through governance, partnerships, education and training; improve the climate-resilience of food systems and value chains, as well as conserve and restore the coastal ecosystems which underpin climate-vulnerable livelihoods in the target districts.

West Africa as a region is highly vulnerable to climate change and Sierra Leone as a coastal country is especially exposed to climatic risks. Climate model projections show a potential for increased temperatures and a higher frequency of climate-induced disasters across Sierra Leone. Higher temperatures of 3-4°C and substantial variation in rainfall towards the end of the century are expected. These expected climatic changes, as described in the Climate section, are likely to further accelerate ongoing coastal erosion and degradation because of climate impacts combined with unsustainable agricultural and fisheries management practices. This would affect Sierra Leone's fisheries sector, which is already characterized by declining fish stocks and is particularly exposed to climatic shocks as described above. According to the ND-GAIN index, Sierra Leone is one of the most vulnerable countries to climate change, with high vulnerability exposure and readiness to manage climate change and provide resources for climate-resilient investments. National adaptation needs are profound and urgent action is required to ensure that climate change does not fundamentally disrupt traditional economic patterns, leading to irreversible change.

Assessing the specific impact of climate change on Sierra Leone and the intervention regions of the project is hampered by patchy point-source historic observational climatological data, although more recent data, including through the HARPIS-SL project, has enabled further validation of regional climate models. Limitations apply both to the time over which data exists, and the geographic range it covers. More generally, the foundation for a better understanding of and ability to react to climate impacts is the existence of a robust and modern climate information system. Despite previous interventions, such as the *Strengthening Climate Information and Early Warning Systems in Sierra Leone*[454] *(2013-2018)*, investment in expanding and modernising the overall meteorological observation system of Sierra Leone continues to be needed.[455] Such an improved meteorological system that strengthens long-term weather forecasting and enables early warning of drought will also be important for enhancing the coastal population's adaptive capacity, for example, influencing decision-making on harvesting rates.

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[452] Sei, S., O'Donell, C., and Sarre, A. 2022. Assessing climate change driven variations in pelagic fish species distribution and abundance in the North-East Atlantic fishery of Sierra Leone (conference abstract). *Species on the Move*. [Online]. Available: https://pwd.aa.ufl.edu/sotm/2022/01/25/assessing-climate-change-driven-variations-in-pelagic-fish-species-distribution-and-abundance-in-the-north-east-atlantic-fishery-of-sierra-leone/

[453] Hutchison, J., Spalding, M., and zu Ermgassen, P. 2014. *The Role of Mangroves in Fisheries Enhancement*. The Nature Conservancy and Wetlands International. [Online]. Available: https://www.oieau.fr/eaudoc/system/files/33226.pdf

[454] https://www.adaptation-undp.org/projects/ldcf-ews-sierraleone

[455] The African Development Bank-led GCF project in Sierra Leone currently under development is focused on climate information services and early-warning systems and will address adaptation gaps and barriers in this regard.

9.1.3 Data quality

Assessing the specific impact of climate change on Sierra Leone and the intervention regions of the project is nevertheless not straightforward. There is a dearth of point source based historic observational climatological data, although more recent data is in better supply. Limitations apply both to the time over which data exists, and the geographic range it covers. From a climate modelling perspective, at present only secondary data sources were used and no primary modelling undertaken. Considering the lack of observation data for Sierra Leone, a similar approach to that used for Botswana (FP158), and also for the recent Tanzania project (FP179), has been used, with similar justifications for expected weakness in model outputs and validation. More generally, the foundation for a better understanding of and ability to react to climate impacts is the existence of a robust and modern climate information system. Investment in expanding and modernising the overall meteorological observation system of Sierra Leone will be required. Such an improved meteorological system that strengthens long-term weather forecasting and enables early warning of drought will also be important for enhancing the coastal population's adaptive capacity, for example, influencing decision-making on harvesting rates.

9.2 Paradigm shift potential

The SLCRP will catalyse a paradigm shift in Sierra Leone's coastal communities by comprehensively strengthening institutions, planning, knowledge, management and practices to enhance the climate resilience of food and water security, livelihoods and at-risk ecosystems, especially for women and youth. The proposed project's integrated package of interventions will deliver results beyond its implementation period, as it will strengthen and mainstream climate change adaptation at the local level by building community governance, and partnerships with government, research bodies, training centres/schools, as well as the private sector where possible. The package of project interventions is designed to deliver a comprehensive paradigm shift in the coastal zone. This paradigm shift will change the way in which local communities and government institutions co-manage coastal ecosystems and undertake livelihood activities towards climate-resilient, sustainable livelihoods and ecosystems.

9.2.1 Replicability and Scalability

The SLCRP's design allows for upscaling and replication based on models of locally led governance, partnership building, knowledge building and sharing and use of existing, proven best practice technologies and systems, that increase the resilience of coastal communities to climate induced floods, droughts and extreme events. Replication of the project to EbA and coastal zone management in other regions of Sierra Leone (not covered by this project) and/or other countries in the region will require the robust documentation of the proposed project's implementation progress, results and impacts throughout the implementation.

To achieve the potential to deliver replication and scalability in country and the wider region, a robust monitoring, reporting and verification protocol will be implemented with clear encouragement of dissemination of knowledge. Each of the three components (see further detail below) of the SLCRP will provide community-led adaptation models of climate resilient products and processes, that can be scaled up and replicated in other similar vulnerable coastal community settings in Sierra Leone, elsewhere in West Africa and potentially also beyond the western African region.

a. **Component 1:** The participatory governance process and template for CAPs, guided by the CGP and the integration into local development planning and District Development Plans to support mainstreaming of locally led adaptation; the school climate change curriculum and establishment of Resilient Schools Programme (addressing food and water security issues, WaSH and basic DRR coping mechanism to key climate hazards such as floods and heatwaves), will have transferable and scalable aspects that other coastal communities can adopt. The health and nutrition activities provide excellent models for scaling and transferring knowledge building initiatives that create women's/mother's health and nutrition champions that mitigate water and food borne diseases and undernutrition at the household and community level.
b. **Component 2:** The establishment of Coastal Livelihood Circles that promote climate resilient agriculture and fishery resource management through knowledge building, demonstrations and partnerships;

specific climate resilient practices, tools and technologies will strengthen the ability of farmers, fishers and related industry jobs to withstand impact of floods, precipitation changes, and extreme events such as heat waves and tropical storms; the development of Sustainable Livelihood Action Plans will deliver institutional and long-term backing for such changes and increase preparedness; the financial and market mechanisms that support livelihood diversification and a climate resilient approach will provide beneficiaries with the means to invest in resilience; the last-mile dissemination of climate information and early warnings through dialogue with local and national SLMet agents (and synergistic proposed projects such as AfDB), including using innovative, accessible, 'low technology mobile solutions' to deliver messaging and up-to-date climate and market information to key stakeholder's mobile phones will support disaster preparedness. Finally, the development of women and youth-led climate resilient coastal businesses in partnership with government, NGOs and the private sector (including other coastal livelihood opportunities as mentioned in Activity 2.2.1) will ensure inclusivity and access for marginalised groups.

c. **Component 3:** The capacity building program on EbA, mapping, participatory conservation planning, community-based management; conservation practices, community monitoring and co-governance linked to local development planning and District Development Plans will be a transformative model that can be replicated elsewhere in Sierra Leone and the wider region.

9.2.2 Potential for knowledge exchange and learning

The communication tools and formative research proposed will enhance knowledge exchange and learning by encouraging engagement by local stakeholders, government counterparts, and community members at the local level, much of which will be captured by the CGP and enacted through the CAPs, Coastal Livelihood Circles, Resilient Schools Program, and project M&E. Existing national priorities and subnational programmes will be drawn on where possible and enhanced. SLCRP results will be fed-back to participating stakeholders for continual improvement, and provide models and case studies for interested non-project beneficiaries beyond the targeted geographical sites. Limited sectoral technical knowledge will be addressed through the establishment of Coastal Livelihood Circles, strengthening of mother support groups and Coastal Governance Platforms, maintenance committees that are responsible for maintaining sector-related physical interventions, and the promotion of climate resilient agricultural and fishery practices, tools and technologies. The SLCRP is focused on marginalised vulnerable coastal communities, with special attention to activities that serve women, youth and children to ensure food, water, livelihoods and health resilience outcomes. Barriers related to expanding agricultural frontiers for short-term economic gains and further natural degradation of mangrove ecosystems will be addressed through Components 2 and 3, with the latter focused on capacity building, participatory governance of natural assets and natural resources for sustainable and select harvesting.

9.2.3 Creation of an enabling environment

The SLCRP will remove barriers related to limited climate and risk knowledge at the community level by providing broad capacity building along with guidance on developing local actions based on local needs through the CAPs (this aspect is also considered in the risk assessment section). Communities will be empowered with new knowledge and support to plan effective solutions with local government linked to district and national government processes, and other partners that ultimately fill a gap in participatory climate adaptation policy and planning. Insufficient investments remain a challenge given the adaptation funding gap, however the SLCRP will engage with public and private sector investors, to establish extended and new markets for climate resilient coastal products and services (including the development of women and youth inclusive business plans and livelihood/value chain strengthening).

9.2.4 Contribution to the regulatory framework and policies

The SLCRP will contribute to the formulation and strengthening of policy and governance measures by way of: development of CAPs, a CGP, dialogues through Coastal Livelihood Circles, Resilient Schools Program and Community-led Mangrove Management Plans and ecosystems monitoring, which provide valuable feedback to local planning and sustainable development processes and priorities. These activities support regulatory and institutional strengthening by women, men, youth and children exercising their rights to engage in climate resilient development, while also facilitating representative and fair natural resource

management and meaningful local participation. These outcomes will go towards strengthening local institutions and good governance practices at the local level, which will significantly contribute to improving the regulatory framework and policies.

9.2.5 Overall contribution to climate-resilient development pathways consistent with a country's climate change adaptation strategies and plans

The proposed project will effectively contribute to climate-resilient coastal development by implementing activities that will help vulnerable communities cope with current climate variability and extremes, as well as build the capacity to adapt to future climate change and shocks. The project will also minimise the costs and consequences of climate change, so they do not hamper progress toward development goals by disseminating and utilising appropriate climate information, and taking targeted and inclusive actions to reduce climate risks and vulnerabilities. Similarly, the project will contribute to climate-resilient development at the local level by managing risk in an adaptive manner, developing systems that adopt new knowledge, and strengthening institutions that can deliver fair and equitable outcomes.

9.3 Sustainable development potential

The design and implementation of the activities under the proposed Sierra Leone Coastal Resilience Project (SLCRP) is in alignment with a number of Sustainable Development Goals (SDGs), in particular:

- SDG 1: End poverty in all its forms everywhere
- SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- SDG 3: Ensure healthy lives and promote well-being for all at all ages
- SDG 5: Achieve gender equality and empower all women and girls
- SDG 6: Ensure availability and sustainable management of water and sanitation for all
- SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- SDG 11: Sustainable cities and communities, through making human settlements inclusive, safe, resilient and sustainable
- SDG 13: Climate action: Take urgent action to combat climate change and its impacts
- SDG 14: Life below water: Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- SDG 15: Life on land: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

This will result in demonstrable economic, social, and environmental co-benefits, while also supporting the participation of underserved groups such as women, girls, youth, and the elderly. The SLCRP implementation will be critical to demonstrate the utility of gender-transformative and child-centred approaches in increasing the resilience of vulnerable coastal communities in least developed countries, which in turn further underscore the potential for replicability and scalability in Sierra Leone and in other countries with similar socio-economic context and climate profiles.

- *Environmental and climate (mitigation) co-benefits*. The SLCRP directly responds to the hazards of floods, drought and extreme events and offers several environmental co-benefits. These includes protection/restoration of 1,500 Ha of mangroves whose roots **slow down water flows and encourage sediment deposits that in turn reduce coastal erosion** and provide shoreline protection. In addition, mangroves provide critical ecosystem services such as "blue" carbon storage in coastal ecosystems, and cleaning water through the filtering of nitrates, phosphates and other pollutants from the water. Mangroves support overall marine biodiversity and hatcheries, by providing habitat to a wide array of wildlife such as birds, fish, invertebrates, mammals and plants. Estuarine habitats with coastal mangrove shorelines and tree roots are often important spawning and nursery territory for juvenile marine

species.[456] These impacts are directly aligned with SDG 14 and 15, and also in part to SDG 11. Mangrove protection and restoration will also sequester carbon and will reduce GHG emissions by reducing mangrove loss and degradation. Agricultural practices that increase soil carbon, and solar and efficient cooking/smoking technologies implemented will also sequester carbon and reduce GHG emissions.

- *Economic co-benefits*. Assuring the continuation of sustainable coastal fisheries and strengthening livelihoods at community level will be critical for the continued viability of coastal communities in Sierra Leone. The project therefore has the potential to deliver substantial macro-economic benefits by increasing exports and value generation in-country. The proposed interventions under the SLCRP will support sustainable economic activities through the sustained engagement of local communities with their own environment (benefiting from the environmental co-benefits highlighted above), which results in the adoption of measures related to climate resilient agricultural and fishery value chains based on food products and services. It is expected that this will increase jobs and create more income generation for women, men and youth. These jobs include farming and fishing, and related industries such as preserving food, transporting food, selling food as well as secondary jobs. For example, increased jobs in fishery related employment such as: boat building, wood cutting, fish transportation, fish processing (such as fish smoking) and fish traders (roles predominantly held by women), basket weavers and fishing gear salespeople.
- Other jobs include those related to the development, installation and maintenance (where needed) of technologies such as household water purifiers, rainwater harvesting tanks, and farming tools. Direct and indirect jobs linked to ecotourism roles such as tour guides and companies and associated hotels and hospitality sectors benefiting from increased tourism.
- Women and youth will be included and, in some cases, directly targeted to develop their livelihood opportunities and increase their income generation ability. Early prevention of negative health effects related to water and food insecurity and impacts of extreme events may result in economic productivity gains across households. New skills, markets, and networks will increase income generation in rural coastal communities, thereby reducing vulnerability to climate hazards and risks and providing a pathway out of poverty. This economic strengthening may also result in greater resilience to price shocks and other economic disturbances at a regional/national level. At a broader economic level, mangrove restoration activities will provide significant benefits in avoided loss and damage from extreme events. An economic assessment was carried out and presented in the form of an integrated Cost Benefit Analysis (CBA) of seven interventions for Sierra Leone, to determine the extent to which the investments proposed are economically viable.

- *Social co-benefits*. Social co-benefits include strengthening this through the strong focus on the community for delivery, giving added weight to it, the provision of new opportunities for employment and learning in marginalised communities, and the ability of the community to economically benefit from the changes driven by the project and to become more capable at adapting to negative climate change events. Furthermore, there are strong gender, health and education benefits expected from the inclusion of WASH components, and the overall support of livelihoods of highly exposed households.
- Another social co-benefit is the proposed project's validation of communities' dwindling but valuable traditional knowledge on fisheries-/mangroves co-existence, maintenance of coastal zones in times of a changing climate and supporting healthy fish stocks. Coastal based Sierra Leoneans will benefit socially from the SLCRP implementation in several ways. Improvements to health and safety will be delivered through the health and nutrition programming focused on vulnerable women and school children, which will include aspects of WASH and access to clean water and hygiene awareness, as well as planting and harvesting from school kitchen gardens as part of a safe and fresh food initiative. These activities lead to significant health benefits and reduce the financial burden on households and local health systems related to water and food borne disease and under nutrition. With diversified and extended climate

[456] https://www.nature.org/en-us/about-us/where-we-work/united-states/florida/stories-in-florida/why-mangroves-important/#:~:text=Mangrove%20forests%20nurture%20our%20estuaries%20and%20fuel%20our%20nature%2Dbased%20economies.&text=Mangroves%20are%20important%20to%20the,deposits%20that%20reduce%20coastal%20erosion.

resilient livelihood options for agricultural and fisher families, households can avoid food losses, and increase the quality and quantity of food they consume. improving food and nutrition security.

- Education and social inclusion forms part of each result area of the program, building knowledge and participatory governance for broad community stakeholders, with a strong focus on women, youth and children, is central to the proposed project. Moreover, investing in disaster risk reduction, especially options that enhance social protection, will foster poverty reduction. Local knowledge is also preserved where aligned with climate resilient action, but also in terms of community mobilising and partnership building efforts.
- *Gender-specific impacts*. Women will have an important stake in the successful implementation of the project. At the same time, women are disproportionately vulnerable because of the traditional roles assigned to them, which increase pressure especially during hardship periods, and mean that they are more likely to fall back on social safety nets. The SLCRP will reduce gender-related inequalities in the access to financial and natural resources as well as to decision-making power and opportunities. In addition, it seeks to reduce the pervasive inequalities in the benefit-sharing from the implementation of the proposed activities. Equitable participation in project activities will also facilitate economic empowerment and raise the standard of living and quality of life of women in their communities. This rebalancing of participation by women and girls will strengthen the gender dynamics in the home and the community. The project will recognize and differentiate the roles played by women and men and contribute to filling gaps in gender equality; thereby ensuring the delivery of services will improve participation in decision-making, increase agency and directly build leadership capacity. Some of the likely outcomes of the project's gender-responsive approach include increased food and water security, improved health, security, education and skills development, as well as improved livelihoods and income. For example, improvements in food yields, the reduction in the time, effort and labour spent by women on food processing will increase women's access to and control of agricultural inputs and income, which, in turn, increases their participation in decision-making. The SLCRP aims to target up to 60% women representing 180,000 direct beneficiaries out of a total of 260,000. This will directly contribute to SDG 1, 5, and 8.

9.4 Needs of the recipient

As a least-developed sub-Saharan African country Sierra Leone is recognised as being particularly vulnerable while having urgent and immediate adaptation needs. Furthermore, the project focuses on adaptation in the highly exposed coastal zone and fisheries sector through livelihood improvements and coastal management. The project addresses these marginalised communities directly and exclusively, focusing its support on them and not supporting commercial fishing. It works with community buy-in through the formalisation of the new management approaches through community level agreements and the development of Coastal Adaptation Plans. The establishment of new income sources, more resilient agricultural practices and the introduction of coastal management practices that lead to mangrove rehabilitation and therefore higher fish stocks will create a virtuous cycle preventing overfishing in community waters and will be highly beneficial to these communities overall. This approach will ensure the high relevance to local needs.

There are specific macro-economic vulnerabilities in the country, as detailed in the baseline section (Section 2), that undermine the government's ability to intervene fully in climate action. The post-conflict economic performance of Sierra Leone has been strong, until the Ebola outbreak of 2014-2016, and then the Covid-19 epidemic in 2020, both of which critically impacted the country's economic and social recovery. The Ebola epidemic caused not only serious health impacts throughout the country but it also undermined food security in Sierra Leone, as many households saw a reduction in their income-generating opportunities on the back of restricted travel and business activities.[457] An array of negative impacts were experienced, such as a decrease in trade and transportation, reduced number of tourists, adverse effect on agricultural market chains, decrease in mining activity and hesitance of investors to start businesses in this kind of environment,

[457] https://reliefweb.int/sites/reliefweb.int/files/resources/FFP%20Fact%20Sheet_Sierra%20Leone_1.30.18.pdf.

which led to less tax revenue and rising unemployment.[458] A similar pattern of reduction in industrial output and economic growth was experienced during the Covid-19 pandemic. The COVID-19 pandemic further accentuated the vulnerabilities of the fragile economic landscape. GDP fell by 2.7%[459] in 2020 as it led to a slowdown in all sectors following global supply chain disruptions and lockdown measures[460], reversing some of the recent gains in poverty reduction.[461]

As regards public sector climate commitments, Sierra Leone needs approx. USD 2.764 billion (conditional and unconditional) and seeks to allocate 10% of national budgets to climate change adaptation across sectors, including the mainstreaming of climate adaptation in sub-national development plans. The GoSL is establishing a National Trust Fund for cross sectoral adaptation support with plans to secure 40% of international development funding.[462] Despite these commitments, the adaptation gap, particularly at the local community and government levels is evident as local climate responses are not financed and remain inadequate, leaving communities extremely vulnerable with existing poverty exacerbated by climate change. The GoSL is not currently positioned to sufficiently finance climate change adaptation at the local level.

There are also critical barriers to private investment. Private sector investment is limited, as there are no banks that allow for lending conditions to be flexible (requirements on tenures, collateral, interest rates, gender inclusive) in order to meet the needs of the marginalised and vulnerable coastal people. The private sector is reluctant to take policy risks and are concerned about financial and regulatory barriers, which are the main factors that undermine their risk-return profiles. Where such finance is available, it is generally channelled to big infrastructure and mitigation projects. The absence of international commitment to channel a substantial proportion of adaptation finance to the local level is inconsistent with the common understanding that adaptation occurs at the local level, and that institutions at this level are critical determinants of successful adaptation.[463]

9.5 Country ownership

9.5.1 Alignment with national climate strategy and policies

The project is aligned with the revised NDC (2021), which stresses the importance of adaptation in the agricultural, water and coastal resource management (including fisheries and ecosystems) sectors as key relevant government strategies. The NDC draws its target from the NAP 2021, of "enhancing adaptive capacity, strengthening resilience and reducing vulnerability by half, by 2030." This is further supported by the National Climate Change Policy 2021, with all three policies supporting the need for climate risk awareness, capacity improvements at the institutional and local community levels, and taking an integrated approach to adaptation in development programs and policies, including the mainstreaming of climate change adaptation into sub-national development plans by 2025. The SLCRP also aligns with many of the recommendations outlined in these national policies, including the Coastal Climate Change Adaptation Plan (2019) and the Integrated Coastal Zone Management Plan 2016-2020 (2015).

The SLCRP also aligns with many of the recommendations outlined in these national policies, including:

- the **Second National Biodiversity Strategy and Action Plan 2017-2026**[464] (2017), with the main objectives of: 1) Ensure well-protected biodiversity by focusing on improving legislation and policy implementation across all sectors; 2) Improve practical and functional methods and mechanisms to safeguard biodiversity; 3) Implement practical and robust conservation actions that significantly improve the status of species, habitats sites and ecosystems within and beyond protected areas; 4) Improve the standard of living, ecosystem services and opportunities provided to people, particularly local

[458] https://www.mercycorps.org/blog/ebola-outbreaks-africa-guide/chapter-4.
[459] African Economic Outlook. https://www.afdb.org/en/countries-west-africa-sierra-leone/sierra-leone-economic-outlook.
[460] World Bank Country Overview in Sierra Leone. https://www.worldbank.org/en/country/sierraleone/overview#1.
[461] World Bank Country Overview in Sierra Leone. https://www.worldbank.org/en/country/sierraleone/overview#1.
[462] GoSL, 2021, Updated Nationally Determined Contribution. Available here.
[463] Black. 2009. Climate change adaptation: Local solutions for a global problem. *Geo. Int'l Envtl. L. Rev.*, *22*, p.359
[464] Second National Biodiversity Strategy and Action Plan 2017-2026. https://www.fao.org/faolex/results/details/en/c/LEX-FAOC176343/.

communities, through sustainable and inclusive biodiversity conservation actions; and 5) Enhance sectoral and public engagement, and build capacity and awareness, that contribute to effective planning and results-oriented execution of conservation programmes.[465]

- the **Coastal Climate Change Adaptation Plan** (2019)[466], calls for adopting an ecosystems-based approach to climate change adaptation and coastal resilience to ensure healthy coastal resources for present and future generations, with aspiration to replicate across West Africa.
- the **Integrated Coastal Zone Management Plan 2016-2020** (2015), which identifies the need for an integrated and cross-sectoral approach to coastal zone management and supports protection and conservation (including sustainable use) of coastal resources, as recommended by the State of the Marine Environment Report (2015).
- The **Medium-Term National Development Plan (2019-2023)**[467], which sets implementation plans to build an inclusive, diversified, and resilient green economy, keeping the long-term objective for Sierra Leone to become a middle-income country by 2039. The plan also includes public health, gender and community empowerment, and education through improved social justice, cohesiveness, security and peace. It also underscores the role of a resilient natural and physical infrastructure to achieve the above objectives. One key policy cluster (Policy Cluster 7) addresses vulnerabilities and resilience in Sierra Leone, aiming at b) Strengthening Forest management and wetland conservation; and c) Improving disaster management governance.
- The **Gender Equality and Women's Empowerment Policy** (2020), which promotes equality in women's access to coastal resources and rights to meaningfully engage in decision-making, including the establishment of a minimum of 30% women's representation in governance at all levels.

Section 2 of this Feasibility Study lists the full range of policy and legislation that are supportive of climate action and sustainable development. However, despite the existence of a large number of targeted policies and laws, Sierra Leone continues to struggle in accessing international climate finance that can be disbursed at local level and to the benefit of local communities. The NDA recognises that this project could directly tackle this specific barrier by refocusing climate adaptation finance for community-based interventions.

9.5.2 Engagement with communities and other relevant stakeholders

Community involvement is central to the project, which includes a structured approach to the engagement of communities, focusing on local engagement and dissemination process. Working through a localised approach, the project will utilise tried and tested approaches and actions to engage communities in project areas and ensure local support to achieve for long-term sustainability by mainstreaming key climate change adaptation and pastoral management techniques.

The project development process included repeated consultations with communities to contextualise and refine the proposed activities, as well as meetings with relevant Ministries, stakeholders and donors. For example – as also highlighted in the section on Stakeholders Consultation and in its relevant annex (Annex 13 of the FP) – the project has been developed through extensive consultations with the NDA, other relevant key stakeholders working across the country, and local communities, which included over 40 general consultations with stakeholders – including NGOs, government authorities, international institutions and private sector - from February to May 2022. Save the Children Sierra Leone worked closely with a national expert consultant to undertake several consultations, workshops and focus group sessions, enabling key stakeholders to analyse and revise the proposed project's problem/solution tree and provide input to the GCF's investment criteria, as well as other sections of the concept note. This included analysing adaptation options at the local level, GESI mainstreaming, adopting a child-centred approach and implementation arrangements. In April 2022, a stakeholder engagement workshop was held in Freetown with 42 stakeholders from the government, NGO and donor community to review the proposed project activities, solicit feedback on the targeted communities to ensure appropriate data collection and discuss co-financing opportunities. Additionally, to the workshops and consultations, quantitative data was

[465] Second National Biodiversity Strategy and Action Plan 2017-2026. https://www.fao.org/faolex/results/details/en/c/LEX-FAOC176343/.
[466] Coastal Climate Change Adaptation Plan (2019) www.wabicc.org/mdocs-posts/climate-change-adaptation-plan-launch-report/
[467] Medium-Term National Development Plan (2019-2023). https://www.slurc.org/uploads/1/0/9/7/109761391/sierra_leone_national_development_plan.pdf.

obtained from a field survey of 402 respondents from vulnerable coastal households in 20 selected communities in the target areas. For the qualitative study, 15 focus group discussions and 24 key stakeholder interviews were held. Separate consultations with women and children were held to ensure that gender and children's specific views were captured. A field visit with national and international consultants took place in May 2022. Further, additional stakeholder workshops were held 26 and 28 July 2022 in Freetown and Bo locations, to validate the activities presented in this document.

9.6 Efficiency and Effectiveness

The total project costs are estimated at USD 26.86 million, of which USD 25 million is requested to GCF in the form of grant, and the remaining USD 1.86 million is contributed as co-financing by the government of Sierra Leone, Jersey Overseas Aid and Clifford Chance LLP. This budget covers the three project components, the monitoring and evaluation costs, as well as project management costs at 5%. The project's total cost is USD 103 per direct beneficiary and USD 27 per indirect beneficiary. The GCF costs is USD 96 per direct beneficiary and USD 25 per indirect beneficiary. Efficiency and effectiveness will further be ensured by adopting proven and sound best practices and models which are scalable and replicable to similar coastal settings. Furthermore, the SLCRP will work effectively using agreed protocols with all partners, supporting project success.

In order to avoid any risk of replication or overlapping of interventions, the project activities will be guided by a high-level Project Steering Committee, which includes the NDA, to ensure the Project Implementation Unit remains aware of relevant upcoming projects and can work collaboratively with them to avoid duplication and overlap. In addition, activities will draw on existing relevant projects results, resources and networks (e.g., WA BiCC, UNDP, GEF, Adaptation Fund, USAID).

The climate objective of the project is to achieve adaptation outcomes through long-term institutional and behavioural change at community and individual level by establishing new institutional linkages, developing climate action plans and community-based conservation plans. This requires the participation and active support of GCF, as neither the financial requirements nor the technical capacity needs can be met in the absence of its support. Instead, absent the requested GCF financing, the available financing would only enable the employment of eco-rangers, but not the necessary training and equipment purchases to ensure that the ambitious project outcomes are achieved, including a systematic focus on achieving and tracking of climate change adaptation results, and the overall value of the project would be much lower. During the project preparation timeline, several discussions and negotiations were held with the government in order to determine their wiliness and capacity to provide some co-financing to the project. There remain, though, critical barriers to public sector investment, limiting Sierra Leone's ability to sufficiently finance climate change adaptation at the local level.

Healthy mangrove ecosystems are fundamental to the social and economic wellbeing of Sierra Leone's coastal communities and a cornerstone of their climate resilience. Past and current investments on Sierra Leone's coast (although providing important groundwork and lessons) have not taken the necessary comprehensive, integrated approach to address the key climate risks and barriers in mangrove socio-ecological systems, nor worked at the necessary scale to achieve transformative change. The proposed GCF grant investment is thus critical in to implement a comprehensive and integrated set of interventions to overcome the existing short-term approaches. In areas where no external support has been channelled, mostly where substantial mangrove restoration efforts have not taken place, local authorities have adopted harsh approaches to mangrove ecosystem protection (including huge fines, burning of boats and imprisonment), which effectively antagonises local populations and decreases their support for externally funded interventions. These barriers lead to missed opportunities for collaboration, minimal impacts, duplicated efforts and counterproductive adaptation and resilience outcomes.

Without considerable investment from the GCF, coastal adaptation and resilience interventions are likely to remain focused on few communities and on limited risks and vulnerabilities. This narrow approach will be detrimental to ensuring effective solutions for the most vulnerable, failing to catalyse adaptation benefits beyond individual communities. With GCF investment, the project will scale up 'equitable resilience' approaches to foster transformational change focused on GCF result areas of food and water security and health and wellbeing, most vulnerable people and communities and ecosystem and ecosystem

services. The GCF investment presents an opportunity for supporting progressive, ambitious and gender-responsive interventions that mainstream climate adaptation approaches for building resilience. Sierra Leone's Gender Equality and Women's Empowerment Policy places women at the centre of development and this project will help to achieve that through the development of women's leadership and the amplification of women's voices in planning and implementation of climate change adaptation. Vulnerable populations, including youth, and the adoption of a child-centred approach to engaging schools, will also be embedded in the SLCRP. The present time is opportune for committing adequate funds to reach vulnerable coastal communities to support them to implement urgently needed adaptation and resilience activities in their local contexts. The implementation arrangements will ensure strong fiduciary risk management, low transaction costs and transparency in the management of funds. These are key reasons for GCF engagement and a primary justification for the NDA's endorsement of the project.

9.7 Sustainability and exit strategy

The proposed project has a strong focus on sustainability of investments and replicability of its model beyond the project's duration. All activities build upon existing relevant government and partner projects; they engage with the relevant national and subnational agencies, research institutes and training institutes during activity implementation and are fully aligned with key national policies and sectoral priorities.

A key aspect of the project is that it operates through partner national non-governmental organisations as well as with community-based organisations, with which Save the Children will maintain a close working relationship, with strong focus on capacity strengthening throughout the implementation of the SLCRP, including continuous familiarisation with GCF processes, compliance and management control to enable them to access more funding in the future. The project will also be working closely with district officers, offering capacity building to strengthen all technical and fiduciary aspects, such as compliance/ accountability /financial reporting etc. It will embed technical staff in national-level institutions with a view to capacity developing staff to oversee this kind of work and future project development.

The key elements of the exit strategy are:

- Establishment of models in local ownership, empowerment and institutionalisation demonstrated through the capacity building and understanding of how to mainstream climate change adaptation at the local level through development of Community Adaptation Plans (CAPs) to be integrated in local development planning (including by ward development committees and chiefdom development committees), as well as in District Development Plans and the district-level annual budget and planning cycles. The local development planning feeds into the District Development Plans, which align to the national priorities and the NAP planning process. In this way, the activities will reflect coastal communities' climate resilience needs and priorities, maintaining a continuous participatory governance structure and learning. Capacity building activities will also include training of trainers (ToT) models, which will support the consolidation of knowledge as well as sharing of that knowledge at the community level.
- Development of participatory governance models demonstrated through the Coastal Governance Platform supported by representatives of the community, NGOs and governments to guide and deliver information exchange (including proven best practices), and support community with implementing prioritised climate adaptation measures – this includes the CAPs, agricultural and fishery resilience practices and mangrove ecosystems monitoring and management. Maintenance committees will also be established to provide repairs and maintenance support for equipment, such as solar dryers or other equipment used at the community level.
- Models of forums, curriculums and schools for food and water security, nutrition, wellbeing and health in addition to livelihoods diversification and ecosystems management. This includes the Mother's Support groups, Coastal Livelihood Circles for climate resilient agricultural and fishery resilient practices, livelihoods and livelihood diversification, as well as the Resilient Schools Programme, with the support of relevant ministries, e.g., Agriculture and Education.
- Models of private sector partnerships demonstrated by investing in women- and youth-led climate resilient entrepreneurship focused on coastal products and service models (e.g., extended fishery

products, crafts and eco-tourism sector), supporting access to financing, possible private investment in coastal products and services, water efficiency, rainwater harvesting and water purification technologies, private investment in solar dryers and freezers/cold storage, awareness-raising activities to stimulate market demand to cover new products.

- Monitoring and Evaluation (M&E) and knowledge sharing of project results and best practices. This includes capturing project results as well as feeding back to subnational and national agencies the continued gaps, needs and opportunities in activity implementation for uptake into revised policies and the NAP process and plans. Knowledge sharing in Sierra Leone and internationally will also be facilitated by Save the Children's strong network in Sierra Leone and the reach of the Save the Children movement across more than 100 countries.

10. Recommendations

Based on the desk research, national vulnerability analysis, field study, and evaluation of alternative approaches conducted for this feasibility study, the following recommendations have emerged:

Recommendation 1: Locally-led adaptation focus

As noted in this feasibility study, few donors have made significant funding available for the delivery of locally-led adaptation projects in Sierra Leone. Socio-cultural characteristics in Sierra Leone and the geography (such as the remoteness of many vulnerable coastal communities) present challenges for the implementation of uniform, top-down approaches, therefore the most appropriate approach in Sierra Leone is to work through communities, empowering them to identify their own vulnerabilities and adaptation measures. Further to this point, the cultural heterogeneity of Sierra Leone requires a community-centric approach. The SLCRP should thus be designed to put communities at the centre of adaptation and resilience building, with a strong focus on community and local governance structures. A key strategy in this regard will be the community-level adaptation planning that is envisioned to feed into district development plans, thus linking from the local level through to national priorities. A locally-led adaptation approach will contribute to the government's NDC and NAP target of "enhancing adaptive capacity, strengthening resilience and reducing vulnerability by half, by 2030".

Recommendation 2: Ecosystem-based adaptation focus

The ecosystem goods and services provided by mangrove ecosystems underpin the livelihoods of many coastal communities in Sierra Leone and help protect the coastline and people against the increasing impacts of climate change. Given the importance of mangroves for people's resilience, the significant extent of intact mangroves and the concerning rate of degradation of mangroves, an ecosystem-based adaptation approach is recommended. Conservation, restoration and sustainable management of ecosystems should be conducted in a community-centered manner, combining local knowledge with national and international best practices.

Recommendation 3: Overcoming multiple barriers to strengthening resilience requires a comprehensive approach

Considering the multiple, intersecting challenges that coastal communities in Sierra Leone face under climate change, the feasibility study recommends an integrated, comprehensive approach to simultaneously address a range of these barriers in terms of institutional capacity, climate risk information, governance, planning, gender and social inclusion, livelihoods and technical capacity. This should include using the approach of Integrated Coastal Zone Management, which seeks to achieve climate-resilient and sustainable coastal zone management by integrating across relevant policy areas, sectors, and levels of administration, while balancing environmental, economic, social, and cultural objectives within the limits set by natural dynamics.

Recommendation 4: Gender-sensitive and gender transformative approaches

Women in Sierra Leone and in the country's coastal communities are particularly vulnerable to climate change, as they typically have less access than men to resources, land, education, decision-making structures and other determinants of adaptive capacity. Challenges that women face include discrimination and exposure to sexual and gender-based violence (SGBV). Successful climate adaptation requires actively addressing social norms and factors that undermine the agency of women. This feasibility study therefore recommends that gender-sensitive and gender transformative approaches are used throughout the proposed project.

Recommendation 5: Focus on youth and children

This feasibility underscores that youth and children in Sierra Leonean coastal communities are particularly vulnerable to climate change, that they will experience more climate change impacts over their lifetimes than current older generations, and that they are essential role players in achieving successful adaptation at community level. While youth and children have some specific needs in terms of adapting to climate change, they are also often the most open in their communities to new ideas and approaches. Considering also Sierra

Leone's relatively youthful population overall, the barriers youth face in accessing resources and decision-making structures, and the large need among youth for economic opportunities, it is clear that youth empowerment is essential for climate adaptation in this context. Climate change is becoming a more immediate and visible threat to educational infrastructure in coastal areas, while schools do not have sufficient disaster risk reduction measures in place and have also not adequately incorporated climate change into curricula in meaningful and locally relevant ways. This feasibility study therefore recommends that the SCLRP includes a particular focus on youth and children, invests in increasing the resilience of the educational sector, improves climate change education and enhances the access of youth to climate resilient and sustainable economic opportunities.

Recommendation 6: Enhance access of communities to adaptation resources and financing

This feasibility study also found that coastal communities lack the necessary institutions, tools, and resources to implement locally-led adaptation and resilience building initiatives, and that efficient mechanisms to channel financial and other resources to communities for resilience building are lacking. An approach is therefore recommended that channels resources directly to communities to support small-scale community-owned investments in adaptation that they themselves have identified through a rigorous community adaptation planning process. This approach can subsequently be scaled and replicated, both through government programming and through engagements with other climate finance projects that are currently in the design phase.

Recommendation 7: Focus on context appropriate information and skills

This feasibility study found that there is often relatively limited awareness, knowledge, and information available at the community level which can limit people's interest and engagement in climate adaptation activities, given the pressing day-to-day challenges that people – women and youth especially - face. This includes limited knowledge about climate change and climate resilient livelihoods, as well as limited access to information about climate risks, vulnerabilities, and adaptation measures among farmers, fishers and other occupations across the rural coastal areas of Sierra Leone. This feasibility study therefore recommends an approach that starts with the provision of locally appropriate and context specific information about climate change risks and vulnerabilities, with a progression towards capacity building programs that equip farmers, fishers and small businesses with knowledge of adaptation approaches and technologies, and clear steps to facilitate uptake of these approaches and technologies, with a particular focus on women and youth.

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12. Appendix A: Full results of vulnerability assessment and maps of priority Sections

The table and figures presented below are from the analysis described in Section 6 of the Feasibility Study.

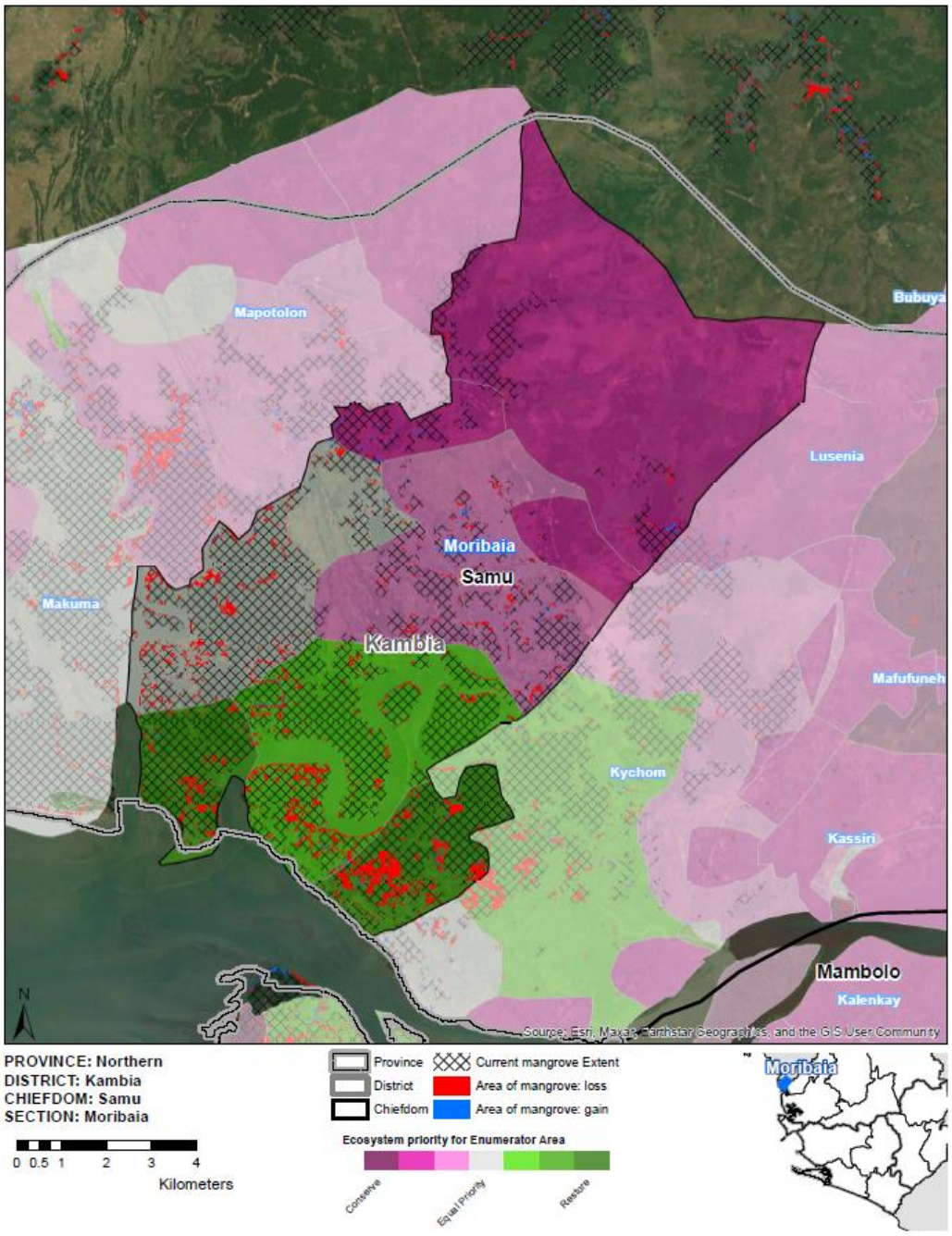

Figure 1. Moribaia Section

Figure 1 is provided as an example. Maps of other Sections are available on request from the AE.

Table 1 Vulnerability Assessment ranking of all Sections with mangrove cover within target districts. Shading in "Selection" column indicates the selected Sections based on priority in terms of ranking and additional considerations.

Rank	District	Chiefdom	Section	Mangrove area lost (ha)	Total mangrove area (ha)	Mangrove % loss	A) # EAs in top 100 for climate vulnerability & restoration priority	B) # EAs in top 100 for climate vulnerability & conservation priority	Total # EAs for A) + B)	Selection
1	**Pujehun**	Kpaka	Sarbah	208.4	699.5	30%	2	10	**12**	Priority
2	**Kambia**	Samu	Moribaia	386.7	4 337.5	9%	4	2	**6**	Priority
3	**Port Loko**	Kamasondo	Konta	11.7	15.4	76%	4	2	**6**	Excluded - small mangrove area
4	**Kambia**	Samu	Kassiri	145.9	637.1	23%	3	2	**5**	Priority
5	**Kambia**	Samu	Mafufuneh	9.4	77.8	12%	0	5	**5**	Priority
6	**Moyamba**	Bumpeh	Samu	982.5	2 204.2	45%	0	5	**5**	Priority
7	**Moyamba**	Kagboro	Mambo	73.9	1 359.8	5%	0	5	**5**	Priority
8	**Moyamba**	Kagboro	Youndu	445.9	924.9	48%	1	4	**5**	Priority
9	**Kambia**	Magbema	Bombe	12.7	9.5	134%	2	2	**4**	Excluded - all mangroves lost
10	**Kambia**	Mambolo	Mayakie	67.0	160.9	42%	4	0	**4**	Priority
11	**Kambia**	Samu	Makuma	152.2	2 395.6	6%	4	0	**4**	Priority
12	**Moyamba**	Bumpeh	Bumpeh	139.8	302.7	46%	3	1	**4**	Priority
13	**Moyamba**	Bumpeh	Moforay	210.6	278.0	76%	0	4	**4**	Priority
14	**Pujehun**	Kpaka	Jassende Kpeima	306.5	1 036.8	30%	0	4	**4**	Priority
15	**Pujehun**	Kpaka	Parvu	33.6	75.4	45%	0	4	**4**	Priority
16	**Kambia**	Magbema	Kargbulor	29.7	55.6	53%	3	0	**3**	Priority
17	**Kambia**	Samu	Mapotolon	104.5	1 239.6	8%	1	2	**3**	Priority
18	**Moyamba**	Bagruwa	Benkeh	265.9	10 060.1	3%	3	0	**3**	Priority
19	**Moyamba**	Bumpeh	Bellentin	351.1	402.9	87%	0	3	**3**	Priority
20	**Moyamba**	Kagboro	Mofuss	18.2	506.7	4%	0	3	**3**	Priority
21	**Port Loko**	Bureh	Kalangba	45.5	147.1	31%	3	0	**3**	Priority
22	**Port Loko**	Koya	Foredugu	10.6	45.3	23%	3	0	**3**	Priority
23	**Port Loko**	Koya	Kagbala A	152.9	1 075.0	14%	3	0	**3**	Priority
24	**Port Loko**	Lokomasama	Gbainty	102.4	59.9	171%	2	1	**3**	Excluded - all mangroves lost
25	**Bonthe**	Bendu-Cha	Gba-Cha	15.3	508.5	3%	2	0	**2**	Priority

Rank	District	Chiefdom	Section	Mangrove area lost (ha)	Total mangrove area (ha)	Mangrove % loss	A) # EAs in top 100 for climate vulnerability & restoration priority	B) # EAs in top 100 for climate vulnerability & conservation priority	Total # EAs for A) + B)	Selection
26	**Bonthe**	Jong	Tucker-Nyambe	40.8	175.9	23%	1	1	**2**	Priority
27	**Bonthe**	Sittia	Saama	86.7	1 532.2	6%	0	2	**2**	Priority
28	**Kambia**	Samu	Bubuya	12.3	293.9	4%	1	1	**2**	Priority
29	**Kambia**	Samu	Kychom	123.1	1 671.7	7%	2	0	**2**	Priority
30	**Kambia**	Samu	Rokon	2.2	61.5	4%	0	2	**2**	Priority
31	**Moyamba**	Bagruwa	Benduma	23.2	1 227.9	2%	2	0	**2**	Priority
32	**Moyamba**	Bumpeh	Mamu	368.8	401.3	92%	0	2	**2**	Priority
33	**Moyamba**	Kagboro	Moyah	28.6	205.8	14%	0	2	**2**	Priority
34	**Moyamba**	Kagboro	Tassor	118.2	3 775.9	3%	1	1	**2**	Priority
35	**Moyamba**	Ribbi	Masanka	107.3	531.1	20%	2	0	**2**	Priority
36	**Moyamba**	Ribbi	Mobureh	477.3	3 087.3	15%	2	0	**2**	Priority
37	**Moyamba**	Ribbi	Mokera	11.5	46.5	25%	2	0	**2**	Priority
38	**Moyamba**	Ribbi	Upper Ribbi	33.0	567.0	6%	2	0	**2**	Priority
39	**Port Loko**	Bakeh Loko	Sendugu	0.2	9.2	2%	2	0	**2**	Priority
40	**Port Loko**	Kaffu Bullom	Mamanki	76.9	1 297.0	6%	1	1	**2**	Priority
41	**Port Loko**	Kamasondo	Katonga	2.5	2.2	111%	0	2	**2**	Excluded - all mangroves lost
42	**Port Loko**	Koya	Mandoma	11.5	125.4	9%	2	0	**2**	Priority
43	**Port Loko**	Lokomasama	Yurika	68.4	120.7	57%	0	2	**2**	Priority
44	**Pujehun**	Galliness	Gendema I	70.5	76.1	93%	0	2	**2**	Priority
45	**Pujehun**	Mono Sakrim	Massanda Majagbe	0.4	-	NA	0	2	**2**	Included - co-financing
46	**Bonthe**	Bendu-Cha	Sokenteh	27.9	1 782.4	2%	1	0	1	Included - Bonthe; co-financing
47	**Bonthe**	Dema	Turttle Islands	26.7	175.4	15%	0	1	1	Included - Bonthe representation
48	**Bonthe**	Imperri	Babum	41.6	184.3	23%	1	0	1	Included - Bonthe representation
49	**Bonthe**	Imperri	Moimaligie	133.2	6 050.5	2%	1	0	1	Included - Bonthe ; co-financing
50	**Bonthe**	Jong	Basiaka	46.8	881.7	5%	0	1	1	Included - Bonthe representation
51	**Bonthe**	Jong	Landi-Ngere	10.2	217.3	5%	1	0	1	Included - Bonthe representation
52	**Bonthe**	Nongoba Bullom	Bohol	56.0	332.8	17%	0	1	1	Included - Bonthe representation

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53	**Bonthe**	Nongoba Bullom	Salon	44.1	29.1	151%	1	0	1	Excluded - all mangroves lost
54	**Bonthe**	Nongoba Bullom	Torma Subu	50.9	51.4	99%	1	0	1	Excluded - all mangroves lost
55	**Bonthe**	Sittia	Kamai	128.3	2 259.2	6%	0	1	1	Included - Bonthe representation
56	**Kambia**	Magbema	Rokupr	0.6	1.5	42%	1	0	1	Not priority
57	**Kambia**	Mambolo	Kalenkay	21.6	30.9	70%	0	1	1	Not priority
58	**Kambia**	Mambolo	Rowollon	13.3	17.2	77%	1	0	1	Not priority
59	**Kambia**	Samu	Koya	41.9	170.1	25%	0	1	1	Not priority
60	**Kambia**	Samu	Lusenia	12.0	121.7	10%	0	1	1	Not priority
61	**Kambia**	Samu	Rosinor	8.5	31.1	27%	0	1	1	Not priority
62	**Moyamba**	Bagruwa	Moseilolo	9.4	935.5	1%	1	0	1	Not priority
63	**Moyamba**	Bagruwa	Sembehun	7.1	267.7	3%	1	0	1	Not priority
64	**Moyamba**	Bumpeh	Motobon	156.0	1 003.1	16%	1	0	1	Not priority
65	**Moyamba**	Bumpeh	Yengessa	17.5	155.5	11%	1	0	1	Not priority
66	**Moyamba**	Kagboro	Bumpetoke	24.8	495.1	5%	1	0	1	Not priority
67	**Moyamba**	Kagboro	Gbuallay	0.5	8.2	7%	0	1	1	Not priority
68	**Moyamba**	Kagboro	Konolor	61.1	606.6	10%	0	1	1	Not priority
69	**Moyamba**	Kagboro	Mano	7.3	51.5	14%	1	0	1	Not priority
70	**Moyamba**	Kagboro	Mobeh	6.3	98.1	6%	0	1	1	Not priority
71	**Moyamba**	Kagboro	Mokandor	14.0	564.3	2%	0	1	1	Not priority
72	**Moyamba**	Kagboro	Mokobo	2.3	30.9	7%	0	1	1	Not priority
73	**Moyamba**	Kagboro	Ngiehun	0.8	12.6	7%	0	1	1	Not priority
74	**Moyamba**	Kagboro	Rembe	150.6	89.2	169%	0	1	1	Not priority
75	**Moyamba**	Kagboro	Thumba A	54.8	886.2	6%	1	0	1	Not priority
76	**Moyamba**	Kagboro	Thumba B	2.1	123.7	2%	0	1	1	Not priority
77	**Moyamba**	Kongbora	Senehun	0.4	6.1	6%	1	0	1	Not priority
78	**Moyamba**	Lower Banta	Gbangbatoke	55.9	1 762.6	3%	1	0	1	Not priority
79	**Moyamba**	Ribbi	Kentineh	28.7	282.8	10%	1	0	1	Not priority

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80	**Moyamba**	Ribbi	Lower Ribbi	492.6	2 938.5	17%	1	0	1	Not priority
81	**Moyamba**	Ribbi	Motonkoh	10.4	189.3	5%	1	0	1	Not priority
82	**Moyamba**	Ribbi	Yoni	4.5	24.4	19%	1	0	1	Not priority
83	**Moyamba**	Timdale	Kebail	22.8	411.9	6%	0	1	1	Not priority
84	**Moyamba**	Timdale	Nunguba	87.8	2 139.2	4%	1	0	1	Not priority
85	**Moyamba**	Timdale	Sahan	4.9	146.3	3%	0	1	1	Not priority
86	**Port Loko**	Bakeh Loko	Gberray Morie	27.5	506.4	5%	0	1	1	Not priority
87	**Port Loko**	Bakeh Loko	Magbeni	0.3	0.3	83%	1	0	1	Not priority
88	**Port Loko**	Bureh	Rogbla	9.9	11.4	87%	0	1	1	Not priority
89	**Port Loko**	Koya	Fondu	0.4	6.9	5%	1	0	1	Not priority
90	**Port Loko**	Koya	Roponka	13.1	309.8	4%	1	0	1	Not priority
91	**Port Loko**	Koya	Rosarr	4.5	0.3	NA	1	0	1	Not priority
92	**Port Loko**	Maforki	Gberray Thunkara	52.8	389.8	14%	1	0	1	Included - stakeholder options
93	**Port Loko**	Maforki	Maboni	96.6	175.2	55%	1	0	1	Included - stakeholder options
94	**Port Loko**	Maforki	Makorobolai	141.4	582.5	24%	1	0	1	Included - stakeholder options
95	**Port Loko**	Maforki	Old Port Loko	5.5	33.7	16%	1	0	1	Included - stakeholder options
96	**Port Loko**	Maforki	Pothocase	7.4	74.4	10%	1	0	1	Included - stakeholder options
97	**Port Loko**	Marampa	Petifu Madina	1.8	7.3	24%	1	0	1	Not priority
98	**Bonthe**	Bendu-Cha	Tissagbe	4.4	267.0	2%	0	0	0	Not priority
99	**Bonthe**	Bendu-Cha	Yallan-gbokie	133.1	4 579.5	3%	0	0	0	Included - co-financing
100	**Bonthe**	Bonthe Urban	Bonthe Town	22.9	634.2	4%	0	0	0	Included - co-financing
101	**Bonthe**	Dema	Chepo	14.1	110.5	13%	0	0	0	Not priority
102	**Bonthe**	Dema	Dema	17.7	276.0	6%	0	0	0	Not priority
103	**Bonthe**	Dema	Yoh	64.8	1 681.5	4%	0	0	0	Not priority
104	**Bonthe**	Imperri	Bapus	533.8	14 442.6	4%	0	0	0	Not priority
105	**Bonthe**	Imperri	Kahekay	102.8	1 744.9	6%	0	0	0	Not priority
106	**Bonthe**	Imperri	Sokrapan	35.6	2 565.6	1%	0	0	0	Not priority

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107	**Bonthe**	Jong	Sopan-Cleveland	9.1	133.7	7%	0	0	0	Not priority
108	**Bonthe**	Nongoba Bullom	Baoma	3.1	2.8	110%	0	0	0	Not priority
109	**Bonthe**	Nongoba Bullom	Bullom	5.3	12.2	43%	0	0	0	Not priority
110	**Bonthe**	Nongoba Bullom	Garinga	39.5	348.3	11%	0	0	0	Not priority
111	**Bonthe**	Nongoba Bullom	Gbap	0.3	-	NA	0	0	0	Not priority
112	**Bonthe**	Sittia	Bamba	36.3	638.9	6%	0	0	0	Not priority
113	**Bonthe**	Sittia	Gonoh	312.5	5 607.7	6%	0	0	0	Not priority
114	**Bonthe**	Sittia	Kwalloh	145.5	2 433.5	6%	0	0	0	Not priority
115	**Bonthe**	Sittia	Moh	105.5	1 750.7	6%	0	0	0	Not priority
116	**Bonthe**	Sittia	Ngepay	2.9	6.2	46%	0	0	0	Not priority
117	**Bonthe**	Sittia	Sahaya	56.1	1 226.0	5%	0	0	0	Not priority
118	**Bonthe**	Sittia	Sahn-Gbegu	12.1	90.0	13%	0	0	0	Not priority
119	**Bonthe**	Sittia	Sampoh	5.2	95.9	5%	0	0	0	Not priority
120	**Bonthe**	Sittia	Yoni	49.7	1 203.6	4%	0	0	0	Not priority
121	**Bonthe**	Yawbeko	Baryegbe	0.5	0.1	376%	0	0	0	Not priority
122	**Bonthe**	Yawbeko	Mobulie	2.8	4.4	63%	0	0	0	Not priority
123	**Kambia**	Mambolo	Mambolo	10.6	5.6	189%	0	0	0	Not priority
124	**Kambia**	Mambolo	Matetie	7.0	4.0	176%	0	0	0	Not priority
125	**Kambia**	Mambolo	Robis	18.5	42.7	43%	0	0	0	Not priority
126	**Kambia**	Mambolo	Rotain Bana	5.2	2.6	200%	0	0	0	Not priority
127	**Kambia**	Mambolo	Tombo-Wallah	0.4	1.0	37%	0	0	0	Not priority
128	**Moyamba**	Bagruwa	Kigbai	15.5	690.3	2%	0	0	0	Not priority
129	**Moyamba**	Bagruwa	Mani	1.9	61.2	3%	0	0	0	Not priority
130	**Moyamba**	Bagruwa	Palima	0.6	1.7	34%	0	0	0	Not priority
131	**Moyamba**	Bumpeh	Kassipoto	111.9	243.0	46%	0	0	0	Not priority
132	**Moyamba**	Bumpeh	Massah	0.9	4.4	20%	0	0	0	Not priority
133	**Moyamba**	Bumpeh	Mokebbie	47.3	167.3	28%	0	0	0	Not priority

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134	**Moyamba**	Bumpeh	Saiama	0.9	13.1	7%	0	0	0	Not priority
135	**Moyamba**	Kagboro	Bendu A	13.0	186.0	7%	0	0	0	Not priority
136	**Moyamba**	Kagboro	Bendu B	56.8	1 743.0	3%	0	0	0	Not priority
137	**Moyamba**	Kagboro	Mokebay	52.0	1 088.2	5%	0	0	0	Not priority
138	**Moyamba**	Kagboro	Mopaileh	25.6	877.9	3%	0	0	0	Not priority
139	**Moyamba**	Lower Banta	Bengelloh	7.3	87.5	8%	0	0	0	Not priority
140	**Moyamba**	Timdale	Bembellor	36.7	478.6	8%	0	0	0	Not priority
141	**Moyamba**	Timdale	Gambia	5.7	221.5	3%	0	0	0	Not priority
142	**Moyamba**	Timdale	Gbehan	20.4	1 171.4	2%	0	0	0	Not priority
143	**Moyamba**	Timdale	Kamasunu	5.9	705.9	1%	0	0	0	Not priority
144	**Moyamba**	Timdale	Kambotoke	6.9	501.1	1%	0	0	0	Not priority
145	**Moyamba**	Timdale	Mando	116.7	2 417.4	5%	0	0	0	Not priority
146	**Moyamba**	Timdale	Mye	0.4	128.7	0%	0	0	0	Not priority
147	**Moyamba**	Timdale	Tombay	13.2	273.7	5%	0	0	0	Not priority
148	**Moyamba**	Timdale	Yapoma	0.5	79.1	1%	0	0	0	Not priority
149	**Port Loko**	Bakeh Loko	Kondato	-	0.4	0%	0	0	0	Not priority
150	**Port Loko**	Bakeh Loko	Sanda	1.1	7.4	15%	0	0	0	Not priority
151	**Port Loko**	Kaffu Bullom	Foronkoya	10.4	182.1	6%	0	0	0	Not priority
152	**Port Loko**	Kaffu Bullom	Kasongha	65.4	1 171.2	6%	0	0	0	Not priority
153	**Port Loko**	Kaffu Bullom	Mayaya	0.1	0.1	85%	0	0	0	Not priority
154	**Port Loko**	Kaffu Bullom	Rosint	30.5	598.0	5%	0	0	0	Not priority
155	**Port Loko**	Kaffu Bullom	Yongro	1.0	9.3	10%	0	0	0	Not priority
156	**Port Loko**	Kamasondo	Kamasondo	569.7	4 450.4	13%	0	0	0	Not priority
157	**Port Loko**	Kamasondo	Kantaya	12.9	131.5	10%	0	0	0	Not priority
158	**Port Loko**	Kamasondo	Magbokorr	17.2	235.7	7%	0	0	0	Not priority
159	**Port Loko**	Kamasondo	Mannah	61.7	360.6	17%	0	0	0	Not priority
160	**Port Loko**	Koya	Benkia	174.6	1 318.7	13%	0	0	0	Not priority

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161	**Port Loko**	Koya	Futa	117.0	638.1	18%	0	0	0	Not priority
162	**Port Loko**	Koya	Gbabai	8.3	228.6	4%	0	0	0	Not priority
163	**Port Loko**	Koya	Kagbala B	8.3	81.9	10%	0	0	0	Not priority
164	**Port Loko**	Koya	Magbeni	41.6	79.8	52%	0	0	0	Not priority
165	**Port Loko**	Koya	Mahera	4.5	3.5	126%	0	0	0	Not priority
166	**Port Loko**	Koya	Marefa	202.6	4 471.8	5%	0	0	0	Not priority
167	**Port Loko**	Koya	Robia	41.3	859.1	5%	0	0	0	Not priority
168	**Port Loko**	Koya	Sanda	1.5	77.1	2%	0	0	0	Not priority
169	**Port Loko**	Koya	Tumba	156.5	2 254.0	7%	0	0	0	Not priority
170	**Port Loko**	Lokomasama	Komrabai	20.6	629.8	3%	0	0	0	Not priority
171	**Port Loko**	Lokomasama	Mapiterr	80.7	2 037.3	4%	0	0	0	Not priority
172	**Port Loko**	Lokomasama	Petifu	11.6	223.5	5%	0	0	0	Not priority
173	**Port Loko**	Maforki	Gberray Bana	12.4	11.3	110%	0	0	0	Not priority
174	**Port Loko**	Maforki	Gbonko Mayira	25.8	73.3	35%	0	0	0	Not priority
175	**Port Loko**	Maforki	Magbengbeh	9.3	50.6	18%	0	0	0	Not priority
176	**Port Loko**	Maforki	Marunia	1.4	56.2	3%	0	0	0	Not priority
177	**Port Loko**	Maforki	Massebay	4.7	26.1	18%	0	0	0	Not priority