Updated Country Environmental Profile and Review of the INDC

Sierra Leone

August 2020

Technical assistance for the mainstreaming of environmental sustainability, biodiversity, climate change and disaster risk reduction

Stantec agreco ADE ANALYSIS FOR ECONOMIC DECISIONS

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Summary

Sierra Leone is endowed with considerable mineral, timber, fishery and agricultural resources. Yet, benefits from these natural assets have rarely reached the broader population. Indeed, increasing direct pressures have been exerted on all natural resources, which directly affect the performance and the viability of practices in environmentally sensitive sectors such as water or agriculture. Particularly threatening issues include the destruction of biodiversity and notably of forest cover, poor water management, challenges related to equal access to natural resources and notably to land, and multiple issues related to the extractive industry including environmental contamination issues and lack of participation in sustainable development efforts.

Despite relatively recent attempts in updating the environmental legislations and related policies, the environmental and climate institutional framework remains weak in terms of coordination and concrete synergies in the management of environmental resources such as forest, land, wetlands, coastal areas, ecosystem conservation. Competencies between environmental institutions are often overlapping and potentially conflicting, and could allow elite interests and power to be prioritised at the expense of sustainable resource extraction and livelihood security. There is also a poor integration in environmentally sensitive sectors such as agriculture, energy, water or transport. The 2019-2023 National Development Plan highlights the importance environmental resilience and is the first one to explicitly include climate change as an issue to be considered. The NDP, however, does not formulate concrete climate related action.

Further, and in spite of its status as a Least Developed Country and natural potential in contributing to climate change mitigation, Sierra Leone has not really benefitted from the recent momentum of climate finance. Its Initial Nationally Determined Contribution was not sufficiently convincing, in terms of proposed action and coherence with national policies, to bring the needed support from the international community.

To face part of these challenges, strong institutions exist, such as the Environmental Protection Agency who concentrates all major functions related to environmental and climate change policy making, legislation, coordination, control, mainstreaming, fund mobilisation and management, research and awareness raising. Further, the recently created Ministry of Environment (2019) is currently under discussions with other line ministries in order to define how to create new space for dialogue on environmental management.

The new vision of the EU for its external support implies the implementation of the European Green Deal, which offers clear opportunities for a renewed dialogue on environmental and climate action in its partnership with Sierra Leone. The EU and its member states are well placed to support a renewed environmental governance framework, notably through:

- Updated data and improved understanding on the status of the environment and its evolution, as well as on the adverse impacts and risks of climate change at sector level;
- Accompany environmental governance reforms, translating overarching policy objectives into tangible targets and action, allowing to increase the coherence of the institutional framework and the credibility of state institutions;
- Sensitise stakeholders to environmental issues, not only in terms of environmental sustainability but also as related economic opportunities as incentives to further engagement;
- Reconciling benefits from natural resource, such as forest conservation or extracted minerals, as a mean to social stability for instance through improved livelihoods and human wellbeing

in neighbouring communities, or redistribution of benefits from the extractive industry in social sectors.

Chapter I: Background

Geography /physical environment

The Republic of Sierra Leone is located on the West Coast of Africa, between latitudes 7 and 10 north and longitudes 10.5 and 13 west. It has about 540 km of coastline. Sierra Leone (central coordinates – 6°55' – 10°14'N and 10°14' – 13°17'W) with a land area of 72,300 km^2 is located on the west coast of Africa, which is also the east-Atlantic coast in Africa. It borders Guinea to the north and northeast, Liberia to the south and south-east and the Atlantic Ocean on the west.

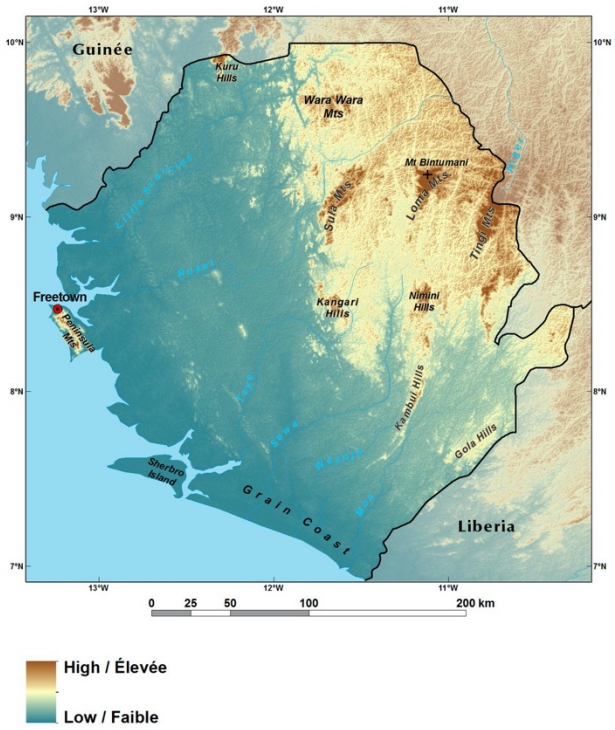

Figure 1: Main topography of Sierra Leone

The total area consists of 60,650 km^2 uplands and 11,650 km^2 lowlands. Land suitable for cultivation is estimated at 5.36 million hectares (ha), (74% of the total land). It is made up of four major physiographic regions, namely; peninsular mountains which are up to 900 m in elevation; a 40 km strip of coastal plain most of which is below 15 m; interior plain which is 100 km wide and 15 - 150 km elevation; interior plateau and hills of 150 - 600 m elevation[1]. Only about 3 to 5% (depending on sources) of the country is estimated to be under mature forest, but 70% of the country was forested several decades ago. Logging and slash and burn agriculture have had serious negative impact on the vegetation. Sierra Leone has 295,950 ha destined to forestry, game reserves and national parks and 32,000 ha of community forests. Not only the country has fauna and flora of international importance

[1] Odell RT, Dijkerman J, van Vuure W, Melsted SW, Beavers AH, Sutton PM, Kurtz LT, Miedema R (1974) Properties, Classification and Adaptation of Soils in Selected Areas in Sierra Leone West Africa.

suitable for ecotourism[2], Sierra Leone is also part of the Upper Guinea Forest biome. It shows a high level of endemism, unique and mostly gone in West Africa. This mainly justifies conservation activities.

Climate Change

Climate background

Sierra Leone enjoys a tropical climate strongly influenced by the West African Monsoon, with two seasons: a prolonged and abundant rainy season from May to November, and a dry season from November to April. Due to the orientation of the coast and main mountain ranges the coastal regions can receive close to 4,000 mm of rainfall per year and monthly rainfall can exceed 1,000 mm, making these the wettest parts of West Africa. Yet, interannual variability is particularly strong. In other years during the same months in the far west, rainfall may decrease significantly to about 300mm. The timing and intensity of the West African Monsoon determine changes in the precipitation pattern, as well as the intensity and frequency of storms and winds[3].

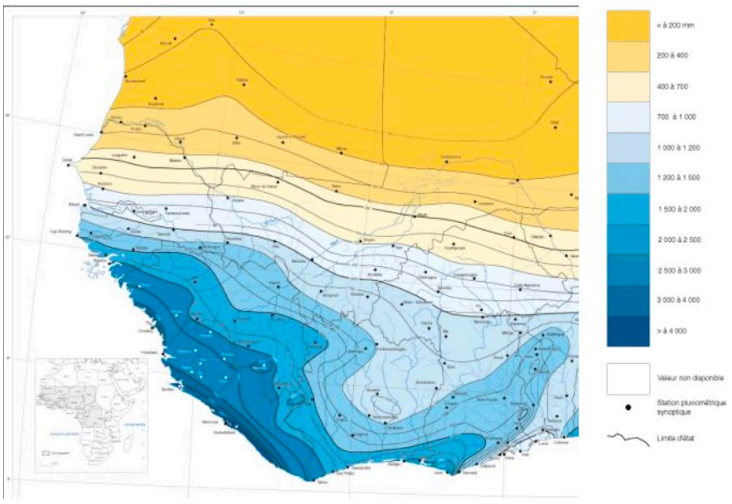

Figure 2: Average annual rainfall in West Africa (www.ird.fr)

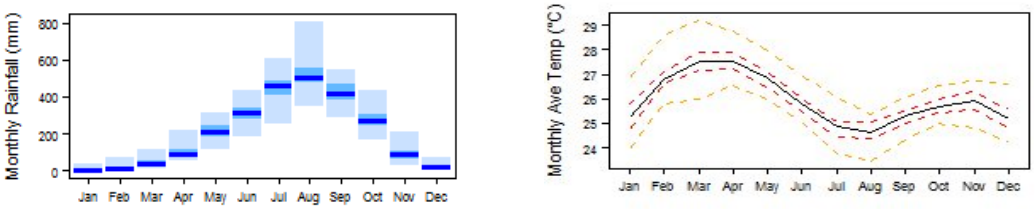

Figure 3: Monthly Rainfall in Sierra Leone - British Geological Survey (2013, based on data 1950-2012) and Monthly Average Temperature in Sierra Leone - British Geological Survey (2015)

[2] IFAD (2010) Integrating adaptation to climate change into agricultural production and food security in Sierra Leone. Project Document. International Fund for Agricultural Development, Rome

[3] Country Profile on Climate Change, Agricultural Trade and Food Security in ECOWAS - Sierra Leone Report, 2016

The average temperature follows a seasonal cycle, with a maximum around March and a second maximum around October/November, separated by lower temperatures during the rainy season.

Temperatures are lowest at the peak of the wet season (about 22 to 25 ºC) and high during the rest of the year (around 25 to 27 ºC)[4].

Observed climate variability and change

Rainfall varies on interannual and decadal time scales, but the variations are low compare to the total amounts received, with a coefficient of variation of the order of 11%, and no clear, significant trend in rainfall is observed. Temperatures, on the other hand, have risen at the rate of 0.14ºC per decade.

While Sierra Leone is overall water rich, there are variations in rainfall depending on whether slopes are windward or leeward, or by valley or higher elevation locations. The estimated annual rainfall can differ by 200 mm. In addition to spatial variations, rainfall amounts and timing vary between years as well as on longer time scales. This is due to decadal variability, intrinsic to the climate system and quite noticeable in the Sahel, causing multiyear droughts of the 1970s and 1980s, leading to famines and profound changes in the societies. Interannual and decadal variations arise from the interactions between ocean and atmosphere in the climate system and are independent from the changes in atmospheric composition underlying climate change. Interannual variations can reach up to 30% of the annual total.

In a study of 2016[5] assessing trends in seasonal (May-September) mean temperature over West Africa for the period 1983-2010, a clear warming trend is detected over parts of West Africa. Countries in the Gulf of Guinea including Sierra Leone have experienced the most significant and warmest signals ranging from 0.2°C to more than 0.5°C per decade. This is consistent with the 5th IPCC report[6] and a study from 2015[7] stating that the whole of West Africa has warmed between 0.3 and 1°C in recent decades.

More localised analysis of recent evolution in rainfall and temperature in coastal areas of Sierra Leone show that rainfall seasonal total average over the period 1951-2014 is around 2,700mm with a standard deviation of approximately 300mm and a coefficient of variation of 11%.

The National Adaptation Programme of Action[8] notes that the characteristics of the seasons have changed. Particularly, the Harmattan period (dry season) in recent times is reported to be warmer than in the past. It is also observed that the pre-monsoon period which runs from April to June is now associated with stronger winds and more frequent rain/storms causing greater damage to lives and property. Calmer and dryer weather now appears to be associated with the September/November period which was usually characterised by frequent thunder and lightning and short but heavy rainfall. Certain areas of the country have experienced rain delays and/or succession of dry spells and torrential rains leading to flooding. Changes in the characteristics of the seasons have been linked to

[4] NAPA report, 2007

[5] Sylla, M., P. Nikiema, P. Gibba, I. Kebe, and N. Klutse. (2016). Chapter 3 Climate Change over West Africa: Recent Trends and Future Projections. In *Adaptation to Climate Change and Variability in Rural West Africa.* Springer International Publishing: Switzerland, doi: 10.1007/978- 3-319-31499-0_3

[6] Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), https://www.ipcc.ch/report/ar5/wg1/ , 2013

7 Padgham, J., Jabbour, J., & Dietrich, K. (2015). Managing change and building resilience: A multi- stressor analysis of urban and peri-urban agriculture in Africa and Asia. Urban Climate, 12, 183– 204. doi:10.1016/j.uclim.2015.04.003.

[8] NAPA, Government of Sierra Leone, Ministry of Transport and Aviation, Final Report, December 2007

impacts such as water shortages in Freetown and flooding, although changes in water demand and land use linked to fast urbanisation are certainly also at play here.

Projected changes

Climate change projections indicate no or small tendency of rainfall increase and a consistent increase in temperatures. Thus, if managed properly water resources should not be a threat to Sierra Leone while temperature change may affect ecosystems and agricultural systems in the long term.

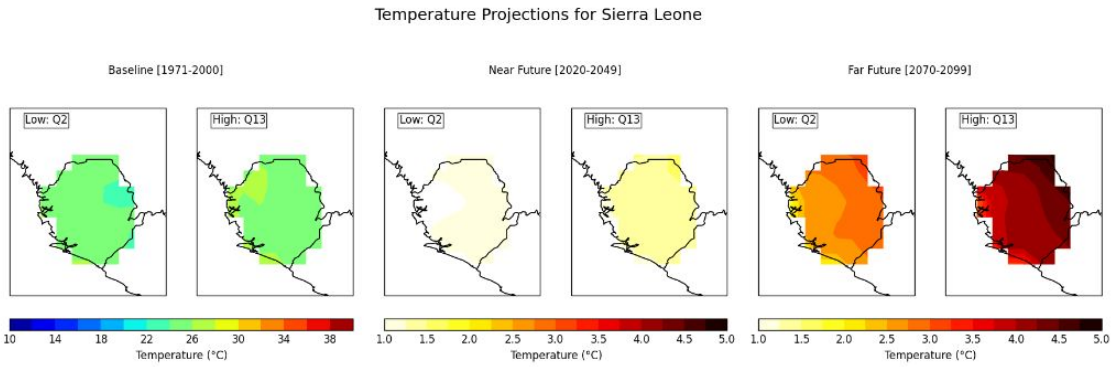

Figure 4: Temperature projections in Sierra Leone[9]

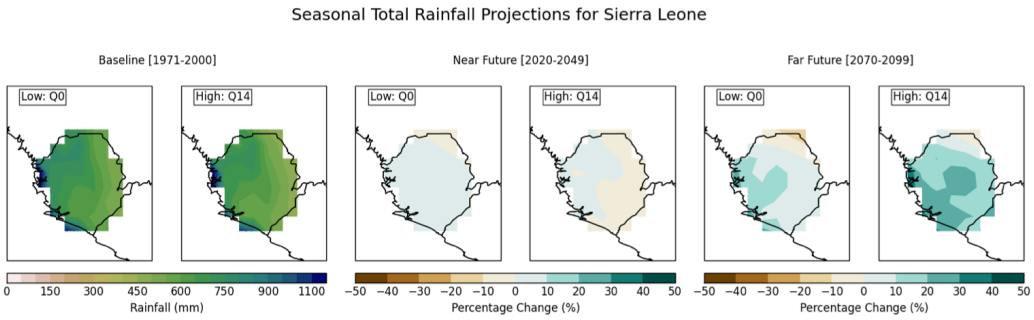

Figure 5: Seasonal Total Rainfall Projections for Sierra Leone[10]

Figure 5 shows temperature and precipitation simulations for Sierra Leone, for the baseline period (1971-2000), and projected changes for the near future (2020-2049) and far future (2070-2099). As shown in Figure 5, as much as a 1.5ºC increase in annually averaged surface temperature can be expected in the 2020-2049 time period. In 2070-2099, a 2.0-4.5 ºC increase is projected to occur. Note, however, the lack of details in the maps accounting for the topography, especially in the reference-period map.

Weak changes in rainfall amounts are expected to occur for the 2020- 2049 period, with a potential increase of about 10% on the coast and a 10% decrease inland. In the far future, as much as a 30% increase in rainfall is predicted on the coast and a 20% decrease inland. These precipitation projections, including the increase on the coast, are consistent with the IPCC assessment that the

[9] Jones R., Hartley A., McSweeney C., Mathison C. and Buontempo C. 2012. Deriving high resolution climate data for West Africa for the period 1950-2100. UNEP-WCMC technical report

[10] Hartley, A., Jones, R. and Janes, T. (2015). *Climate Change and Ecosystem Services Fact Sheet: Sierra Leone*. UNEP-WCMC technical report.

hydrological cycle may increase in intensity, meaning more rainfall, and potentially more frequent extreme events, in regions currently receiving large amounts of rainfall.

Effects of climate change

Changing precipitation patterns

A change in precipitation patterns makes it more difficult to deal with climate related events, reduce risks and adapt to seasons. Less rainy events with more intensity are likely to cause flooding and erosion that could engender considerable loss of and damage to lives and property, and harm ecosystems along the coasts and throughout watersheds. Existing production systems, as well as flood and water management structures that were not designed with climate change in mind will be negatively affected. The lack of regular rainfall combined with higher temperatures that could cause severe droughts should also be considered.

Intense and frequent storms

The wet season is now characterised by more frequent storms causing significant damage to the built and natural environment through flooding, erosion, and high winds. In the last 15 years, intense and frequent storms, as well as flash floods, have affected more than 220,000 people along the coast of Freetown[11]. Storms have also accounted for the majority of disaster losses in coastal areas, leading to economic impacts and consequences that could be exacerbated by climate change. In addition to the physical damage caused by flooding and high winds, stormwater runoff also introduces pollutants and toxic substances to ecosystems, which further stresses habitats.

Rising sea levels

Sea level rise is usually associated with the melting of glaciers and polar ice yet most of it originates from thermal expansion of the oceans and is therefore quite predictable. Atmospheric and oceanic circulation, which will be altered by climate change, will also affect relative sea level. Rising sea levels have caused significant damage to coastal property at Lakka and Konakridee. Coastal wetlands and other low-lying lands can also be inundated and intensify erosion and flooding as new areas become exposed to storm surges, waves, currents and tides. Human populations will also be affected by the reduced quantity and quality of freshwater, as saltwater inundates estuaries and rivers and permeates into groundwater; water tables will rise; and affected lands and infrastructure will introduce more nonpoint source pollutants and toxic materials into the rising seas.

Increasing water temperature

Increasing air temperatures are leading to warmer conditions in both marine and freshwater systems, affecting species distribution and biological productivity and connectivity, accompanied by increased occurrences of pathogens and disease, and invasive species.

[11] The World Bank. (2018). Sierra Leone Multi-City Hazard Review and Risk Assessment Final Report (Volume 2 of 5): Freetown City Hazard and Risk Assessment.

Ecosystem services

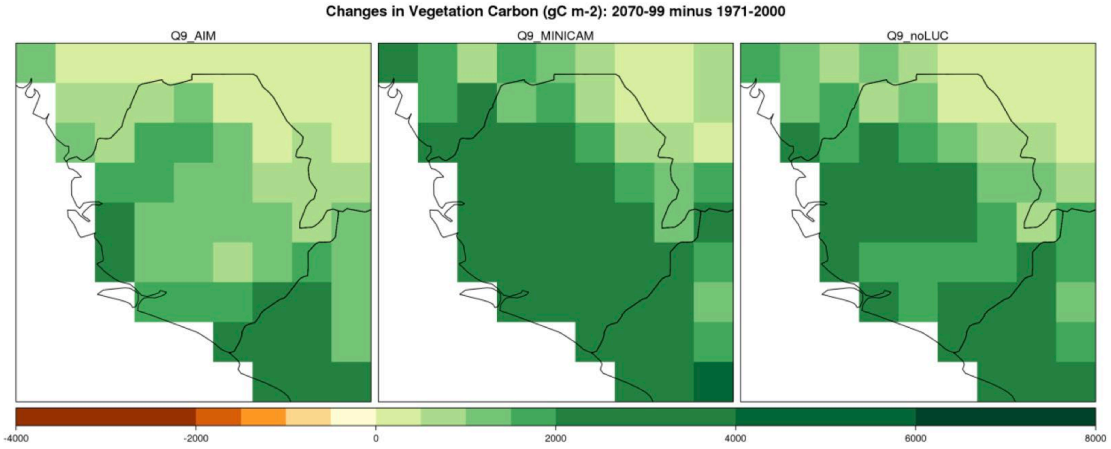

Figure 6: Changes in above ground vegetation carbon storage for the median ensemble member ("Q9") and three land use scenarios for Sierra Leone[12]

The conclusions of the projections in Figure 6 include an increased broadleaf tree cover and vegetation productivity throughout Sierra Leone (high confidence), although human disturbance would restrict this increase. There is a large variability in the projections of change in surface runoff with increases towards the end of the century related to changes in precipitation, and thus these projections are plausible but not confident. The results indicate that tropical forests in Sierra Leone will become an even more valuable resource for storing carbon in the future, therefore contributing to mitigation of global climate change. However, including scenarios of future land use shows that human disturbance would significantly reduce this potential and so, minimising human disturbance (i.e., through the form of land use change) would maximise the mitigation potential of the projected increase in forest carbon storage.

The challenge of climate Information availability and accessibility

Despite the above claims in rainfall and temperature, much of the available information is sourced from analyses performed at larger, regional scales. Climate monitoring with in-situ instrumentation and analyses of collected data are critical to the identification of natural climate variability and long-term climate changes. This is even more critical in a country like Sierra Leone with strong spatial variability in climate due to the topography, and as values from global networks may stem from observations several hundred kilometres away. There has been recent support from the UK in equipment to rebuild Sierra Leone capacity to monitor its own climate (which was largely destroyed during the war), yet, this remains insufficient to get accurate data on climate trends, risks and impacts for effective decision-making.

Besides, there is a general lack of access to relevant, in-situ information about climate change and related conditions of environmental change, because of a weak climate research.

[12] Hartley, A., Jones, R. and Janes, T. 2015. Climate Change and Ecosystem Services Fact Sheet: Sierra Leone. Met Office Hadley Centre and UNEP-WCMC

As a conclusion, accurate in-situ observations are necessary to assess local climate variability and change, to correctly downscale and bias correct global climate information systems and projections, and to carry out impact analyses.

General context on current economic trends

Main socio-economic data

The population of Sierra Leone is approximately 7.1 million based on the last census statistics (2015), with over 40% comprising persons below the age of 15 years. About 40% of the population is urban, concentrated in the capital city Freetown and the major provincial urban areas. The rural population remains majority (60%), yet in 2010, it was almost twice as high than the urban population. This reflects the limited opportunity for people to access jobs, and historically, the dependence of rural communities on natural resources notably forests for their livelihoods.

The approximate 70% poverty data is indicative of multiplicity of issues like low educational attainment, limited opportunity for people to compete for high flying jobs, but more so as in the case with Sierra Leone, the legacy of the brutal civil war which infiltrated into the entire fabrics of the system (social, economic and environmental), with forest communities targeted as a source of exploitation to fund guerilla activities[13].

According to UNDP Human Development Report[14], the following apply to Sierra Leone's development status: life expectancy at birth stands at 54.3 years (51.3 in 2015); expected years of schooling and mean year of schooling are given as 10.2 and 3.6 (9.5 and 3.3 in 2015), respectively.

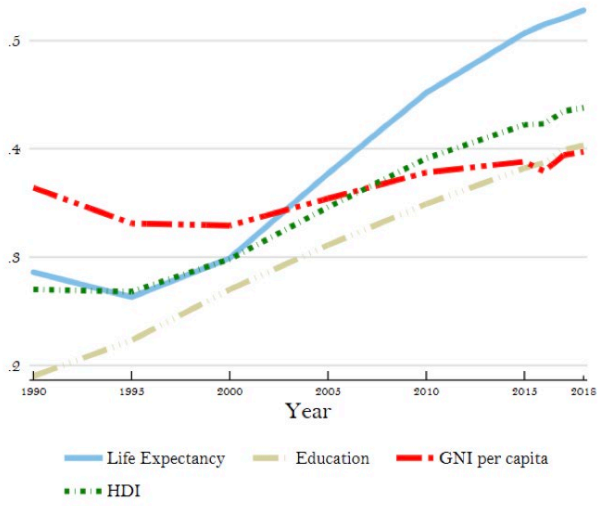

Figure 7: Trends in Sierra Leone's HDI component Indices 1990-2018 (UNDP, HDR report 2019)

There is high growing inequality in the country, with the poor still finding it hard to cope with basic livelihood requirements, while reliance on foreign aid is seen as a means to an end in funding essential

[13] United Nations Environmental Programme. (2010). Sierra Leone Environment, Conflict and Peacebuilding Assessment, Technical Report .

[14] United Nations Development Programme, & Sierra Leone Government. (2019). SIERRA LEONE 4th NATIONAL HUMAN DEVELOPMENT REPORT 2019.

activities by the government[15]. Ranked at the bottom of the country profile table, the human development index of 0.438 (2019 data) is quite low given the natural resource endowment capability of the country.

Gross Domestic Product (GDP) considerably grew to up to 21% in 2013 and contracted to a negative value of -21% because of the EVD outbreak in 2014, implying a corresponding decline in the Gross National Income per capita to US$ 1,529; and recovered to +5.5% in 2019[16]. Gender inequality remains very high, with the female Gender Development Index (GDI)[17] value standing at 0.411 in contrast with 0.465 for males (0.392/0.451 in 2015), resulting in a comparative GDI value of 0.881 (0.871 in 2015). The overall Human Development Index value for Sierra Leone in 2019 stands at 0.438 (0.422 in 2015), giving a rank of 181 out of 189 countries, which some improvement compared to the last two decades. However, as a measure of multiple deprivations in a household in education, health and living standards, 57.9% of Sierra Leoneans were considered multi-dimensionally poor in 2017[18].

As for the Sustainable Development Goals, Sierra Leone has a global rank of 153 (out of 166 countries)[19]. As seen in Fig. 8, SDG13 on Climate Change and SDG12 Sustainable Production and Consumption, show particularly good scores and are the only ones where Sierra Leone is considered to be “on track”. Of interest for the present review, results for 14 Life Below water and 15 Life on land remain above the average and SDG15 is even marked with a positive trend. On the other end, SDG7 on Energy is particularly low, and SDG6 on Water shows that strong challenges remain. These results are discussed in further detail in their relative sector review.

[15] International Monetary Fund. (2019). *SIERRA LEONE ECONOMIC DEVELOPMENT DOCUMENTS—NATIONAL DEVELOPMENT PLAN, 2019–23*.

[16] https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=SL

[17] The 2014 Human Development Report introduced a new measure, the GDI, based on the sex-disaggregated Human Development Index, defined as a ratio of the female to the male HDI.

[18] 77.5% in 2013; 2017 being the latest data available according to the HDR 2019

[19] Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., Fuller, G., Woelm, F. 2020. *The Sustainable Development Goals and COVID-19. Sustainable Development Report 2020.* Cambridge University Press., pp 406-407

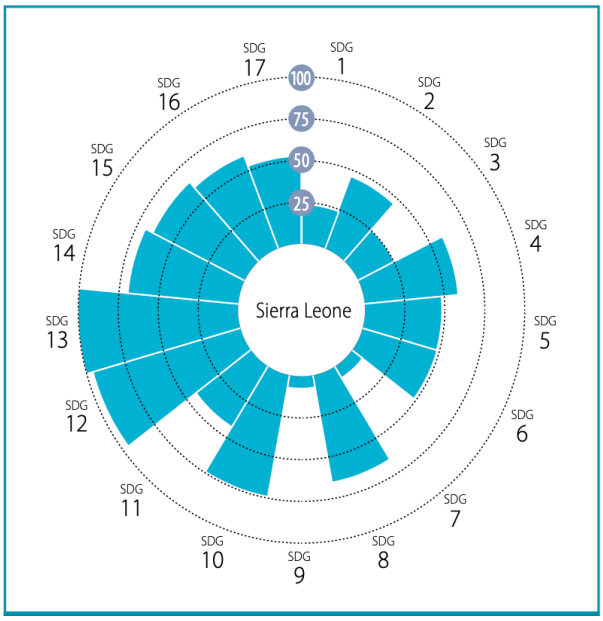

Figure 8: Sierra Leone overall performance across the SDGs

Socio-economic elements of environmental resources

Sierra Leone's economy is almost entirely dependent on its natural resource endowment, with most employment in the country linked to environment and natural resources. Yet, a UNEP report[20] indicated that many of the risk factors for conflict that existed in the 1980s and 1990s have not been adequately addressed, most prominently in the environment and natural resources sector.

Also, conservation inherently involves limiting or controlling the access to natural resources that communities and outsiders may depend on for their livelihoods[21]. If managed effectively, conservation can play a role in peacebuilding and development in Sierra Leone by strengthening natural resource governance; developing sustainable livelihoods; creating employment opportunities; generating tourist revenue; and promoting dialogue, trust-building and cooperation. The Gola Rainforest National Park can be considered an example of success story on conservation of natural resources that can be replicated elsewhere in the country. Conservation when poorly managed can, however, inadvertently cause and exacerbate disputes over natural resources and introduce new or additional economic burdens or risks on local communities.

The following sub-sections give additional information on the relationship between environmental resources and the economy in Sierra Leone.

Agriculture

Agriculture constitutes the key economic activity, accounting for almost 50% of the country's GDP, and employing about 60% of the national work force[22]. Of the national land area, 5,360,000 ha

[20] UNEP 2010 - *Sierra Leone Environment, Conflict and Peacebuilding Assessment, Technical Report*

[21] Conservation and Peacebuilding in Sierra Leone, Oli Brown, Alec Crawford, IISD, January 2012

[22] GoSL (2014). Inclusive Comprehensive Agriculture Development Programme, ICADEP 2015-2018. MAFFS, World Bank, African Development Bank & Food and Agricultural Organisation.

(approximately 74%) are arable, of which 80% constitute upland ecosystems[23]. The form of agriculture practiced by the vast majority of farmers in Sierra Leone is very rudimentary and is characterised by the archaic slash-and-burn fallow cultivation[24]. Over the years, as the land availability becomes limited by growing population and traditional governance system, anecdotal evidence shows that the farming system has changed from a traditional shifting cultivation (wherein the farming village moving from one location to another to farm) to a more sedentary fallow mechanism (wherein the village remains in one location and the farming plots rotated). Yet less than five percent of the farming families have access to fertilizers, insecticides, herbicides and basic machinery which are resources that could help enhance crop production[23].

The National Biodiversity Strategy and Action Plan (NBSAP) indicates that agriculture-related habitat destruction is widespread in Sierra Leone. Habitat availability and mobility of species have also been declining. This has been worsened by declining fallow periods resulting from the growing rural population, increasing cost of living and lowering crop yields. Fallow periods have declined from over 15 years to an average of less than seven years in one to two generations and that local farming communities view fallow agriculture (or shifting cultivation) is increasingly challenging with lowering crop yields over time[22].

Water

In Sierra Leone, most disease outbreaks are either water-related or water borne. Sierra Leone has poor water supply and sanitary facilities. Most people rely on untreated water sources such as hand dug wells, springs, and streams for water use. This leads to cholera emergencies in most rainy seasons. Additionally, typhoid fever is very common among citizens. Sewage ends up into those water sources through surface runoff and base flow, introducing pathogens that cause the disease. The high prevalence of Malaria also has to do with poor sanitation and stagnated water.

Notably, the small towns (with population from 5,000 to 20,000) seem to remain the “forgotten middle” – and there are challenges with the management and the sustainability of service provision.

[23] *National Rice Development Services, 2009, Prepared for the Coalition for African Rice Development 2009.*

[24] Gleave, M.B. (1996). The Length of the Fallow Period in Tropical Fallow Farming Systems: A Discussion with Evidence from Sierra Leone. The Geographical Journal Vol. 162, No. 1 pp. 14- 24.

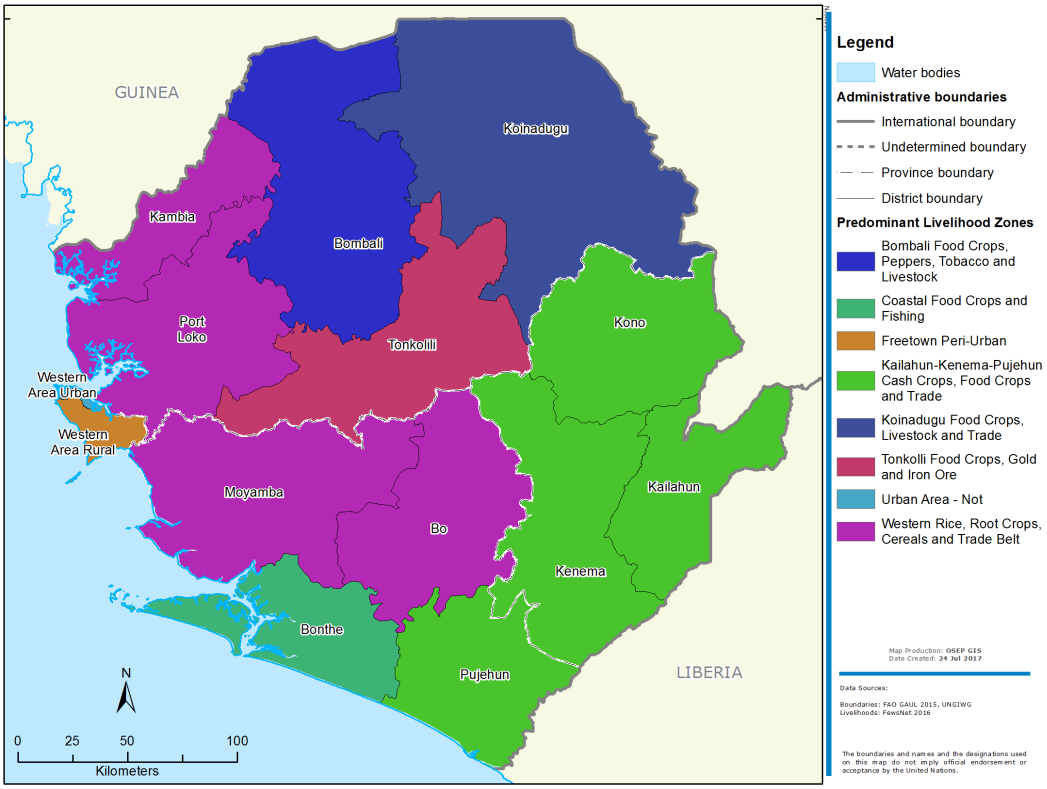

Figure 9: Predominant livelihood zones by District (WFP, FEWSNET, 2016)

Forest

Forest contribution to GDP is estimated to be about 4.4%[25]. The credibility of this figure is questioned due to the wide range of activities taking place within the forestry division in Sierra Leone (including timber logging and charcoal trading) and other social benefits that are probably not taken into account[26]. Yet, this figure is somehow compatible with the estimations of a low revenue capture rate, only 25% of its potential[27].

Forest is undoubtedly playing a great role in Sierra Leone's communities. About 80% of the population in rural areas consume 6.2 million m^3 of firewood, 396,000 m^3 wood equivalent of charcoal, 43,200 m^3 of fence sticks and 252,000 m^3 of timber for construction, cooking and heating, per year[28].

In greater Freetown of Sierra Leone alone, particularly in the Freetown peninsular, it has been noted that over 70 plant species have been identified for plant medicine and dye[27].

It is also noted that "during the next 2 decades, the area of legally constituted forest estates will continue to decrease due to urbanisation and forest degradation, which will permanently change land

[25] National Statistics of Sierra Leone, 2014

[26] Jackson EA (2015) Assessment of Forest Valuation to GDP Contribution in Sierra Leone. Forest Res 4: 143. doi:10.4172/2168-9776.1000143

[27] Food and Agriculture Organization of the United Nations. *Building resilience and sustainable food and nutrition security*, 2008

[28] Alieu, E.K. *Country Perspectives—Sierra Leone*; Commonwealth Forestry Association: Shropshire, UK, 2011.

use; about 10% of the country's land area (both government controlled estate and salvage) comprising of closed forests will be deforested at the rate of about 1.5-2.0% per annum, thereby increasing the area under forest re-growth currently occupying 60% of the country's total land area"[27]. This has given rise to direct consequences on livelihoods, particularly for poor rural residents in forest communities.

Last, but not least, in six out of seven cases studied by the Environmental Foundation for Africa[29], the Ebola Virus Disease emerged where and when specific forest fragmentation parameters were within a narrow range of values. EFA clearly correlates forest condition with increased risk of transmission of the Ebola virus from its natural reservoirs to new hosts including humans.

Protected areas

SDG15 – Life on Land

Mean area that is protected in terrestrial sites important to biodiversity (%)	68.8	2018	●	↑
Mean area that is protected in freshwater sites important to biodiversity (%)	72.5	2018	●	↑
Red List Index of species survival (worst 0–1 best)	0.9	2019	●	↑
Permanent deforestation (% of forest area, 5-year average)	2.0	2018	●	●
Terrestrial and freshwater biodiversity threats embodied in imports (per million population)	0.0	2018	●	●

Figure 10: SDG15 Life on land, main components

The high number of protected areas is a major factor for the overall positive score given to SDG15 on Life on land. Yet it should be noted that indicators for SDG15 do not take into account the health status of the protected areas nor the quality of their management.

As communities often equate economic development with natural resource exploitation, if development benefits do not follow the decision to protect biodiversity, tensions could arise. The use of Protected Areas in Sierra Leone is intensely debated and IISD[30] formulated the following challenges.

Limiting access to local resources: The establishment of a Protected Area can limit community access to valuable resources like forest products and arable land and restrict activities like hunting and fishing. In Sierra Leone, conflicts tend to arise around protected area boundaries: unmaintained and obscured park boundaries are inadvertently or purposefully moved or ignored for farming, mining, charcoal and hunting activities.

Create a new burden: Further, communities living alongside protected areas can experience economic losses and personal risk if those areas include migratory or destructive wildlife[31]. For example, in Sierra Leone chimpanzees have been reported to have destroyed cocoa crops in farms adjacent to Gola Rainforest National Park. There are costs associated to the protection assets against wildlife damage and there are no specific funding mechanisms in place in Sierra Leone to compensate for these losses.

[29] Ebola Virus Disease and Forest Fragmentation in Africa, EFA, 2017

[30] Ganson, B., & M'cleod, H. (2017). The political economy of fragility: Business, conflict and peace in Sierra Leone.

[31] Hammill, A., Crawford, A., Craig, R., Malpas, R. & Matthew R. (2009). Conflict- sensitive conservation: Practitioners' manual. Winnipeg: International Institute for Sustainable Development.

Unequal benefit sharing among stakeholders: In the case of community development programs included in conservation projects, adjacent communities may receive compensation through small-scale development projects (Hammill et al., 2009). However, conflicts can arise if these benefits are seen as being distributed inequitably among stakeholders.

Unmet community expectations. However, despite the country's considerable mineral, timber, fishery and agricultural resources, benefits from natural resources have rarely reached the broader population[32]. "Mining companies tend to make lavish promises to build schools, roads and clinics, but once the deal is signed and work is underway, deliver much less than they promised"[33]. In the mining sector, the failure to meet community expectations has led to violent clashes in the past.

Coastal areas

Fishing is the major livelihood activity in all coastal zones (although smallholder rice cultivation can also be found in these areas). Capture fisheries also takes place in the main rivers (the Sherbro, Sierra Leone, Scarcies) and inland lakes, but is largely undocumented and is considered to be less important than coastal fisheries[34].

As such, Sierra Leone's fisheries are crucially important to the population's livelihoods and food security: 300,000 to 400,000 people are estimated to be employed in the sector, and fish is responsible for 75% of the animal protein in the population's diet (compared to a global average of 15%)[35]. Tombo, Shenge, and Yeliboya supply most of the fish consumed in Freetown, which has increased in intensity.

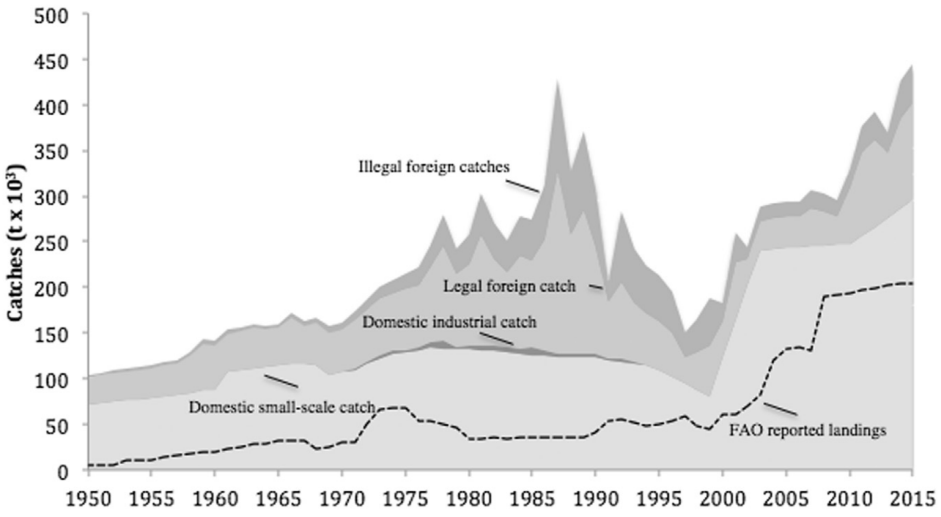

Figure 11: Total reconstructed catches (both domestic and foreign) in Sierra Leone's EEZ 1950–2015 compared to total FAO FishStat catches reported for Sierra Leone (domestic catch only, dotted line).[36]

[32] UNEP 2010 - *Sierra Leone Environment, Conflict and Peacebuilding Assessment, Technical Report*

[33] Conservation and Peacebuilding in Sierra Leone, Oli Brown, Alec Crawford January 2012

[34] Thorpe A. et al., (2009) Fisheries and failing states: The case of Sierra Leone. https://www.researchgate.net/publication/223885422_Fisheries_and_failing_states_The_case_of_Sierra_Leone

[35] Seto, K. (2011). Sierra Leone's seas: A project to assess the current status and potential role of marine resources in the development and peacebuilding of Sierra Leone. San Diego: AWIS/CMBC/IICAS/UNEP.

[36] Seto K. et al. (2017), War, fish, and foreign fleets: The marine fisheries catches of Sierra Leone 1950–2015

Over the period 1950–2015, total reconstructed catches of the domestic fishery within the Sierra Leone EEZ amounts to 9.4 million tonnes, or 2.27 times that of reported FAO data (Fig. 11). It also shows the essential role of small-scale fishing in the population, with volumes sometimes greater than three times the national catch data reported to FAO. This obviously biases the positive results reported for SDG14 on Life below water[37]. A strong increase in domestic catch after war times is attributed to massive increases in ODA towards small-scale fishers and the commercial incentives these may have to form illegal partnerships with industrial fishers[37].

Also, from 2014 to 2016, Sierra Leone has witnessed further increases in illegal foreign fishing, which happened at the same time as the termination of major development projects aimed at reducing illegal activities, and led to a rise in competition with artisanal fishers[37].

Other economic activities include salt production and fish processing, which uses large quantities of mangrove wood. It is believed that around 40,000 artisanal fishers and their families operate more than 12,000 fishing boats that create up to 50,000 jobs in the fisheries sector[38].

Fisheries represent around 10% of Sierra Leone's gross domestic product and directly employ over 40,000 fishermen with a total of 500,000 people employed either directly or indirectly in the fisheries-related sector (fish processing, marketing, trading and transporting, boat building, wood cutting, basket weaving, and so on).

[37] Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., Fuller, G., Woelm, F. 2020. *The Sustainable Development Goals and COVID-19. Sustainable Development Report 2020.* Cambridge University Press., pp 406-407

[38] EJF (Environmental Justice Foundation). (2009). Dirty Fish – How EU Hygiene Standards facilitates illegal fishing in West Africa. Environmental Justice Foundation: London, pp.28

Land and land use change

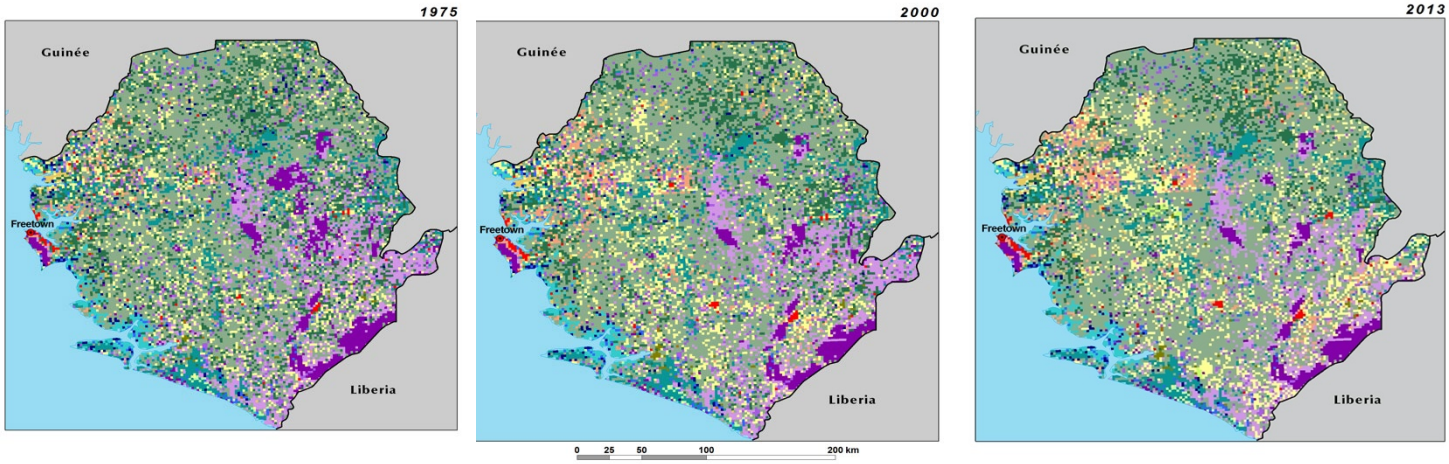

Figure 12: Land use change 1975-2013[39]

As can be seen in Fig. 12, there was a strong decrease in forested areas from 1975 to 2000, an increase in the process of degraded forests (eastern part and centre), and thicket (northwest) to agricultural land and plantations (central area, central west, south). There is also a reduction of connections between forested areas, as confirmed by WWF indication that Sierra Leone shows the greatest level of fragmentation of natural forests when compared to Liberia and Côte d'Ivoire.

Access to land is also closely associated to the peace and stability of rural areas. A vast majority of rebel fighters had been drawn from impoverished rural backgrounds with low capacity to develop livelihoods[40].

Further, the role of protected areas, usually associated to imperatives for the conservation of biodiversity, forests and wildlife, and including other benefits such as mitigation of climate change, is also discussed[41] as an impediment to local communities to access local natural resources.

Large land acquisitions can also be detrimental to stability of socio-economic conditions in rural areas. Large plantations are encouraged on the basis of the argument that they make more efficient use of

[39] Land use, land cover and land use change in Sierra Leone, https://eros.usgs.gov/westafrica/land-cover/land-use-land-cover-and-trends-sierra-leone

[40] Humphreys, M., & Weinstein, J. (2004). *What the fighters say: A survey of ex-combatants in Sierra Leone, June–August 2003*. New York, NY: Centre on Globalization and Sustainable Development, Columbia University.

[41] Jackson, E.A. (2018). Political Economy of Forest Ecology in Sierra Leone: A Focus on the Western Area Peninsular Forest (WAPFoR). Postmodern Openings, 9(1), 63-90.

land relative to smallholder agriculturalists[42] and achieve reductions in the 'yield gap' between actual and optimal agricultural output apparently needed to feed a growing global population[43]. In reality, questions remain about whether they provide socio-economic benefits on a relevant scale, and whether prevailing wages and labour conditions are perceived to be attractive relative to other forms of livelihood. Further, acquisitions also include part of protected areas, decreasing the credibility of conservation practices. Finally, pressures on existing arable land due to large-scale foreign acquisitions also reduce capacity of local farmers to develop agricultural production in quality plots. As a conclusion, large land acquisitions for commercial agriculture increasingly risks catalysing new forms of internal displacement, and in ways that map onto the often-unresolved legacies of these previous instances of forced migration.

Mining

Mining contributes an average of about 4 to 10% of the country's GDP (depending on the quantity of minerals mined and the global market price), and provides among the highest private sector employment in the country. The production of iron ore by two large mining companies between 2008 and 2012 was the reason for the dramatic growth in the country's GDP, up to about 20% in 2013. Yet, mining is also a locally intense and destructive practice in Sierra Leone and a primary cause of habitat destruction in parts of the country[44]. Mining has been closely tied to civil conflicts throughout this region (including Guinea, Côte d'Ivoire, Liberia, and Sierra Leone), especially diamond mining[45].

Community development funds drawing from resource revenues are increasingly used to address issues of revenue distribution and local development in resource production regions. A study on the Sierra Leone's Diamond Area Community Development Fund[46] shows how "local elite capture, coupled with limited transparency and accountability, led to fund misuse and embezzlement. Though such funds are usually established with good intentions, their ability to uplift mining communities through improved incomes, social services and infrastructure tend to be undermined by local power dynamics". The author suggests that institutional reforms need to recognise the vulnerability of community-based natural resource management programmes to be captured by local elites. This requires that such schemes should be informed by a nuanced analysis of local power relations within and around communities.

[42] Fairhead, J., Leach, M., & Scoones, I. (2012). Green Grabbing: A new appropriation of nature? *Journal of Peasant Studies, 39*, 237–261.

[43] Li, T. M. (2014). What is land? Assembling a resource for global investment. *Transactions of the Institute of British Geographers, 39*, 589‑602.

[44] Connor Joseph Cavanagh (2017): Enclosure, dispossession, and the green economy: new contours of internal displacement in Liberia and Sierra Leone?, African Geographical Review,

[45] Utas M (2012) Bigmanity and network governance in African conflicts. In:Utas M (ed.) African Conflicts and Informal Power: Big Men and Networks. London: Zed Books, pp. 1‑31.

[46] Strong Institutions in Weak States: Institution Building, Natural Resource Governance, and Conflict in Ghana and Sierra Leone, McKenzie F. Johnson, 2017

Chapter II: State of the environment/climate change, trends and pressures

Main ecosystems

Sierra Leone's vegetation comprises two major biogeographic ecosystems: the Sudan-Guinea savanna biome mainly in the north and the Upper Guinea forest biome mainly in the south-east of the country. Mixed elements of these two major biomes occur in places, mainly in the transition zones between the northern and southern sections. The north to northwest is dominated by mixed elements of woodland and grassland ecosystems. The current vegetation map of Sierra Leone shows about 50% covered in bush fallows and farm vegetation, about 3- 5% closed forest and most forest estate being secondary forest. In the north to northwest the vegetation is mainly savanna, with mixed elements of woodland and grassland ecosystems.

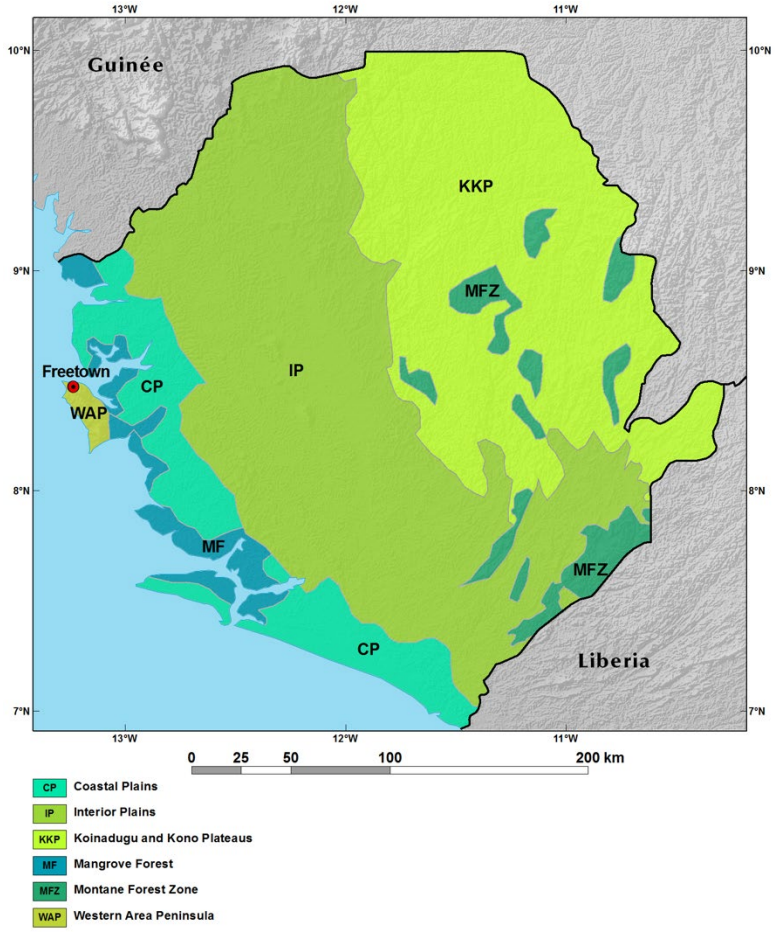

Figure 13: Main landscapes of Sierra Leone

Sierra Leone's wetlands cover a land area of about 4,838 km^2, categorised into two main types – the inland wetlands (floodplains, lakes and rivers) with vegetation typical of freshwater swamp forests, riparian zones and bolilands; and the coastal/marine wetlands, mainly associated with mangroves, sand flats and mud flats.

The shores of Sierra Leone run for about 560 km northwest to south, and a continental shelf of area of 25,000 km^2. There are four major estuarine systems that form the drainage basins of the network of rivers and account for the largest proportion of mangrove swamps in the country.

Flora and fauna

Sierra Leone has over 2,000 species of vascular plants including 74 endemic to the West African sub-region and 90 species listed as threatened and near threatened according to the International Union for the Conservation of Nature.

Plant Community	Area (ha)	% of country
Tropical Closed Forest		
Moist closed evergreen rain forest	358,700	5.0
Moist semi-deciduous forest	258,264	3.6
Moist montane forest	NA-	NA
Secondary forest &forest regrowth	**3,766,350**	**52.2**
Edaphic / Swamp forest		
Fresh inland valley swamp forest	107,610	1.5
Riverine, riparian and gallery forests	35,870	0.5
Mangrove swamp forest	172,176	2.4
Raphia swamp forest	28,690	0.4
Savanna		
Savanna-Forest mosaic -	616,964	8.6
Woodland Savanna	724,574	10.1
Southern Guinea or mixed savanna	265,438	3.7
Lophira tree savanna	107,610	1.5
Coastal park savanna	251.090	3.5
Tropical Grasslands		
Riverine grassland	179,350	2.5
Bolilands (seasonally flooded grasslands)	71,740	0.1
Montane grassland	NA-	NA
Plantations		
Rubber	-	-
Oil palm	71,740	0.1
Cacao and Coffee	165,002	2,3
Forest tree planatations	NA	NA

Figure 14: Diversity of plant communities found in the major ecosystems in Sierra Leone (source: NBSAP)

According to the WWF, in Sierra Leone, common plant associations include species that are also common in the moist evergreen forest[47]. The swamp and gallery forests of Sierra Leone possess some unique plant associations[48]. 'Farm bush' vegetation is made up of fast-growing pioneers, including common species. [49] Recent estimates indicate there are more than 200 plants endemic to the Liberia-Guinea-Sierra Leone ecoregion.[50]

The number of threatened plant species is apparently correlated with the threat status of the ecosystems and this is the reason for the greater number of threatened forest tree species compared

[47] Anthonotha fragrans, Bridelia grandis, Daniella thurifera, Parinari excelsa, Parkia bicolor, Pycnanthus angolensis, Terminalia superba and Terminalia ivorensis.

[48] Pterocarpus santalinoide, Napoleonaea vogelii, Uapaca heudelotii, Newtonia elliotii, Myrianthus arboreus, Cynometra vogeli, Mitragyna stipulosa and Raphia spp.

[49] Funtumia africana, Holarrhena floribunda and Pycnanthus angolensis.

[50] All citations in this paragraph are from the Government of Sierra Leone, & United Nations Environmental Programme. (2017). Sierra Leone's Second National Biodiversity Strategy and Action Plan 2017-2026

to species from other ecosystems. The NBSAP count 90 threatened species among floral families in Sierra Leone.

There are well over 1,900 of terrestrial fauna and aquatic fauna of various phyla and classes (excluding other invertebrates), as shown in Figure 15.

Taxonomic group	CR	EN	VU	NT	DD	Total SC	Total NS
Mammals	1	3	11	8	3	26	170
Birds	2	3	10	12	3	30	642
Reptiles	3	3	1	1	0	8	67
Amphibians	0	5	1	13	7	26	55
Fish	0	0	1	6	0	7	180
Butterflies	0	0	0	4	0	4	800
Total number	**3**	**15**	**23**	**28**	**13**	**92**	**1914**

Figure 15: Number of Species of Fauna of various taxonomic groups categorised under IUCN threat status - SC: Species of Conservation, NS: Number of Species (source: NBSAP)

Sierra Leone is home to almost 1800 species of terrestrial fauna including about 170 species of mammals, including 15 species of primates (six of which are threatened), 18 species of antelopes (16 species considered threatened or locally rare), other species of large mammals (eight are threatened), 45 species of bats (three species are threatened) and a good diversity of other mammalian groups.

English and Scientific names	IUCN/BL Status	UGF Endemics	Main habitat
Lesser Flamingo Phoenicopterus minor	NT		Wetland
Hooded Vulture Necrosyrtes monochas	CR		Varied
White-backed Vulture Gyps africanus	CR		Savanna
Bateleur Terathopius ecaudatus	NT		Savanna
Crowned Eagle Stephanoaetus coronatus	EN		Forest
Martial Eagle Polemaetus bellicosus	NT		Savanna
Pallid Harrier Circus macrourus	NT		Open
Lesser Kestrel Falco naumanni	VU		Open
White-breasted Guineafowl Agelastes meleagrides	VU	+	Forest
Great Snipe Gallinago media	NT		Wetland
Damara Tern Sterna balaenarum	NT		Wetland
Grey Parrot Psithacus erithacus	EN		Forest
Rufous Fishing Owl Scotopelia ussheri	VU	+	Forest
Blue-moustached Bee-eater Merops mentalis	NT		Forest
Brown-cheeked Hornbill Ceratogymna cylindricus	VU	+	Forest
Yellow-casqued Hornbill Ceratogymna elata	VU		Forest
Yellow-footed Honeyguide Melignomon eisentrauti	DD		Forest
Western Wattled Cuckoo-shrike Campephaga lobata	VU	+	Forest
Green-tailed Bristlebill Bleda eximia	VU	+	Forest
Baumann's Greenbul Phyllastrephus baumanni	DD		Forest
Yellow-bearded Greenbul Criniger olivaceus	VU	+	Forest
Lagden's Bush-shrike Malaconotus lagdeni	NT		Forest
Rufous-winged Illadopsis Illadopsis rufescens	NT	+	Forest
White-necked Picathartes Picathartes gymnocephalus	VU	+	Forest
Sierra Leone Prinia Prinia leontica	VU	+	Forest
Black-capped Rufous Warbler Bathmocercus cerviniventris	NT	+	Forest
Nimba Flycatcher Melaenornis annamarulae	VU	+	Forest
Gola Malimbe Malimbus ballmanni	EN	+	Forest
Copper-tailed Glossy Starling Lamprotornis cupreocauda	NT	+	Forest
Emerald Starling Lamprotornis iris	DD		Savanna

Figure 16: Threatened Bird species in Sierra Leone listed on IUCN/BirdLife International 2017 Red List and their habitat specificity (NBSAP from IUCN)

A total of 642 species of birds have been identified in Sierra Leone including 15 endemic and rare species. Thirty species of birds are of global conservation concern, consisting of two critically endangered (CR), three endangered (EN), 10 vulnerable (VU), 12 near threatened (NT) and three data deficient (DD) species[51].

Fish biodiversity has been mainly studied in the Sierra Leone River Estuary, with 80 identified species. Fish productivity in Sierra Leone is not exactly known, but based on data from some studies[52] fish production in the estuaries is between 3,855 and 4,144 million tonnes per year. The offshore pelagic fisheries consist mostly of species associated with three types of hydrographic regimes. *Engraulis encrasicolus*, *Sardinella aurita* and Decapterus species are found associated with the thermocline. *Scomber japonicus* and *Trachurus* spp are found in the upwelling zones. Tuna species are also found in this zone, which include: Yellowfin tuna (*Thunnus albacares*), Skipjack tuna (*Katsuwonus pelamis*) and Little tuna (*Euthynnus alletterates*).

[51] BirdLife International (2017) IUCN Red List for birds. http://www.birdlife.org

[52] Blabber, S.J.M (1997) Fish and Fisheries of tropical estuaries. Fish and Fisheries series. No. 22 Chapman and Hall London.

There are also numerous information gaps in the invertebrate fauna for this ecoregion, but several recent inventories conducted in Sierra Leone have led to the discovery of several new species, especially among the order Coleoptera (*Euconnus spp*., and *Termitusodes spp*.). New discoveries in the orders Lepidoptera and Diptera have also been made, with two endemic species of dragonfly[53].

Protected areas

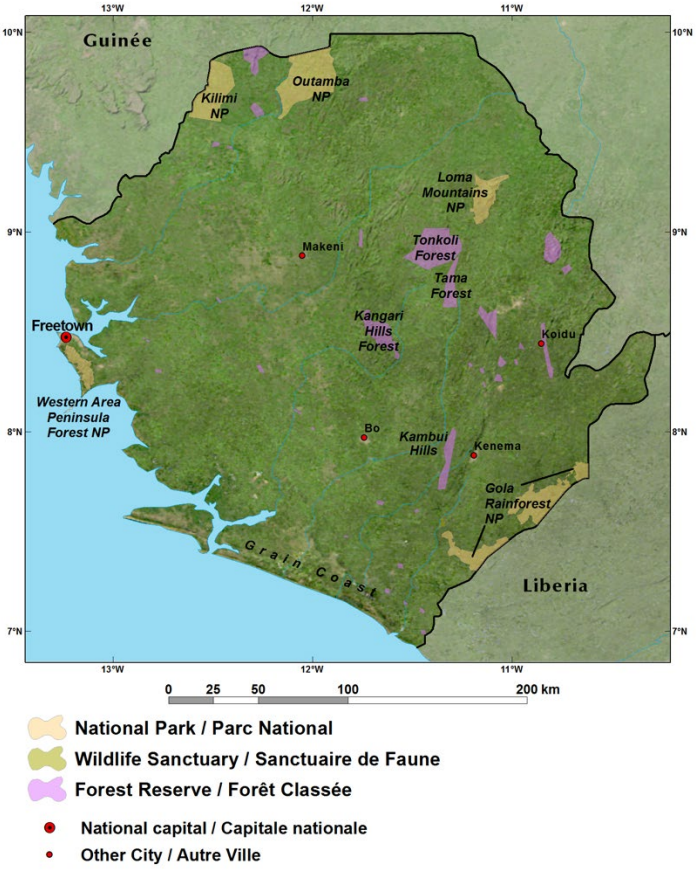

Figure 17: Protected Areas in Sierra Leone

[53] Argiagrion leoninum and Allorhizucha campioni. From NBSAP 2017-2026

Protected Area	Status Size	(ha)	Main localisation
Outamba Kilimi	National Park	110,900	Bombali District
Gola Rainforest	National Park	71, 070	Kailahun, Kenema, Pujehun Districts
Western Area Peninsula Forest	Non-hunting Forest Reserve	17,688	Western Area
Loma Mountains	Non-hunting Forest Reserve	33,201	Koinadugu District
Kangari Hills	Non-hunting Forest Reserve	8,573	Bo, Tonkolili
Tingi Hills	Non-hunting Forest Reserve	10,519	Koinadugu, Kono
Tiwai Island	Wildlife Sanctuary and Community Conservancy	1,200	Pujehun, Kenema
Kambui Hills	Forest Reserve	21,228	Kenema
Sierra Leone River Estuary	Ramsar Site	295,000	Port Loko, Western Area
Tonkoli Forest Reserve	Forest Reserve	47,646	North Province
Dodo Hills	Forest Reserve	21,185	Eastern Province
Kuru Hills	Forest Reserve	7,001	North Province
Kasewe Forest Reserve	Forest Reserve	2,333	North Province

Figure 18: Major components of protected areas and Ramsar sites in Sierra Leone, size and main location

The different protected areas according to their status, as stated by the 1972 Wildlife Conservation Act, are as follows:

Strict Nature Reserve: No hunting and extraction is allowed and entry is restricted for scientific purposes only. There is currently no strict nature reserve in Sierra Leone but there are two proposed areas within Gola North forest reserve, which is now part of the Gola National Park.

National Park: for propagating, conserving and managing wildlife and wild vegetation as well as protecting sites, landscapes or geological formations from damage or injury. Access is given only to visitors and researchers. Hunting and capture of wild animals and the taking of forest products are strictly prohibited. National parks are listed in Figure 18.

Game reserve: protection is specifically offered for fauna requiring special protection. Most of the conditions and prohibited activities in National Parks and Strict Nature Reserve also apply to a Game Reserve. It corresponds to Tiwai Island.

Game sanctuary: for unique ecosystems, at the request of a Chiefdom Authority, as management of the sanctuary is usually in the hands of the local communities. Hunting and trapping of animals are not allowed. Mamunta-Mayosso is currently the only Game Sanctuary in the country.

Non-hunting forest reserve: hunting and capture of animals in all designated reserves are strictly prohibited, except permitted by the Director of Forestry. Extractive activities such as logging and woodcutting are only permitted under strict conditions. At present only Kangari Hills and Tingi Hills are gazetted as non-hunting forest reserves.

Forest reserve: limited protection is offered to wildlife within forest reserves since hunting of certain species is permitted under licence. There are about 24 forest reserves in the country.

Soils / land

There is variability in soil properties across the country but in general, the soils of Sierra Leone are of low inherent fertility (low activity clays). Soils of the savannah agro-climatic regions tend to be sandier than soils of forest agro-climatic regions and the latter tend to have higher organic matter contents and water holding capacities. These are mostly: gravely, ferralitic soils; shallow, stony and ferralitic soils; or hydromorphic clays

The most serious crop production problems on these soils are that of deficiencies in plant available phosphorus and low inherent fertility. The fragility of these soils is increased by a high level of deforestation. Poor management and lack of inputs led to a decline in productivity, soil erosion, and loss of vegetation.

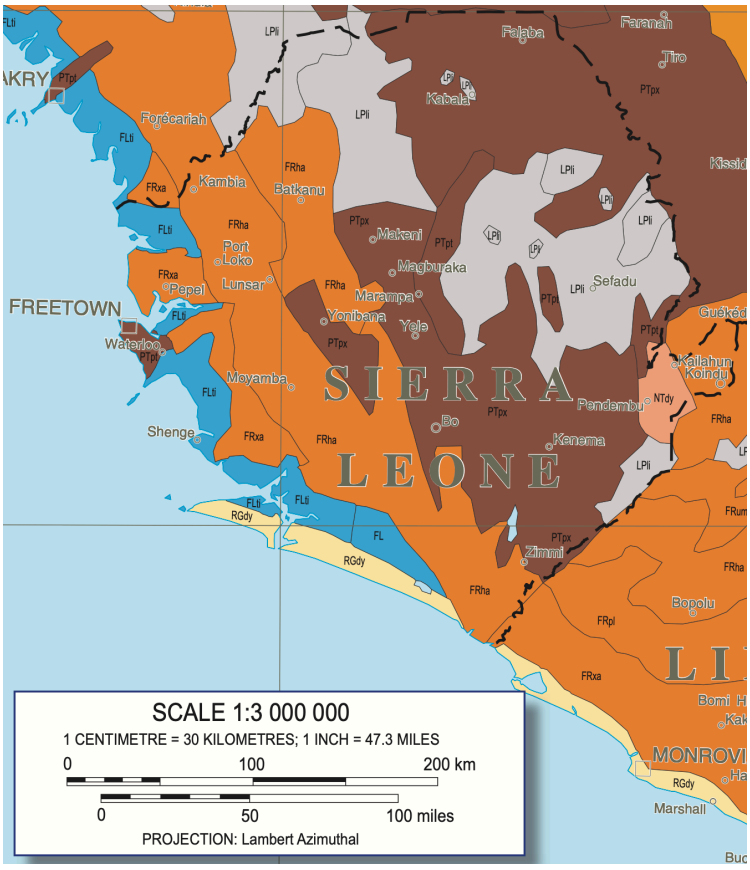

Figure 19: Soil map of Sierra Leone [54]

The JRC soil maps of Africa in Figure 19 indicates a predominance of Haplic Ferralsols (orange, FRha, Strongly weathered soil with low nutrient levels showing no major characteristics), Pisoplinthic Plinthosols (brown, PTpx, Soil with accumulation of iron that hardens irreversibly when exposed to air and sunlight, containing nodules that are strongly cemented with Fe), Thionic Fluvisols (blue, FLti, Soil in floodplains, lakes, deltas or marine deposits, with acid horizon rich in sulphur), Lithic Leptosols (grey, LPli, Shallow soil over hard rock having continuous rock close to the surface) and Dystric Regosols

[54] JRC, African soil Atlas. https://esdac.jrc.ec.europa.eu/content/soil-map-soil-atlas-africa. The EU is currently funding a new soil survey throughout the country at a very fine scale.

(yellow, RGdy, Weakly developed soil in unconsolidated material weathered, acid). Ferralsols are characterised by a low PH and tend to have low yields. Lime enrichment is therefore used to increase soil PH.

Interviewed stakeholders indicated that information on soil types tend to be available at the reconnaissance level and detailed information only at plot or project levels. Soil surveys were undertaken at 1:8,000 and 1:10,000 of three pilot areas in the west, north and south of Sierra Leone using the conventional rigid grid soil mapping methodology[55]. The survey report provided information on coordinates of the sites, agro-climatic regions in which they are located, slope, soil depth, soil profile morphology along toposequences, particle size, exchangeable cations, total nitrogen, organic carbon, pH, and Bray P1 of the horizons of sample profiles.

UNU-INRA indicates that Uplands soils are generally of poor fertility, well drained, have varying but mainly medium textures (sandy loam to sandy clay loam). Soils of the lowlands (inland valley swamps, riverine grasslands, bolilands and mangrove swamps) are in wetland ecologies. They are poorly drained and waterlogging at the surface is of varying durations ranging from less than 1 month to over 5 months. The mangrove soils are of medium to fine textures and the textures of the soils of the other lowland ecologies are variable ranging from sandy to medium textures. They are deeper than the upland soils.

Surface & ground water

Sierra Leone has 12 watershed basins and 9 major rivers, flowing in north-east to south-west directions through the agro-climatic regions into the Atlantic ocean with catchment areas varying from 720 km^2 (Peninsular) to 14,140 km^2 (Sewa) and an estimated annual discharge of 73,770 x 10^6 m^3/year. Catchment sizes are perceived to have declined over time, but there is no quantitative data available to ascertain the extent.

Despite the abundance of water resources, there can be water shortages at the local level for example where swamps have been drained for agricultural purposes and tributaries which used to be perennial have become seasonal.

There is also limited data on status of the groundwater and some are conflicting[56].

Efforts in evaluating groundwater resources notably include UNICEF mapping of favourable drilling areas (Fig. 20).

[55] Ojanuga AG (2007) Land Use Planning for Optimizing Agricultural Production in Sierra Leone. Mission Report TCP/SIL/3101(A).Consultancy Report. Food and Agriculture Organization of the United Nations, Rome

[56] Agricultural Sector Review and Agricultural Development Strategy. Sector report: Water management and irrigation. Food and Agriculture Organization of the United Nations, Rome

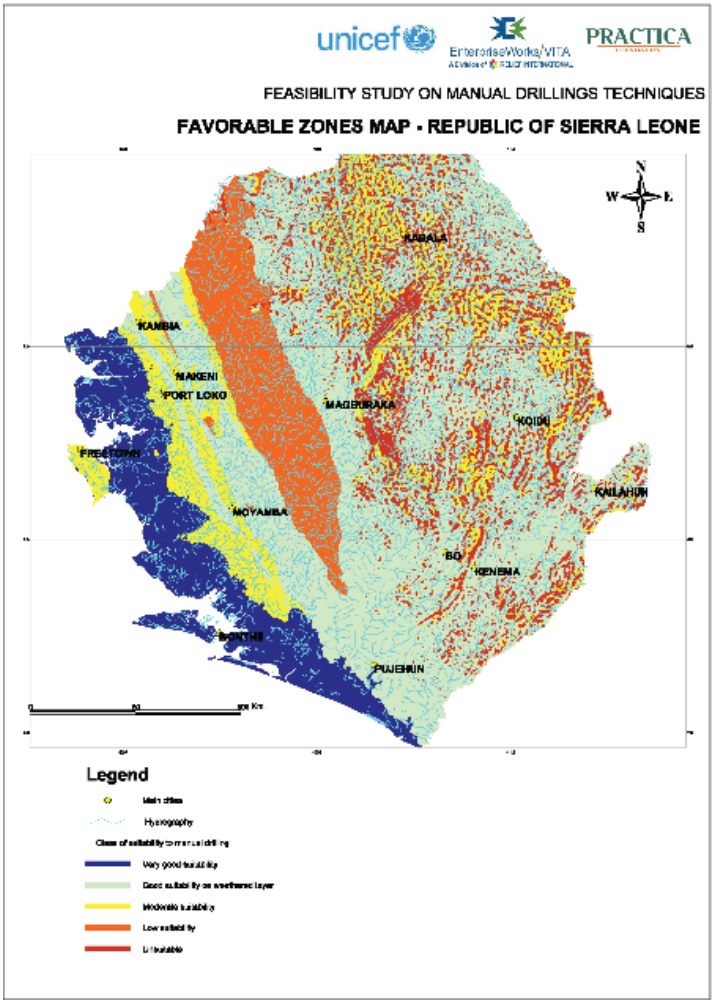

Figure 20: Favourable drilling zones (UNICEF)

Access to water in rural areas

For rural areas (rural settlements and rural communities <2000 people) the Multi-Indicator Cluster Survey MICS 2017[57] shows that access to safely managed water services is only 1% and the access to basic services (using an improved water source within a maximum collection time of 30 minutes) is 47%. Hence, neither the MDG target (69%) nor the National Water and Sanitation Programme target (74%) for 2015 were reached.

Functionality and seasonality are serious and growing problems for rural water services. Comparison between the 2012 and the 2016 functional water points shows that only 30% of the springs, wells and public standpipes provide water all year-round.

[57] Water, Sanitation and Hygiene Sector Performance Report 2017, Ministry of Water Resources and Ministry of Health and Sanitation, 2018

To reach the SDG targets of 100% by 2030 the annual rate of increase would need to double. Especially, the functionality of water facilities needs attention and additional focus is needed on capacity building for community management and private sector maintenance services.

Urban water services

The MICS 2017 data for access to water services in urban areas show 3% access to safely managed water and 69% access to basic water services - water from an improved source within a total collection time of 30 minutes. The statistics are available for urban areas defined as settlements with population of more than 2,000 people and therefore covers rural towns (2,000 to 5,000 persons), small towns (5,000 to 20,000 persons) as well as the urban areas with population larger than 20,000.

Forests

The current types of forest include rainforests, semi-deciduous forests, montane, mangrove, savannah, swamp forests and farm bush (the most dominant). The literature review showed that different figures are used regarding forests in Sierra Leone. In the draft Forest Policy for Sierra Leone 2010, the forest is not defined, but the area of forest is given as 5%, which is exactly the same percentage as given for the "closed high forest" class in 1975. The FAO Global Forest Resource Assessment Report for Sierra Leone for 2010 gives a slightly smaller area of forest (equivalent to about 3.6%) but in the country report of 2015 the forest cover is given as 14.7%, with other wooded land at 61.1%. This is at least partially a definitional issue as the 2015 figure is an aggregation of several land cover classes; closed high forest, secondary forest, coastal woodland, fringing swamp forest, mangrove, Raphia palm swamp, rubber plantations (but not oil palm), savanna woodland (and *Lophira* savanna and mixed species savanna are "other woodland").

Coastal areas of Guinea, Côte d'Ivoire, Liberia, and Sierra Leone are included in the 200 most outstanding and representative areas of biodiversity of the WWF[58]. The tree composition of this ecoregion is quite uniform over long distances, with species such as *Dacroydes klaineana*, *Strombosia glaucescens*, *Allanblackia floribunda*, *Coula edulis* and *Diospyros sanza-minika* being common in many places[59]. Typical canopy dominants of the moist evergreen forest of Sierra Leone include *Heritiera utilis*, *Cryptosepalum tetraphyllum*, *Erythrophleum ivorense* and *Lophira alata*, with small amounts of *Klainedoxa gabonensis*, *Uapaca guineensis*, *Oldfieldia africana*, *Brachystegia leonensis* and *Piptadeniastrum africanum*[60].

Sierra Leone National Biodiversity Strategy and Action Plan (NBSAP) 2017-2026, states that forest-dependent species constitute the highest proportion of species in the country.

The largest stands of high forest in all of these countries are found within so-called 'protected areas' and 'forest reserves'. Despite these titles, the management of protected areas and reserves is assessed by the WWF as poor to non-existent[61].

[58] https://www.worldwildlife.org/ecoregions/at0130

59 Davies, G. 1987. The Gola Forest Reserves, Sierra Leone. IUCN, Gland, Switzerland and Cambridge, UK.

60 Savill, P. S. and J. E. D. Fox. 1967. Trees of Sierra Leone. Government Printers.

[61] https://www.worldwildlife.org/ecoregions/at0130

Mangroves

There are six mangrove species in the Sierra Leone coastal area[62]. *Avicennia germinans* is the dominant species in all the regions except for Sherbro, where *Rhizophora Racemosa* dominates.

Mangroves not only serve as fish nurseries but also host crabs, oysters, shrimp and lobsters and provide feeding grounds for terrestrial mammals such as monkeys and feeding and nesting ground for turtles and birds. Critically endangered species of wintering birds, such as Ringed and Kentish Plover, Sanderlings, and Curlew Sandpipers have also been reported to occur in this landscape.

Total mangrove cover in Sierra Leone is estimated to have decreased by approximately 25% from 1990 to 2017[63] but very unequally among regions: while the decrease reaches 46% in the Scarcies River Estuary, due to widespread conversion of the land to rice farms, mangrove cover has marginally increased in Ywari Bay and Sherbro River Estuary and significantly increased in the estuary of the Sierra Leone river due to reforestation efforts.

Despite deforestation, the remaining mangroves in Scarcies are reported to be in good health, with high species diversity, mature forest and high regeneration level, indicating high regeneration potential should human pressures be lowered or better managed. The opposite situation is in Sherbro, with the lowest species diversification, oldest trees and lowest regeneration rates. SLRE has the youngest forests, a sign of past and current exploitation of the forest, while the Yawri Bay has fewer adult trees but the highest number of seedlings, both showing signs of good potential for regeneration and sustainability[64].

Pressures on the environment

General overview

Sierra Leone ranked 177th out of 180 in the Environmental Performance Index (EPI) for 2020 (Guinea, Côte d'Ivoire and Liberia being respectively ranked 175, 176 and 180)[65].

Sierra Leone scores below the regional average in all categories of the EPI except for ecosystem vitality for Agriculture, which relies on the Sustainable Nitrogen Management Index (SNMI) as a proxy to "measures efforts to support healthy populations while minimizing the threats of agriculture to the environment", and Fisheries, which intends to measure the health and sustainability of the world's fisheries through three indicators: fish stock status, marine trophic index, and fish caught by trawling.

[62] *Avicennia germinans*, *Rhizophora harissonii*, *Rhizophora mangle*, *Rhizophora racemosa*, *Laguncularia racemosa*, and *Anisophylia laurina*.

[63] Trzaska, S., de Sherbinin, A., Kim-Blanco, P., Mara, V., Schnarr, E., Jaiteh, M., & Mondal, P. (2017). CLIMATE CHANGE VULNERABILITY ASSESSMENT IN MANGROVE REGIONS OF SIERRA LEONE.

[64] 6th National report to the Convention on Biological Diversity

[65] https://epi.yale.edu/

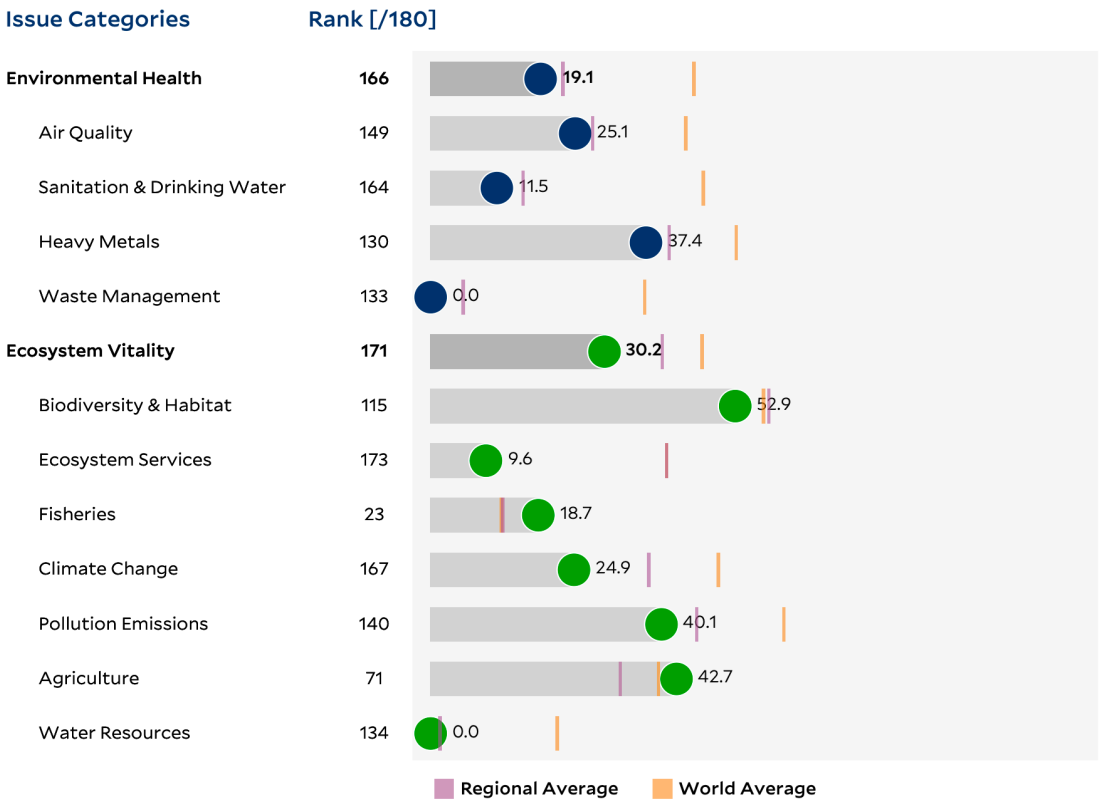

Figure 21: Summary of findings - Environmental Performance Index 2019

Over the last 10 years, the most significant changes concern: a loss in biodiversity (measured by the Species Habitat Index), Tree cover loss and Fish stock status. Increases can be seen in grassland area and wetland area.

The NBSAP presents a ranking of the threats to biodiversity in Sierra Leone. In the graph below, a threat is considered most important if its local application is very injurious to both the species and its habitat, whilst considered least important if its effect is limited

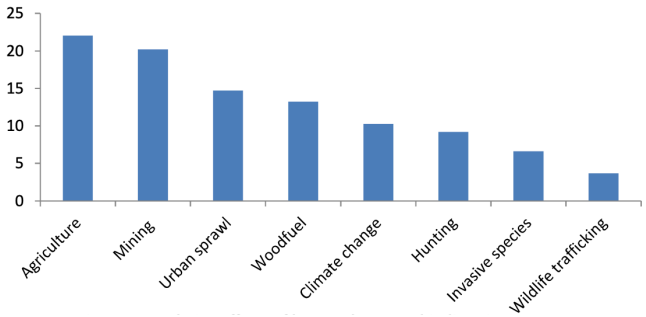

Figure 22: Relative effects of known threats to biodiversity in Sierra Leone (source: NBSAP)

Agriculture

With the population expected to increase significantly and food security remaining a real concern, there is considerable pressure to expand the area of land under agricultural production not only to

feed the country but also to provide crops for export markets[66]. Current subsistence agricultural practices are highly inefficient: slash-and-burn agriculture remains prevalent and contributes to extensive deforestation, bushfires and erosion. All sources consulted during this study refer to forest degradation and habitat destruction through agricultural-related activities being very common, especially in the rural areas.

In the coastal areas, mangrove swamps especially in the north are cleared for rice production, with about 35,000 ha in the north and 5,000 ha in the south[67].

Mining

Sierra Leone's mineral resources include rutile, bauxite, ilmenite, zircon, gold and coltan. Diamond productions are concentrated in Kono, Kenema and Bo Districts. Bauxite deposits and production sites include those between Moyamba and Mano. Rutile production is distributed around Gbangbama, Sembehun, Rotifunk and Kambia. Iron ore has long been mined at Marampa and recently mining activities have begun in Tonkolili. Diamond is one of the country's largest exports. There are large scale mining operations in diamonds, rutile and bauxite and continued small-scale and artisanal mining of gold and diamonds.

Despite the contribution of the sector to the economy, by all indications, mining constitutes one of the most significant threats to ecosystems and biodiversity. Mining of bauxite and titanium dioxide (rutile) in the south-east has resulted in forest loss, with the subsequent dredging leaving large bodies of deep water polluted with heavy metals. These mining activities have also caused perpetual displacement of people and have locally increased the pressure on remaining forests. In other regions of the country where mining for diamonds and gold has occurred, siltation is threatening freshwater fish populations, while hunters have increased their assault on the dwindling wildlife populations in nearby forests to supply bushmeat to the mining settlements.

Artisanal gold and diamond mining are also destroying viable habitats, notably riparian zones and flood plains. Field surveys[68] show that birds that depend on riparian ecologies are absent from river systems that have experienced years of sedimentation from both artisanal and industrial mining activities.

Sand mining, which is generally artisanal, is creating huge localised disturbances to natural aquatic habitats along some sections of the coast (particularly around the Freetown peninsular) and along some of the major rivers and tributaries. Sand mining is also an identified driver of beach erosion[69].

Fisheries

Marine ecosystems already face considerable pressures: fish stocks are declining, a result of overfishing and unsustainable fishing practices[70]. Erosion and the loss of mangrove forests continue to impact coastal fisheries. Meanwhile, rampant illegal, unreported and unregulated (IUU) fishing in

[66] UNEP 2010 - Sierra Leone Environment, Conflict and Peacebuilding Assessment, Technical Report

[67] Fomba, S.N. (1994) Overview of mangrove rice production in West Africa 17 – 20. In training in mangrove rice production. Instructor's manual. Wilson, R.T. and M.P. Wilson (eds) Bartridgepartners. Umberlergh. U.K. pp254.

[68] 6th report to the CBD

[69] https://www.adaptation-undp.org/projects/adapting-climate-change-induced-coastal-risks-management-sierra-leone

[70] UNEP 2010 - Sierra Leone Environment, Conflict and Peacebuilding Assessment, Technical Report

Sierra Leone's waters amounts to estimated losses of USD 29 million per year, representing 25–50% of the country's total reported catch[71].

Mangroves are used as fuel wood, for charcoal production, and construction material. Mangrove swamps and wetlands are bound to be put under further pressure leading to habitat destruction and loss of biodiversity.

Fuelwood

Sierra Leone was once heavily forested (estimates put the country's original forest cover at between 70 to 90%). There is also a growing trend in urbanisation and timber production, which consequently results in deforestation and degradation. The main drivers of deforestation identified by the 6th Report to the Convention on Biological Diversity are: farming, land grabbing, rapid urbanisation, fuel wood consumption, and mining.

The Energy Policy (2009) indicates biomass (fuelwood and charcoal) annual use is estimated to be 1,197 Tonnes of Oil Equivalent, and may increase with the population. This would put the nation's dwindling forest under pressure, which could culminate in extensive deforestation, with negative consequences on climate change, agriculture and water resources, if no significant action is taken. For instance, deforestation in Western Peninsula is already impacting the water reserve of the Guma Water Valley (Guma Dam) on which Freetown is entirely depending on.

At present biomass use is limited to fuelwood and charcoal, although there is great potential for the use of agricultural wastes that could provide over 2,000 GWh of electricity annually. It recognises that biomass will remain the main energy source for the foreseeable future. However, apart from biomass, there are other potential renewable energy sources available for exploitation, including small-hydro, geothermal, wind and solar.

Pressures on land

Sierra Leone follows a customary land tenure system, which has complex practices regarding land use and ownership. It seems not always clear who makes decisions about land and who is entitled to it, as there is no documentation or records of land owners, users, or demarcation, except for the Freetown Area[72]. Further, Agriculture is central to community life and affects vulnerability across all the dimensions.

[71] Seto, K. (2011). Sierra Leone's seas: A project to assess the current status and potential role of marine resources in the development and peacebuilding of Sierra Leone. San Diego: AWIS/CMBC/IICAS/UNEP.

[72] In the Freetown Area, land can be purchased, demarcated and officially registered with a property title.

- The role of Paramount Chiefs and Members of Parliament in approaching communities for negotiations **compromised Free, Prior and Informed Consent**. Furthermore, customary decision-making regarding the agreement to lease land were made by elders of land- owning families and excluded women, junior men, and members of non-land-owning families.
- Companies and local authority figures **used vague references to 'development' to convince land-owners to sign**. There is no clear, transparent record of local content policies, making it difficult to assess how company promises match with community expectations.
- **There are a number of investments that could be classed as 'speculative'.** This has created problems with the transfer/sale of leases that are characterised by limited transparency in who is operating the investment project.
- **Surface rent payments are sometimes made through power-brokers** (such as Paramount Chiefs) whereas they should be made directly to land-owners and communities.
- Gendered effects on food security and farming practices are determined in large part by whether the deal is for upland or seasonal lowland swamp (boliland) agricultural land. Upland plots leased to companies are more likely to result in deficiencies in palm oil, and to push women's vegetable farming into dry season boliland planting, while boliland plots leased to companies are more likely to decrease land used for household and cash crop rice, and increase pressure and competition for upland plots.

Figure 23: Identified issues in land tenure in Sierra Leone[73]

This underscores the importance of tenure assessments and the dissemination of knowledge regarding land tenure and good practices on land tenure management.

Pressures on coastal zones

Coastal resources and values are increasingly undermined by the ever-changing environmental conditions. For instance, in recent decades, intense and frequent flash floods and storms, with four major floods affecting up to 220,000 people in the last 15 years, have had significant effects in coastal Sierra Leone (World Bank 2017). Still, stakeholders estimate that further research is needed to quantify the trends and impacts of climate change on the coast.

According to the State of the Marine Environment (2015), the problems of the nearshore and coastal zones pose the most pressing threats to the marine environment. These threats are primarily terrigenous in origin and are related to sewage disposal and pollutant run-offs. The assessment also reveals that the trend of increasing pressure on the environment will certainly continue for as long as urban migration remains high. Such issues requiring priority attention include the potential threats of invasive species, marine litter, increasing uncontrolled coastal development leading to habitat degradation and changing land-use patterns, and climate change.

[73] Ryan, C. (2018) 'Negotiating and implementing large scale land deals in Sierra Leone. Improving transparency and consent.' Policy Brief 6. LANDac, Utrecht.

Another identified challenge is the lack of a proper database and information systems on the environmental conditions of coastal zones.

Wildlife trafficking

Often disregarded, wildlife trafficking is becoming a serious threat to Sierra Leone's biodiversity, as indicated in the NBSAP. The wild bird trade target species included estrilids, hornbills, timneh parrots[74], orioles and starlings among others. The skins of most other species are the main reasons for hunting them, rather than food. Skins of pangolins, pythons and boars, crocodiles and the shells or turtles and tortoises are smuggled out of the country. Currently, the most significant threat comes from cross-border activities through the Republic of Guinea, for live trophies, and to a lesser extent, Liberia, where monkey and other bush meat are delicacies.

Air pollution

Sierra Leone is rated as the 17th most vulnerable country in terms of air pollution (WHO). Most of the air pollution comes from domestic sources including kitchen smoke, bush fires and automobile exhaust pipes. Mining also has a great effect on air quality and dust generated by mining activities is a serious cause of illnesses, causing respiratory diseases and asphyxia of plants and trees. Both types of workers in mining companies or open-pit mines are affected.

Water pollution

There are several causes of water pollution in Sierra Leone, the most common being sewage effluents and surface run-offs into boreholes, streams and rivers. In most parts of the country, boreholes and rivers are the means by which most of the water is supplied for drinking and domestic, agricultural, and industrial use. Pesticides are also used to control pests of rice but also malaria, schistosomiasis and onchocerciasis. Oil palm plantations and sugar plantations use inorganic fertilisers without being subject to strict controls and are suspected to contribute to increase pollution levels of their nearby aquifers.

In 2012, Sierra Leone experienced the worst cholera outbreak in its history, having over 20,000 cases with 392 deaths. The main cause of the outbreak was as a result of the heavy rainfall and flooding combined with poor hygiene practices, unsafe water sources, and ineffective waste management in the country.

About 95% of all industries in the country are located in Freetown, exacerbating the water quality problem in the capital city. Further, about 70% of all households in Freetown and big towns use pit latrines. About 20% have cesspits and 10% use rivers, coastlines and the bush. In the smaller settlements 80% of the inhabitants use the beaches as toilets. In Freetown sewage from pit latrines and cesspits are only partially treated and discharged into the sea. In addition, untreated sewage is discharged directly into the Sierra Leone River Estuary through four main sewer lines or outfalls (Murray Town, Kingtom, Government Wharf and Cline Town) that are close to bays and creeks. Solid waste collected in Freetown is disposed of at two dumpsites: Granville Brook[75] and Kingtom. Some part of these wastes is eventually washed out to sea. Coastal populations deposit their solid waste on the beaches.

[74] Timneh parrot: formerly classified as a subspecies of the grey parrot Psittacus erithacus timneh, it is now considered a full species Psittacus timneh.

[75] Estimate of about 66T of solid waste being deposited every month (Nyuma, 2000), probably much higher now

Vulnerability

Vulnerability to disasters

According to the National Disaster Preparedness and Response Plan (Draft) the disasters to which Sierra Leone is prone are related to the following natural hazards:

1. weather and climatic hazards: droughts, water shortages, tropical storms, and lightning
2. geological hazard: coastal and upland erosion, mud and landslides, rock falls
3. ecological hazards: bush fires, deforestation and pollution
4. pest hazards: insect, and animal pest and livestock diseases
5. epidemic hazards: HIV/AIDS, cholera, malaria, typhoid, lassa fever, tuberculosis and yellow fever.

The Hazard and Risk Profile Information System[76] HARPIS also established the following National risk profile.

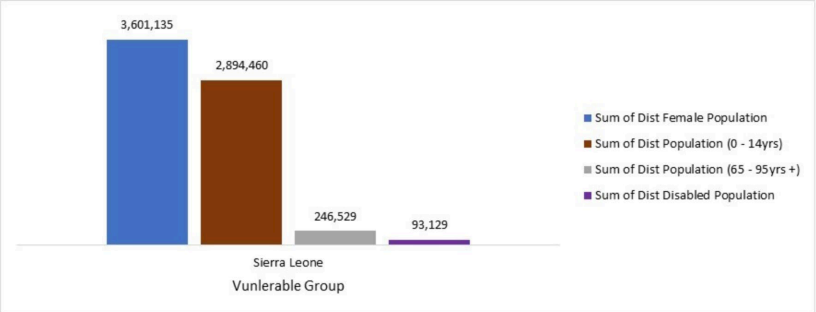

Figure 24: Vulnerable groups - HARPIS website

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

Country	Hazards	Frequency Scale					Magnitude Scale				
		1	2	3	4	5	1	2	3	4	5
Sierra Leone	Landslides										
	Flooding										
	Coastal Erosion										
	Drought										
	Epidemics										
	Storm Surge										
	Tropical Storm										
	Thunder and Lightning										
	Sea Level Rise										

Figure 25: HARPIS analysis of disasters risks in Sierra Leone

[76] https://www.harpis-sl.website/index.php/hazard-profiles/sierra-leone-hazard-profile, under the UNDP sponsored "Update of Sierra Leone Hazard Profile and Capacity Gap Analysis Project"

These scores can be explained through the following information.

Epidemics: More than 14,000 Sierra Leoneans were infected of the Ebola Virus Disease (EVD) in 2014, of whom nearly 4,000 died. Between 1980 and 2010 epidemics (malaria, cholera and typhoid) were responsible for 83% of the total number of deaths due to disasters, with 1,103 people dead and 13,447 affected. Three people died of Lassa fever in Kenema in 2017. The COVID19 pandemic also affected Sierra Leone with more than 1500 confirmed cases and 60 people dead (as of 3 July 2020).

The impacts of **floods** in Sierra Leone have been largely increasing over the last decades. Between 1980 and 2010, floods affected approximately 221,204 people, with 145 casualties. Important events include: September 2015 in Freetown, affecting more than 3,000 people; and in 2017, with floods in the Nongowa Chiefdom and Lower Bambara Chiefdom, and across different parts of Freetown City. The primary cause of flooding in Sierra Leone is tropical rains, lack of urban planning and of block drainage in urban areas.

Landslide disasters accounted for 42% of nationally reported geophysical/geohazard mortalities between 1990 and 2014. In August 2017 one disaster alone left over 500 people dead, some 600 missing, with about 50,000 directly or indirectly affected in the densely populated Freetown. The impact of landslides and mudslides in Sierra Leone is highly concentrated in the Western Area where the combined effects of steep slopes, heavy rainfall, and unabated deforestation and construction provide a perfect recipe for mass movements.

Coastal erosion in Sierra Leone is accelerated due to anthropogenic activities notably sand mining and poorly planned coastal infrastructure development adding stresses on the coastal ecosystems. The effect of sea level rise induced by climate change has led to the physical alteration of the coastline and destruction of structures as well as displacement of people in the coastal communities of Yeliboya and Kortimor (north coast), Shenge and Plantain Island (south), Adonkia, Mahera Beach (Lungi area) and Konakridee.

Drought: North-eastern parts of the country experience longer usual dry spells at dry season peak (February/ March). This leads to reduction in the water table and lead to drought-like conditions. Crop failure, freshwater shortages, wildfires and disease outbreaks, have been attributed to longer dry spell periods, countrywide. Areas which have been identified as vulnerable to long dry spells are communities in the extreme north of Koinadugu District (Kabala) and Kono District.

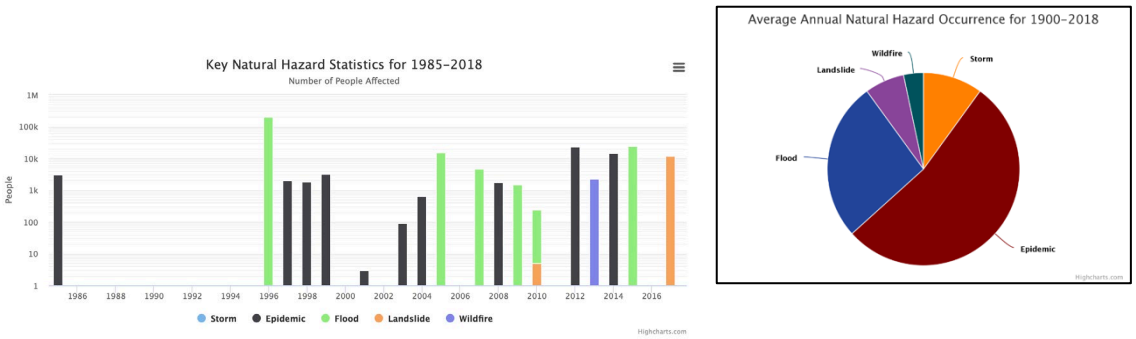

Figure 26: Key natural hazards statistics for 1995-2018[77]

[77] https://climateknowledgeportal.worldbank.org/country/sierra-leone/vulnerability and https://climateknowledgeportal.worldbank.org/country/sierra-leone/vulnerability

Further, according to the Welthungerhilfe vulnerability assessment[78], vulnerability is strongly tied to agricultural activities and land.

More specifically, the main determinants of vulnerability of WHH study area were:

- lacking membership in a Land Owning Family (LOF),
- having no access to leadership,
- having no cash crop fields,
- being a female- headed household.

Vulnerability to climate change

There are different rankings for climate change vulnerability, and all tend to agree on the particular vulnerability of Sierra Leone. Indeed, Sierra Leone was recently considered the 2nd most vulnerable country in the world to the adverse effects of climate change[79].

The Global Adaptation Index (GAIN) places Sierra Leone in the 147th position out of 181 countries, while it was ranked 161 in 1995. GAIN comments on "a great need for investment and innovations to improve readiness and a great urgency for action. Sierra Leone is the 26th most vulnerable country (with specific weaknesses on agriculture, dam capacity, and medical staff) and the 57th least ready country (with issues in the economy and education sector)".

The Climate Risk Index (Germanwatch), which analyses to what extent countries and regions have been affected by impacts of weather-related loss events (storms, floods, heat waves etc.) by using the most recent data available — for 2017 and from 1998 to 2017, places Sierra Leone as the 8th most vulnerable country. This can be seen as a consequence of the mudslide which took place on August 2017, as Sierra Leone was in position 120 in 2016.

At a more local level, the climate change vulnerability assessments for the Sierra Leone Coastal Landscape Complex (WABICC) confirmed the vulnerability of coastal areas to the effects of climate change and human activities and highlighted varying levels of exposure, sensitivity, and adaptive capacity. For instance, in the case of coastal Sierra Leone, people in the Scarcies region are more exposed to climate change threats but have a higher adaptive capacity and are willing to engage in mangrove restoration activities. On the contrary, in the Sherbro region, villages were less exposed to climate change impacts but had lower adaptive capacity. As the mangroves of Sherbro are in better shape than in the Scarcies, the communities are less willing to restore degraded mangrove areas.

The characterisation of climate impacts remains poorly described in most of documents, except in specific vulnerability studies or localised plans such as the Coastal Climate Adaptation plan.

[78] Rural Vulnerability and Inequality in Eastern Sierra Leone: Findings from the Field, Annie Werner, 2018

[79] Maplecroft 2015, https://reliefweb.int/map/world/world-climate-change-vulnerability-index-2015

Chapter III: Environmental and Climate policies, legislative and institutional frameworks

Environmental policy and legislation

This section focuses on the principal laws, regulations and policies that address environmental issue, giving more details on those issued after 2006.

Legislation

- **Wildlife Conservation Act, 1972,** is the primary piece of legislation governing the protection of wildlife in Sierra Leone. The Act established the categories of land to be set aside for wildlife protection. It was supposed to be replaced by the **Draft Conservation and Wildlife Policy and Act, 2011**. The draft Conservation and Wildlife Policy sets out five principles for wildlife management (sustainable management, rights-based governance, economic and social benefits, integrated wildlife conservation and culturally-sensitive, knowledge-based conservation) and recommends action in five areas (species management, conservation areas, research and monitoring, education and awareness, and capacity building).
- **Forestry Act, 1988**. Forest legislation started in 1912 in Sierra Leone. The principal legislation governing the management and regulation of forestry and Forest Reserves in Sierra Leone remains the 1988 Act, which gave the Ministry of Agriculture Forest and Fisheries, and in particular the Forestry division the power to protect and conserve water, soil, flora and fauna. It also enacted significant provisions promoting a more efficient management and rational use of the country's forest resources in order to achieve a combination of benefits through forest production, forest protection and non-forest uses. This act despite been considered as a step forward, was poorly applied in practice, more so, due to poor monitoring by officials from the forest division at MAFFS, which then led to one of the highest levels of illegal access, particularly in the protected areas[80].
- The **Draft Forestry Policy and Act** is under preparation since 2010 to replace the 1988 Act. It set out according to similar guiding principles as the draft Conservation and Wildlife Policy and establishes a set of policy objectives around forestry land management, forest-based industry and practices, ecosystem conservation, education and awareness, research and monitoring, and capacity building. The new Act shall acknowledge the environmental role of forest areas and places emphasis on the preservation of the forest environment.
- **The Environment Protection Agency Act 2008** (amended July 2010) established the Sierra Leone Environment Protection Agency (EPA) to provide for the effective protection and management of the environment and other related matters. The 2010 amendment gave the Office of the President Oversight responsibility of the Agency. In 2010, an Environmental Impact Assessment License Regulations was prepared as a statutory instrument that outlines the regulations for the application, issuance, fees for license and monitoring of the activities of license holders.
- **National Protected Area Authority and Conservation Trust Fund Act, 2012** provides for the establishment of the National Protected Area Authority (NPAA) and Conservation Trust Fund (CTF). The Act promotes biodiversity conservation, wildlife management, research and ecosystems services in national protected areas. Part III of the Act states the role of the NPAA, an arm of MAFFS, with the mandate of managing all areas dealing with improvement of the

[80] Konteh, W. Forest Resource Management in Sierra Leone: A Critique of Policy Formulation and Implementation. Ph.D. Thesis, Leeds University, Leeds, UK, 1997.

environment, and more so, ensuring (forest) protected areas are effectively managed, and to promote sustainable land use practices and sustainable environmental management. The mandate of the CTF is to generate resources and financing for biodiversity conservation interventions through NPAA and where possible capable partners in conservation. In this regard, the effective delivery of the NPAA interventions partly depends on the input of the CTF. The review of this Act is underway, to empower the Trust and make sure more avenues of revenue generation are created, including with regards to the CTF.

- A **Wetland Conservation Act (2015)**, formulated by the NPAA, focuses on improving the sustainable management of priority wetland ecosystems across the country.
- **The National Water Resource Management Act (2016)** aims at providing "equitable, beneficial, efficient, and sustainable" use and management of the country's water resources. It also establishes a National Water Resource Management Agency and a Water Basin Management Board and Catchment Water Resource Management Committees for the management of the water resources and for other related matters. Part VII of the Act is about water use and permit procedures. The provisions require permit for water use in all major categories including domestic, commercial, municipal, industrial, agricultural, power generation, water transportation, fisheries, environmental, underwater wood harvesting, and recreational water use.

Other legislation of interest includes:

- **The Mines and Minerals Act (2009)**. Building on the 1994 Act it includes social and economic benefits, transparency, and other matters. It also encompasses areas dealing with administration; ownership of minerals; and acquisition of mineral rights and surface rights prospecting and exploration licenses; and several new areas including dredging, underground mining, health and safety, EITI etc. The Act introduces stricter rules for administrators and mineral rights holders, including reporting requirements. The act addresses water quality issues related to mining activities in the nation, including any freshwater dam and the waters impounded thereby to be left intact on cessation of operations or termination of a mineral right.
- **The Petroleum exploration and production Act of 2011** defines pollution as any direct or indirect alteration of the physical, thermal, chemical, biological, or radioactive properties of any part of the environment that affects any beneficial use adversely, to cause a condition which is hazardous to public health, safety, or welfare, or to animals, birds, wildlife, fish, or to plants. Territorial waters, under this Act, refers to the sea and inland waters, and territorial sea means any part of the open seas within twelve nautical miles of the coast of Sierra Leone measured from the low water mark.
- **The Environment Protection (Mines and Minerals) Regulations 2013**. In the exercise of Section 62 of the Environment Protection Act of 2008, the Environment Protection Regulations (Mines and Mineral) was developed to regulate the activities of extractive industries and projects including mining, quarrying, extraction of sand, gravel, salt and peat.

Policies and plans

- **The National Environmental Policy (1994)** remains the reference policy for environment. It seeks to ensure sound environmental and natural resources management throughout Sierra Leone. The key objectives are to encourage and facilitate local participation in environmental governance practices; secure an environment that is adequate for the health and wellbeing of communities and ecosystems; and foster learning and knowledge exchange through public education campaigns and programmes.
- **The Regional Development Authorities Policy (2007).** Like the Local Government Act (2004), it provides for the use of local-level institutional arrangements to ensure equitable and balanced

national sustainable development planning and effective natural resources management. The policy has a direct bearing on streamlining and strengthening the roles and functions of community-based structures in rural and coastal zone development and management.

- **The National Land Policy** (approved by Cabinet in November **2015**) is part of efforts to reform land policies in the country and incorporate good practices related to gender.
- A **National Agriculture Policy** approved by Cabinet in **2019** has a component on green agriculture and protection of the environment.
- **The National Disaster Management Policy (Draft, 2006)** and **National disaster preparedness and response plan (NDPRP)** remain the national references for Disaster Risk Reduction. They give strategic directives to the government on steps to be taken before, during and after disasters. The objectives of the Draft Disaster Management Policy are to:

    - Ensure the integration of disaster risk management into sustainable development programmes and policies to ensure a holistic approach to disaster management
    - Ensure priority and requisite institutional capacities for disaster risk reduction at all levels
    - Enhance the use of knowledge, education, training, innovation and information sharing to build safe and resilient societies
    - Improve the identification, assessment, monitoring and early warning of risks.

Analysing the National Disaster Preparedness and Response Plan (draft) and its identified potential disasters, identified key legal issues include: customs duties, delays and restrictions on goods and equipment, facilitation of services for international relief actors (i.e. entry fees and visa for personnel, obtaining legal status for relief providers and their organisations, recognition of professional qualifications, quality of goods and accountability to beneficiaries) and, last but not least, coordination between relief providers to avert duplication[81]. Also, a National Disaster Preparedness Baseline Assessment (NDPBA) is underway since late 2018.

- **Climate Change policies**. Most of the country's policy response to climate change is centred around internationally motivated directives from the United Nations Framework Convention on Climate Change (UNFCCC), such as the Initial Nationally Determined Contribution, (INDC), the National Adaptation Programmes of Action (NAPAs), National Communications etc. Other country-wide laws, policies, and plans exist, but they focus more on the management of natural resources with very scant consideration of climate change.
- **Intended/Initial Nationally Determined Contribution (ratified 2017)**[82]**,** which includes prioritised activities for the transition to a low-carbon, climate resilient economy; information for financing adaptation actions; and monitoring and control procedures. Key priority actions for adaptation include: a review and adoption of the draft climate policy; establishment of enabling legislative frameworks; establishment of a National Climate Change Council; and strengthening of the existing National Climate Change Secretariat as the key agency for climate change response in the country. Priority climate change response strategies in the INDC include: a comprehensive assessment of vulnerability and GHG contributions; management of rangelands; restoration of degraded areas using soil and water conservation approaches; management of coastal areas and

[81] International Disaster Response Laws (IDRL) in Sierra Leone Legal preparedness study for strengthening the legal and policy framework for foreign disaster response.

[82] The official document has been published as the "Intended Nationally Determined Contribution" even after its ratification, and today national stakeholders usually refer to it as "Initial Nationally Determined Contribution".

fisheries; promotion of early warning and observation systems; improvement of local adaptive capabilities through safety nets and insurance schemes; and integration of disaster management, land tenure, extractives, tourism, and health matters into climate change actions and legislation. The INDC is analysed in detail in Annex I.

- **National Adaptation Programme of Action (2007),** which documents information and resources used in the identification and prioritisation of strategies for climate change adaptation in the country. The Sierra Leone NAPA recommends climate adaptation projects under the following themes: establishment of early warning systems to facilitate effective climate awareness and education; development of an integrated natural resources and environmental management programme; promotion of renewable energy systems; management and protection of forest reserves and catchment areas including wetlands; improvement of energy efficiency and conservation to reduce deforestation for fuelwood and charcoal; development of an integrated coastal zone management plan; development and enactment of appropriate policies and laws; delineation and restoration of degraded vulnerable coastal habitats and ecosystems.
- **National Biodiversity and Strategic Action Plan (2017-2026)**, which seeks to protect marine and coastal biodiversity by strengthening technical research, developing and applying landscapes, establish Marine Protected Areas (MPAs), foster broad stakeholder participation, facilitate learning and knowledge exchange, and promote positive attitudes through communications and education.

  There is a long list of Priority Legislative actions expected during the NBSAP 2017- 2026 implementation, which illustrates the difficulties to progress at this level. This list includes:

  - The enactment of the draft reviewed and amended 1972 Wildlife Conservation Act and its Regulations of 2015.
  - The enactment of the draft reviewed and amended 1988 Forestry Act and its Regulations of 2015.
  - Enactment of the draft Wetlands Conservation Act and its Regulations of 2015.
  - A review of the Mines and Minerals Acts of 2008 to incorporate biodiversity conservation considerations.
  - Introduction of policy, guidelines and regulations that incorporate biodiversity into urban development.
  - Review of GoSL's decentralisation policy to include a strong biodiversity component.
  - Development of policy and regulations for the utilisation and conservation of inland wetland ecosystems.
  - Review of the land tenure and ownership system with the purpose of ensuring a strong element of land preservation for biodiversity.

  The new NBSAP 2017-2026, which preparation started in 2012 with a first version intendedly starting in 2014, recognises that former national biodiversity plans (i.e., 2004-2010) had a "fair share of successes and challenges". It also indicates Sierra Leone's biodiversity has gone through a period of slow, but steady decline since the colonial era, although the situation is not unique to the country, justifies the need for special action on biodiversity.

  The implementation process is difficult to assess because of the lack of adequate information on progress that have been made since its adoption. However, some noticeable progress has been made in a number of action plans that were specified in the document. Some of the major achievements of the implementation of the strategy and action plan are in the area of education and awareness-raising on the importance of biodiversity in general to human survival, and the establishment of protected terrestrial and marine areas. Though a wide range of projects have been undertaken in diverse areas of biodiversity conservation including habitats and species, some experts claim the overall level of implementation of 2003 NBSAP's objectives to be relatively

low. One of the assessments put the overall achievement at less than 50%, and that 70% of the objectives had a success rate of less than 25%.

- **Integrated Coastal Zone Management Plan (2015),** seeks to harmonise existing plans for the management of the coastal zone and formalise collaboration between and among concerned sectors. The ICZMP lays out four pathways for improving coastal ecosystems management in Sierra Leone, including: increase knowledge generation and conversion into effective management actions; adopt an adaptive collaborative management approach for design and delivery of coastal management institutions and interventions; follow thorough procedures to manage for results, thus improving monitoring, ownership, and accountability.
- A **Coastal Climate Change Adaptation Plan** has been developed (latest version: 2020) to contribute towards increasing resiliency and protecting coastal ecosystems across the Sierra Leone Coastal Landscape Complex (the Bonthe-Sherbro River Estuary, the Scarcies Region, the Sierra Leone River Estuary and the Yawri Bay landscapes) and beyond. The plan proposes a fundamental shift in the way practitioners and climate change risk managers work together to protect and restore critical coastal ecosystems and bolster sustainable livelihoods. In addition, the plan advocates for the use of proven best practices, building on previous and ongoing efforts to create fair, equitable and lasting adaptation solutions in coastal West Africa. It is anticipated that this plan will also foster a new culture that prompts practitioners and policy-makers to mainstream consideration of climate change risks, vulnerabilities, and adaptation into decision-making
- **National Climate Change Strategy and Action Plan** includes mechanisms and frameworks for climate adaptation and resilience-building at the national, district and community levels. The plan was supported by UNDP and validated in 2015.

International agreements and processes

Multilateral Environmental Agreements

The Environmental Protection Agency serves as the Focal point for all Multilateral Environmental Agreements, including:

- United Nations Framework Convention on Climate Change, ratified in 1995,
- Kyoto Protocol, ratified access in November 2006,
- Paris Agreement, for which Sierra Leone prepared its INDC in 2015,
- United Nations Convention to Combat Desertification (UNCCD), accessed in 1997,
- Ramsar Convention, on wetlands, ratified access in 1999,
- Convention on Biological Diversity (CBD), since December 1994,
- Nagoya Protocol accessed in November 2016 and the Cartagena Protocol in June 2020,
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), accessed in January 1995,
- Montreal Protocol, Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa: Sierra Leone planned to access in 2017 but is still not a party,
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal: Ratified 20 October 2016 and acceded on 1 November 2016. Entered into force 30 January 2017. Sierra Leone is Party Member nº185 (of 187 signatories).

- Rotterdam Convention on Prior Informed Consent Procedure for certain Hazardous Chemicals and Pesticides in International Trade – Ratified 20th October 2016 and entered into force on January 2017. Sierra Leone is Party Member nº156.
- Stockholm Convention on Persistent Organic Pollutants. Acceded on 29 September 2003 and entered into force in May 2004.

REDD / REDD+

Reducing Emission from Deforestation and Forest Degradation (REDD) started in 2008 in Sierra Leone, supported by the UNEP and the Forest Investment Programme (FIP), hosted by the World Bank. In Sierra Leone, a new strategy was launched in July 2013 (with initial capacity building programme piloted earlier on May 2013) to assess compliance and readiness by officials to implement the scheme. This was supported by the EU through the project: "REDD+ capacity building in Sierra Leone (Global Climate Change Alliance)[83]". The purpose was to generate basic institutional, technical and social conditions and experience for sound forest governance, benefit from REDD+ initiatives according to a pro poor approach and for the development of renewable energy. The REDD+ initiative was seen as a compensatory scheme to support the rural poor in reducing their destructive acts of deforesting the environment while enhancing their skills through community initiatives through community initiatives like community-based forestry and agroforestry. In Sierra Leone as a whole, the true impact at community level in general is not well known. Yet, the positive experience of the Gola Rainforest National Park can be underlined: it has achieved REDD+ certification and is now selling carbon credits. Positive impacts on the communities are documented.

Kimberley Process

The Kimberley Process (KP) is a joint initiative from governments, industry and civil society to stem the flow of conflict diamonds – rough diamonds used by rebel movements to finance wars against legitimate governments. The trade in these illicit stones has fuelled decades of devastating conflicts in countries such as Angola, Cote d'Ivoire, the Democratic Republic of the Congo and Sierra Leone. The Kimberley Process Certification Scheme (KPCS) imposes extensive requirements on its members to enable them to certify shipments of rough diamonds as 'conflict-free'. As of September 2007, the KP includes 74 countries. The UN Resolution on Sierra Leone diamonds was lifted in 2003 when the KP came into effect and since then all legally won diamonds have been exported in compliance with the minimum requirements of the KP.

Institutional framework

Environment

The Environment Protection Agency (EPA) was established by an Act of Parliament in September 2008 as a semi- autonomous institution in the Office of the President, and is the principal organ of government responsible for coordinating, monitoring, regulating and supervising all matters relating to the environment in Sierra Leone. The Agency also serves as the national focal point for the Global Environment Facility (GEF) and MEAs including the Convention on Biological Diversity (CBD) in Sierra Leone. It also is the Nationally Designated Agency (NDS) for the Green Climate Fund.

[83] Period: 2012-2017, reference: ENV/2011/023-261

Its mandate is to implement government's environment policies, plans, and programs and to coordinate, monitor, regulate, supervise and advise on all issues of the environment in Sierra Leone and serve as a focal point for all international environmental matters.

Its 10 core functions are a clear indicator of its overarching position on environmental issues:

- *Environmental policy making and legislation*. Responsible for the formulation of policies on all aspects of the environment. It also initiates legislative regulatory proposals, standards and guidelines on the environment in accordance with the EPA Act of 2008.
- *Pollution control*. Prescribe standards and guidelines relating to ambient air, water and soil quality, the pollution of air, water, land and other forms of environmental pollution including the discharge of wastes and the control of toxic substances.
- *Overall coordination*. Coordination of all environmental management efforts among government institutions, international and regional organisations, and other related institutions.
- *Education and Awareness raising on the Environment*. Responsible for the creation of public awareness of the environment and its importance to the economic and social life of Sierra Leoneans.
- *Enforcement and Compliance*. Ensures compliance with laid down environmental impact assessment procedures in the planning and execution of development projects, including compliance in respect of existing projects.
- *Environmental Impact Licensing*. Reviews and approves environmental impact assessments and environmental impact statements submitted in accordance with the EPA Act of 2008 or any other sector law.
- *Environmental Integration*. Ensures the integration of environmental and climate change concerns in overall national planning by developing modalities and maintaining linkages or partnerships with relevant Government Ministries, departments and Agencies.
- *Environmental Research*. Undertakes such studies and submits such reports and recommendations with respect to the environment as the Government or Board may consider necessary.
- *Mobilise, expedite and monitor resources for environmental management*. Develops plans and programs with environment management issues that can be funded from multiple funding sources.
- *Strengthen private sector involvement in Environmental Management*. Liaise with the private sector, non-governmental agencies, Community Based Organisations on issues relating to the environment.[84]

The EPA has a Board which provides direction and makes decisions on the environment. The Executive Chairperson oversees all activities of the Agency and the Office of the President has oversight responsibility of the Agency as referenced in Section 17 subsection (1) of the 2010 EPA Act. As an EPA staff member observed, “if [the EPA’s] power and authority is equal to all other ministries, [the] authority of the EPA would not work. The EPA’s proximity to the President has simultaneously reinforced and undermined its position in the government”[85].

[84] Management and functional review of the EPA, 2018

[85] J. Duke, 2017

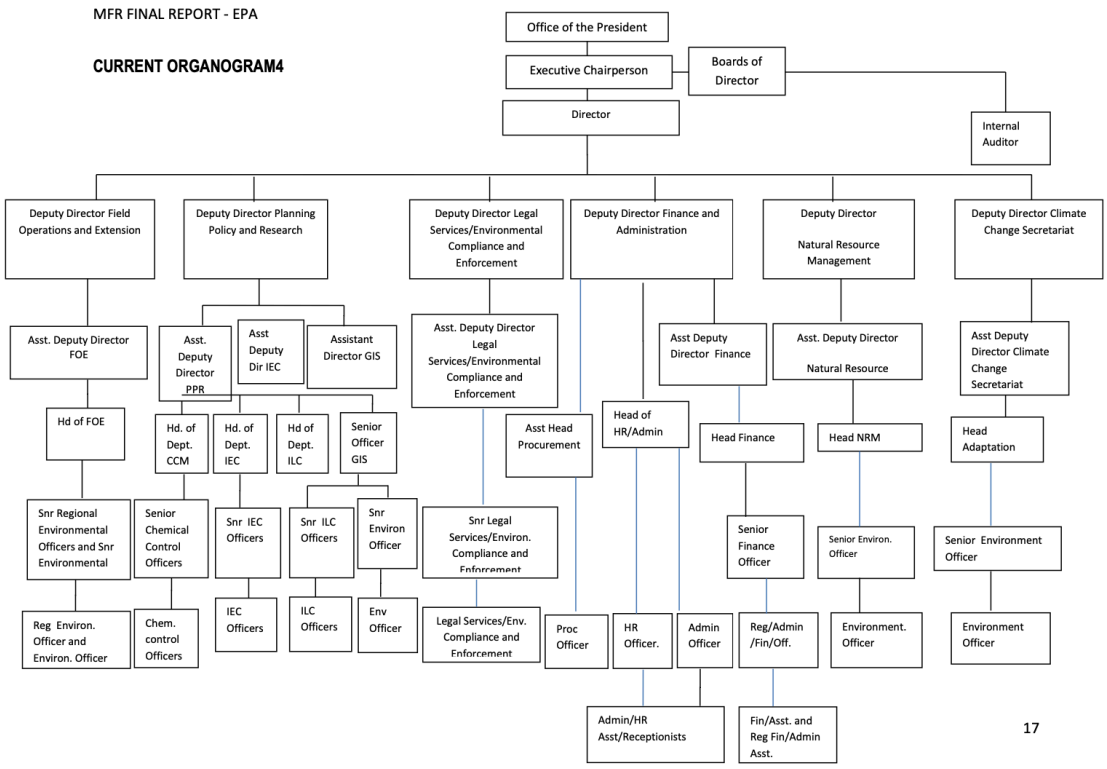

Figure 27: Current organogram of the EPA

The "management and functional review of the Environmental Protection Agency" (2018) proposes 26 recommendations going from the statutory framework organisational structure (including to restructure and simplify the organogram, Fig. 27), human resources management and training, to budgetary and financial procedures, records management, logistics and communication.

- **Ministry of Environment.** A Ministry of Environment was created in 2019 and a Minister of Environment appointed in November 2019. Discussions are still ongoing with other Ministries related to environmental resources (including, Ministry of Agriculture, Forestry, and Food Security and Ministry of Lands, Country Planning) to define the mandate of a Ministry of Environment and relationship with environmental institutions and stakeholders.
- **Ministry of Agriculture, Forestry, and Food Security (MAFFS)**, notably hosts the Forestry Division and the National Protected Areas Authority (NPAA), is responsible for conserving protected areas, and preventing further degradation including in the coast.
- **Ministry of Fisheries and Marine Resources (MFMR)** is responsible for developing and managing fisheries and marine resources across the country. In this regard, MFMR also leads in establishing Community Management Associations (CMA) and getting them to work, undertaking coastal livelihood support interventions, and providing technical advice for the establishment and running of Marine Protected Areas (MPAs) which also involves formulating and enforcing laws and policies as applicable.
- **The Disaster Management Department (DMD**) of the Office of National Security (ONS) led the development of a Disaster Management Policy, Strategy and Action plan, which were approved by the National Security Council in November 2015. DMD has also established a centralised DesInventar database and conducted trainings to increase staff capacity for efficient collection, processing and dissemination of disaster-related data.
- The **National Minerals Agency (NMA)** is a semi-autonomous government agency that was legally established with the passing of the National Minerals Agency Act in March 2012. The NMA has

responsibility for administration and regulation of the minerals sector. The Ministry of Mines and Mineral Resources retains responsibility for policy making in this sector, but the NMA will take on responsibility for policy implementation.

Environmental issues at local level are also dealt with:

- Local Councils (including District Councils) take care of legalising community by-laws using procedures set out in the Local Government Act (2004). As such, MAFFS has devolved forest governance to local councils, and MFMR devolved the functions of managing/licensing artisanal fisheries in coastal districts.

- Traditional authorities (such as Chiefs, Headmen etc) who are custodians of land and have a mandate to make and enforce by-laws that ensure effective governance of common property resources. Management practices follow provisions in the Local Government Act (2004) and the Chieftaincy Act (2009).

Climate Change

The coordination of climate change activities is the responsibility of the Climate Change Secretariat (CCS) under the Office of the President. This secretariat is housed at the Environmental Protection Agency (EPA).

The Secretariat provides guidance and direction for the formulation of a national climate change policy and strategies in line with the National Agenda. It ensured the domestication of the climate change convention and its related instruments through the mainstreaming of climate change into national development planning and budgeting. The Secretariat also ensured that line ministries would be informed of the important outcomes of the decisions of the Conference of the Parties to the UNFCCC.

The CCS receives quarterly guidance on climate change issues from a committee composed of government, NGOs and universities. This committee has the potential and mandate to build institutional links between various agencies on the cross-cutting issues of climate change adaptation, including disaster management, agricultural development and infrastructure design and planning.

The EPA also hosts the National Adaptation Planning focal point. Yet, the National Focal Point for the UNFCCC is housed within the National Meteorological Agency.

Also, the Office of National Security and Disaster Management Department oversees adaptation and resilience-building after major disasters in the country.

There is also an informal climate change coordination committee that meets irregularly in Freetown to discuss climate change issues under the leadership of the CCS and the EPA. This committee comprises NGO representatives, Universities and different ministerial departments and agencies. However, it is not clear how the discussions contribute to the mainstreaming of climate change into different sectors of the economy.

The **Meteorological Department** of the Ministry of Transport and Aviation is the body responsible for collecting weather data, processing and disseminating information and related services to end users. Its key policy objective is to make available and accessible weather, climate and climate related information and services to various stakeholders and to strengthen the capacity of the Department to provide good quality information and services. The Department has linkages with local and international partners, notably the Environment Protection Agency (EPA), Ministry of Water Resources, Ministry of Agriculture Forestry and Food Security (MAFFS) and the Disaster Management Department of the Office of National Security. The major way of collaboration is by providing

information and services on weather, climate related issues and participation in the activities of stakeholders for example in the new project on strengthening climate information and early warning. Key international partners include WMO, UNDP, IFAD, DFID and UNICEF.

Institutional challenges

Despite their high number, Sierra Leone institutions may not have clear roles and responsibilities, and sometimes overlapping mandates. This situation undermines natural resources management efforts. Many examples of unclear situations could be found, for instance, wetland conservation is placed under the Ministry of Agriculture, Forestry, and Food Security (MAFFS), while the Ministry of Fisheries and Marine Resources (MFMR) is responsible for managing fish and other living resources in the coastal and estuarine habitats. Also, allocation of large areas of land by MAFFS to private companies can contain part of protected areas managed by NPAA. Another example is related to the management of Marine protected areas which may fall under the control of the Ministry of Fisheries and Marine Resources or Conservation and Wildlife division, which is under the Department of Forestry. As a last example, the CTF indicates that MDAs and local governments collect revenues (including in the form of license fees) from ecosystem and natural resource users, which remain inaccessible to the CTF despite being one of its functions.

Other issues include overlapping jurisdictions between (and within) the central government and its environmental ministries, departments and agencies, and with traditional and elected authorities, which result in competing mandates and priorities, and poor coordination[86]. Communities are often not involved in park management decisions[87], leading, in some areas, to distrust of conservation authorities and perceptions of unfulfilled obligations. Further, as seen in the previous section, the legislation upon which conservation policies are based is often outdated, for instance much conservation work is still governed by the Wildlife Act of 1972.

According to the ongoing WABICC project, many agencies are understaffed to carry out their delegated tasks, which is partly because the government lacks a sustainable funding strategy for projects designed for and delivered in coastal areas. There are also low capacities for scientific analysis and monitoring; low operating budgets; low political capital; and low capacities for demarcation, patrolling and enforcement[88].

Finally, despite the presence of international donors, funding for environmental action seems difficult to secure, making it difficult to support continued operations, community-based conservation programs and integrated conservation and development projects.

[86] Forestry Policy 2010

[87] Conservation and Peacebuilding in Sierra Leone, Oli Brown, Alec Crawford, IISD, January 2012

[88] NPAA annual report 2017

Chapter IV: Integration of environment and climate change concerns in main policies and sectors

Mainstreaming in the national development plan

The mid-term 2019-2023 National Development Plan is the first one to explicitly include climate change as an issue to be considered. Indeed, it makes multiple references to climate induced risks and impacts and includes in its Theory of Change a full dedicated cluster: “a society that is resilient to climate change and natural disasters” (Cluster 7).

Cluster 7.1 includes environmental resilience and aligns with the NBSAP in terms of policy actions.

Key targets on environmental resilience are:

1. By 2023, put in place an environmental court to prosecute cases related to environmental infractions.
2. By 2023, ensure that a policy is in place for the management of toxic chemicals and hazardous substances.
3. By 2023, review and pursue land degradation neutrality targets.
4. Progressively amend regulations on ozone-depleting substances.

Key policy actions on environmental resilience are:

1. Review the Environmental Protection Agency Act and other legislation to strengthen and enhance the legal framework for enforcement and compliance.
2. Increase the proportion of terrestrial and marine areas protected.
3. Control land degradation and minimise pollution.
4. Increase the coverage of terrestrial sites of biodiversity importance to protect biodiversity and endangered species.
5. Educate and raise awareness about changing traditional and cultural practices that are harmful to the environment.

Forest management and wetland conservation are the focus of sub-cluster 7.2

Key targets are:

1. By 2023, establish a National Timber Agency.
2. By 2023, declare at least two new Ramsar Convention sites for wetlands management.
3. By 2023, ensure that a Wetlands Act is in place.

Key policy actions are:

1. Improve legal and enforcement mechanisms with appropriate laws.
2. Enhance the management and oversight capacity of regulatory agencies.
3. Combat environmental degradation and manage forests and wetlands.
4. Promote the conservation of the environment through educating and mobilizing the population through awareness raising.
5. Increase marine protection and maintain the number of forest reserves and conservation areas.

The 2019-2023 plan also identifies vulnerabilities and risks and subsequent impacts, in cluster 7.3 dedicated to Disaster management governance.

HAZARDS/RISKS	AREA OF PREVALENCE	IMPACT
FLOODS	Freetown, Pujehun, Kambia, Bonthe, Kenema, Moyamba	• Human casualties • Loss of crops • Loss of livestock and poultry • Infrastructure damage • Deterioration of drainage systems • Outbreak of waterborne diseases
FIRES • Domestic fires • Wild/bushfires • Electrical/industrial	Urban and local areas	• Human casualties • Damages of housing • Economic loss
STORMS AND LIGHTNING	Mainly eastern and northern provinces	• Human casualties • Fires • Infrastructure damage
EPIDEMICS	Nationwide	• Ebola, human casualties
MUD / LANDSLIDES	Kono District, Tonkolili District, Western Area	• Human casualties • Infrastructure damage
PEST INFESTATION	Kambia, Bombali, Koinadugu, Moyamba, Kailahun, and Pujehun Districts	• Loss of crops • Loss of livestock and poultry
POLLUTION	Predominantly urban; mining areas nationwide	• Biodiversity loss • Outbreak of waterborne diseases
TRANSPORT-RELATED ACCIDENTS • Sea transport • Road transport • Air transport	Freetown peninsula waters and the coastal communities; Freetown to provincial areas and vice versa; Lungi International Airport	• Human causalities • Injuries • Infrastructure damage
UNPLANNED URBANIZATION Including population movement	Mainly urban Sierra Leone	• Poor sanitation • Increased trend in disaster events
DEFORESTATION	Mainly Eastern and Northern provinces, and Western Area	• Reduction in water catchment area • Water shortage • Loss of biodiversity • Increase erosion • Increase land/mudslides
MINING: • Sand mining • Aggregate stone mining • Mineral mining	North, East, South, and the Western Area rural districts	• Human casualties • Land degradation • Coastal erosion • Food insecurity • Pollution
CLIMATE CHANGE	Nationwide	• Increased magnitude of extreme weather events • Food insecurity • Coastal erosion • Overall increased magnitude of natural disasters

Figure 28: Risks and Impacts - Extract from the Medium Term National Development Plan 2019-2023

Key targets for Disaster management are:

1. By 2023, achieve 100 percent completion status for the functioning and operations of a National Disaster Risk Management Agency.
2. By 2023, achieve 100 percent completion status in the development of Local Disaster Preparedness and Response Plans based on the Vulnerability and Capacity Assessment.
3. By 2023, achieve 100 percent completion status in the development of a flexible information system for data on disaster victims, internally displaced persons, missing persons, damaged and lost properties, and the reunion of families.

Key policy actions for Disaster management are:

1. Develop policies and a legal framework on vulnerability and disasters.
2. Improve on disaster response within the country at all levels.

3. Strengthen early warning mechanisms and legal frameworks.
4. Enhance coordination and collaboration among key actors.
5. Increase community involvement in responding to disasters and implement the Climate Information, Disaster Management and Early Warning System developed for climate information dissemination.

While climate is present in policy action 5 of sub-cluster 7.3, there are no specific sub-cluster, targets or Key indicators dedicated to climate change action (even in cluster 7).

Apart from a climate related target in its sub-cluster 1.4 on Environmental sanitation and hygiene, with the Key target: *By 2023, reduce deaths and property loss from natural and human-made disasters and extreme climate events by 30 percent*; there is no other mention of other climate related action (adaptation or mitigation), except to "create systems to track public spending on gender and climate" and "Access support from untapped thematic funds" such as the GCF, both presented as possibilities to fund the National Plan.

Mainstreaming at sector level

The review of the sector policies mostly related to environmental and climate issues showed, in general, a weak degree of integration, showing a low level of priority at sector level. When available, there is limited detail on the related environmental and climate issues and most policies include climate change mostly as a potential source of additional funds. Overall there is a lack of coordination and follow-up on environmental and climate change mainstreaming, which mostly happens through punctual activities at sector level.

On the **draft Forest Policy (2010)**, it is proposed to deepen climate change knowledge for information and public awareness purposes and to improve regulatory compliance. Policy Statement 14 focuses on contributing to the development and implementation of a national climate change strategy. The policy also recognises that climate change mitigation and adaptation programming represent two emerging funding steams.

The updated draft of the **Conservation and Wildlife Policy (2011)** considers more research needs to be done on climate change and its impacts ("collect and apply scientific evidence and traditional knowledge for informed decision-making and adaptive wildlife management"). Government should also explore possibilities for investment in sustainable financing mechanisms, for example through carbon markets and trading schemes, under the current and future Climate Change protocols, as well as by signing up to future Reducing Emissions from Deforestation and Degradation (REDD) programmes.

The **Energy Policy (2009)** recognises that the international community put a light on the climate change phenomenon, which has led to greater attention being paid to issues relating to cleaner energy development and could lead to additional resources to support energy programmes. It makes the policy statement that GOSL will take measures to reduce the rate of deforestation and land degradation and minimise threats on climate change in the use of biomass resources. As for environmental issues, it proposes to take steps to reduce pollution, and deforestation. Other statements include the intent to use best international and regional practices in the operations of upstream petroleum exploration and development, including those relating to the respect for land rights, protection of the environment, security and safety, and to ensure that environmental considerations are included in all renewable energy planning and implementation and will enhance co-operation with other relevant stakeholders. The document only formulates policy statements and does not propose any form of plan or action.

The **National Sustainable Agriculture Development Plan 2010-2030** identifies basic climate change characteristics, without going in the details of adaptation needs. It notably intends to develop a comprehensive policy on climate change together with regulations on use of carbon credits to encourage reforestation and afforestation.

There is no real climate change consideration in the **Water Sanitation and Hygiene Policy 2010** (only mentioned once throughout the document). On the opposite, the environmental context is well-developed and links are duly made across the agricultural, forestry, and health sectors. Hence the proposed actions focus on water quality and the respect of international standards for drinking water, reduction of water pollution, and needs in increasing wastewater treatment capacity.

As for the **Integrated Transport Policy, Strategy and Investment Plan 2013**, "it is expected of GOSL to regulate this effectively by ensuring minimal environmental degradation and minimal negative effects on surrounding societies". While there is specific mention to how the policy will address economic sectors such as agriculture or the extractive industry, there is no further mention of any environmental or climate related aspects.

Institutional responsibility

The EPA has the mandate to ensure the integration of environmental concerns in overall national planning by developing modalities and maintaining linkages or partnerships with relevant Government Ministries, departments and Agencies.

Environmental Impact Assessment

The EPA Act of 2008 stipulates the procedure for an Environmental Impact Assessment (EIA). Projects defined in the First Schedule need to apply for a licence to the EPA. The Agency then decides if the project requires to undertake EIA based on the factors considered in the Second Schedule. Third Schedule sets the content of the environmental impact assessment for projects that require an EIA. The Act further establishes the obligations of the environmental licence holder and the Board of Directors.

Main challenges for mainstreaming

Challenges such as lack of technical capacity, which relate to the ability of local and national governments, communities, and NGOs to prepare for, respond to, and recover from the impacts of climate change, have been highlighted in various synthesis reports[89]. These challenges can notably be seen at sector and local levels. Similarly, at central level and within the EPA, there is a lack of tools and resources to support the capabilities needed to address climate change, including regulatory and planning capabilities (such as disaster preparedness plans, infrastructure guidelines etc), and administrative and governance capabilities (such as trained staff, capacity building assistance oriented towards the sector level, and the availability of relevant equipment).

There is also a challenge with fiscal capabilities (funding and other financial incentives); and infrastructure (flood and erosion control structures, water management structures etc). The over-reliance on international funds also leads to a lack of vision and leadership on environmental and climate issues. All ministries related to the environment and natural resources indicated that the legal

[89] For instance, the EPA (2015): Integrated Coastal Zone Management Plan for Sierra Leone

framework still has weaknesses in ensuring that there is a proper balance between the long-term conservation and sustainable use of natural resources and pressures to maximize revenue[90].

According to UNU INRA[91], these key challenges revolve around improving climate and environmental information systems and data collection in terms of quality, its processing and dissemination. Even recent documents such as the "State of Biodiversity for food and agriculture" (MAFFS / FAO, 2017) uses Forest data of 1990, Biodiversity estimations from 2003, and even earlier descriptions. The lack of references, recent data, updated information, or of clear baselines and definitions for comparisons, makes that such reports give a static image of the state of environment and are not useful.

As such, the 6th National Report on Biodiversity starts by indicating that "one of the greatest challenges to biodiversity conservation in Sierra Leone is the lack of knowledge and awareness about the benefits of managing biodiversity, especially amidst the difficult economic situation the country finds itself"[92].

[90] European Commission, Government of Sierra Leone – EPA & NAO Office. (2017). Final Evaluation of the Environmental Governance and Mainstreaming Project (EGMP) in Sierra Leone.

[91] Country Profile on Climate Change, Agricultural Trade and Food Security ECOWAS/Sierra Leone, 2016

[92] 6th National Report for the CBD, EPA, UN Environment, Convention on Biological Diversity, Feb. 2020

Chapter V: Elements on external aid

Main EU support actions

The EU provided support to both the development of the Environmental Protection Agency (EPA) as an independent agency (from the previous Ministry of Lands, Country Planning and Environment) and the establishment of the National Protected Areas Authority, initially envisaged as a replacement of the Wildlife Conservation Unit of the Forestry Division that resorted under the Ministry of Agriculture Forestry and Food Security (MAFFS[93]). The NPAA became an independent Authority, with the mandate to conserve and manage Protected Areas (PAs) in Sierra Leone, both terrestrial as well as marine.

With respect to environmental governance and management of Protected Areas, Forest Reserves (FRs), and Marine Ecosystems, during the past 10 years, the EU supported Sierra Leone with the implementation of the following projects:

- 2007-2012: Development of the Gola Rainforest National Park: A new practical model for achieving sustainable protected areas in post-conflict Sierra Leone.
- 2008-2013: Across the River: A transboundary peace park for Sierra Leone and Liberia.
- 2009-2014: Conservation of the Western Area Peninsular Forest Reserve and its watershed.
- 2010-2017: Developing Marine Protected Areas and an ecosystem management approach to fisheries in the Mano River Region, with special focus on Sierra Leone and Liberia.
- 2011-2016: Environmental Governance and Mainstreaming Project (EGMP).
- 2012-2017: Reduction of Emissions from Deforestation and Forest Degradation (REDD+) and Capacity Building Project (RCBP) in Sierra Leone.

The EGMP has been a key driver in facilitating the establishment of the EPA, which is now the major functioning Government Agency working on environmental protection across a wide range of sectors.[94]

The Western Area Peninsula Forest REDD project was a four-year project funded by the European Union and is being implemented in what is now the Western Area Peninsula National Park (WAPNP) declared in the Statutory Instrument No. 6 of 2013) by the Environmental Forum for Action (ENFORAC), Welthungerhilfe (WHH) and the Forestry Division of the Ministry of Agriculture Forestry and Food Security (MAFFS). Additional partners include the Ministry of Lands, Country Planning and Environment (MLCPE) which have been involved to ensure planning permissions for construction and house settlements are not approved within the forest reserve boundaries.

The project had two main objectives: 1) to protect the Western Area Peninsula Forest Reserve and its watershed and promote its sustainable use for the benefit of the adjacent population; and 2) to introduce participatory processes in decision making on the sustainable use of natural resources.

REDD+ has been identified as a sustainable financing opportunity for WAPNP and activities have started for the development of a REDD+ project in the reserve. A pre-feasibility study was completed

[93] Previously Ministry of Agriculture, Forestry and Food Security (MAFFS) – before May 2018.

[94] European Commission, Government of Sierra Leone – Environmental Protection Agency, & Ministry of Finance National Authorising Office. (2017). Final Evaluation of the Environmental Governance and Mainstreaming Project (EGMP) in Sierra Leone.

in 2012 and based on this initial work, project partners together with experts from Fourah Bay College (University of Sierra Leone) embarked on the process of developing a Project Design Document (PDD) to be validated under the Verified Carbon Standard (VCS). In 2013 the biodiversity baseline and monitoring system was completed, as well as ground truthing surveys to complement previous remote sensing assessments for the purpose of developing a carbon stock inventory.

Support by other international organisations

The programmes and projects funded by international organisations and foundations addressing environmental and climate issues can be found in Annex III.

Several donors and implementing organisations work actively in Sierra Leone, the most important being United Nations Development Programme, Global Environmental Facility, European Union, Green Climate Fund, UK Department for International Development, Irish Aid, USAID, UN-FAO, Adaptation Fund, and GIZ.

Several Sierra Leone ministries, offices, institutes, agencies, and sub-national governments are included in the active implementation of these programmes and projects. The Environmental Protection Agency is often involved in climate change-related programmes and projects.

Anecdotally, while UNEP and GEF were quite well known, none of the interviewed stakeholders indicated having a special knowledge of the international climate funds such as the Adaptation Fund, the Green Climate Fund or of specialised support organisations such as the NDC Partnership.

Chapter VI: Conclusions and recommendations

Conclusions

On the management of ecosystems and protected areas

The study identifies worrisome trends in terms of continuous degradation of arable land and forest, land grabs, and the widespread and unsustainable use of natural resources across the country. Also, while there seems to be an overall agreement that overexploitation of the nation's environmental resources has intensified, its rate and real consequences are not well known.

In terms of knowledge, little progress has been made in terms of state of the environment in general. This applies not only to fauna and flora of particular interest, but also to the biological resources (including diversity) and ecosystem services (including provision of freshwater) that rural livelihoods are almost entirely based on. Notably, forests are characterised by a lack of clarity in the definitions and datasets, leading to important differences in the general knowledge of forests status across the various stakeholders.

Sustainable forest landscape management cannot be successful without addressing illegal and/or unsustainable activities, and the need to reconcile forest conservation with improved livelihoods and human wellbeing in neighbouring communities. In addition, it is increasingly imperative to integrate emerging challenges related to climate change into forest management work[95].

At sector level

Increasing direct pressures are being exerted on all natural resources, which directly affects the performance and the viability of practices in sensitive sectors such as water or agriculture.

Unlike in many other regions in West Africa, and in particular the Sahel, water is abundant in Sierra Leone, although access to clean water is still an issue. The access to water services in urban areas is relatively high compared to rural and small towns, however there are large differences in access between wealthy and poor households and different geographical areas. Improvement in access to water has been steady but slow and the annual rate of increase in access will need to increase four-fold to reach SDGs. Investments are needed in rehabilitation and expansion of water services in Freetown and other urban areas.

Nationally, increased rates of foreign investment related to large-scale land deals and resource extraction are greatly shifting the ecological contexts of Sierra Leone. This directly affects local agrological and socio-economic conditions. While much of the value of the extracted mineral resources are being accumulated outside of the country, Sierra Leone's lands and waters are becoming permanently altered. Further, large land acquisitions for commercial agriculture increasingly risks catalysing new forms of internal displacements. These elements not only contribute to forming a strong gap between the population's expectations and the benefits agricultural production is effectively providing, they also erode the production capacity of the arable land that is left to the population.

[95] Suggested actions to address this issue are included in the section on recommendations

At climate change level[96]

The information on projected changes in the climate of Sierra Leone relies currently on large scale regional studies. They indicate that while the temperature is overall projected to increase, rainfall may also increase, although here uncertainties are large. However, current results may not fully account for spatial differentials within the country and are not discussed within the current levels of climate variability observed in Sierra Leone. In addition, information on current and projected changes in climate do not provide us with information on their impacts on the communities.

Climate change is often seen as a mean to receive additional international funding. Yet, the precise climate issues that are lived at national and local level remain poorly known or studied. Climate change threatens to exacerbate existing problems of underperformance, particularly in the agriculture sector.

At governance and institutional level

Governance reforms have produced strong environmental regulatory institutions such as the EPA, which is an achievement. Yet, the complexity of the institutional system including mandate overlaps makes that several options co-exist for obtaining legitimate access to natural (including mineral) resources, leading to conflicts of interest and affecting all three economic, social and environmental pillars of sustainable development.

Plural authoritative networks, shall they be from administrative or traditional systems, compete for the control of natural resources. Informal bottom-up processes and internal conflicts erode the credibility of the state institutions. This, in turn, has contributed to chronic, low-intensity conflict, environmental degradation, and the pursuit of elite interests and power at the expense of sustainable resource extraction and livelihood security[97].

In the last ten years, Sierra Leone prepared an important number of legislative and strategic documents. Yet, the present study identifies many challenges for their implementation, many of these being synergetic.

At the source of these challenges is a lack of information and knowledge. On the one hand, it does not allow a good sensitisation of the stakeholders and thus a motivation to act. On the other hand, it also makes decision making more difficult.

Operational capacities are also limited: existing capacities and mobilisation are insufficient, national financial resources are also insufficient, and operations seem to be mainly carried out on a project-by-project basis, i.e. in a piecemeal fashion, with little possibility of setting up self-sustaining local dynamics.

At the national level, forces are scattered, with a compartmentalisation of powers and of information, sectoral functioning, institutional competition. Sectoral integration of environmental and climate issues remains to be implemented in practice.

The governance of environmental resources can be directly related to two root issues with strong environmental and social consequences. The continued scale of deforestation and forest degradation,

[96] Conclusions related to the INDC are included in Annex I.

[97] Strong Institutions in Weak States: Institution Building, Natural Resource Governance, and Conflict in Ghana and Sierra Leone, McKenzie F. Johnson, University Program in Environmental Policy Duke University, 2017

as well as the complex land tenure context that predominates today, are both related to processes of asset accumulation, dispossession, and enclave-oriented territorialisation.

Community empowerment alone cannot guarantee the adoption of sustainable solutions. The segmented land tenure and resource management system in the provinces has also created confusion and encouraged overexploitation, as paramount chiefs, national ministries, local councils and communities struggle to control ownership and access to resources ranging from forests, water and mining resources to commercial and subsistence agricultural land[98]. These elements call for a stronger territorial approach that is inclusive and ensures all groups within local communities are involved in the management of their natural resources and ecosystems.

Further, subject to a precise institutional and operational analysis, convergence of international tools, including the INDC and NBSAP, with national policies has not yet been achieved. Few convergences and synergies can be observed in the application of the major international conventions.

As for Official Development Assistance related to the environmental sector or climate change action, it remains to be intensified in order to bring meaningful support in the light of the difficulties identified above. As per formulated by the stakeholders in Sierra Leone, international actors should show use a clear coordination mechanism, more dialogue and a comprehensible strategy towards national partners.

Recommendations

Most recommendation are particularly relevant to actors who principally endorse an environmental mandate (e.g., EPA, NPAA), but could also be implemented in sectors where the EU has been active and that are particularly sensitive to environmental and climate issues, such as nutrition/food security, employment/growth, ecosystems and biodiversity, and the sectors listed as most relevant in the 3rd National Communication such as energy, cities and infrastructure, and coastal areas.

Improve knowledge on the state of environment and on sound environmental practices

Objective: Build a clear data and information framework, transparent (in its nature and its intended use), credible, robust and accessible, that can be used for awareness raising and decision making that ultimately serves environmental sustainability.

This was considered as a necessary basis by most national stakeholders consulted during this assignment.

- Build credible baseline data starting with the major environmental assets, notably forests and preserved areas, but also on environmental issues at industrial level and in urban areas (wastewater, solid waste);
- Build local capacity for monitoring environmental and climate related information, as well as in translating climate knowledge into warning systems and adaptation practices;
- Monitor the situation of environmental resources (including forests at a national level) and their overall evolution, allowing to follow and alert on the pace and consequences of potential degradation of environmental resources due to overexploitation or pollution, on a regular basis (every 2-3 years);

[98] UNEP 2010 - Sierra Leone Environment, Conflict and Peacebuilding Assessment, Technical Report

- Identify profiles of environmental management practices and uses, and relate them to potential disturbances or benefits, in all types of ecosystems including wetlands and marine environment;
- Raise awareness on benefits of sound environmental and climate related practices, as well as on the role of conservation and protected areas.

Increase understanding of the dynamics created by environmental governance

Objective: Ensure that environmental governance is driven by principles of socio-economic equity and positive environmental and climate action.

This is particularly in line with the European Green Deal's principles of boosting a green and circular economy and ensuring quality ecosystem services in a context of increased social equality.

- Understand the political economy of forest management presently in Sierra Leone, incorporating the complex dynamics of culture / traditions and the prevailing dynamics at national level so as to allow forest ecosystems to serve their purposes of livelihoods;
- Make the case for environmental and climate action in sensitive sectors, to entice their mainstreaming in agriculture/food security, inclusive growth (through more sustainable and equitable services to energy, water, transport);
- Promote an inclusive territorial management at local level, improving local consultative processes and decision making. This may also include using integrated approaches for natural resource management, where communities take steps to jointly plan the use and manage forest, water and land resources;
- Develop integrated water resource management schemes at relevant scales, with the possibility of including payment for ecosystem services as a benefit sharing mechanism;
- Define the role of local and traditional authorities regarding natural resources, in order to promote sound and inclusive local environmental management;
- Support credible transparency mechanisms in sensitive operations such as extractive/mining industry, and large land acquisitions;
- Identify barriers and increase knowledge related to current environmental practices, equal access to natural resources and ecosystem services, and gender.

Translate the overarching national policy statements into tangible objectives and targets

Objective: Operationalise the environmental dimension of the National Development Plan, upon which sector strategies can be rooted.

This can notably be supported through a State level Budget Support operation.

- Develop the proposed measures and targets related to environmental and climate issues into detailed activities and measurable items;
- Establish bridges between the NDP and sector strategies to reinforce coherence and environmental sustainability and climate resilience;
- Set common NDP / sector implementation short to mid-term milestones accompanied by work plans for environmental and climate action;

- Build a common roadmap of expected outputs and results between the NDP and the future NDC.

Improve convergence of sector documents towards environmental sustainability and coherent climate action

Objective: Clarify and ensure coherence of governmental action towards the environment and climate change.

This can notably be supported through a State level Budget Support, any Budget Support operation or dedicated governance project to a sector sensitive to environmental resources and/or climate change.

- Perform a systematic review of environmental legislation and policies (on environment, conservation areas, forests, marine areas, coastal zones … see list in Chapter III), through a finalisation of the updated versions, still to be adopted and implemented. This would imply a simplification of the overall legislation by identifying loopholes and overlaps,
- Perform a detailed analysis of the quality of climate change and environmental integration at sector level including for agriculture, water, energy, transport (see Chapter IV);
- Identify and address root drivers of unsustainable environmental practices but also of social instability notably in relation to land tenure;
- Apply the principle of sustainable benefit sharing in the case of large operations dealing with natural resources, notably in the extractive sector and land acquisition;
- Identify in more detail issues between principles and practices in environmental conservation, in order to define practical steps towards coherence between the two;
- Support sectors in their environmental and climate mainstreaming efforts, notably, through identifying incentives that can be seen as development opportunities and eventually lead to a stronger environmental long-term involvement within the sector (e.g., engaging in eco-tourism, developing value chains related to recycling activities, define community led forestry schemes, …);
- Systematically study the opportunity to launch a Strategic Environmental Assessment for each focal sector to be supported by the EU. Of strategic importance are the sectors related to food security and nutrition, employment and inclusive growth, ecosystems and biodiversity.

Clarify the role of institutional stakeholders

Objective: Promote clear coordination mechanisms with specialised environmental institutions (in the actual environmental institutional framework format, it should probably be under the EPA), allowing for discussions on environmental problems and how to address them, building the Government's environmental accountability processes, and eventually a consistent approach to enforcement and compliance of environmental legislation and policies. Please note national authorities should work through synergies rather than having to manage internal conflicts. Also, the implementation of environmental sound practices and environmental responsibility should be shared across institutions.

- Improve knowledge of the actual possibilities and potential performance of the institutions through a Climate Public Expenditure Review (CPEIR, for climate change action) and of a Public Environmental Expenditure (PEER, for environmental action). A CPEIR is a systematic qualitative and quantitative analysis of a country's public expenditures, across specific sectors, and how they relate to climate change. A PEER examines government resource allocations within and among

sectors, and/or at national and subnational levels of government and assesses the efficiency and effectiveness of those allocations in the context of the environmental management framework and priorities.

- Take the opportunity of the ongoing discussions on the role of the new Ministry of Environment to launch a national dialogue on the importance of environmental resources for Sierra Leone, jointly identify opportunities related to sound environmental management, formulate a common vision and form a national coalition for environmental action, including line ministries and actors from civil society, representatives of community and vulnerable groups and at the sub-national level, and also anti-corruption and security forces.
- Ensure this policy dialogue feeds the contents of newly drafted policies notably at sector level.

Improve synergies in international support

Objective: Improve coordination of international stakeholders to avoid competition or contradictions between donors and different sources of support.

- Promote long-term support rather than project-based mechanisms, reinforcing national systems (e.g., national M&E systems, public finance in climate change or environmental sectors) as well as local initiatives;
- Entice donor partners in tuning national stakeholders in today's international climate and environmental agenda, to increase national ownership on what can be perceived in Sierra Leone as distant climate problems and enrich overall dialogue over sensitive environmental issues;
- Support Sierra Leone's involvement at regional level, enhancing synergies and benefits from shared natural resources including transboundary national parks;
- Such regional involvement could also take the form of stronger links with regional knowledge brokers on climate action in order to influence policies and the preparation of Sierra Leone's reporting commitments under the UNFCCC, including the next version of the NDC;
- Use donor coordination groups to support practical action that directly benefits vulnerable groups in their climate adaptation needs, yet also supporting national information systems related to climate adaptation / DRR and the environment. This can be done in accordance to donors' individual focal sectors.

Annex I: Review of the Initial Nationally Determined Contribution (INDC, 2015)

Analysis of the national framework for climate action

As a complement to the institutional climate change framework presented in the updated CEP, the present review analyses the existing Initial Nationally Determined Contribution (INDC[99]), its actors involvement and objectives, and a review of its progress. It also analyses the relation between the INDC with national development papers and climate change dedicated plans and programmes.

Institutional actors

The process of the Sierra Leone INDC development, approved on 1st November 2016, involved a series of Ministries, i.e. Ministry of Finance, Ministry of Planning and Economic Development, Ministry of Works and Infrastructure, Ministry of Transport and Aviation, Ministry of Agriculture, Forestry and Food Security, Ministry of Energy, Ministry of Local Government and Rural Development, Meteorological Agency of Sierra Leone, and Environmental Protection Agency (EPA) (see Fig. 30). Among the several national actors, the ones in charge of climate change aspects were mainly the EPA and Meteorological Agency (2012, "Second National Communication").

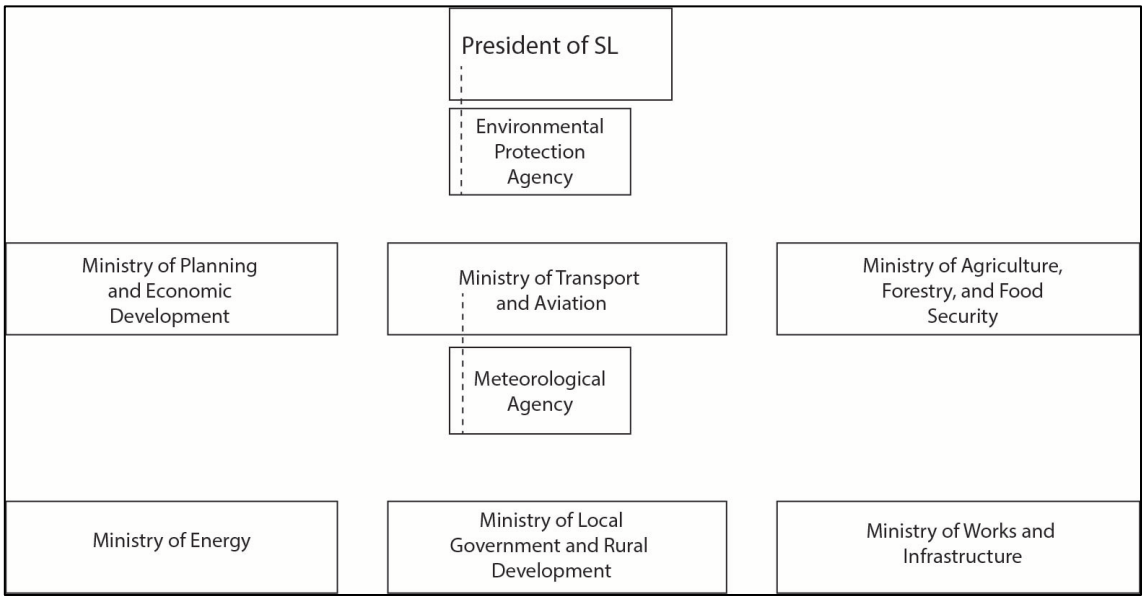

Figure 29: Ministries and Agencies involved in 2015 the INDC 2015-2020 development (Source: UNDP)

[99] The official document has been published as the "Intended Nationally Determined Contribution", and today national stakeholders indistinctly refer to it as "Initial Nationally Determined Contribution" or "Nationally Determined Contribution".

Elements on the INDC preparation

In 2015, the INDC was preceded by two policy documents, which should be reviewed every 5 years, namely the :

- National Climate Change Policy
- National Climate Change strategy and action plan

Before 2015, Sierra Leone produced two National Communications concerning climate change, the 1st in 2007 and the 2nd in 2012[100], and during the 2015-2020 period, Sierra Leone produced the Third National Communication (in 2018). The Second National Communication was used for the 2015-2020 INDC[101].

In terms of climate change mitigation, Sierra Leone prepared a Nationally Appropriate Mitigation Actions (NAMA) document (which, according to UNDP, was never really completed), while in terms of climate change adaptation, Sierra Leone prepared a National Adaptation Programme of Action (NAPA) (2007).

When interviewed, the 2015 INDC authors indicated they did not have a precise idea of what an INDC was at that time and to which international processes it would be related. As such, the drafting of the INDC was geared by the possibility of attracting additional funds for development action.

National framework and INDC policy objectives

The INDC included and aligned to the National Development Plan – Agenda for Prosperity 2013-2018, committing to integrating green growth into Sierra Leone development programmes.

Since 2002, the Government of Sierra Leone has been producing national development plans, initially labelled as Poverty Reduction Strategies. Building on the 2008–2012 Agenda, the Agenda for Prosperity 2013–2018 aimed at strengthening the economy transition in thee long run (2035) towards a middle-income country status.

Building on these Agendas, Sierra Leone produced a medium-term National Development Plan (2019–2023) announcing significant improvements in goals achievement and public participation. This plan represents the first five years of a 20-year long-term national commitment to a vision for a middle-income country, with an appropriate governance framework that would be based on inclusivity, unity, and taking account of the special needs of women, children, and the most vulnerable groups. This framework still needs to be put in practice.

Unlike the previous NDP 2013-2018, the 2019-2023 Plan mentions climate change related issues. In fact, Cluster 7 is resilience-oriented and also aims at tackling climate change impacts and effects. However, it lacks any specific mentions of climate related targets and measures (see Chapter IV).

[100] https://unfccc.int/non-annex-I-NCs

[101] http://content.ccrasa.com/library_1/11618%20-%20UNFCCC%20-%20Sierra%20Leone%20Second%20National%20Communication.pdf

Concerning the policy and planning frameworks, the INDC objectives are stated clearly, namely:

- Establishing the Climate Act
- Establishing the legislative framework for the National Climate Change Strategy and Action Plan implementation (NCCS&AP)
- Establishing the National Climate Change Cabinet (NCCC) in the office of Sierra Leone President
- Setting the National Climate Change Secretariat (NCCS) as primary National Agency for Climate Change
- Establishing the Sierra Leone domestic Climate Fund

In terms of Climate Policy integration at the national level, climate change received some attention during the 2015-2020 period. Yet, from organisational and procedural perspectives, Sierra Leone's endeavours remain limited.

Indeed, the climate change legislative framework and the Climate Act are yet to be established. The related ministries are under restructuring. A Ministry of Environment has been established and the former Ministry of Agriculture, Forestry, and Food Security became the Ministry of Agriculture and Forestry. The Sierra Leone domestic Climate fund has not been created yet – consisting of a National Financial office that collects and redistributes funds from public and private organisations.

During the 2015-2020 period, new planning outputs have been produced, which are:

- Third National Communication to the UNFCCC (2018)[102]
- Sierra Leone's Climate Change Communications Strategy under the National Adaptation Plan (2020)[103]

However, they were not mentioned – as possible forthcoming documents or plans – in neither the INDC (2015-2020) or its related Blueprint.

Third National Communication

The Third National Communication to the UNFCCC (2018) provides relevant contents concerning Sierra Leone's climate policy state-of-art and potential pathways.

Notably, it shows progress made since the INDC with regards to what could be done in terms of climate change adaptation. The most critical sectors for adaptation comprise agriculture, water, health, coastal and sea resources, and human settlements.

As for mitigation, the document provides several and heterogeneous options, e.g. solar energy, cogeneration and biomass, small-scale hydropower, and wind energy. The baseline year remain 2005, yet with the need to improve the GHG inventory.

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

[103] http://napglobalnetwork.org/wp-content/uploads/2020/06/napgn-en-2020-Sierra-Leone-Climate-Change-Communications-Strategy-under-NAP.pdf

The Communication also recognises the low degree of climate change adaptation and mitigation mainstreaming – not even reaching basic coordination. In fact, both adaptation and mitigation are left to be implemented at sector level, with no comprehensive and integrated vision.

New "relevant actors" are cited, including the Petroleum Agency, Freetown City Council, and the University of Sierra Leone.

The climate change assessments and scenarios made in the document are based on projections (made in 2015) employing several models and approaches – indicating consistent credibility of this information. Still, short- (1 to 5 years) and medium (5 to 15 years) term climate information and services are still missing.

It also underlines a lack of technological capacity and resources for tackling both mitigation and adaptation. For fulfilling this gap several options are listed, including: building the capacity of professional and scientific staff, technology and knowledge transfer, capacity building processes, devices and station for monitoring and early warning.

Concerning the observation systems and climate related knowledge production, the Communication states that Sierra Leone urgently need external support and investments for tackling both short- (including: early warning systems, GHG emission monitoring, weather monitoring capacity) to long-term actions. Notably, in order to have national learning and research institutions that can be able to constantly provide topical weather information and to co-produce climate knowledge.

INDC Mitigation and Adaptation objectives, costs, and achievements

The base year GHG emissions listed in the INDC is based on the inventory of 2000 (and reported in the 2nd National Communication) according to IPCC methodology 1996. The country shows two overall reduction targets covering all sectors: one in 2035 limiting emissions growth to 7.58 $MtCO_2$ and one in 2050 to achieve carbon neutrality.. This commitment is totally conditional to the availability of international funding, estimated at USD 900 million.

In terms of adaptation, the African Development Bank (2019 "Analysis of Adaptation Component in African NDCs") reviewed Sierra Leone's INDC and deduced that the Country needs 9 million USD/year for adapting to climate change (see Fig. 31).

No.	Country	Annual adaptation cost (million USD)	No.	Country	Annual adaptation cost (million USD)
1	Benin	55.946	15	Mauritania	93.774
2	Burkina Faso	39.008	16	Mauritius	40
3	Cameroon	18.150	17	Morocco	350
4	CAR	15.539	18	Namibia	226
5	Chad	141.6	19	Niger	16.070
6	Comoros	3	20	Seychelles	2.950
7	Djibouti	8.330	21	Sierra Leone	9
8	Egypt	730.4	22	Somalia	1.325
9	Ghana	127.9	23	Tanzania	121.5
10	Guinea	6.7	24	Togo	15.4
11	Guinea Bissau	420	25	Sudan	12
12	Kenya	400	26	Uganda	24
13	Madagascar	287.130	27	Zambia	200
14	Mali	136.860	28	Zimbabwe	350
		Total cost			$3.852 billion

Figure 30: Cost of Adaptation by country (African Development Bank, 2019)

Sierra Leone also defined a roadmap for the INDC 2015-2020 implementation, i.e. the "Sierra Leone Blueprint for the Implementation of the Paris Agreement".

This roadmap was based on five pillars, which were:

1. Political will and effective governance to maintain *momentum* and ensure accountability across diverse actors and levels.
2. Long term mitigation strategies to deliver GHG emissions reductions through national and sectoral plans aligned with development priorities.
3. Integrated adaption planning that builds long-term resilience to the impacts of climate change. Mainstreaming climate change adaptation into national sectoral strategies in order to deliver cost effective interventions.
4. Climate finance framework set up aiming to create agile access to a fund stream at the service of local needs.
5. Measurement, reporting, and verification (MRV) systems to track implementation and apply lessons learned.

The Blueprint proposes relevant activities. However, as well as the INDC, it lacks information concerning the existing Sierra Leone National sectoral policies.

In terms of feasibility and implementation, Pillars 1, 2, 4, and 5 had actions with defined deadlines, while Pillar 3 (climate change adaptation related) had not.

Pillar 4, on Climate finance, clearly identified potential financing windows and climate-related funds, which were: Green Climate Fund, Global Environmental Facility, Adaptation Fund, and Global Climate Change Alliance Fund.

Deadlines for Pillars 1, 2 and 4 were mostly at the beginning of 2016, while Pillar 5 set the actions deadlines in May/June 2016. In addition to having too short deadlines, as all action deadlines were set within 2016, almost none of the planned actions were accomplished.

Despite being properly written, the INDC Blueprint embodies a series of critical gaps: National sectoral policies and programmes are not mentioned; the MRV pillar contains vague information and did not specify the key institutional actors that should be involved in the MRV and M&E planning. Sources in the EPA confirmed that the Blueprint was never really implemented or followed-up as such.

Climate Change Mitigation in the INDC

In terms of Climate Change Mitigation, Sierra Leone contributes with 0.1% of total global emission, less than 1 tCO_2/year/per capita (see Figure 29) – the INDC consider it even lower, namely less than 0.6 tCO_2/year/per capita. Aware of the fact that national capability to implement climate change-oriented actions is still subject to limitations and that it has a very small emission profile, it aimed to play its own part addressing climate change by a fair contribution.

Sierra Leone's climate change mitigation target covers GHG carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), based on 1990 inventories under the 1st and the 2nd National Communications. Business as Usual (BAU) emissions are estimated to be 6.6 $MtCO_2eq$ by 2030 - excluding downstream exploitation in the mining/extractive sector.

Sierra Leone also intends to reduce its GHG emissions, with an implementation window in 2030-2050, by implementing a series of plans, programmes, and measures, whose aggregated impact was expected to achieve 7.58 Mt CO_2eq by 2035 and domestic carbon neutrality by 2050. Knowing the difficulties related to data acquisition and quality, leading to a poor baseline, without a proper plan or budget, and as these figures do not include the mining sector, this remains vague and probably not realistic.

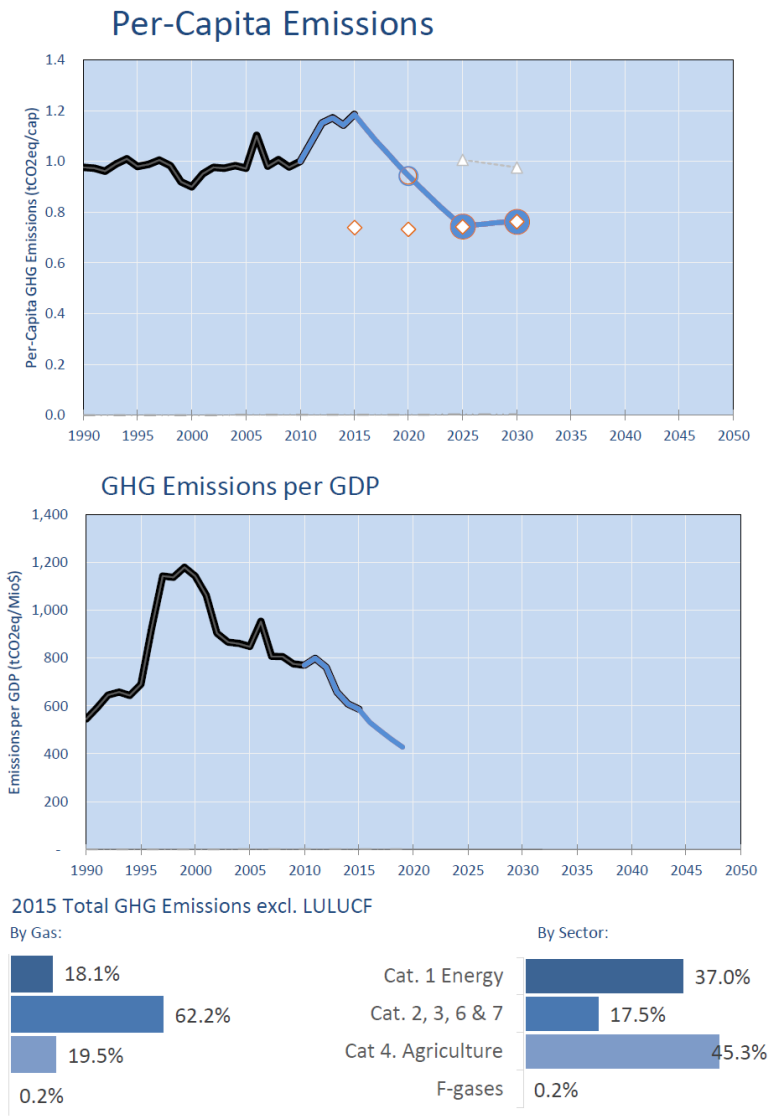

Figure 31: GHG per capita emission (Source: "Sierra Leone INDC Fact Sheet")[104]

As shown in Fig. 33, the major greenhouse gas emitted is methane (CH_4) with projected emissions of 6.5 $MtCO_2eq$ in 2030. The largest emitting sectors are agriculture and waste and between them, they are projected to emit between 95 to 98% of the projected national emissions from 2015 to 2030. The largest emitting category is Waste Management and will be responsible for about 56% of GHG emissions in 2030.

[104] http://www.mitigation-contributions.org - Fiji COP23 Edition 21 Oct 2017

Sierra Leone	2015	2020	2025	2030
All Sources, Gases, Sectors	4.765	5.239	5.851	6.551
CH4	3.670	4.029	4.458	4.970
N2O	0.997	1.069	1.156	1.271
Agriculture	2.107	2.224	2.374	2.575
Energy	0.001	0.001	0.001	0.001
Industrial Processes	0.097	0.142	0.238	0.311
Waste	2.559	2.872	3.239	3.664

Figure 32: Projected GHG Emissions from (2015-2030) (Source: INDC 2015-2020[105]

The overarching and strategic objectives defined in the 2015 INDC were:

- Clean energy utilisation
- Energy efficiency programmes development. Awareness raising and sensitisation
- Charcoal sustainable reduction and firewood dependence reduction
- Alternative energy sources development (e.g. sugar cane biofuel)
- Energy production via agricultural and waste incineration programmes development
- Waste management improvement (composting and recycling)
- Transport plans formulation and regulation development on regular vehicle maintenance
- Public transport (passengers and cargo) utilisation promotion for GHG reduction
- Air, water, and soil quality standards development (embodying regular M&E)

Although being pertinent for tackling climate change mitigation and coherent with the NCCP, these objectives are still vague. The GHG emissions baseline and GHG emissions reduction targets were not mentioned in any of these objectives.

The INDC mentions the development of hydroelectric dams in 20 potential sites. It is the only concrete action under the climate change mitigation component of the INDC. This can be debated as dams in tropical areas can be GHG emitting, notably depending on their size, site context and biomass clearance before inundation. Furthermore, large hydroelectric dams can have significant negative impacts on the ecological status of rivers and watersheds. Yet, the INDC does not provide any environmental information that could be associated with dam development.

[105] http://www.epa.gov/climatechange/EPAactivities/economics/nonco2projections.html

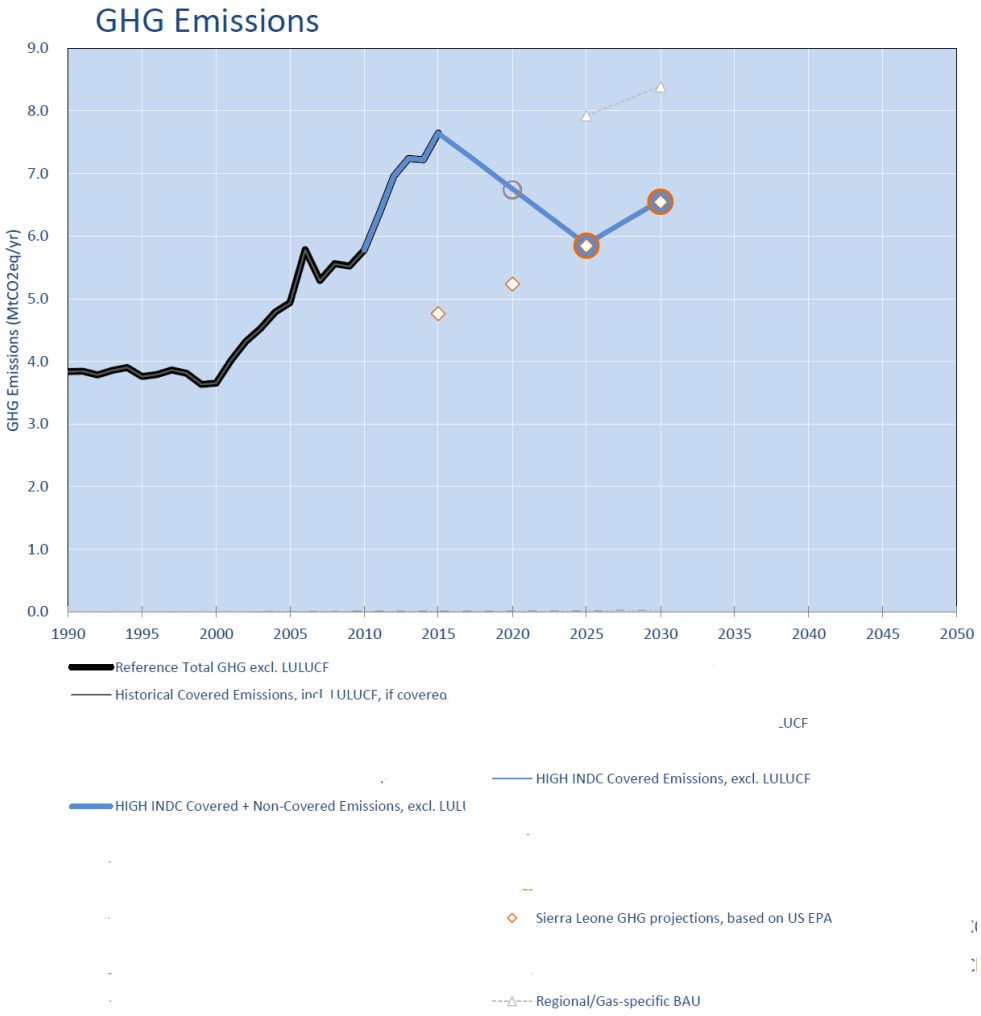

Figure 33: GHG emission history and projected trends[106]

Climate Change Adaptation in the INDC

As a climate-vulnerable country whose emissions are about 0.02% of global emissions, the principal focus of CCA activities are on increasing Sierra Leone's population resilience to the impacts of climate change. The 2015-2020 INDC is based on Sierra Leone's existing strategies and plans, in particular the NAP.

The general overarching goal of the INDC includes reducing or minimising risks by improving adaptive capacity, reducing vulnerability to climate change impacts and increasing the resilience and sustainable wellbeing of all citizens.

Among the 12 objectives listed in the INDC for climate change adaptation, 11 directly tackle an adaptation objective:

[106] USAID 2017 "Sierra Leone INDC Fact Sheet - Fiji COP23 Edition 21 Oct 2017 - data from http://www.mitigation-contributions.org/)

- Range and pasture lands management against wildfires
- Integrated management of crops and livestock
- Degraded lands restoration
- Marine ecosystem resilience enhancement via promotion of non-destructive coastal management and fishing techniques
- Early warning system and disaster preparedness enhancement
- Climate change adaptation integration into health sector
- Enhancing adaptive capacity of most vulnerable people through local networks and insurance schemes
- Tourism value chain resilience enhancement
- Creation of an enabling environment for private investments in climate resilience projects
- Climate change adaptation integration into mining sector
- Climate change adaptation integration into land use regulation

The remaining objective is: "Estimation in a sustainable manner, of Sierra Leone's contribution to global warming and climate change". It remains uncertain how this will be done in order to contribute to adaptation.

Although being pertinent for tackling climate change adaptation and coherent with the NAPA, these objectives lack associated targets. The sectors mentioned in the INDC are: Agriculture, Health, agriculture, health, disaster preparedness, Coastal protection, Fisheries, Tourism, Finance and insurance, Human settlement, and Land management. Among these, the ones with higher priority were: Agriculture, health, DRR, Coastal protection, Fisheries, Tourism, Finance and Insurance.

In terms of protection, security, and disaster management, the INDC did not specify the current related policies, programmes, and actions. Notably, a National Hazard Profile was developed in 2005 and it is not mentioned in the INDC. Yet, the National Hazard Profile was reviewed in 2017, showing that Sierra Leone kept an interest in the related issues. This review includes details on the Climate Information, Disaster Management and Early Warning System (known as CIDMEWS), which was developed to collect and process climate and environmental information for increasing climate change awareness. As such, the climate change related outputs expected by 2023 could be included in the next version of the NDC, i.e.:

- Establish the operative National Disaster Risk Management Agency
- Develop Local Disaster Preparedness and Response Plans based on the Vulnerability and Capacity Assessment
- Develop a flexible information system for data on disaster victims, internally displaced persons, missing persons, damaged and lost properties, and the reunion of families.

Concerning M&E and MRV, both were mentioned but were not described or specified, as already also stated by the African Development Bank (2019) and shown in Figure 32.

Country	Monitoring strategy	Stresses importance of MER	Includes specific plan for MER	Status of MER
Algeria	MRV (monitoring, notification, and reporting) system	●		
Angola				
Benin	MNV (monitoring, notification, and verification) system	●		Already in place
Botswana				
Burkina Faso	External annual evaluation	●		Planned
Burundi		●		
Cameroon	MRV system	●		
Cape Verde	M&E framework	●		
CAR		●		
Chad		●		
Comoros	Working group assessments	●		Planned
Congo				
Cote D'Ivoire				
Djibouti				
DR Congo		●		Planned
Egypt				
Equatorial Guinea				
Eritrea				
Ethiopia	Regular consultative dialogues	●		
Gabon	M&E strategy	●		
Gambia	M&E for agriculture. No general M&E plan	●		
Ghana	M&E system to be integrated into existing M&E plans	●		
Guinea	External evaluation every 5 years	●		
Guinea-Bissau				Planned
Kenya	Review of NAP and climate change strategy every 5 years	●		
Lesotho	M&E indicator system	●		Planned
Liberia				
Madagascar	M&E plan implemented by ministry	●		
Malawi				
Mali				
Mauritania	M&E based on national action plan for the environment	●		Planned
Mauritius	M&E plan implemented by climate change department	●		Planned
Morocco	M&E strategy	●		Planned
Mozambique				Planned
Namibia		●		
Niger	M&E system	●		
Nigeria	Gap analysis to inform MRV development	●		
Rwanda	M&E by Green Economy Technical Coordinating Committee & National Fund for Environment & Climate Change	●		Planned
Sao Tome & Principe		●		
Seyohelles	M&E by national climate change committee	●		Planned
Senegal				
Sierra Leone				
South Africa		●		Planned
South Sudan				
Somalia		●		
Sudan				
Swaziland				
Tanzania		●		
Togo	Existing M&E system	●		
Tunisia				
Uganda		●		
Zambia	M&E mainstreaming	●		
Zimbabwe	M&E system	●	●	Already in place

Figure 34: Information on African countries' monitoring, evaluation, and reporting status for CCA[107]

To summarise, the adaptation dimension of the INDC includes:

- Qualitative objectives, without specifying quantitative objectives,
- References to policies and plans (i.e. NAP),
- Global costs (see African Development Bank, 2019),
- A generic support request for capacity building and technology transfer.

Regarding the complementary aspect of Losses and Damage, the INDC includes the following priority actions:

- Integrating DRR Policy into a comprehensive Climate Policy,
- Establishing an enabling legislative framework to implement the DRR and DRM actions,
- Establishing Disaster Management Department under the Office of the Vice President,
- Establishing a National DRR agency as the primary national government agency for climate change response.

INDC and climate change mainstreaming in sectors

The INDC mentions the climate change mitigation sectors: land, forests, and agriculture. Climate change adaptation sectors include: Agriculture, Health, Disaster preparedness, Coastal and sea protection, Mining, Tourism, Finance and Insurance.

No specific sectoral policies are mentioned. The INDC blueprint does not include them either. Yet, in 2015, Sierra Leone already had official and formal policy and planning documents in Agriculture (National Sustainable Agriculture Development Plan 2010), Energy (National Energy Policy 2009), Land

[107] African Development Bank 2019

and forests (National Land Policy 2015), Water (National Water and Sanitation Policy 2010), and Security (National Security and Central Intelligence Act 2002).

Another important point is that mining, a critical sector for the economy, but also in terms of environmental degradation and social protection, is not really dealt with in the INDC.

Sector	Policy/Plan (year)	CC relationship
Agriculture	- National Sustainable Agriculture Development Plan (2010)	CCA
Health	- National Action Plan for Health Security (2019)	CCA
Energy	- National Energy policy document (2009) - National Energy Efficiency Action Plan (2015-2030)	CCM
Land and Forest	- National Land Policy (2015)	CCM, CCA
Water	- National Water and Sanitation Policy (2010)	CCA
Coast and Sea	- Climate Change Adaptation Plan for Coastal Landscape Complex (2020)	CCA
Disaster management and Security	- National Security and Central Intelligence Act (2002) - National Platform for DRR (in progress of creation)	CCA

Figure 35: National climate-related sectoral policies

Concerning national security and disaster risk management (DRM), the Government of Sierra Leone established the Office of National Security through the National Security and Central Intelligence Act 2002 as the primary coordinator during national emergencies. Climate-related hazards and threats should be tackled also in coordination with the Ministry of Defence and the related offices. The 2015 INDC development process did not include these actors.

Moreover, a National Policy for Disaster Risk Reduction has been developed through a consultative engagement with stakeholders and is still awaiting to be launched. In terms of climate change preparedness and climate information provision, the Government kicked off a National Disaster Preparedness Baseline Assessment (NDPBA) in partnership with the Pacific Disaster Centre (PDC) in Freetown on October 23, 2018. PDC is an applied research centre managed by the University of Hawaii that promotes risk-informed policies and decisions through risk and vulnerability research, advanced decision support tools, and disaster management best practices.

Sierra Leone became the 7th African country to launch a National Action Plan for Health Security. This milestone was reached in 2019 through a five-year multisector Action Plan to strengthen core capacities in the country as required under the International Health Regulations 2005.

Concerning the energy sector, Sierra Leone built upon the 2010 Energy policy document the National Energy Efficiency Action Plan (2015-2030) within the implementation of the ECOWAS Energy Efficiency Policy framework.

Recently, concerning coastal management and maritime planning, Sierra Leone approved the Climate Change Adaptation Plan for Coastal Landscape Complex (2020).

Conclusions on CCM and CCA contents

Summary table

Information contained in the INDC	Policy	Objectives	Establishing the Climate Act Establishing the legislative framework for National Climate Change Strategy and Action Plan implementation (NCCS&AP) Establishing the National Climate Change Cabinet (NCCC) in the office of Sierra Leone President Setting National Climate Change Secretariat (NCCS) as primary National Agency for Climate Change Establishing Sierra Leone domestic Climate Fund *-No mention of sectoral policies*	
	Mitigation	Targets	Unconditional	Not mentioned
			Conditional	In 2035 limiting emissions growth to 7.58 $MtCO_2$. In 2050 to achieve carbon neutrality.
		Basis of target	Analytical basis	Business as Usual (Data from 1990) methodology is detailed in the 2nd National Communication (2012) GHG considered: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O)
			Existing dedicated policies	NAMA
			Mitigation actions	Hydroelectric dams (20 potential sites, not identified yet)
			Implementation strategies	No implementation strategies were defined for the 20 potential hydroelectric dams In the INDC blueprint, planned actions were not accomplished
	Adaptation	Basis of target	Analytical basis	Not mentioned
			Existing dedicated policies	NAP
			Priority sectors	Agriculture, health, disaster preparedness, coastal and sea protection, tourism, finance.
			Adaptation actions	General objectives were defined – no concrete action nor targets
			Implementation strategies	Blueprint lists actions without implementation deadlines
	Participation			Internal: 6 Ministries and 2 National Agencies (National level) – see Fig. 30
	Financial assistance (requested)			900M USD to be used in 2015-2020
	Financial assistance (received to date)			Not mentioned and probably not identified
	Technical needs identified			Not mentioned
Complementary Information	Loss and Damages (Objectives)			Integrating DRR Policy into a comprehensive Climate Policy Establishing a National DRM agency
	Gender			Mention of the 5-year development plan "Gender and Women empowerment"

Figure 36: INDC Summary (Structure based on and adapted from USAID 2016's "Analysis on INDCs"[108]

108
https://www.climatelinks.org/sites/default/files/asset/document/INDC%20White%20Paper%20-%20June%202016_public_RALI.pdf

Summary of findings

Objectives, institutional setting, and governance

The INDC 2015 and related blueprint, which tackle comprehensively climate change mitigation and climate change adaptation, defined general objectives based on National development policies.

Several ministries and agencies have been involved in the INDC development and implementation, with the Environmental Protection Agency and the Meteorological Agency being the most important actors. The Ministry of Defence and the internal DRR and DRM offices have not been officially included in the making, despite their critical role in Disaster Risk Reduction and Management, climate change adaptation, and climate resilience.

Neither the INDC or the related blueprint mention national sectoral policies, and this is a critical gap. Furthermore, no international projects and programmes were mentioned. Positive outcomes from the past and ongoing projects should be stated in the future version of the NDC. This would allow to recognise institutional efforts and increase credibility to the international audience of donors notably the climate dedicated ones. This recognition is done in the Third National Communication.

Climate-focused international funds and opportunities were identified in the INDC blueprint. Although defining in the INDC the objective to establish a domestic climate fund where to convey internal and external *ad hoc* funds for climate change adaptation and climate change mitigation, no domestic finances were considered along the 2015-2020 period. Moreover, it set the condition to receive USD 900 million in order to implement the 2015-2020 INDC, and this gap concerning climate-dedicated domestic finance highlights a lack of ownership.

Mitigation

GHG emissions reduction targets were set for 2035 and 2050 (carbon neutrality), despite the BAU was based on 1990 and reference data was not up to date, yet with the aim of tackling this issue during the 2015-2020 period. GHG inventories need to be updated and also have to include the mining sector – excluded from the INDC GHG analysis.

Among the general overarching objectives defined in the INDC, only one concrete CCM action can be underlined, i.e., the development of hydroelectric dams, with 20 potential sites already defined. Implementation strategies, however, were not defined for these dams. Regarding the INDC blueprint, mitigation general objectives were supposed to be reached in 2016. Even though they were coherent with the INDC and National policies, implementation did not start.

Energy, Agriculture, Forest, Land, Transport, and Water were the sectors mentioned in the INDC objectives. Mining, a critical sector, was not mentioned. Mining provides 15 to 18% of GDP and 90% of export earnings, and oil reserves have been discovered off Sierra Leone's coast. This business might concern several policy sectors, e.g. Sea protection, Energy, Mining.

Adaptation

The INDC sets 12 general climate change adaptation objectives (11 out 12 are consistent with adaptation) but no concrete measures were defined. The general overarching goal is to reduce or minimise risks by improving adaptive capacity, reducing vulnerability to climate change impacts and increasing the resilience and sustainable wellbeing of all citizens.

The sectors that were implicitly mentioned in the INDC are: Agriculture, Health, agriculture, health, disaster preparedness, Coastal protection, Fisheries, Tourism, Mining, Finance and insurance, Human settlements, and Land management. Among these, the ones with higher priority were: Agriculture, health, DRR, Coastal protection, Fisheries, Tourism, Finance, and Insurance.

In terms of protection, security, and disaster management, the INDC did not specify the current climate resilience and DRR related policies, programmes, and actions.

In terms of climate risk and vulnerability's analytical basis, the INDC and the related blueprint did not contain specific and recent climate risk assessment, predictions (for 2015-2020) or projections (2015-2050). Regional research and learning institutes and climate knowledge brokers were not mentioned.

The INDC blueprint, even though was well written and structured, had some critical gaps, i.e. CCA objectives did not have an implementation plan.

Cross-cutting and complementary issues

Both in the INDC and in the related blueprint, neither M&E nor MRV were mentioned, highlighting a potential lack of transparency and accountability.

Loss and Damages were considered separately from the CCA issue, and the INDC set dedicated objectives, which were: i) integrating DRR Policy into a comprehensive Climate Policy, and ii) establishing a National DRM agency.

Gender-related issues were mentioned by citing the 5-year Gender and Women Empowerment plan. The INDC and the related blueprint lightly mentioned gender issues without defining objectives and targets.

Recommendations for the EU policy dialogue on updating the next NDC

In order to make the next NDC (2020-2025) more credible and its implementation more effective, consistent with national development policies and boosting their potential in terms of adaptation and mitigation, drawing on the insights and following the recommendations of the Third National Communication for the UNFCCC, it is recommended that the future version of the NDC:

- ensures broad national support and clear political backing in its preparation methodology;
- responds to expressed local development needs;
- shows clear institutional leadership in national coordination for climate change;
- clarifies the role for all key institutional actors;
- explicitly includes all relevant sectors, including in the extractive industry (mining, oil);
- builds a budget that will be included in the national budgeting and planning exercises;
- is associated to a clear monitoring and reporting mechanism;
- is accompanied with guidelines for integrating international climate commitments into national development planning;
- has a climate policy integration strategy that aims to at least coordinate and harmonise national development policies, sectoral policies, and international projects;
- includes the participation of external climate research organisations;
- includes updated information on risk reduction and preparedness.

- include thorough requirements for technical and knowledge improvement concerning climate information production, and adaptation and mitigation planning;
- aligns with the National government's decentralization policy and pave the way for the local governments' climate mainstreaming;
- includes detailed gender mainstreaming actions and includes gender equality when performing climate policy integration;
- shows potential links to international climate finance, notably for international funds that remain under-utilised by Sierra Leone,
- includes a domestic financial strategy for autonomous action, to increase local ownership, and for setting up LDC-sensitive insurance schemes (e.g. micro-insurances, re-insurances).

Institutional setting and governance

The governmental setting has changed during the 2015-2020 period and is currently preparing for the next 5-year NDC. During the 2015-2020 period, especially in the most recent years, new departments and offices have been created or moved with the aim to strengthen the climate change policy framework.

In order to achieve a more credible, coherent, and operative national climate framework for the next NDC, it is suggested to:

- explicitly build on the 2018-2023 National Development Plan, with a clear objective to establish a tracking system for public financing and budgetary allocation on gender equality and climate resilience;
- use updated baselines and data, or prepare for the updating of such data in the next 5 years, for both climate change mitigation and climate change adaptation;
- explicitly mention the key leading institutional Ministries and Agencies for each Adaptation/Mitigation proposed action and for global NDC coordination and implementation;
- include the sectoral policies that are highly relevant for tackling climate change mitigation and climate change adaptation, and list potential synergies of climate action with sector objectives, results, and M&E systems notably for adaptation;
- give more details on the foreseen set-up of the central MRV system and how it should interact with line ministries to monitor sector mitigation efforts;
- define an implementation roadmap that contains clear information on internal and external resources mobilisation, governance structure and processes (e.g. set up permanent climate-dedicated roundtables twice a year with the key institutions), and that includes feasible deadlines. Due to time and data constraints, the next version of the NDC might not be a fully updated one.

Mitigation

Drawing on the Third National Communication, the NDC 2020-2025 should better integrate the role of extractive industries: mining, petrol. These sectors are essential to the economy and need to be fully on board in terms of GHG sectoral information. Furthermore, issues related to the social and environmental sustainability of these sectors can be partially tackled through climate action, for instance through compensations conveyed to a domestic climate fund. Such a mechanism could also help in increasing national ownership on climate action.

Forests have also an obvious role to play in country's climate change mitigation action, and a logical continuation of past efforts would lead to further support of international climate funds to forest conservation measures.

Adaptation

The review identified relevant adaptation dimensions that should be considered in the next NDC, namely: disaster risk reduction and management, climate information and early warning systems, and research and education.

It is also recommended to involve the Ministries and Agencies in charge of DRR and DRM, and to create an enabling environment where DRR and DRM can be integrated with the National Development policies and with the climate change adaptation related key sectors, i.e. agriculture, land and forest, environment, water, transport, mining.

Also, specific risk assessments are needed to understand climate change impacts and therefore should be promoted at sector level, notably, to be able to produce a credible NDC for the period 2020-2025.

Further, clearer adaptation objectives and related actions should be proposed. This implies that Sierra Leone makes clearer references to existing climate change prediction, projections, and risk assessments so as to guide the formulation of the NDC 2020-2025.

These can also be useful to enhance climate information services and develop disaster risk management systems, including early warning systems. In order to make climate information production and early warning system effective, it is recommended to define the institutional actors and the regional research organisations that work on climate issues and emergency planning.

Cross-cutting and complementary issues

M&E and MRV systems for transparency and accountability should be included in the next version of the NDC. For this, it is highly recommended to start defining the metrics that can be useful to the context. Some of the national sectoral policies have already created or started using M&E schemes (e.g. Water, Energy, Agriculture), and these sectoral approaches can be used a basis and a springboard for a climate change mitigation and climate change adaptation national M&E mechanism.

As there is little international agreement on the scope of loss and damage programmes, it is crucial to identify potential funding sources so that loss and damage response programmes can be institutionalised, implemented, evaluated and improved. Building on the Third National Communication, it is recommended to systematically track the potential assets to be related to losses and damages, including land and water ecosystems, goods (e.g. livestock, food, stored water) and the built environment. Again, critical sectors like mining can become a source of funds for a national loss and damages finance framework.

As for gender-related issues, they were mentioned in neither the 2015-2020 INDC nor its Blueprint. The future NDC should assess how the gender/climate nexus is being addressed in existing policies and promote future climate and gender mainstreaming, thereby clarifying Sierra Leone's line for a more equitable and sustainable international support.

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ANNEX III: List of main projects relevant to environmental and climate action in Sierra Leone

Donor(s)	Programme (period)	Projects (action period)	Focus (CC relation)	Funds	SL institutional actors involved
UNDP (GEF)	/	Adapting to Climate Change Induced Coastal Risks Management in Sierra Leone	Coast, Fisheries (CCA)	US$9.9 million Co-Financing Total: US$ 31.6 million	Environmental Protection Agency (EPA SL), the Ministry of Fisheries and Marine Resources (MFMR), the Institute of Marine Biology and Oceanography (IMBO) and the National Tourist Board (NTB).
UNDP (GEF)	/	Energy Efficient Production and Utilisation of Charcoal through Innovative Technologies (2015-2019)	Energy, Biomass (CCM)	US$ 2 million approx.	Ministry of Energy, Environment Protection Agency- Sierra Leone; Ministry of Finance and Economic Development; National Protected Areas Authority; Ministry of Trade and Industry
UNDP (Sustainable Development Goal Fund)	/	Sustainable Livelihoods through Improved Natural Resources (2015-2017)	Health, Resilience, Mining (CCA)	US$ 1,500,000	Environment Protection Agency Sierra Leone + National Youth Commission + Koidu New Sembehun City Council + Kono District Council
UNDP	/	Environment and Natural Disaster Management Project (2016)	Disaster risk reduction and management (CCA)	US$ 800,000	National Protected Areas Authority + Environmental Protection Agency
UNDP (GEF/LDCF)	/	Strengthening climate information and early warning systems in Africa for climate resilient development and adaptation to climate change (2013-2018)	Early warning, Agriculture, Fisheries, Water (CCA)	US$ 4.000.000 (co-financing: US$ 20,347,310)	Ministry of Water Resources (Implementing partner) + SL Meteorological Dept + Ministry of Agriculture and Forestry
UNDP/GEF (Implementing Partner: Environmental	/	Building the Adaptive Capacities of Water Services to Climate Change in SL (2012-2018)	Water (CCA)	US$ 4.000.000 (approx.)	Freetown City Council and Western Area Rural District Council

Foundation of Africa)					
EU/GEF		Mainstreaming Adaptation to Climate Change into National Development Planning (2004-2007)	Policy, Governance	N/A	Environmental protection agency
Green Climate Fund	started 2019	FP128: Arbaro Fund – Sustainable Forestry Fund	Forests (CCM)	US$ 20 million Co-funding: US$ 200M	Environmental Protection Agency
World Bank	N/A	Energy Sector Utility Reform Project (2013-2022)	Energy	US$ 40 million	N/A
World Bank	N/A	Social Safety Net Program (2016-2018)	Health	US$ 17 million	N/A
US AID	N/A	Protection of Women through Empowerment and Response	Gender and social equity	N/A	N/A
US AID	N/A	Feed the Future Sierra Leone Scaling up Aquaculture Production project	Aquaculture	$US 3.5 million	N/A
USA (Implementing partner: US-AID)		National Adaptation Planning Framework	Fisheries, Tourism, Biodiversity. Agriculture (CCA)	N/A	Environmental Protection Agency
Irish Aid	IRISH CIVIL SOCIETY Programme Partners (2015)	N/A	Resilience, water, Environment (CCA)	€159,150 (to resilience projects) + €556,404 (water sanitation and hygiene projects) + €50,098 (environmental programming)	N/A
Irish Aid (Partners: Climate Finance Adaptation (UNFCCC) +	IRISH CIVIL SOCIETY	N/A	Biodiversity, Resilience, Water (CCA)	€ 299,876	N/A

Climate Finance Cross-cutting + Biodiversity (UNCBD) + Desertification (UNCDD))	Programme Partners (2016)				
Irish Aid (Partner: Climate Finance Adaptation (UNFCCC)	IRISH CIVIL SOCIETY Programme Partners (2017)	N/A	Resilience, Disaster risk reduction (CCA)	€904,956 (CCA and Resilience) + €212,500 (for Disaster risk management)	N/A
UK Department of International Development	LEGEND Challenge Fund	Natural Habitats Sierra Leone (NHSL) (2016-2019)	Land protection and Food security	607,685.00 (Sterling pounds)	N/A
FAO	/	Pilot Community-based Forestry (CBF) project in Sierra Leone (2016- 2018)	Forests	$US 178,754	Forestry Division, Ministry of Agriculture and Forestry
Adaptation Fund	/	Promoting Climate Resilience in the Cocoa and Rice Sectors as Adaptation Strategy in Sierra Leone (2019-2025)	Agriculture (CCA)	$US 9,916,925	Ministry of Agriculture and Forestry + Environmental Protection Agency
WELTHUNGERHILFE. Co-funding or coordinating with: EU, UK DfID, German BMZ and GIZ, IrishAid	WELTHUNGER HILFE Country Programme 2018—2021	Several projects	Agriculture, Health, Water, Energy, Food security	N/A	N/A
African Development Bank	/	Strengthening West African Public Health Systems Project (-2019)	Health	N/A	N/A
African Development Bank	/	Post Ebola Recovery Social Investment Fund (-2018)	Health, Disaster preparedness	N/A	N/A

African Development Bank	/	Support to ECOWAS for Peace & Development (2018)	Security	N/A	N/A
African Development Bank	/	The Three Towns Water Supply and Sanitation Project (2010-2016)	Water	$US 65 million	Bo, Kenema and Makeni provincial cities

Figure 37: Main international programmes and projects addressing environmental and climate issues in Sierra Leone