

REWILDING MAFORKI



Document Prepared by eco securities Group Limited

Project title	Rewilding Maforki
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Project lifetime	25 June 2022 – 24 June 2072; 50-year lifetime
(CCB) GHG accounting period	25 June 2022 – 24 June 2072; 50-year total period
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Project location	Sierra Leone, Northwestern Province, Port Loko District
Project proponent(s)	<p>Rewilding Maforki Limited (RML)</p> <p>Contact name: Idriss Koromah</p> <p>Email Address: idriss@rewildingcompany.com</p> <p>Address: 56A Cape Road, Aberdeen, Freetown, Sierra Leone.</p>

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<p>History of CCB status</p>	<p>This is the first version for seeking validation under both the Climate, Community and Biodiversity Standard as well as the Verified Carbon Standard</p>
<p>Gold Level criteria</p>	<p>The project is seeking the Triple Gold Level criteria for climate change adaptation, community, and biodiversity impacts according to the following criteria:</p> <p>Climate: The Rewilding Maforki Project will result in over 7 million tCO_{2e} of emission removals in the initial 50-year crediting period. This will be achieved through long-term binding partnerships with local communities. The project's activities will enhance the communities' resilience and adaptation to climate change impacts. By increasing their financial capabilities and wellbeing, the project assists in decreasing people's vulnerability to climate change effects. The restoration of degraded land and forest cover will ensure its long-term sustainability and ecosystem revival.</p> <p>Community: About 70% of the people in the region of Project Area live under less \$2 per day. Most communities lack access to safe and affordable drinking water, and basic education, health, and hygiene facilities. They also lack proper housing and shelter facilities and are extremely vulnerable. The Project will undertake community development as well as alternative livelihood interventions activities as outlined in detail in Section 4 – generate both short-term and long-term net positive well-being benefits for local community members for impact at household level, including women and marginalized groups.</p> <p>Biodiversity: The project region is home to several IUCN listed endangered and vulnerable species and the Scarcies River which is a Key Biodiversity Area (KBA). It is in an ecologically rich zone that needs restoration. The project biodiversity intervention focuses on restoring biodiversity connectivity as well as eco-habitats. This will be achieved through:</p> <ul style="list-style-type: none"> • Increase in forest cover will enhance biodiversity corridors, reviving species habitats • Controlling poaching and illegal trade through the effective enforcement of wildlife law • Building capacity of enforcement agencies in natural resources management

	<ul style="list-style-type: none"> • Awareness raising amongst stakeholders • Training and capacity building of communities and other stakeholders in sustainable management of natural resources <p>Mobilization of human, technical, and financial resources for biodiversity conservation.</p>
<p>Expected verification schedule</p>	<p>TBA.</p>
<p>Prepared by</p>	<p>ecosecurities</p> <p>Rue de la Faiencerie 2, 1227, Carouge, Switzerland</p> <p>info@ecosecurities.com</p> <p>https://www.ecosecurities.com/</p>

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1 SUMMARY OF PROJECT BENEFITS

The Rewilding Maforki grouped project comprises reforesting degraded ecosystems around key ecoregions in the Port Loko district, in Northwestern Sierra Leone. The 20,000-ha grouped project will remove an average of 141,365 tCO₂e per year.

At the local level, the project is improving households' quality of life (QoL) by paying land leases, generating new employment opportunities, supporting sustainable agriculture, and increasing communities' adaptive capacity to climate change effects.

Access to clean water will be facilitated through the construction of boreholes within selected villages situated near the project area¹. Furthermore, the project aims to increase biodiversity by promoting ecosystem connectivity and expanding healthy natural habitats.

1.1 Unique Project Benefits

This section outlines unique project benefits that are not captured in **Section 1.2**.

Outcome or impact estimated by the end of project lifetime	Section reference
1) 20,000 ha reforested creating permanent multi-aged, multi-species forests with over 7 million tCO ₂ e emissions removals, a climate positive contribution.	2
2) Enhancement of wildlife and aquatic habitats for biodiversity, restoration, and protection of landscapes, and increase in wildlife, fish, and plant species (near threatened)	5
3) Improvement of marginalized communities' life quality in the project zone ² focusing on women's empowerment. Activities such as seedling establishment and planting are done mostly by women.	4.5
4) Expansion of sustainable agricultural practices and lifting nutrition by promoting climate-smart agriculture and inclusive agricultural value chains.	4.5

¹ Project area- The geographic area in which the project activities are implemented <https://verra.org/wp-content/uploads/2023/08/VCS-Program-Definitions-v4.4.pdf>.

² Project zone- is defined as the area encompassing the project area in which project activities that directly affect land and associated resources, including activities such as those related to provision of alternative livelihoods and community development, are implemented. For grouped projects, the project zone also includes all potential project areas (i.e., all potential new land areas in which project activities that aim to generate net climate benefits may be implemented in the future after the initial validation). https://verra.org/wp-content/uploads/2017/12/CCB-Standards-v3.1_ENG.pdf

1.2 Standardized Benefit Metrics

Category	Metric	Estimated by the end of project lifetime	Section reference
GHG emission reductions or carbon dioxide removals	Net estimated removals in the project area, measured against the without-project scenario	7,068,250 tCO ₂ e	2
	Net estimated reductions in the project area, measured against the without-project scenario	N/A	N/A
Forest ³ cover	For REDD ⁴ projects: Estimated number of hectares of reduced forest loss in the project area measured against the without-project scenario	N/A	N/A
	For ARR ⁵ projects: Estimated number of hectares of forest cover increased in the project area measured against the without-project scenario	20,000-ha ⁶	2
Improved land management	Number of hectares of existing production forest land in which IFM ⁷ practices are expected to occur as a result of project activities, measured against the without-project scenario	N/A	N/A
	Number of hectares of non-forest land in which improved land management practices are	N/A	N/A

³ Land with woody vegetation that meets an internationally accepted definition (e.g., UNFCCC, FAO, or IPCC) of what constitutes a forest, which includes threshold parameters, such as minimum forest area, tree height and level of crown cover, and may include mature, secondary, degraded and wetland forests (VCS Program Definitions)

⁴ Reduced emissions from deforestation and forest degradation (REDD) - Activities that reduce GHG emissions by slowing or stopping conversion of forests to non-forest land and/or reduce the degradation of forest land where forest biomass is lost (VCS Program Definitions)

⁵ Afforestation, reforestation and revegetation (ARR) - Activities that increase carbon stocks in woody biomass (and in some cases soils) by establishing, increasing and/or restoring vegetative cover through the planting, sowing and/or human-assisted natural regeneration of woody vegetation (VCS Program Definitions)

⁶ As the project is a grouped project, the project area may expand later on.

⁷ Improved forest management (IFM) - Activities that change forest management practices and increase carbon stock on forest lands managed for wood products such as saw timber, pulpwood, and fuelwood (VCS Program Definitions)

	expected to occur as a result of project activities, measured against the without-project scenario		
Training	Total number of community members who are expected to have improved skills and/or knowledge resulting from training provided as part of project activities	2,600 community members, of which 1,500 will benefit from training relating to employment and 1,100 from agricultural training.	4
	Number of female community members who are expected to have improved skills and/or knowledge resulting from training as part of project activities	1,300	4
Employment	Total number of people expected to be employed in project activities ⁸ , expressed as the number of full-time employees ⁹	1,500 through direct and contracted employment.	4
	Number of women expected to be employed as a result of project activities, expressed as number of full-time employees	600 through direct and contracted employment	4
Livelihoods	Total number of people expected to have improved livelihoods ¹⁰ or income generated as a result of project activities	3,780	4
	Number of women expected to have improved livelihoods or income generated as a result of project activities	1,900	4

⁸ Employed in project activities means people directly working on project activities in return for compensation (financial or otherwise), including employees, contracted workers, sub-contracted workers and community members that are paid to carry out project-related work.

⁹ Full time equivalency is calculated as the total number of hours worked (by full-time, part-time, temporary and/or seasonal staff) divided by the average number of hours worked in full-time jobs within the country, region or economic territory (adapted from the UN System of National Accounts (1993) paragraphs 17.14[15.102];[17.28])

¹⁰ Livelihoods are the capabilities, assets (including material and social resources) and activities required for a means of living (Krantz, Lasse, 2001. The Sustainable Livelihood Approach to Poverty Reduction. SIDA). Livelihood benefits may include benefits reported in the Employment metrics of this table.

Health	Total number of people for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	N/A	N/A
	Number of women for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	N/A	N/A
Education	Total number of people for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	1,840	4
	Number of women and girls for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	970	4
Water	Total number of people who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	6,200	4
	Number of women who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	3,100	4
Well-being	Total number of community members whose well-being ¹¹ is	10,000	4

¹¹ Well-being is people's experience of the quality of their lives. Well-being benefits may include benefits reported in other metrics of this table (e.g. Training, Employment, Livelihoods, Health, Education and Water), and may also include other benefits such as strengthened legal rights to resources, increased food security, conservation of access to areas of cultural significance, etc.

	expected to improve as a result of project activities		
	Number of women whose well-being is expected to improve as a result of project activities	5,000	4
Biodiversity conservation	Expected change in the number of hectares managed significantly better by the project for biodiversity conservation ¹² , measured against the without-project scenario	20,000	5
	Expected number of globally Critically Endangered or Endangered species ¹³ benefiting from reduced threats as a result of project activities ¹⁴ , measured against the without-project scenario	N/A	N/A

¹² Managed for biodiversity conservation in this context means areas where specific management measures are being implemented as a part of project activities with an objective of enhancing biodiversity conservation, e.g. enhancing the status of endangered species

¹³ Per IUCN's Red List of Threatened Species

¹⁴ In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

2 PROJECT DETAILS

2.1 Project Goals, Design and Long-Term Viability

2.1.1 Summary Description of the Project (VCS, 3.2, 3.6, 3.10, 3.11, 3.13, 3.14; CCB, G1.2)

The Rewilding Maforki grouped project aims to restore and reforest degraded areas in Port Loko District in the Northwest Province of Sierra Leone (Figure 10). The region is prone to shifting to agriculture, including slash and burn practices (Appendix 1), leading to deforestation and land degradation. Strategic activities to restore the areas include tree nursery, tree planting, care and management of the tree plantation, and prevention of fires, pests, and illegal activities such as encroachment within the project areas. Currently, the vegetation types in the project area are dry degraded grasslands, scarce shrubs, rare, isolated trees, and inactive /abandoned plantations. These areas are eligible for reforestation activities adding up to 20,000 ha, The total GHG reductions or removals are estimated (Table 1) at an average of 141,365 tCO_{2e} per year and 7,068,250 tCO_{2e} during the initial 50-year crediting period.

The project's overarching goal is to improve the livelihoods of vulnerable households in the project zone by generating income and employment opportunities, enhance biodiversity by providing ecosystem connectivity, and mitigate climate change through emissions reductions.

The initial project activity instance is 5,000 ha distributed across 3 chiefdoms (Maconteh, Kasseh, and Bureh). The addition of further instances will ultimately lead to over 20,000 ha being reforested at the end of the project. The project is designed to continually increase its project zone, project area, and the number of project instances¹⁵ within the geographical area¹⁶ during the project lifetime. The project proponent has been engaging with local communities and landowners through a participatory, collaborative, and all-encompassing approach.

Table 1: GHG Reductions and Removals

GHG Reductions and Removals	
Average Yearly GHG Reductions and Removals	141,365 tCO _{2e}
Total GHG Reductions and Removals	7,068,250 tCO _{2e}

The project promotes innovative silvicultural practices, using native species for its reforestation sites including, *Albizia ferruginea*, *Azadirachta indica* (2023 plantings), *Bombax buonopozense*, *Cassia sieberiana*, *Ceiba pentandra*, *Newbouldia leavis*, *Spondias mombin* and *Tamarindus indica*, inter alia. It aims to achieve a three-fold benefit that combines sustainable planting of indigenous tree species with ecological effects comparable to those of the native successional forests, including carbon sequestration, the creation of corridors and preservation of habitats for biodiversity, and the restoration and protection of hydrological and soil resources. The project co-benefits and enhancement of ecosystem services are incentives to avoid encroachment, keeping trees standing permanently.

¹⁵ For grouped projects, specify potential project areas and communities that may be included in the project at a future verification. <https://verra.org/wp-content/uploads/2023/08/VCS-Standard-v4.5.pdf>

¹⁶ Geographical area- 3.6.10 Grouped projects shall specify one or more clearly defined geographic areas within which project activity instances may be developed. [area for expansion of project activities]

Community activities encompass the creation of decent income opportunities, training, and educational measures among others, with focus on women and marginalized groups. It, therefore, represents a viable alternative to more unsustainable land-uses such as monocultures and cattle grazing that have led to degradation and overexploitation of ecosystems.

The project expects to benefit 2,600 households through training in sustainable forest management practices and agroforestry systems implementation, as well as employing 1,500 local people with job opportunities for women and men while increasing income at the household level in an area where unemployment and poverty rates are reportedly high¹⁷. More activities are planned to be implemented such as capacity building for climate smart agriculture and access to clean water through the construction of boreholes. These activities contribute to sustainable development goals such as poverty reduction, good health and wellbeing as well as gender equality.

Biodiversity restoration is another key aspect of the project. The Scarcies River, which runs through the region, is home to species such as the West African Manatee, African Dwarf Crocodiles, and many endemic fish species such as the Catfish, which is classified as vulnerable^{18,19,20}. Biodiversity in the area is declining due to habitat loss and fragmentation, primarily attributable to deforestation²¹.

The biodiversity objective of the project is to restore degraded lands through reforestation activities using a permanent multi-species model with an understory that reduces risks, revives connectivity of wildlife habitats, the carrying capacity of degraded lands and hydrological systems, generating positive impacts on the ecosystem services such as soil regeneration, water protection, carbon sequestration. Additionally, the creation of biological corridors for native flora and fauna in the region will connect existing forest patches and adjacent protected forests or indigenous forests, by thus, enhancing biodiversity in the region, restoring, and creating habitats for endangered species. The project activities will also enhance wildlife biodiversity and habitat protection by preventing overexploitation and addressing degradation threats.

The project is not within any jurisdiction covered by a jurisdictional REDD+ program²².

2.1.2 Audit History (VCS, 4.1)

Audit type	Period	Program	Validation/verification body name	Number of years
Validation	(22-06-2022 - 01-April-2024)		Earthhood	2

2.1.3 Sectoral Scope and Project Type (VCS, 3.2)

¹⁷ See the Needs assessment conducted by RML

¹⁸ Biodiversity assessment report done for RML by Environmental Management Services (SL) Limited, 2023

¹⁹ Reeves, R., Tuboku-Metzger, D., & Kapindi, R. (1988). Distribution and exploitation of manatees in Sierra Leone. *Oryx*, 22(2), 75-84. doi:10.1017/S0030605300027538

²⁰ <https://portals.iucn.org/library/sites/library/files/documents/1998-012.pdf>

²¹ <https://www.nature.com/articles/s41893-023-01256-9#ref-CR42>

²² Available at: https://www.globalsupportprogramme.org/sites/default/files/downloads/seirra_leonredd_strategy.pdf

Sectoral scope	14: Agriculture, forestry, and other land use
AFOLU project category ²³	Afforestation, Reforestation and Revegetation (ARR)
Project activity type	Reforestation

2.1.4 Project Eligibility (VCS, 3.1, 3.6, 3.8, 3.18, 4.1; CCB Program Rules, 4.2.4, 4.6.4)

According to the rules and requirements of the VCS Program, this project meets the eligibility criteria under the VM0047 methodology:

- The project activity is reforestation/restoration to establish, increase and/or restore vegetative cover, and is eligible under the ARR category as described in the VCS Standard 4.5 Appendix 1.
- The project adheres to the VCS Program Guide v4.4, VCS Standard v4.6, and VCS Methodology Requirements v4.4, and other applicable program requirements, including the principles taken from ISO 14064-2 (relevance, completeness, consistency, accuracy, transparency, and conservativeness).
- Area-based approach was used.
- The period between the start date and validation completion is four years.

Under the area-based approach, project activities produce continuous tree and/or shrub cover on any contiguous area exceeding one hectare. All the polygons are more than one (1) ha.

- Project activities do not occur in tidal wetlands (e.g., mangroves, salt marshes). Section 2 describes the project boundary where wetlands are excluded in the delineation of the project area.

The project area has been classified as non-forest for the past ten years with less than 10% percent pre-existing woody biomass cover. Forest cover maps (2012-2022) were analysed to exclude any areas classified as forest. See section 2.1.15

- The project activity involves the reforestation of degraded lands. These activities are eligible under the Sierra Leone law according to conditions set out in sections 1.15 and 3.5.

Satellite imagery, including mainly the Landsat (7 and 8) and Sentinel (2) constellations, were used to make an assessment relying on the production of yearly Forest Tree Cover maps derived for the years 2012 to 2022; see Fig. 1 and 2).

As this is a grouped project, additional information relevant to the eligibility criteria for inclusion of new project instances is outlined in Section 2.1.6.1.

²³ See Appendix 1 of the VCS Standard



Figure 1. Aerial imagery-green boundary are project polygons from left to right (2022-Image one left), Forest Cover Map (2012-image 2-middle,) and Forest Cover Map (2022-image 3 right) from one of the polygons of the project. Differences are hardly noticeable as the area remained unchanged over the ten-year period. Orange to red pixels show areas that were grasslands while the light green shows less dense vegetation such as small patches of shrubs and scattered trees with unnoticeable change over the years

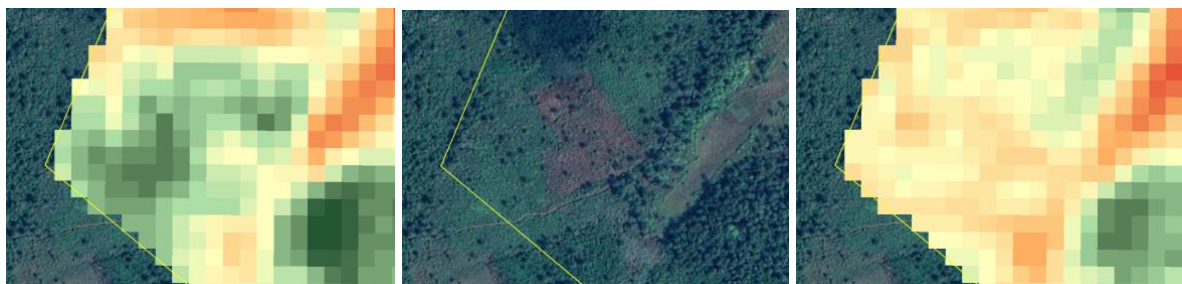


Figure 2. From left to right: Forest Cover Map (2012), middle -aerial imagery (2022) and Forest Cover Map (right- 2022). This small patch of land was transformed into a small field. The cover maps help detect this phenomenon as in 2012, the cover values were significantly low. Yellow to orange pixels depict areas that maintained as grasslands and bare lands while the darker green show highly vegetated areas. There was a shift from tree cover to grassland as seen on the left parts of the polygons.

The table below shows the change in forest cover as depicted in the above images which was significantly low. We can observe a stable trend with some minor annual variations due to the specific climate conditions of each year. A warmer and wetter year will yield greener vegetation, which the onboard sensors are very sensitive to.

Year	Estimated forest extent (ha)	Difference with 2012 (ha)
2012	6370	0
2013	6480	110
2014	6380	10
2015	6100	-270
2016	6570	200
2017	6120	-250
2018	6510	140
2019	6020	-350
2020	6370	0
2021	5900	-470

2022	6210	-160
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2.1.4 Transfer Project Eligibility (VCS, 3.23, Appendix 2)

Not a transfer project.

2.1.5 Project Design (VCS, 3.6)

Indicate if the project has been designed as:

- Single location or installation
- Multiple locations or project activity instances (but not a grouped project)
- Grouped project

2.1.5.1 Eligibility Criteria for Grouped Projects (VCS, 3.6; CCB, G1.14)

For the grouped project, the same project activity instance will be applied in all the project sites, which meet the eligibility requirements described in the VCS Standard v4.6 and the VM0047 ARR methodology. The following additional eligibility requirements are strictly followed in the inclusion of new project sites:

- All initial and future project sites adhere to the same eligibility criteria detailed in VM0047.
- All future project sites have similar policy environments to the initial project activity instances.
- All future project sites will have native species planted
- All future project sites will use the same land preparation, planting, maintenance, and monitoring procedures as in the initial project activity instances as detailed in this project document.
- In all future project sites, the delineation of project boundary, identification of baseline scenario, accounting for leakage, and estimation of performance benchmark for demonstration of additionality will be undertaken identically to the initial project sites, following the same area-based approach; If a new site is highly similar to an existing site, data may be shared.
- In all future project sites, analogically to the initial project sites, the demonstration of additionality will follow the performance method based on the performance benchmark detailed in Appendix 1 of the applied VCS methodology²⁴.

The grouped project is designed to encompass activity instances over 20,000 ha in Northwest Province Sierra Leone. However, as this is a grouped project totalling 5,000 ha as the first instance, the project area may expand later. RML is responsible for the project implementation, management of the plantations, and monitoring activities. RML will ensure the sustainability of the operations by hiring sufficient staff.

Funding constraints could limit project scalability. The project will deliver co-benefits with no adverse community or biodiversity impacts.

2.1.6 Project Proponent (VCS, 3.7; CCB, G1.1)

²⁴ <https://verra.org/wp-content/uploads/2023/08/VCS-Standard-v4.5-updated-11-Dec-2023.pdf>

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2.1.7 Other Entities Involved in the Project

Organization name	Ecosecurities Group Ltd
Role in the project	Carbon technical services
Contact person	Pablo Fernandez
Title	CEO
Address	Rue de la Faïencerie 2, 1227 Carouge, Switzerland
Telephone	+41 789658584
Email	info@ecosecurities.com

Organization name	Carbon Done Right Developments Inc.
Role in the project	Financial
Contact person	James Tansey
Title	CEO
Address	
Telephone	
Email	james.tansey@klimatx.com

2.1.8 Project Ownership (VCS, 3.2, 3.7, 3.10; CCB, G5.8)

The project is implemented on private land parcels. Ownership is demonstrated through land lease agreements and proof of ownership from landowners participating in the project activities.

In respect of all GHG emission reduction or removals, this is reflected in the carbon agreements signed with all landowners.

Additionally, landowners have agreed that the plantation is carried out for their benefit, and they have the exclusive possession and right of use of all the natural resources produced by the Project and other valorised outcomes, with the only exception being the carbon credits generated by the Project.

The landowners have agreed that the property rights on the carbon credits generated by this project during the crediting period (50 years) are exclusively allocated to Rewilding Maforki. Section 2.5.8 summarizes the benefit sharing.

2.1.9 Project Start Date (VCS, 3.8)

Project start date	25 June 2022
Justification	Land preparation and planting of tree species commenced

2.1.10 Benefits Assessment and Project Crediting Period (VCS, 3.9; CCB, G1.9)

Crediting period	25-June-2022 to 24-June-2072 meets the VCS standard requirements as the minimum crediting period is 40 years.
Start date of first or fixed crediting period	25-June-2022 to 24-June-2072
CCB benefits assessment period	The benefits assessment period is from 25th June 2022 to 24th June 2072, during which changes in climate change adaptive capacity and resilience, biodiversity, and community well-being resulting from project activities are monitored.

2.1.11 Differences in Assessment/Project Crediting Periods (CCB, G1.9)

The project crediting period is not different from the period over which climate change adaptive capacity and resilience, biodiversity, and community well-being resulting from project activities are monitored.

2.1.12 Project Scale and Estimated Reductions or Removals (VCS, 3.10)

- < 300,000 tCO₂e/year (project)
- ≥ 300,000 tCO₂e/year (large project)

Calendar year of crediting period	Estimated GHG emission reductions or removals (tCO ₂ e)
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2022	-
2023	561
2024	3,620
2025	13,512
2026	29,766
2027	53,126
2028	78,084
2029	103,581
2030	122,096
2031	138,104
2032	151,987
2033	163,995
2034	174,331
2035	183,166
2036	190,652
2037	196,920
2038	202,093
2039	206,277
2040	209,570
2041	212,062
2042	213,834
2043	214,547
2044	213,035
2045	206,891
2046	198,227
2047	187,094
2048	178,064
2049	170,357
2050	168,536

2051	166,466
2052	164,178
2053	161,703
2054	159,066
2055	156,292
2056	153,402
2057	150,417
2058	147,355
2059	144,231
2060	141,060
2061	137,856
2062	134,631
2063	131,395
2064	128,158
2065	124,928
2066	121,713
2067	118,521
2068	115,356
2069	112,224
2070	109,131
2071	106,079
Total estimated ERs	7,068,250
Total number of crediting years	50
Average annual ERs	141,365

2.1.13 Physical Parameters (CCB, G1.3)

A summary of the physical parameters is provided in Table 2.

Table 2. Description of Physical Parameters

Physical Parameter	Description
Climate	The project is located within a humid tropical monsoon climate, with two rain regimes: the wet season, which lasts from May to November and is related to the tropical maritime monsoon, which flows from southwest to northeast, and the dry season, which lasts from December to April and is associated with the dry Harmattan winds that blow from the Sahara region. ²⁵
Rainfall	According to the Koppen–Geiger Classification system the geographical area is under the Tropical Savanna Climate dominated by Aw. The mean yearly precipitation for the country is over 2500 mm ²⁶ (Figure 4)
Temperature	Minimum 22 °C, Max. 31 °C, and mean annual temperature is 27°C (82.42°F) in the geographical area. ²⁷ (Figure 5)
Soils	Based on FAO soil classification data ²⁸ (Figure 6), the geographical area is mainly of Dystric Regosol, Orthic Ferralsols, and Xanthic Ferralsols.
Hydrology	The main river is the Little Scarcies River 280km, which meanders through the upper region of the project area, passing through the boundary of Kambia and Port Loko Districts. River Bankasoka, which forms part of the Sierra Leonean Estuary, flows through the Port Loko District. These waterways provide a source of livelihood for many communities in the area and are also used for transportation and irrigation (Figure 9)
Elevation	The geographical area's elevation (Figure 7) ranges from -8 to 178 meters above sea level (masl).
Slope	The slope (Figure 8) of the geographical area is gentle and undulating.
Vegetation	The ecoregion of the project zone is parallel to the coastline but inland of the coastal belt at the Interior Plains. This Guinean Forest ecoregion consists lowland plains, containing forest regrowth, woodland, savannas ²⁹
Protected Areas	The Scarcies river estuary registered under the Ramsar Site, Wetland of International Importance ³⁰

2.1.13.1 Climate

The local climate is tropical, with coastal areas having hot and humid weather and inland areas having a more temperate climate. The average annual temperature is 27 °C, and the annual average rainfall is 2,500 mm. The rain season is controlled mainly by the movement of the tropical rain belt, Inter-Tropical Convergence Zone (ITCZ), which oscillates between the northern and southern tropics over a year³¹. Most rainfall occurs in August with a monthly average rainfall of 760 mm. The lowest rainfall occurs in January (3 mm). The months when Port Loko receives plenty of rainfall are July and August, while the months when the least rainfall occurs are January and February.

²⁵ <https://unfccc.int/sites/default/files/resource/Sierra%20Leone%20INC.pdf>

²⁶ <https://slmet.gov.sl/our-services/climate>

²⁷ <https://climateknowledgeportal.worldbank.org/country/sierra-leone/climate-data-historical>

²⁸ <https://www.fao.org/soils-portal/data-hub/soil-maps-and-databases/faounesco-soil-map-of-the-world/en/>

²⁹ <https://eros.usgs.gov/westafrica/ecoregions-and-topography/ecoregions-and-topography-sierra-leone>

³⁰ UNEP-WCMC and IUCN (2023), Protected Planet: The World Database on Protected Areas (WDPA)[On-line], [July 2023], Cambridge, UK: UNEP-WCMC and IUCN. Available at: <https://doi.org/10.34892/6fwd-af11>

³¹ <https://climateknowledgeportal.worldbank.org/country/sierra-leone/climate-data-historical>

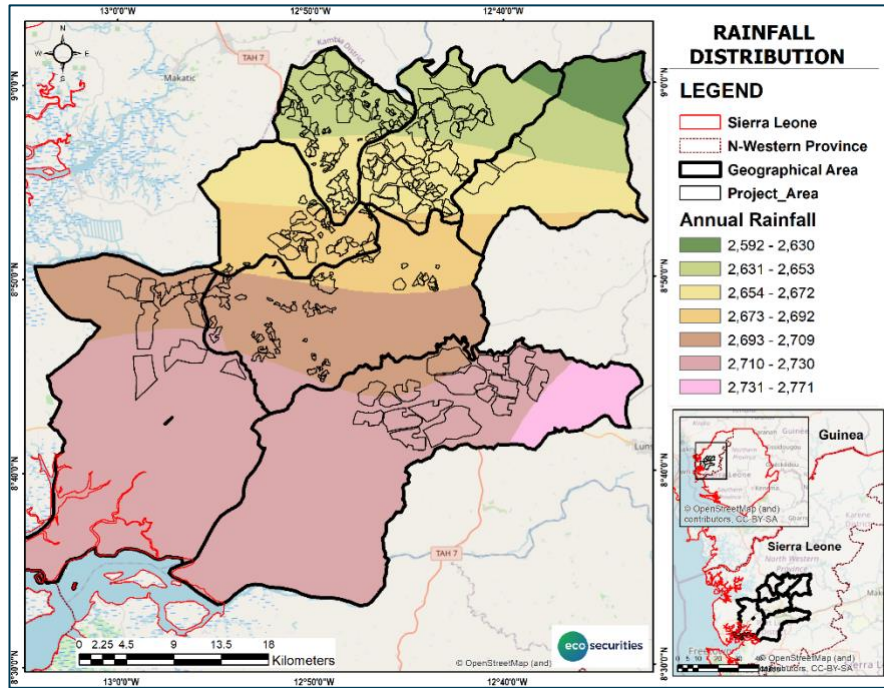


Figure 3 Average annual distribution of rainfall in the geographical area 2015-2022

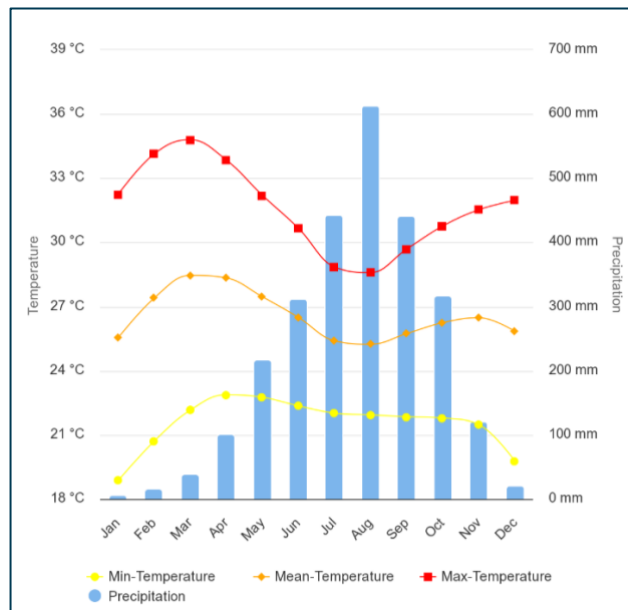


Figure 4. Climatology in Sierra Leone temperature and precipitation variations³²

January is the warmest month of the year. August is usually the coldest month in Port Loko, with an average temperature 27°C. The difference between the hottest month, January, and the coldest month, August, is 3.3°C.³³

³² <https://climateknowledgeportal.worldbank.org/country/sierra-leone/climate-data-historical>

³³ <https://www.worldclim.org/data/index.html>

Soils and Geology

The most dominant soil types in the area are Ferralsols (see Figure 6). They are formed principally in humid tropical zones under rainforest, scrub, thorn or on flat, gently sloping uplands. They are typically found on old landscapes subject to shifting cultivation, as common in the project area.

They are rich in iron and aluminium oxides and typically have a reddish colour. Orthic Ferrerosols are characterized by having a low to moderate nutrient content and a neutral to slightly acidic ph. Orthic Ferrerosols often have a well-defined soil profile, with distinct layers of organic matter, clay, and iron oxides, making them suitable for revegetation activities.

The soils in the project area provides the nutrients needed without chemical additives. Therefore, fertilizer use will be very limited in the project area, and organic chemicals will be prioritized.

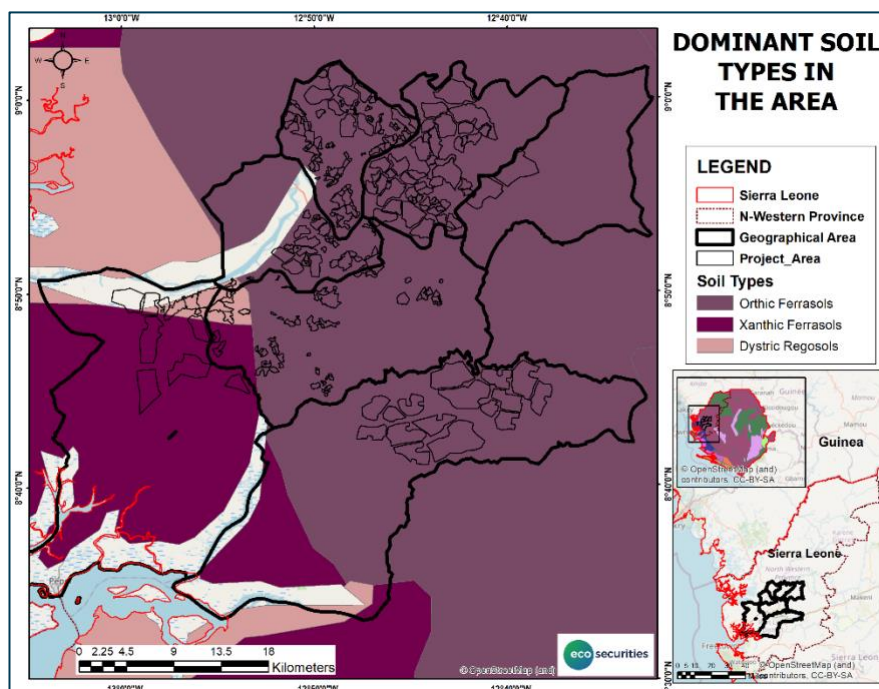


Figure 5. Dominant Soil Types in the Geographical area (FAO³⁴)

For **Geology** the geographical area is located under the Kasila Group trending strip of highly deformed and metamorphosed amphibolite- to granulite-facies metasedimentary and meta-igneous rocks of Paleoproterozoic age (De Waele et al., 2015).

They consist of gabbros, amphibolite, hornblende schists, garnet-mica schists, and charnockitic and anorthositic granulites with a predominantly north-west to southeastern strike and showing some signs of isoclinal folding and intensive shearing. The lithology of the Kasila Group is dominated by fine- to medium-grained basic granulites with minor horizons of quartz magnetite, quartz diopside, and sillimanitic rocks³⁵

Topography

The geographical area predominantly features a low-lying plain with slight variations in elevation and slope, as shown in Figures 7 and 8, respectively.

³⁴ <https://www.fao.org/soils-portal/data-hub/soil-maps-and-databases/faounesco-soil-map-of-the-world/en/>

³⁵ <chrome-extension://efaidnbmnfnkcefnmckaj/https://frontier.dk/wp-content/uploads/2022/10/ESIA-EXECUTIVE-SUMMARY-PORT-LOKO.pdf>

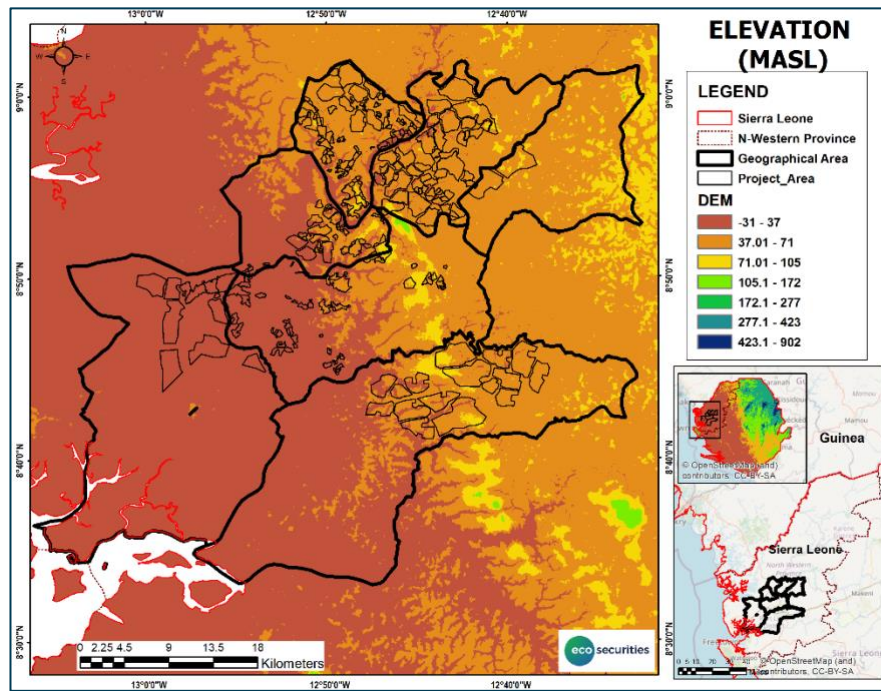


Figure 6. Elevation profile in the Geographical Area (NASA STRM DEM³⁶), DEM - digital elevation model, a representation of the bare ground topographic surface of the Earth.

The dynamic slope profile transitions from low-lying coastal plains to steeper terrains in the east. Bordering the Atlantic Ocean, the western parts of the district feature gentle slopes with elevations generally below 100 meters. Moving inland, the landscape transitions into rolling hills and undulating plains with a gradual increase in slope.

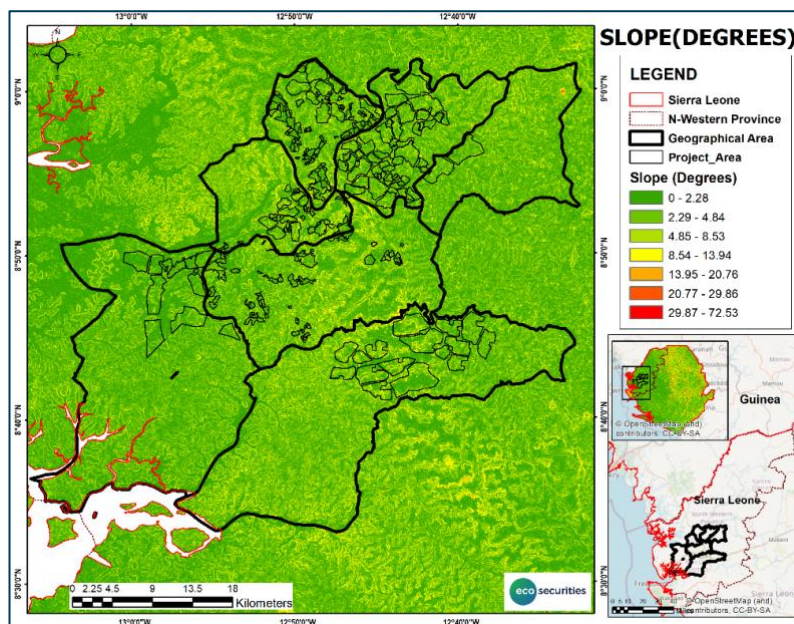


Figure 7. Slope

³⁶ <https://earthexplorer.usgs.gov/>

Hydrology

The Little Scarcies River, also known as the Kaba River splits the project area in two is the main water source with uses such as local transportation within its reach, particularly for smaller boats and canoes, The river provides a source of fish for local communities, contributing to their food security and livelihood and Limited irrigation practices might exist along the riverbanks, supporting the cultivation of crops for local consumption. Sierra Leone estuary located on the western side of the project area, where the Scarcies and other rivers converge before emptying into the Atlantic Ocean with an approximate size of 1,200 km².

The Scarcies estuary also part of the hydrology in the region is recognized as a Wetland of International Importance under the Ramsar Convention due to its ecological significance.³⁷

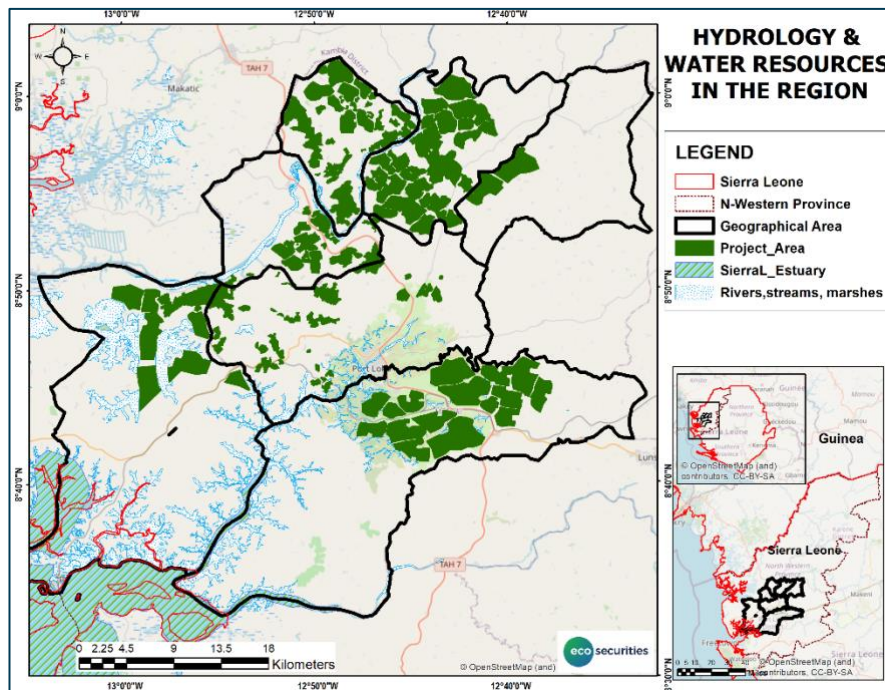


Figure 8. Hydrology in the Geographical Area

2.1.13.2 Land use and stratification

The project area encompasses two main types of land use, therefore a two-strata stratification was selected. The analyses were conducted independently for each stratum.

Stratum 1: covers areas described mainly as dry grasslands / grasslands / unused lands. The vegetation, if any, within this stratum is either grass or scarce shrubs. Rare, isolated trees may be scarcely found. These areas are, by definition, well-suited to welcome plantation operation.

Stratum 2: middle-high vegetated land. This concerns areas with half-dense scattered tree cover and high green shrubs or grassland below the canopy.

³⁷ <https://rsis Ramsar.org/ris/1014>

Strata	Land use - land cover	Project area (ha)	Project area %
Stratum 1	Dry grasslands / grasslands / unused lands	14320	71
Stratum 2	Middle-high vegetated land	5730	29
Total area		20050	100

The strata derived from the 2022 Forest Cover maps are shown in the figure below **Error! Reference**



Figure 9. Aerial imageries (Google Earth 2022). The left picture illustrates, inside the red polygon, Stratum 1. On the right Stratum 2 dominates, with an alternance of scattered trees sometimes growing among high green shrubs, sometimes in bare soil / dry grass

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2.1.14 Social Parameters (VCS, 3.18; CCB, G1.3)

The proposed project area is in Port Loko District in the Northwestern province of Sierra Leone. It overlaps 7 chiefdoms: Kamasondo, Bakeh Loko, Dibia, Maconteh, Kasseh, Maforki and Bureh. The sources of information for the social parameters are the Population and Household Census (2015)³⁸, the Census Population (2015)³⁹ and the ESIA.

Population

The population distribution by age group and gender indicates that 49% of the district population is of working age. According to the Population and Household Census 2015, 29% of the population is children in the 5-11 age group, and many of them, particularly in rural areas, are engaged in domestic or other forms of labour/economic activities. According to the population statistics, some 18% of the district population is below 5 years old. Almost 89% live in the district's rural areas.

The households consist of an average of 5.9 people, and more than one-quarter (28%) are headed by women. The table below

³⁸ https://www.statistics.sl/images/StatisticsSL/Documents/final-results_2015_population_and_housing_census.pdf

³⁹ https://www.statistics.sl/images/StatisticsSL/Documents/Census/2015/2015_census_national_analytical_report.pdf

summarises the populations of the chiefdoms in the project zone, according to Sierra Leone 2015 Statistics Data⁴⁰.

Table 3 Chiefdoms Population

Chiefdoms	Males	Females	Total
Kamasondo	14,453	15,530	29,983
Bakeh Loko	3,722	4,051	7,773
Dibia	7,252	8,267	15,519
Maconteh	4,819	5,183	10,002
Kasseh	6,893	7,618	14,511
Bureh	7,467	8,199	15,666
Maforki	18,719	20,414	39,133
Total	44,606	48,848	93,454

Age Groups

The Sierra Leone 2015 census⁴¹ revealed the demographic profile of a young population, where 46 percent are less than 15 years, and only 3.5 percent are 65 years and above.

The working-age population (15-64 years) represents 55.6 percent. The population of children between the ages of 0-4 years and 5-9 years account for 13.3 percent and 15.7 percent of the total population, respectively.

Education

About 55.4 percent of the Sierra Leone population have attended school and 44.2 percent have never attended school. More than half of women and two in five men aged between 15-49 in Sierra Leone have no education. 30% of women and 47% of men have attended secondary school or higher. Women and men in urban areas are most likely to achieve higher levels of education. The percentage of the population that has never attended school in rural areas (32.7%) is almost three times more than those in the urban areas (11.5%). Over one-third (36%) of women and 54% of men are literate⁴².

Employment

The population not in the formal labour force (15-64 years old) is 35%. These are those who are not working and not actively looking for work. In Sierra Leone, 62 % of the labour force are employed in either formal or informal employment, and 2.7 % are unemployed (Table 4).

An unemployed person is one who is not working but is actively looking for work⁴³. Although the unemployment rate stands at 3.2% in 2018⁴⁴, the underemployment rate is 30.9% and almost one-third of all workers would like to work more hours according to World Bank⁴⁵. Overall, underemployment is an indication of the low capacity of the labour market to provide more full-time jobs to those who desire them, especially highly skilled people.

⁴⁰ https://www.statistics.sl/images/2020/sierraleone_2015_population_census_data_for_16_districts_5_regions.docx

⁴¹ https://www.statistics.sl/images/StatisticsSL/Documents/final-results_-2015_population_and_housing_census.pdf

⁴² https://www.statistics.sl/images/StatisticsSL/Documents/final-results_-2015_population_and_housing_census.pdf

⁴³ https://www.statistics.sl/images/StatisticsSL/Documents/Census/2015/2015_census_national_analytical_report.pdf

⁴⁴ <https://data.worldbank.org/indicator/SL.UEM.TOTL.NE.ZS?end=2018&locations=SL&start=2010&view=chart>

⁴⁵ <https://documents1.worldbank.org/curated/ar/134691513064668572/pdf/Sierra-Leone-Jobs-Diagnostic.pdf>

The employment rate is almost the same for male and female, 91.5 % and 91.3 %, respectively. At the regional level, the employment rates are: Eastern Region - 94.1 %, Northern Region - 93.5 %, Southern Region - 92.1 % and Western Area – 84.7 %.

Agriculture - including forestry and fishing, crop farming, and animal production - is the largest industrial sector, employing 59.2 % of the employed population. The next major industry is services at 31.1 %, followed by industrial (manufacturing, utilities, construction, and mining) accounting for 9.6 %⁴⁶.

Table 4 Distribution of the population aged 15+ years.

Source: Sierra Leone 2015 Statistics Data Census, Analytical Report.

Economic activity	Total	
	Number	Per cent
Both Sexes		
Total	4,183,879	100.0
Employed	2,594,487	62.0
Unemployed	112,268	2.7
Not in labour force	1,477,124	35.3

Economic activities

Nationally, three in five (62%) households own agricultural land and half of households own farm animals. Production of food crops, such as rice, cassava, and sweet potato, are the main livelihood sources for over 80% of the population in Port Loko⁴⁷. Small-scale mining also takes place. The city of Port Loko is a major trade centre in the Northern Province. To a lesser extent, some people are engaged in cash crop production, such as coffee and cocoa. Hiring labour and exchange workers are seasonal activities during the plantation and harvesting season from which the farming communities generate income⁴⁸.

Housing

Housing conditions vary greatly based on residence. More than 40% of urban households have electricity compared with only 1% of rural households. Overall, six in ten households have access to an improved source of drinking water. Almost 90% of households in urban areas have access to an improved source of water, compared with less than half of households in rural areas. 10% of households have an improved, not shared sanitation facility. One in five households have no sanitation facility. In urban areas, 20% of households use improved sanitation facilities, compared with 5% of households in rural areas⁴⁹.

Religion and Ethnicity

The 2015 census results clearly indicate that there are two predominant religions in Sierra Leone. These are Islam (77.0 per cent) and Christianity (21.9 per cent of the total population). This pattern is not

⁴⁶https://www.statistics.sl/images/StatisticsSL/Documents/Census/2015/2015_census_national_analytical_report.pdf

⁴⁷https://www.statistics.sl/images/StatisticsSL/Documents/Census/2015/sl_2015_phc_thematic_report_on_economic_characteristics.pdf

⁴⁸World Food Programme, Emergency Food Security Assessment Sierra Leone, 2015

⁴⁹https://www.statistics.sl/images/StatisticsSL/Documents/Census/2015/sl_2015_phc_thematic_report_on_housing_conditions.pdf

affected by geographic boundaries as Islam is prevalent across all regions and district. Regionally, Islam is most common in the Northern Region (85.1 per cent) with Port Loko having 92.8% of the population as Islam, 5.9% as Christian, 0.9% represented by other religions and 0.8% of the population have no religion.

Health

The Port Loko Government Hospital and Lungi Government Hospital are the two main health facilities in the two districts. These hospitals are supported by only five doctors and 51 other trained medical personnel. Within the chiefdoms are rural health centres and/or health posts, in our project zone we only have one health centre.

2.1.15 Project Zone Map and Project Location (VCS, 3.11, 3.18; CCB, G1.4-7, G1.13, CM1.2, B1.2)

Project Location

The grouped project is located in Port Loko District in the Northwestern province of Sierra Leone. The location is between latitudes 8.63 and 9.12, and longitudes -12.52 and -13.63. Inside the project boundary, multiple project sites with ecoclimatic conditions and soil properties suitable for growing the selected species are in different plots. The location and geodetic coordinates are provided in a separate KML file.

Before starting any project activities, all potential plots have been thoroughly evaluated. This evaluation will involve mapping the current and historical land cover using Geographic Information Systems (GIS) tools. Based on this mapping, only areas deemed suitable for the Afforestation, Reforestation, and Revegetation (ARR) project will be included.

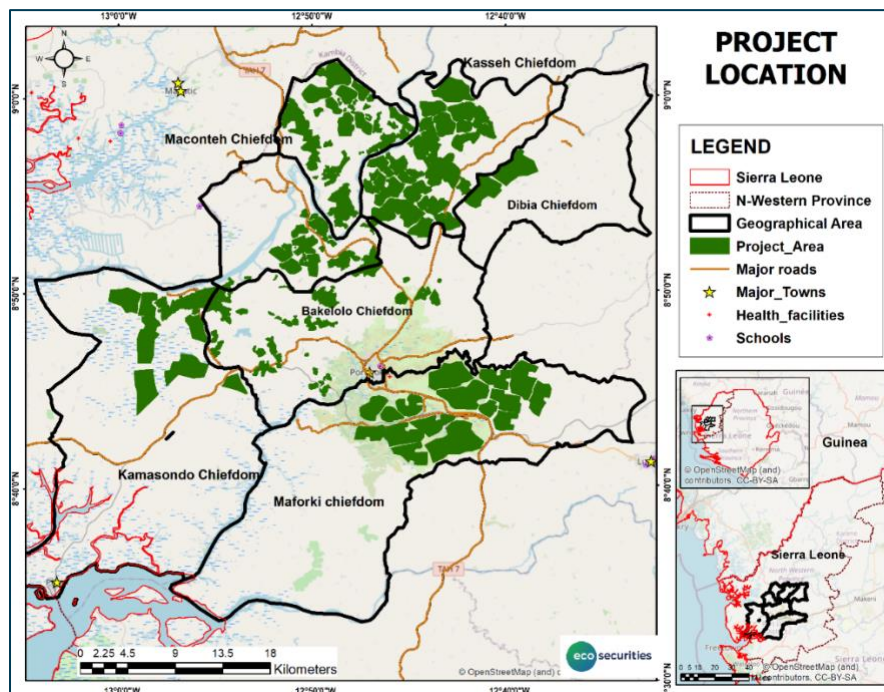


Figure 10. Project Area Location in Port Loko district, Northwestern Province Sierra Leone

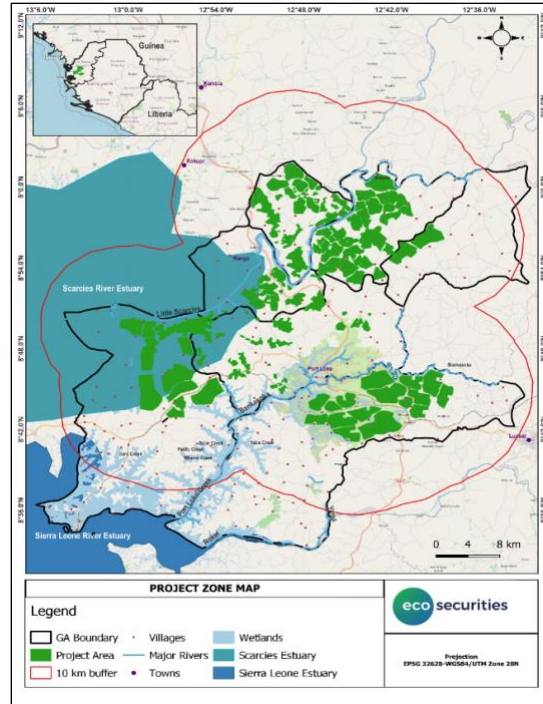


Figure 11 Project Zone Map

The first instance is 5,000 ha distributed across 3 chiefdoms (Maconteh, Kasseh, Bureh), and the total will eventually add up to 20,000 ha. The map below shows the distribution, and detailed spatial boundaries are provided in a separate KML file. Each added instance will follow the same eligibility criteria.

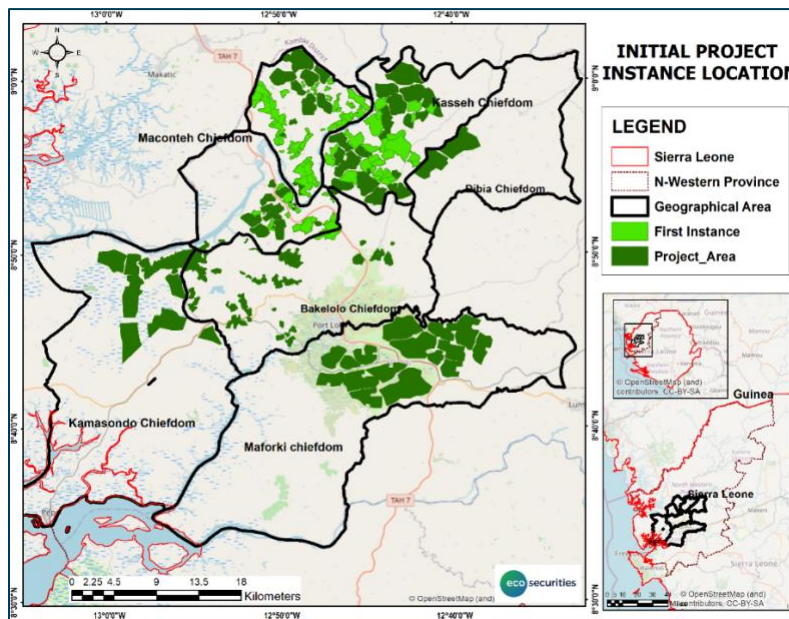


Figure 12. Initial Project Instance

First project Instance

The table below shows the figures planted in the years 2022 and 2023.

Instance	ID	Chiefdom	Eligible Area (Ha)	Planting Year
1	A01	Maconteh	65	2022
1.1	A02	Maconteh	200	2022
1.2	C01	Kasseh	200	2022
1.3	A02b	Maconteh	52.22	2023
1.4	A03	Maconteh	288.80	2023
1.5	A04	Maconteh	212.80	2023
1.6	B01	Bureh	45.66	2023
1.7	B02	Bureh	111.68	2023
1.8	C02	Kasseh	112.47	2023
1.9	C03	Kasseh	402	2023

The Scarcies and Sierra Leone River estuaries and Port Loko forest reserve are key High Conservation Values (HCVs) which the project will monitor as part of the Climate, Community & Biodiversity (CCB) Standard exceptional biodiversity benefits. These areas will be protected by the project activities as described in section 2.1.16.

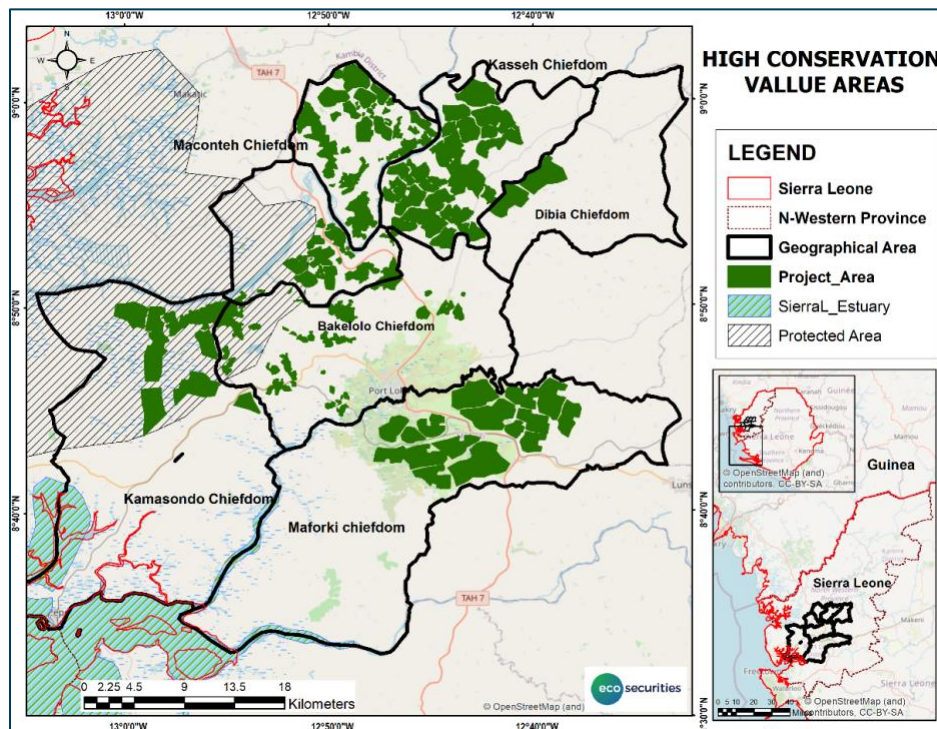


Figure 13. High Conservation Value Areas

2.1.16 Project Activities and Theory of Change (VCS, 3.6; CCB, G1.8)

The project activities and associated theory of change presented here and summarized in Table 5 are expected to generate benefits for communities, biodiversity, climate change mitigation, and adaptation.

The without-project scenario reflects three key issues reported by the literature review and confirmed by the Environmental and Social Impact Assessment (ESIA)⁵⁰ and the Community Needs Assessment report⁵¹.

- (1) The level of local employment is severely low given the lack of stable job opportunities and meagre income from traditional farming, representing the main income in the project area.
- (2) Land is continuously degraded, mostly due to agricultural conversion, leading to the loss of ecosystems and negatively influencing key fauna and flora population and distribution.
- (3) Local climate conditions are threatened by large areas of degraded land generating water loss, soil erosion, destruction of arable land, and increasing ecological deterioration.

The main objective of the project is to establish forest cover on degraded land by planting native species to address the above issues. The expected benefits include:

- **Socioeconomics:** The project will offer more job opportunities to increase the income of local households. After implementing the project activities, the ratio of poor households is expected to decrease. The afforestation project could provide job opportunities with higher and more stable income compared to the current traditional farming opportunities. Women's prosperity will improve as 50% of the hired labour force will be women. Local communities will be trained in sustainable agriculture practices to grow their main crops and improve food security and nutrition levels. Access to markets and microfinancing will be fostered by building on the village banking model. Providing clean water and improved cookstoves will contribute to better health of the beneficiary communities. All these activities are designed to enhance communities' livelihoods significantly.
- **Threat to biodiversity:** The project activities aim to adjust the effectivity of the hydrological and soil nutrient cycle due to increasing forest cover, which will positively impact the survival rate of abundant plants. As the project advances, the increasing dense vegetation will help develop better habitats, improve the distribution of key fauna, and increase the diversity and abundance of forest bird communities and other threatened species in local regions. Additionally, the project will plant native species with high resistance to climatic stress and invasion of pests and diseases. All these project activities will significantly improve local biodiversity and ecological systems' health. The project will, at a later phase, include monitoring and protecting the wildlife that has been sighted in the area, including the Hippopotamus, antelope, and fish species, restoring their habitats and population.
- **Threat to climate:** The project aims to increase forest cover in degraded/barren/fallow land. This will ease water conservation (Scarcies River catchment area), soil health, and nutrients.

⁵⁰ ESIA done by Ecoworld Ltd in February 2023

⁵¹ Conducted by RML

Therefore, the project activities will contribute significantly to enhancing the hydrological cycle, reducing drought and debris flow risk, and promoting the soil nutrient cycle. In addition, the increased forest cover will effectively strengthen fragile habitats and lower the sensibility to excessive burning due to their good improvement of climatic and soil conditions. This will see re-established, the local micro-climate and ecological environment to optimal conditions.

Table 5 Project theory of change

Activity description	Expected climate, community, and/or biodiversity			Relevance to the project's objectives
	Outputs (Short-term)	Outcomes (Medium-term)	Impacts (Long-term)	
Plant native species of trees, including preparing land for Planting using sustainable means	Increased tree canopy cover over soil Increase tree biomass	Improve the ecological local environment.	Trees grow, carbon sequestered, soil quality improves, forest canopy Wildlife corridors expanded	Removal of GHG emissions Increase in local biodiversity
Conduct continuous management and protection of the forest	Improve the local ecological environment	Protect and conserve wildlife	Increase in ecosystem biodiversity	Biodiversity
Offer permanent and temporary job opportunities related to forest planting and management with quota allocated to women	Increase household incomes of local residents	Improve the living level of local villages	Improve well-being of local residents	Achieving SDG objectives of no poverty and gender equality, improved welfare
Access to clean and safe water	Less sickness due to water drinking	Improve health	Improve well-being of residents	Achieving SDG objectives related to access to clean water
Support implementation of climate-smart agriculture in key crops	Alternative livelihoods, sustainable land resource management	Increased agricultural production per unit farm parcel Increased production of higher value and higher nutrition crops	Food security and nutrition at the household level, income from the sale of surplus farm produce Enhancement of the knowledge base and skills of small-scale rural producers in	SDGs poverty reduction,

Activity description	Expected climate, community, and/or biodiversity			Relevance to the project's objectives
	Outputs (Short-term)	Outcomes (Medium-term)	Impacts (Long-term)	
			modern production, processing, and marketing practices	
Integrate carbon finance via high-impact methodology into the blended finance model of project	Attract pre-verification investment and funding to scale up project. Professionally guide project development, implementation, and monitoring.	Financial sustainability	Achieve long-term financial sustainability of continuous scale-up	Financial Sustainability, Community benefits
Monitoring, Reporting, & Verification of climate, community, and biodiversity benefits as well as grievance mechanisms. (MRV & Project Management)	Professionally guide project development, implementation, and monitoring. Locally relevant project design through participative co-development	Accurate reporting on ex-post-performance Adaptive Management & continued improvement in responding to observed trends in monitoring or stakeholder feedback	Quality carbon credits and resultant benefits accrued to communities and the ecosystem	Successful project performance and reporting

Project activities related to rewilding:

Planting Protocol

Planting is targeted for between April and October annually, the period coinciding with the rainy season. To limit the transplantation shock to the plants, all planting materials are transported from the nursery and brought to the planting site only on the day of planting.

The Project adopts a general spacing of 5 m x 5m for all spp. (600-700 trees per hectare) for rewilding areas. This activity will be completed by the end of October of each planting year, depending on the weather, where possible.

Nursery

The Project will operate high-capacity, modern tree seedling nurseries with the eventual capacity to produce up to 3 million seedlings per annum. The project partners operate tree breeding and research that is focused on the continual improvement of genetic stock.

Project partners have been successfully rearing native seedlings at their facilities. Most seedlings for the project would be reared in their own nurseries, with seeds sourced from the highest-quality local sources.

Land Preparation

Land preparation will be principally carried out manually, in which hand tools are used to reduce grass cover.

Marking and Pitting

The project's preferred method for pegging out the planting points at the desired spacing for planting is to lay out a line, marked at intervals with the desired spacing, along the edge of the area to be planted. The pit is dug by working the pick from different sides, to ensure that the pit is straight in section. Soil is loosened, and large clods of earth are broken up. Pits are dug not more than a few days before or concurrent to planting when the ground is moist from early rains.

Planting

Planting will be done in the project areas per the details provided in the protocol for each type of area.

Watering, Survival Survey, and Blanking

In the case of late or lessened rain, it is often essential to water new compartments, done manually by a team or mechanically with a tractor.

Where the planting has been done on schedule between April and October, survival surveys are carried out within 2 months following planting to determine the need to replace plants that have not survived ("blanking"), which, if necessary, is completed within 3 months. Blanking is then carried out where seedling mortality turns out to be more than 10% or concentrated at various spots. In all cases, blanking is done using large healthy nursery stock.

First Years of Care:

Weeding

Predominantly, the vegetation on the land currently under lease is degraded shrubland with fast-growing elephant grass and occasional small trees and shrubs. As part of the land preparation activities, weeds will be controlled manually, as well as weeding maintenance operations.

Three weeding events take place in each of the first and second years after planting, and two weeding events take place in the third year in each compartment.

Slashing or Hoeing

Slashing is done either as a full cover operation whereby the entire area is slashed, or as a spot operation carried out where the weeds are only high in certain areas, such as the inter-row.

Ring hoeing

An area of 50cm to 1m radius around the tree is hoed, and the rest is left, slashed, or sprayed with herbicide.

Line hoeing: the tree line is hoed, and the inter-row is left, slashed, or sprayed with herbicide as appropriate. Line hoeing on slopes is carried out along the contour to prevent erosion.

Use of Chemicals

Appropriate measures are taken to prevent the use of chemicals that are harmful to the environment. The use of organic herbicides is prioritized in care and maintenance of planting areas.

The Project is committed to employing non-chemical weed control wherever practical. The Project will only use products for weed control that are acceptable in terms of the FSC principles, criterion, policies, and guidelines. It will ensure that, before undertaking chemical weed control, spraying teams are well-trained in the use of the chemical and equipment and provided with personal protection equipment (PPE). Any chemicals used will meet strict ecological principles.

Continuous Protection

Following over 10 years of operation and monitoring of conservation areas by the Project Partners, after planting and initial years care, the Project shall also provide continuous monitoring and protection to the forest areas.

The main sources of risks shall be monitored:

- Unplanned fires
- Pests
- Illegal activities

Avoiding such risks is paramount to the success of the regeneration of an area.

Fire Protection

Fire protection is a key issue as it poses the greatest physical risk to forests. Therefore, fire protection focuses on fire prevention, fire risk reduction, and fire preparedness and suppression.

Fire prevention measures require active engagement with the local community. Most fires are man-made, started to clear land or for hunting. Agricultural methods using fire to clear land are less efficient in retaining nutrients and organic matter in the soil, and efforts are made through education programs to re-educate local farmers who clear land using such a practice.

Fire risk reduction methods focus on physical methods of preventing fires from occurring or reducing the potential severity of fires. Weed control methods aim not only to prevent competition with young trees but also to reduce the volume of combustible material that builds up beneath the trees, including control of invasive grasses at land preparation.

Fire breaks are a tool used to reduce further the impact of fires and aid in the ability to fight. Fire breaks of 10 meters wide are installed around planting units within the plantation and serve as access routes within the plantation area. Compartment roads, external boundary roads, crest roads, secondary roads and valley bottom cut-off roads serve as fire breaks, and vegetation management (weed control) is done

to reduce the risk of fire spread. Fire preparedness is highly important during the fire season (December – April).

Roaming security guards are employed and deployed on 24-hour patrol of the plantation during the dry season. The guards are provided with transport and communication to facilitate communication between the groups for rapid response to manage fire outbreaks.




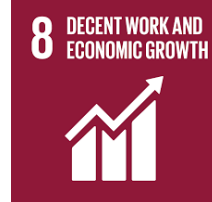
Such Roaming security guards will also be responsible for observing illegal activities that can lead to the destruction or degradation of the forests.

Pest Control

Pest and disease issues include fungal, bacterial, and biological pathogens. The impact of pests and disease vary but may lead to reduced growth rates, reduced yields, lower quality timber, and total crop failure – all of which have a significant financial and biological impact. The Project will actively employ various preventative and control methods to combat pests and diseases. It aims to maintain a diversity of planting stock to ensure that the genetic base of the plantation is wide and varied. There will be research and development (R&D) activities that trial species for deployment, continuously evaluate planted material, and engage with leading research institutions.

2.1.17 Sustainable Development Contributions (VCS, 3.17)

The project’s main contributions towards achieving Sierra Leone sustainable development goals are:

 <p>1 NO POVERTY</p>	<p>Targets 1.1. and 1.2. The project will employ 1,500 people from the community to manage the forests i.e., protection from illegal logging, and forest fires, etc. This will facilitate enhancing the living standard of people living within Port Loko region in Sierra Leone, promoting an increase in household incomes and aiding to reducing poverty.</p>
 <p>2 ZERO HUNGER</p>	<p>Target 2.1 and 2.3. The increase in income and increased stability of income will enable household heads to purchase food for their families. Further, income generated from employment will increase the purchasing power of the communities. Considering that each household on average has 7.9 number of people and that 90 percent live below the poverty line. Such measures will contribute to reducing hunger and improving nutrition.</p>
 <p>5 GENDER EQUALITY</p>	<p>The project will ensure gender balance in employment and co-benefit activities. Target 5.1. The project will ensure gender balance in employment and co-benefit activities. About 20% of those employed will be women. Information sharing through the stakeholder consultation will also cater to gender needs by design and implementation. Women and girls will be given priority in selecting and distribution of the outlined project benefits.</p>
 <p>8 DECENT WORK AND ECONOMIC GROWTH</p>	<p>Targets 8.3, 8.5, 8.6 The project ensures best practice in compliance labour regulations with regard to employees and support staff by providing decent jobs, a safe working environment and pays wages above normal range for the area. The significantly increase household earnings and thereby local economic growth.</p>



Target 13.1, 13.2.

The project is a GHG mitigation project which will remove GHGs from the atmosphere. The project will help communities adapt to climate change by providing alternative sources of income from environmentally destructive practices.



Targets 15.1, 15.2, and 15.5.

The project will halt and reverse land degradation and the loss of biodiversity, combat desertification and ensure the sustainable use of terrestrial ecosystems.

Monitoring and reporting will be covered by recording all the achievements with related evidence, and the contributions to climate, community, and biodiversity will be calculated and evaluated in accordance with the related standards and methodologies.

2.1.18 Implementation Schedule (CCB, G1.9)

Table 6. outlines some key milestones in the project's development and implementation.

Date	Milestone(s) in the project's development and implementation
2018-2022	Consultative meetings with communities formalized lease agreements with landowners
2022	Tree planting, Stakeholder consultation and engagement, environmental sensitization
2023	Project design, Drafting VCS and CCB project descriptions, third party VCS and CCB validation, 1,465 ha planted
2023 onwards	Implementation of community livelihood activities ⁵² ; biodiversity activities implementation, enrichment planting
2024 onwards	Addition of new project instances; Ongoing project and project activity monitoring; continuous stakeholder engagement
2025	Anticipated first Verification
2026 onwards	Ongoing verification annually

⁵² The initial project activities focusing on enhancing community livelihood will start with implementing climate-smart agricultural practices and constructing boreholes.

2.1.19 Risks to the Project (CCB, G1.10)

Table 7 Benefits risks and mitigation measures

Identified Risk	Potential impact of risk on climate, community and/or biodiversity benefits	Actions needed and designed to mitigate the risk
Fire	The project does not convert natural forest to plantations but only establishes plantations in degraded grasslands and abandoned community farms. Fires could damage parts of the reforested area, destroying newly created habitat for biodiversity and commercial value for the communities.	<p>Strengthen forest fire prevention efforts by community engagement to increase the awareness of forest fire prevention in the entire community at appropriate time of year.</p> <p>Fire breaks are used to reduce the impact of fires and aid in the ability to fight them. Fire breaks at 10 metres wide are created around planting units and serve as access routes within the plantation.</p> <p>Investment in mobile firefighting equipment and staff ready during the fire season (December-April)</p>
Pests and Disease Outbreaks	Pest and disease issues can include fungal, bacterial, and biological pathogens. The impact of pests and disease vary, but can lead to reduced growth rates, reduced yields, lower quality product and loss of significant forest area- all of which have a significant financial impact and affects biodiversity negatively. Low likelihood of diseases	<p>Prevention and control plans for diseases has been developed that gives greater priority to biological control, along with organic pesticides used to control outbreaks.</p> <p>There is a research and development focus that trials species for deployment and engages to ensure that the project is abreast of the latest information on pests and diseases.</p>
Pesticides	Improper pesticide application would be harmful to the natural environment, including polluting soil, water, and air	Especially the biological measures to control pests and diseases will be adopted.

	conditions, as well as the habitat of the wildlife.	Therefore, the pesticide application will be limited.
Drought/Natural Disasters/Invasive species	Affect emissions reductions, negative impact on communities and cause ecosystem imbalance.	The project will only plant native species. The geographic location of project areas is safe from flood zones. However, planting methods in disaster risk areas will employ robust land preparation methods
Political stability and policy changes	Government could be inclined to recentralize their forest management systems which requires governments to establish national carbon-oriented forest management plans, reliable baseline data, NDCs, MRV mechanisms, and national institutions for the trading and payment of carbon stocks in the forests. This would affect community benefit sharing.	Rewilding Maforki Ltd (RML) has excellent working relations and partnerships with government departments. Active and constructive engagement with policy makers is a mitigation measure to ensure that well balanced and community-development inclined policies are agreed upon.

2.1.20 Benefit Permanence (CCB, G1.11)

RML intends to sustain the climate, community, and biodiversity benefits beyond the project’s lifetime by building the management capacity of communities according to section 4.2. There are long-term contractual arrangements in place with the Government and communities for the project. Furthermore, the project has been well designed to adhere to best practice management of the forests and stakeholders to ensure that for its period, the project will be sustainable.

RML also intends to build a strong sustainable forestry model in Sierra Leone through community leaseholds. Compared to the traditional farming and grazing, the project will provide job opportunities as well as alternative livelihoods with higher and more stable income, significantly improving the well-being of local communities, therefore enhancing the long-term community benefits beyond the project lifetime.

2.1.21 Financial Sustainability (CCB, G1.12)

While revenues from carbon will be key in ensuring the long-term viability of the project, initial investment will be available from Carbon Done Right⁵³, a climate-finance company located in British Columbia, Canada. Carbon Done Right will provide seed investment and help locate new sources of finance for the following phases of the project prior to significant volumes of carbon revenue. Predicted carbon revenues and precise annual budgets demonstrate sufficient cash flow from sales of VCU to sustain the project through to the end of the crediting period. The project proponents have created a detailed financial model for the development and financial management.

⁵³ www.klimatx.com

2.2 Without-project Land Use Scenario and Additionality

2.2.1 Conditions Prior to Project Initiation and Land Use Scenarios without the Project (VCS, 3.13; CCB, G2.1)

Ecosystem type:

Sierra Leone is divided into 4 main relief regions: coastline, interior lowland plains, interior plateau and mountains. Broadly classified, there are 7 vegetation types, which include the moist rainforest, semi-deciduous, montane, mangrove, savannah, farm bush and swamp forest. About 15,000 plant species⁵⁴ have been identified.⁵⁵

Current and historical Land-use:

The project zone is mostly made of degraded grassland with some patches of inactive palm plantation and low regenerating shrubland. The rest of the area is made of few croplands, with few built-up (roads and paths). In the continuation of the pre-project land use scenario, the area would remain abandoned with no specific activity implemented⁵⁶. Sierra Leone’s economy highly depends on natural resources such as mineral extraction, agriculture, and forestry. These activities require land availability, and as the population grows, there is increasing pressure on the remaining lands.

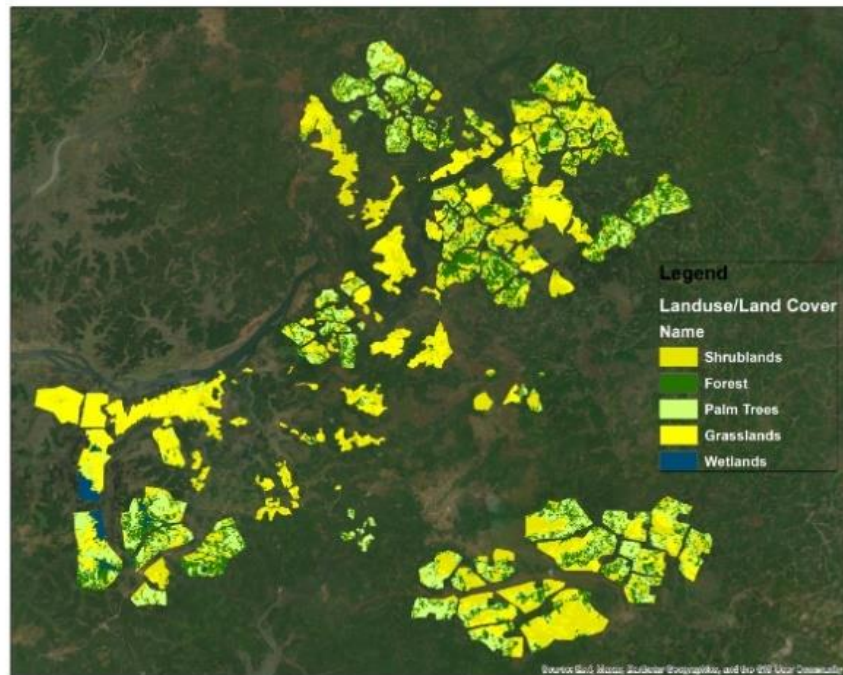


Figure 14 Land cover and land use of the project area.

⁵⁴ Available at : <https://www.cbd.int/countries/profile?country=sl#:~:text=About%2015%2C000%20plant%20species%20have,the%20west%20coast%20of%20Africa.>

⁵⁵ RML Biodiversity Assessment 2023

⁵⁶ Ecoworld Ltd, ESIA for RML, 2023

Historically, most of the local people living in the surrounding communities of the project area are farmers. Smallholder agriculture is a primary driver of deforestation in Sierra Leone and generally in West Africa, as forest conversion is part of the farm fallow cycle⁵⁷. The dominant agricultural activities that affect vegetation and land use are cropland expansion, slash-and-burn agriculture, and cattle grazing.

Present and Prior Environmental Conditions:

The details of the physical environmental conditions are discussed in section 2.1.14.

2.2.2 Most-Likely Scenario Justification (CCB, G2.1)

Scenario 1: Continuation of pre-project land use

The project area is mostly made of degraded grassland with some patches of inactive palm plantation and low regenerating shrubland, as illustrated in the project land eligibility section (2.1.4 Project Eligibility (VCS, 3.1, 3.6, 3.8, 3.18, 4.1; CCB Program Rules, 4.2.4, 4.6.4) where a land use analysis has been conducted. The rest of the area is cropland, with few built-up, barren lands, wetlands, etc. In the continuation of the pre-project land use scenario, the area would remain abandoned with no specific activity implemented on it. This option would result in further degradation of the areas due to increased deforestation land degradation, and cattle grazing. Following discussions with local farmers and the chiefs, it was identified that continued encroachment by illegal migrant farmers could lead to undesirable social conflicts. It also exposes the area to increased risks from fire and fire spread; usually caused by migrant farmers attempting to clear grassland for farming. This alternative was contrary to the wishes and interests of the landowners who lack the capacity to develop these areas⁵⁸.

Scenario 2: Project activities without being registered as a VCS project.

The reforestation is the proposed project activity. However, reforestation projects require significant investments of capital and modern technology to ensure that the project can generate positive impacts on climate, on the local community and biodiversity. The project activities without receiving carbon revenues would not be possible because there is insufficient funding available to implement all activities sustainably. In fact, on one hand, the project implementation would not generate any profit, and on the other hand, some costs are related to the project's activities. The only conservation and/or reforestation projects identified in Sierra Leone have been implemented through carbon revenues and registered under Verra (i.e., project n° 1201, "The Gola REDD project" and project n° 2401, "Reforestation of degraded lands in Sierra Leone").

Scenario 3: Conversion to agriculture

Sierra Leone's economy highly depends on natural resources such as mineral extraction, agriculture, and forestry. These activities require land availability, and as the population grows, there is increasing pressure on the remaining lands with natural ecosystems.

57 Gibbs, H. K., Ruesch, A. S., Achard, F., Clayton, M. K., Holmgren, P., Ramankutty, N., & Foley, J. A. (2010). Tropical forests were the primary sources of new agricultural land in the 1980s and 1990s. *Proceedings of the National Academy of Sciences*, 107(38), 16732–16737. <https://doi.org/10.1073/pnas.0910275107>

58 Ecoworld Ltd, ESIA for RML, 2023

Smallholder agriculture is a primary driver of deforestation in Sierra Leone and generally in West Africa as the conversion of the forest is part of the farm fallow cycle⁵⁹. The ESIA highlighted that most of the communities living in the project area generate income and livelihood through agriculture. About 82.4% of respondents interviewed are farmers (majority of whom are subsistence farmers) which underlines the importance of agriculture in the project area⁶⁰. The dominant agricultural activities that affect vegetation and land use are cropland expansion, slash-and-burn agriculture, and cattle grazing. Shifting agriculture is a common practice and for this reason when a patch of forest is burned, cleared, and cultivated usually for a short period of time (1–2 years) and is then left fallow for several years. After the end of the civil war, cropland expansion increased a lot, going from an average of 32 km² per year from 1975 to 2000, to 130 km² per year between 2000 and 2013. Overall, agricultural area progressed by 35% between 1975 and 2013, mostly in the Interior Plains, in the northern part of the Koinadugu and Kono Plateaus⁶¹.

In addition, the increase in population after the civil war (from about 3 million in 1975 to over 7 million in 2018⁶²) enhanced the need for agriculture and farming, which a large part of the population relies on. In fact, the agricultural sector is the dominant economic sector in Sierra Leone as it employs about two-thirds of the labour force and is around 42.5% percent of GDP⁶³. The country contains fertile and flat land, abundant rainfall, a temperate climate, and several rivers with significant irrigation potential that could support the production of enough food to meet local consumption as well as some for export. The most common crops across the country are rice (85% of farmers grow rice⁶⁴), cassava, maize, millet, cashew, rubber, ginger, vegetables, fruits, and sugarcane, in addition to the rearing of livestock. The main exported crops are cocoa, coffee, kola nut and oil palm. in addition to the rearing of livestock⁶⁵.

The expansion of agricultural activities and areas led to greater pressure on forests. For instance, the protected areas of Outamba Kilimi and Kangari Hills both experienced encroachment from farmers and continue to have agricultural communities settled inside their boundaries⁶⁶. Historically, most of the local people living in the surrounding communities of the project area are farmers. Therefore, the project area has the potential to be used for small-scale agricultural cultivation.

Scenario 4: Conversion to mining site for precious minerals

Sierra Leone is a mineral-rich country endowed with abundant natural resources. Mineral exports, mainly iron ore, diamonds, bauxite, rutile, and gold were equal to 2.7% of Sierra Leone GDP and accounted for 91.1% of exports in 2016⁶⁷. According to USAID, the exports of iron ores, titanium ore, diamonds and

59 Gibbs, H. K., Ruesch, A. S., Achard, F., Clayton, M. K., Holmgren, P., Ramankutty, N., & Foley, J. A. (2010). Tropical forests were the primary sources of new agricultural land in the 1980s and 1990s. *Proceedings of the National Academy of Sciences*, 107(38), 16732–16737.

<https://doi.org/10.1073/pnas.0910275107>

60 See ESIA report conducted by ECOWORLD (SL) LTD in 2023

61 Available at: <https://eros.usgs.gov/westafrica/land-cover/land-use-land-cover-and-trends-sierra-leone>. Accessed on: 04/11/2022.

62 Wadsworth, R. A., & Lebbie, A. R. (2019). What happened to the forests of Sierra Leone? *Land*, 8(5), 80.

63 Statistics Sierra Leone (2015) '2015 Population and Housing Census: Summary of Final Results Google Search. (n.d.). Retrieved November 3, 2022, from https://www.statistics.sl/images/StatisticsSL/Documents/final-results_2015_population_and_housing_census.pdf

64 Available at: http://ingenae.illinois.edu/wp-content/uploads/ING-Landscape-Study-2017-Sierra-Leone-published-2017_07_07.pdf. Accessed on: 04/11/2022.

65 Available at: <https://www.trade.gov/country-commercial-guides/sierra-leone-agriculture-sector>. Accessed on: 04/11/2022.

66 Available at: https://www.iisd.org/system/files/publications/iisd_conservation_in_Sierra_Leone.pdf. Accessed on: 04/11/2022

67 Ukaga, O., Ukiwo, U., & Ibaba, I. S. (Eds.). (2012). *Natural resources, conflict, and sustainable development: Lessons from the Niger Delta* (Vol. 8). Routledge.

aluminium ore made up US\$ 590 million in 2017 and a large part of imports such as machinery and equipment's are for the mining sector⁶⁸.

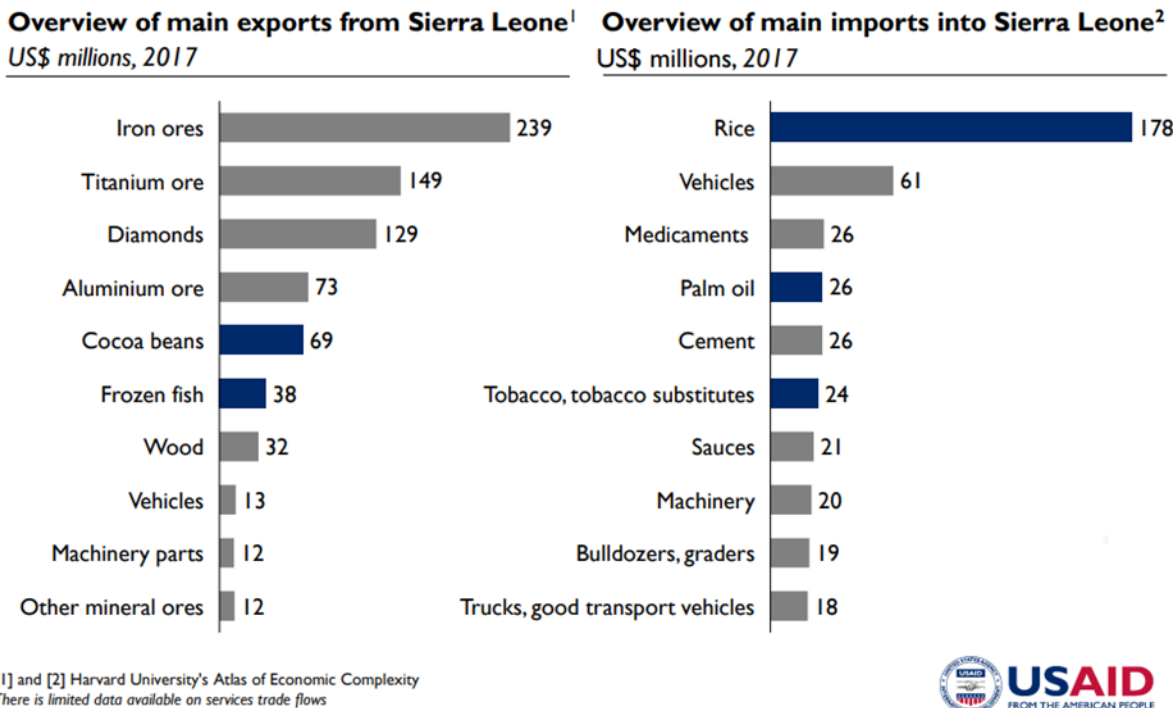


Figure 15. Main exports and imports in Sierra Leone in 2017. Source: USAID 2020

Large mining firms mine mainly rutile and bauxite while the alluvial nature of diamonds and gold makes them available for both artisanal miners and larger mechanized companies⁶⁹. A significant example that illustrates the importance of mineral extraction in Sierra Leone is the number of mining company which amount over 100 on a territory where 82% of the lands are covered by mineral concessions⁷⁰.

However, despite its contribution to the economic development of the country, mining operations have important negative impacts on the environment including deforestation, land degradation and destruction of farmlands, inadequate availability of clean water, poor air quality and noise pollution. The need for economic development and the high price of gold trigger a gold rush that accentuates even more the pressure on land and forest in the country.

The Northwest region of Sierra Leone has been identified for the deposits of iron ore and other precious minerals. The areas around Port Loko are known for bauxite mining. The SL Mining Company, which

68 USAID 2020, Investment, and partnership mapping in Sierra Leone, retrieved November 3, 2022, from https://pdf.usaid.gov/pdf_docs/PA00ZDKV.pdf

69 Mabey, P. T., Li, W., Sundufu, A. J., & Lashari, A. H. (2020). Environmental Impacts: Local Perspectives of Selected Mining Edge Communities in Sierra Leone. Sustainability, 12(14), Article 14. <https://doi.org/10.3390/su12145525>

70 Brown, O., Hauptfleisch, M., Jallow, H., & Tarr, P. (2013). Environmental assessment as a tool for peacebuilding and development: Initial lessons from capacity building in Sierra Leone. In Assessing and restoring natural resources in post-conflict peacebuilding (pp. 333-348). Routledge.

operates iron-ore mining in Lunsar and Marampa, is a major employer in the area. Considering the above information, mining for precious mineral extraction represents a potential alternative land use scenario.

Scenario 5: Small-scale unplanned forest degradation and deforestation by local communities

There are some patches of forest in the project area that can be degraded or deforested. Rural communities in Sierra Leone highly rely on forest resources such as wood and charcoal for construction, firewood for cooking (fuel wood is the main source of fuel across most of the country) or for sales and herbal products for their livelihood⁷¹. The population growth after the civil war increases even more the demand for fuelwood, enhancing deforestation and soil degradation⁷². Without the intervention of this project, the land could continue to be used for wood production (illegal but common practice as there is a clear lack of enforcement of applicable laws), increasing the degradation of the lands.

2.2.3 Community and Biodiversity Additionality (CCB, G2.2)

In 1994, Sierra Leone signed and ratified the United Nations Convention on Biological Diversity (CBD) that seeks to conserve species, genes, habitats, and ecosystems, ensure the wise use of biological resources and access to benefit sharing of our genetic resources. To fulfil its commitment, the Sierra Leone national biodiversity strategy and action plans (NBSAP) have been developed since 2003 for the period 2004-2010. The revised version is effective for the period 2017-2026. The aim of the NBSAP is to seek conservation measures that provide a solid framework for the sustainable exploitation of Sierra Leone's biodiversity for the benefit of present and future generations⁷³.

However, (1) institutional, (2) financial and (3) capacity barriers have been identified and have prevented the effective management of biodiversity in the country:

Firstly, a lack of policy and legislative guidelines for biodiversity conservation and inadequate policy prevent a proper biodiversity protection in addition to weak law enforcement which has been a key factor affecting the conservation of species, habitats, and ecosystems in Sierra Leone⁷⁴. A significant example that illustrates the policies issues in the country is the last place (163/163) on the Environmental Performance Index in 2010. These indicators provide a gauge at a national government scale of how close countries are to established environmental policy goals⁷⁵.

Additionally, the government of Sierra Leone suffers of weak infrastructure and staff shortages and is plagued with chronic shortage of financial resources. In post-war Sierra Leone, budget allocation is mostly directed towards reconstruction and rehabilitation work rather than toward conservation of biodiversity⁷⁶.

71 Jackson, E. A. (2015). Negotiating New Dimensions for Forests Conservation in Sierra Leone. 4(2), 20.

72 National Recovery Strategy. 2002. Report from the Government of Sierra Leone. Available at National Recovery Strategy: Sierra Leone 2002 - 2003 - Sierra Leone | ReliefWeb

73 Government of Sierra Leone (2017), Sierra Leone's Second National Biodiversity Strategy and Action Plan 2017-2026. Accessed on <https://www.cbd.int/doc/world/sl/sl-nbsap-v2-en.pdf>

74 Government of Sierra Leone (2017), Sierra Leone's Second National Biodiversity Strategy and Action Plan 2017-2026. Accessed on <https://www.cbd.int/doc/world/sl/sl-nbsap-v2-en.pdf>

75 Emerson, J., D. C. Esty, M.A. Levy, C.H. Kim, V. Mara, A. de Sherbinin, and T. Srebotnjak. 2010. 2010 Environmental Performance Index. New Haven: Yale Centre for Environmental Law and Policy.

76 Government of Sierra Leone (2017), Sierra Leone's Second National Biodiversity Strategy and Action Plan 2017-2026. Accessed on <https://www.cbd.int/doc/world/sl/sl-nbsap-v2-en.pdf>

Other issues identified are the few highly trained personnel, especially scientists, to undertake biodiversity programmes and inadequate facilities such as libraries, laboratories, and equipment. At local level, activities initiated by government agencies and NGOs to raise awareness and advocacy for public participation in biodiversity management didn't succeed and lead to insufficient involvement of local communities, especially the youth⁷⁷.

Regarding the activities that will benefit the communities, none of them is initiated by a law or regulations. Therefore, the Rewilding Maforki Project has not been initiated by any laws or regulation and rather comes from the will of RML to develop a carbon project that will also benefit biodiversity and communities.

The project is funded by the generation and sale of carbon credits. Some of the impacts the setup of the project will attain are discussed in Table 8. Section 3.1.5 demonstrates the project's additionality and is also applicable to the community and biodiversity benefits.

Table 8. Community and biodiversity benefits that would not occur in the absence of the project.

Type of benefit	Expected benefit (long-term impact)
Community	<p>Increased economic, food, environmental and livelihoods security due to greater agriculture productivity and adaptation to climate change</p> <p>Increase in and diversification of income and livelihoods sources through jobs and business opportunities creation and reduced dependence on natural resources overexploitation as a source of livelihood</p> <p>Improved access to markets promoting inclusive value chains</p> <p>Social and economic empowerment, especially of the marginal and vulnerable groups</p> <p>Improved access to human well-being facilities such as safe and affordable drinking water</p> <p>Expanded and easy access to various public and private sector service providers</p> <p>Increased human capacities due to knowledge, skills and positive attitudinal changes and perspective on life brought as a result of training and capacity building activities</p> <p>Increased coping capacities to deal with economic, social, and environmental shocks and trends</p> <p>Improved local level governance of natural and other livelihood resources due to greater information availability, transparency, accountability, and management capacities.</p> <p>Improved planning, policies and governance mechanisms for biodiversity conservation and sustainable management</p>
Biodiversity	<p>Partnerships development for enhanced and upscaled actions for biodiversity conservation.</p>

⁷⁷ Government of Sierra Leone (2017), Sierra Leone's Second National Biodiversity Strategy and Action Plan 2017-2026. Accessed on <https://www.cbd.int/doc/world/sl/sl-nbsap-v2-en.pdf>

Reduction of threats to biodiversity
Habitats restoration for endemic, threatened, vulnerable and other at-risk species and species of special concern
Increased awareness creation and capacities building about the different ecosystem services of biodiversity
Institutional capacity building for sustainable management of fisheries

2.2.4 Benefits to be used as Offsets (CCB, G2.2)

The project does not intend for any community or biodiversity benefits to be used as offsets.

2.3 Safeguards and Stakeholder Engagement

2.3.1 Stakeholder Identification (VCS, 3.18, 3.19; CCB G1.5)

The preparation of the stakeholder identification process began with the mapping of the stakeholders and interested/affected persons with an influence on the carbon project and the identification of adaptive communication mechanisms for each type of stakeholder to organize the meetings.

The influence/dependence matrix and influence/support mapping were the tools used to identify stakeholders. The results showed that those with high influence on the project include traditional leaders (Paramount, Section, and Regent Chiefs) and government authorities, while the ones with low influence include community-based organizations and leaders of various interest groups. Two stages or levels of engagement were done using a thorough Free Prior and Informed Consent (FPIC) process to ensure a fair and participatory manner of project negotiations.

Multi-stakeholder meetings were conducted for collective decision making by the Landowners. This was to ensure that consent was sought and granted or withheld in accordance with the unique formal or informal political-administrative dynamic of each community/chiefdom. Among the stakeholders was the Chiefdom Council, comprised of the Paramount Chiefs (PCs), Members of Parliament (MPs), Landowners representatives etc).

During this process, Indigenous people and local communities were engaged in participating through their own freely chosen representatives while ensuring the participation of youth, women, the elderly, and persons with disabilities as much as possible.

Throughout the stages of engagement, a paralegal NGO (NAMATI) was involved as representatives of landowners/communities.

- Landowners determine the process, timeline, and decision-making structure.
- All project information is offered transparently and objectively at the Landowners' request.
- The process is free from coercion, bias, conditions, bribery, or rewards.
- Meetings occur at locations and times and in languages and formats determined by the Landowners.
- Community members can participate regardless of gender, age, or standing.
- All facilitation and enjoyments done are at the company's cost

Participatory Mapping

Participatory mapping involved the participation of relevant stakeholders, community members/landowners, and their chosen representatives. These included traditional leaders, women, and youths, but not limited to them.

GPS devices were used to map the area by hired contractors at company cost.

Land ownership boundaries as per the individual Landowners Agreement terms (including the total % of land leased by each land-owning family) were demarcated.

Communities provided alternative parcels of land for the project implementation outside of their usual uses for farming, owners were consulted, and the areas were ground-verified.

Sketch maps and digital maps were produced and the communities LOAs validated these, and they were adopted following adjustments.

The boundaries of protected areas (High Conservation Values) and their encompassing buffer zones were mapped out to demarcate the project area. Other important land uses were mapped. degraded grassland with some patches of inactive palm plantation and low regenerating shrubland. The rest of the area is made of few croplands, with few built-up (roads and paths).

Documentation was generated to demonstrate that the mapping was conducted in a participatory manner. Compiling evidence to support the activity (Participatory Mapping) was the most important part of the whole process⁷⁸.

Relevant documents

The Participatory Mapping and FPIC Process reports compile stakeholders' identification process details.

⁷⁸ See RML Stakeholder Engagement Report 2023

2.3.2 Stakeholder Descriptions (VCS, 3.18, 3.19; CCB, G1.6, G1.13)

Stakeholder	Rights, Interest and Overall Relevance to the Project
Rural Communities of Bakeh Loko, Kamasondo, Bureh, Kasseh, Maconteh, Dibia	<p>Rights: Utilization and benefit from natural resources in their area Equal employment opportunities available.</p> <p>Interest: Contributing to the socio-economic development of the community. — Developing the working capacity of women and young people in the community. Improving the livelihood in the households.</p> <p>Relevance: Direct participants and beneficiaries in project activities.</p>
Communities in the Expansion areas	<p>Rights: Utilization and benefit from natural resources in their area Equal employment opportunities available.</p> <p>Interest: Contributing to the socio-economic development of the community. — Developing the working capacity of women and young people in the community. Improving the livelihood in the households.</p> <p>Relevance: Direct participants and beneficiaries in project activities.</p>
Environmental Protection Agency	<p>Rights: Regulate and enforce compliance with environmental standards related to developing environmental projects. Provide guidance on the environmental management of the project</p> <p>Interest: Ensuring the sustainable management by verifying compliance with the environmental regulations in force for the different interventions in ecosystems and reports of related activities</p> <p>Relevance: Regulatory authority</p>
Forestry Commission	<p>Rights: Regulate forestry activities, access to and utilization of forest products. Provide guidelines on the sustainable management of forests</p> <p>Interest: Involvement in forestry related activities and verifying compliance with established forest and forestry regulations and laws</p> <p>Relevance: Control of forest resources and activities</p>
Chiefs Council	<p>Rights: Ensure land, land tenure, rights and access to land issues are in harmony with local norms, regulations; secure the interests of local communities in developmental projects</p> <p>Interest: Ensure equitable distribution of resources and benefits to communities in their jurisdiction</p> <p>Relevance: Land resources utilization authority</p>
NAMATI	<p>Rights: Advocates for local communities in land accessibility matters</p>

Stakeholder	Rights, Interest and Overall Relevance to the Project
Rural Communities of Bakeh Loko, Kamasondo, Bureh, Kasseh, Maconteh, Dibia	<p>Rights: Utilization and benefit from natural resources in their area Equal employment opportunities available.</p> <p>Interest: Contributing to the socio-economic development of the community. — Developing the working capacity of women and young people in the community. Improving the livelihood in the households.</p> <p>Relevance: Direct participants and beneficiaries in project activities.</p>
Communities in the Expansion areas	<p>Rights: Utilization and benefit from natural resources in their area Equal employment opportunities available.</p> <p>Interest: Contributing to the socio-economic development of the community. — Developing the working capacity of women and young people in the community. Improving the livelihood in the households.</p> <p>Relevance: Direct participants and beneficiaries in project activities.</p>
	<p>Interest: protect community customary rights, social and environmental impacts</p> <p>Relevance: Intermediary between communities and investors in land negotiations</p>

2.3.3 Stakeholder Access to Project Documents (VCS, 3.18, 3.19; CCB, G3.1)

This PD will be shared through consultation and community consultation meetings with project stakeholders in the participating Chiefdoms. Once the project is validated and the first monitoring report is verified, meetings will be held in each chiefdom to share the final PD and monitoring report outcomes. This process will be repeated after each monitoring period. Village assembly meetings will be held to explain the PD and the monitoring reports. Considering low literacy levels, information will be shared verbally during all consultations, including village meetings, to explain contents of the PD, the verification process, and the significance of these documents by local staff in local language.

2.3.4 Dissemination of Summary Project Documents (VCS, 3.18, 3.19; CCB, G3.1)

Summaries of the PD and future Monitoring Reports will be issued to stakeholders and discussed during the community consultation and community consultation meetings. In addition, simplified infographics in local languages will be handed out and placed in public places for wider circulation in the communities.

2.3.5 Informational Meetings with Stakeholders (VCS, 3.18, 3.19; CCB, G3.1)

The project started holding community consultation meetings in 2018 at both the Chiefdom Council and village levels across 7 chiefdoms and has continued this consultation process throughout 2023. To highlight the project's purpose, letters of intent were sent to identified stakeholders, including communities that live in the project zone, government officials, and landowners.

In local communities, people have been invited to meetings via town criers. Meetings were open to everyone, including the head of the women's group, youth representative, religious leaders (Muslim and

Christian), teachers, and headmasters. A sample of these community and stakeholder consultation meetings are described in section 2.3.7. These meetings aimed to build trusted partnerships with project stakeholders and engage in further efforts to understand local context, history, livelihoods, and concerns. Identification of other social, religious, and economic factors that could potentially influence how the community responded to the project was also considered to ensure a more seamless transition for surrounding communities and other stakeholders as project activities began to be implemented.

Participatory Rural appraisal surveys and studies were conducted in the area to obtain such key information.

With RML staff having knowledge of the area, these meetings were held in culturally acceptable settings. The meetings were widely publicized through village representatives at community social gatherings. Details of the engagements have been compiled in a specific report that will be made available.

2.3.6 Risks from the Project and No Net Harm (VCS, 3.18, 3.19)

	Identified risk(s)	Potential impact of risk on stakeholders, ecosystem health, and biodiversity	Mitigation or preventative measure(s) taken
Impacts on biodiversity and ecosystems	Fire	The project does not convert natural forest to plantations but only establishes plantations in degraded grasslands and abandoned community farms. Fires could damage parts of the reforested area, destroying newly created habitat for biodiversity and commercial value for the communities.	<p>Strengthen forest fire prevention efforts through community engagement, increasing the entire community's awareness of forest fire prevention at the appropriate time of year.</p> <p>Fire breaks are used to reduce the impact of fires and aid in the ability to fight them. Fire breaks at 10 metres wide are created around planting units and serve as access routes within the plantation.</p> <p>Investment in mobile firefighting equipment and staff ready during the fire season (December-April)</p>
Soil degradation and soil erosion	Pesticides	Improper pesticide application would be harmful to the natural environment, polluting soil, water, and air conditions and wildlife habitats.	Especially the biological measures to control pests and diseases will be adopted. Therefore, the pesticide application will be limited
Water consumption and stress	Drought/Natural Disasters/Invasive species	Affect emissions reductions, negative impact on communities and cause ecosystem imbalance.	The project will only plant native species. The geographic location of project areas is safe from flood zones. However, planting

			methods in disaster risk areas will employ robust land preparation methods
Participation Risks	Problems in allocation of project benefits	The marginalized groups such as women, aged and the youth might be disadvantaged, and their lack of participation could lead to discontinuation of project activities	<p>The allocation of project benefits is stipulated in the agreements and their performance criteria. However, a process will be in place to conduct community needs assessments, and a steering committee will be elected to manage the process and distribution of project benefits prior to receipt.</p> <p>The community representatives will undergo capacity building training in governance, financial and project management annually.</p>
Participation Risks	Biased participation/elite capture in project activities	Project would lose the social license to continue, adversely affecting local communities that would benefit from project activities and financing	The recruitment and engagement process are open and public, giving equal opportunity. The FPIC policy ensures such processes are supervised. A tracking system of participants and beneficiaries rules out bias.
Occupational risks	Occupational safety risks from handling of tools, work environment	An unsafe work environment would affect the quality of life, health, and income of employees, contractors, and their households, slowing down project activity	<p>There is an SOP in place that identifies the risk activities and the protective equipment to be used.</p> <p>The policy of the project aims at the minimum use of agrochemicals; however, it is guaranteed: Training for the use of agrochemicals.</p> <p>Use of protective equipment (masks, gloves, face shield, etc.).</p> <p>Adequate and properly identified storage</p>
Policy changes	Political stability and policy changes	Governments could be inclined to recentralize their forest management systems, which requires establishing national carbon-oriented forest management plans, reliable	Rewilding Maforki Ltd (RML) has excellent working relations and partnerships with government departments. Active and constructive engagement with policymakers is a mitigation

Potential Costs	baseline data, NDCs, MRV mechanisms, and national institutions for the trading and payment of carbon stocks in the forests. This would affect community benefit sharing.	measure to ensure that well-balanced, community-development-inclined policies are agreed upon.
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2.3.7 Community Costs, Risks, and Benefits (CCB, G3.2)

Information about the proposed afforestation and plantation project, including potential costs, risks, and benefits to communities, was widely discussed with communities and project stakeholders throughout all 7 local partner Chiefdoms, as part of the stakeholder engagement processes described in 2.3.3. From the community and stakeholder consultation meetings, the project risks, costs, and benefits identified are summarized in Table 9.

Attendance and minutes of all consultative meetings are available for reference.

Table 9. Summary of costs, risks, and benefits

Potential Costs	<ol style="list-style-type: none"> 1. Massive manpower needed for planting 2. Occupation of the roads during the planting 3. Impact on water resource for planting
Risks	<ol style="list-style-type: none"> 1. Natural disasters, e.g., fire 2. Pests and diseases
Benefits	<ol style="list-style-type: none"> 1. Carbon credit revenue 2. Long-term living condition improvement from employment, alternative livelihoods, and social amenities from carbon revenue 3. Soil improvement 4. Provide employment and micro-finance opportunities for women

2.3.8 Information to Stakeholders on Validation and Verification Process (VCS, 3.18.6, 3.19; CCB, G3.3)

The status and process of the VCS and CCB validation and verification processes will be publicized through routine community and stakeholder engagement meetings. A summary of all outcomes will be provided in the local language and posted in public areas such as clinics, shops, and public information boards.

2.3.9 Site Visit Information and Opportunities to Communicate with Auditor (VCS, 3.18.6; CCB, G3.3)

RML will ensure that the schedule for the auditor’s site visit will be widely announced – both through verbal announcements disseminated through local staff, implementing partners and community

institutions, as well as through hard-copy announcements (posters, flyers) that will be posted openly in public spaces. Where appropriate, community and project stakeholder meetings will be held to coincide with the Auditor’s visit. The announcement process will be documented, and photographs of the exercise taken.

During the site visit, the auditor will have the opportunity to interview selected community and project stakeholders and, if appropriate, hold community meetings.

2.3.10 Stakeholder Consultations (VCS, 3.18; CCB, G3.4)

The following tables summarize how stakeholder consultations were conducted from project inception following the FPIC principle.

Date of stakeholder consultation	01-June-2018
Stakeholder engagement process	<p>The project team invited stakeholders to informal meetings. The purpose of these meetings was to build trusted partnerships with project stakeholders and engage in further efforts to understand local context, local history, community livelihoods, and community concerns. Identification of other social, religious, and economic factors that could potentially influence how the community responded to the project were also considered to ensure a more seamless transition for surrounding communities and other stakeholders as project activities began to be implemented. Participatory rural appraisal and Participatory learning for action (PLA) surveys and studies were conducted in the area to obtain such key data.</p> <p>Photos, meeting notes as records of the meeting were taken and stored in the RML database.</p>
Consultation outcome	<p>The key outcomes revolved around the observation that the majority of individuals and landowners possess knowledge solely regarding the physical demarcations of their properties, lacking a comprehensive understanding of the total land area due to the absence of official land titles. To address this issue, the RML team undertook a participatory mapping approach, skilfully utilizing GPS coordinates to map out all of the lands. This meticulous process ultimately paved the way for the formulation and execution of individual landowners’ agreements.</p> <p>In addition, all stakeholders were overwhelming in their acceptance of the project and willing to fully participate in all activities proposed by the project proponent. However, the following were a few concerns raised by community stakeholders.</p> <ul style="list-style-type: none"> ● How would participating communities benefit from such a project? ● Would there be any negative impacts on the community and the environment in relation to the company’s operations? ● A call for providing job and livelihood opportunities that would improve local people’s income. <p>The RML team took time to thoroughly explain and answer all questions, queries and concerns raised by community members with a view to allay their fears and address all concerns and clear any lingering doubts. This is to ensure the communities are fully informed before making a final decision.</p>

Stakeholder input	Community stakeholders' willingness for full project participation was assured. Landowning families opted to give their parcel of land for demarcation and later Landowner Lease Agreements were signed by individual landowners/landowning families with clear boundaries demarcated and maps/shapefiles, land sizes/ha
Date of stakeholder consultation	26-September-2021
Stakeholder engagement process	<p>The project team started its community engagement with the people of Maconteh Chiefdom. During this event, the team had the opportunity to clearly explain the project goal and potential community benefits in the local ethnic dialect. Enough time was given to the stakeholders to conduct further consultations before providing feedback to the project proponent.</p> <p>Photos, meeting notes as records of the meeting were taken and stored in the RML database.</p>
Consultation outcome	<p>The consultation yielded a significant outcome: both the Landowners and the stakeholders actively engaged in the decision-making process of the project, recognizing its potential to positively impact their communities.</p> <p>Notably, this project stands as a pioneer in implementing a comprehensive Free, Prior, and Informed Consent (FPIC) process. Securing the stakeholders' consent from the beginning was of utmost importance, as it guarantees alignment with their interests and minimizes any potential adverse effects.</p>
Stakeholder input	A comprehensive Free, Prior, and Informed Consent (FPIC) process was developed as a standard best practice for multistakeholder consultations. This process thoroughly provides community stakeholders with the required information about the project. It encourages everyone to participate fully in the project. Such information includes the costs, benefits and risks of the project and also gives them the opportunity to seek independent legal advice where needed.
Date of stakeholder consultation	28th September- 24th April 2022
Stakeholder engagement process	<p>Similar engagements were held for Kasseh, Bakeh Loko, Kamasondo, Dibia, Maforki and Bureh Chiefdoms. The focus of these meetings was to raise awareness on the "new" concept of carbon, forestry management, benefit sharing and how grievance can be redressed. Local communities agreed that the project can 1) create jobs; 2) generate income from selling carbon credits; 3) improve the local environment and restore biodiversity; 4) improve the social status of women by hiring them in the project. Those community stakeholders consulted therefore affirmed the value and effectiveness of the project design. The result was some landowners coming forward to express interest in working with the project proponent.</p>

Consultation outcome	One of the stakeholder's consultation outcomes is lease agreements with landowners. The most pertinent terms are the lease value per hectare and per year as well as contract duration. Communities are advised regarding lease agreements by NAMATI, a legal NGO. RML is also securing at least a letter of no objection from the government. Engagements were recorded in a report that is available for review.
Stakeholder input	One of the concerns that arose from the communities' meetings is that the previous project (SLA) implemented in the area failed and a lot of people didn't receive their salaries. The area is also prone to fire and communities were concerned about how fire will be managed. As a result, the RML team prepared a fire management plan. As mentioned above, communities welcomed the project because it will create job opportunities and improve the livelihood of local communities.
Date of stakeholder consultation	9th Feb – 15th Feb 2023
Stakeholder engagement process	<p>In addition to stakeholders' engagement, a community need assessment survey was conducted in selected communities within the project sites to gain deeper understanding of communities and assess existing needs of communities in an effort to help design a community development action plan that will contribute to improve the lives of the local people. The community needs assessment supported the design of community activities.</p> <p>Photos, meeting notes as records of the meeting were taken and stored in the RML database.</p>
Consultation outcome	The consultations were conducted to effectively convey the plan to all relevant stakeholders. The objective was to garner their invaluable support and active participation in the project development endeavours. The ultimate goal is to formulate a comprehensive and practical community development plan that effectively tackles the identified needs and challenges of the respective communities. The approach ensures that the voices and concerns of the communities are heard and considered throughout the process.
Stakeholder input	Each community across operational areas were able to identify specific needs for intervention such as agriculture (cassava project), education (scholarship and school learning, materials), infrastructure (including safe drinking water), among others.

Any public comments received during the public consultation period will be incorporated into the project design if deemed relevant. Any such actions to that effected will be documented and evidence provided.

2.3.11 Continued Consultation and Adaptive Management (VCS, 3.18; CCB, G3.4)

Throughout the lifetime of the project ongoing communication and consultation will take place between RML, the local community and other stakeholders (i.e., Chiefdom councils, community representatives, Government representatives etc.) through the following mechanisms and channels:

- Locally hired RML staff in each partnering Chiefdom will act as a project focal point, provide regular project updates, and allow community concerns to also be communicated back to RML management.
- Quarterly partners meetings held at the District and Chiefdom levels and will involve representatives from each Chiefdom, community institutions, traditional leaders, local Government partners, and other local implementing partner organizations.
- Members of the wider community may participate in ongoing sensitization meetings, which are open to the public.
- Monthly and quarterly reports prepared by RML, in collaboration with implementing partners, to be shared with local communities and Government stakeholders, as well as shared externally.

The project will embrace an adaptive management approach that ensures ‘learning by doing’ is embedded in all aspects of the project. RML will periodically review plans, methods, goals, and objectives to incorporate new information, available technology, indigenous knowledge, and new information to adapt project management and implementation to achieve the project goals.

2.3.12 Stakeholder Consultation Channels (CCB, G3.5)

RML has conducted several stakeholder engagement and consultation meetings with identified project communities and other stakeholders from nearby villages and settlements. The project staff have conducted participatory surveys as part of the consultative process. This included focus group discussions (FGDs), interviews with men and women living in nearby settlements and villages, and observation and ground checks with residents, including participatory visits to a variety of important areas and community centres.

These representatives such as Landowners’ Committees and Chiefdom Councils play key roles in communication and resolution of grievances, equitable distribution of resources in the communities, points of contact for community capacity building and development activities. The agreements with communities and the government define the roles and responsibilities of these as well as other stakeholders and interested parties. With these communication channels established, the project has community support.

2.3.13 Stakeholder Participation in Decision-Making and Implementation (VCS, 3.18, 3.19; CCB, G3.6)

The project Stakeholder Engagement Plan is designed to ensure participation of all stakeholders is on an equal basis. The consultation process is designed to ensure that all members of the community, including women and marginalized groups, can be present at and contribute to all meetings. Local culture and customary norms have been taken into consideration when organizing and conducting all consultative meetings. Records have been kept of all meeting participants and disaggregated by gender.

2.3.14 Anti-Discrimination Assurance (VCS 3.19; CCB, G3.7)

The company’s Human Resource Policy requires that every new employee, permanent or seasonal, is inducted into the company’s anti-discrimination policy. New seasonal or permanent employees are informed of the policy during the induction. Further, the project has an equal opportunity policy that ensures that the project will not engage in or be complicit in any form of discrimination or sexual harassment. To ensure compliance, the project has a strict HR and grievance redress mechanism in

place that provides all project employees, identified community members, and other stakeholders with a formal system in the unlikely event that any discriminatory actions or sexual harassment does occur to ensure grievances can be addressed quickly and appropriately.

2.3.15 Feedback and Grievance Redress Procedure (VCS, 3.18.4; CCB, G3.8)

Development process	<p>In developing the grievance redress procedures, the team used their knowledge and experience of drafting similar processes in Sierra Leone before as well as the iterative process of improving the procedures. Cultural dynamics were considered and input from HR practitioners sought. An important element of the mechanism is that grievances are dealt with in a clear and timely fashion and communicated well.</p>
Grievance redress procedure	<ul style="list-style-type: none"> <p>• Engage Community Member and Receive Grievance Our dedicated grievance manager (GM) will receive the grievance and is responsible for documenting and recording it into a stakeholder complaints log database. Stakeholders can make their initial complaint in person or by using any of the communication methods described above in Sections 2.3.1 and 2.3.2. The mechanism is accessible, and the proponents will promote external awareness of its existence and guide to its use.</p> <p>• Carry out a Preliminary Assessment An initial assessment of the grievance will be conducted by the GM. Grievances will be classified into several categories, such as environmental, cultural heritage, land disturbance, recruitment procedures, health and safety, human rights, physical or economic displacement or related to a specific community development activity. A relevant person within the company will be assigned to deal with the specific details of investigating the grievance.</p> <p>• Respond to Grievance A written communication to the complainant to acknowledge the grievance and provide information as to expected next steps and timing for resolution of the grievance will be provided within seven working days of the receipt of the grievance. Where illiteracy is common, consideration will be given to the means of communicating this message. In such cases a community outreach worker will communicate the information in person through the available channels.</p> <p>• Investigation The relevant person(s) will investigate the underlying cause(s) of the grievance and develop actions needed to prevent recurrence of a similar grievance. The approach and team membership to complete the investigation will depend upon the category and level of the grievance. Some investigations may require a simple examination of the situation, whereas others may require discussions with many stakeholders, both internal and external. Wherever possible communities and respected third parties will be involved in the design and implementation of solutions.</p> <p>• Close Out The GM will follow the investigation procedure to develop recommendations to ensure the grievance does not reoccur. The aggrieved parties will be engaged and their views about the</p>

	<p>company recommendations sought through dialogue. If the complainant is satisfied, then the GM manager shall seek their sign-off that the grievance has been resolved. This process will be completed within 28 days of receiving the initial complaint.</p> <ul style="list-style-type: none"> • Further Action If the complainant is not satisfied with the proposed solution, the GM will initiate further investigation to determine what different approach may be taken. In the case that satisfaction cannot be achieved, the grievance may be referred for third party mediation, arbitration, or courts. • Monitoring and Evaluation Part of the grievance management procedure will be entering the details and each step of progress into the company's stakeholder engagement database.
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2.3.16 Accessibility of the Feedback and Grievance Redress Procedure (VCS, 3.19; CCB, G3.8)

Sections 2.3.1 and 2.3.2 describe the mechanisms in place to enable accessibility of the feedback and grievance redress procedure and how it will be advertised and made publicly available.

2.3.17 Worker Training (VCS, 3.19; CCB, G3.9)

Both in-house resources, various government departments, and external individuals and organizations will collaborate implementing the project's training and capacity building program. This training program will be subject to revision and further enhancement on a needs basis and from lessons learnt during implementation.

The members of local communities will be trained equally if they lived around the project area and are willing to participate in the training process, so that local capacity won't be lost through staff turnover. New staff members are also provided with Human Resources (HR) training, to ensure they are aware of their rights and responsibilities as employees whilst complying with national and international rules on workers' rights.

The training program will involve, but not limited to, landing, seeding, planting trees, tending, seeding quality control, cutting, weeding and security provision which will include everyone involved in forest management.

2.3.18 Community Employment Opportunities (VCS, 3.19.13; CCB, G3.10)

RML has an Equal Employment Opportunity Policy. The project will mobilize the whole community involvement, including women, and vulnerable population. All communities' members will be given an equal opportunity to fill all work positions.

Available jobs will be publicized through advert posters pasted in key public areas, and announcements and community meetings. For jobs requiring large groups, such as slashing, potential employees will be recruited with consultation of local community leaders after announcement of the roles and using other locally appropriate, fair, transparent means.

Some of the hiring is done through local contractors that select local communities and allocate 60% to women. In addition, locals who are engaged for technical posts are regularly trained in relevant skills.

The employment opportunities exist from initial land preparation, nursery, planting, and management for the length of the project.

2.3.19 Occupational Safety Assessment (VCS, 3.19; CCB, G3.12)

During the employee orientation sessions, workers are informed about the potential safety risks of their job and methods to mitigate the risks. A hard copy of the relevant laws is kept at the project office and any worker is free to consult these at any time during working hours.

RML has in place a comprehensive occupational health and safety policy that ensures all workers' health and safety is protected, and that all workers are fully informed about workplace risks and safe practices to mitigate those risks. These include training in safe working practices, first aid training for some staff members as well as the enforcement of requirements for safe handling of equipment and other materials. A copy of the plan will be provided to the validators and verifiers and will be kept at the project office and be readily available for any consultation.

The table below shows the occupational safety risks identified and their mitigation measures.

Table 10 Occupational Risks and Mitigation Measures

Risks	Preventive measures
General	There is an SOP in place that identifies the risk activities and the protective equipment to be used
Handling tools	The good condition of tools and equipment is ensured. Sharp equipment must be transported in their cases. Cutting tools are moved with the blade facing forward and only turned on for pruning or cutting. Employees are trained in the use of equipment and tools prior to use.
Fires	Firebreak patrols are made and are permanently maintained. Firefighters train employees annually in fire prevention and firefighting.
Accidents requiring first aid.	Personnel trained in first aid treatment annually. First aid kits in accessible areas/go-bags.
Handling of agrochemicals	The policy of the project aims at the minimum use of agrochemicals; however, it is guaranteed: Training for the use of agrochemicals. Use of protective equipment (masks, gloves, face shield, etc.). Adequate and properly identified storage

2.4 Management Capacity

2.4.1 Project Governance Structures (CCB, G4.1)

The Rewilding Maforki Project is developed, implemented, and managed by RML Group Sierra Leone. This is done in collaboration with government of Sierra Leone and the local communities.

The implementing entity is organized into five departments: Planning and Survey, Operations, Carbon and Community Engagement, Finance and Legal to effectively manage all project and stakeholder aspects. The project is partnering with 7 Chiefdoms. These are headed by Paramount and Regent Chiefs who are legally and traditionally recognized as custodians of project land. Within the Chiefdoms the project works with Landowners who own parcels of land they lease for project implementation to RML Group through binding agreements.

The project operates with the approval of the Sierra Leone Government through the Forestry Commission. The project works with government divisions at Provincial and District levels as well as other line ministries such as the Ministry of Agriculture in implementation of Project Activities. Each of these structures has responsibilities summarized as follows:

- RML Group: Responsible for overall project management, verification compliance and funding
- Landowners Committees: are key actors in planning and management of project activities and investment in forestry and community development locally.
- Forestry Commission: responsible for the provision of technical guidance to all actors in forest protection, formulation of guidelines and standards
- Ecosecurities: provide technical guidance in carbon project development to meet CCB and VCS standards.
- NAMATI: provide paralegal representation to communities participating in the project.
- Environment Protection Agency provides technical and governance input.

2.4.2 Required Technical Skills (VCS, 3.19; CCB, G4.2)

There is a suite of key technical skills which are required to implement the project as outlined Table 11. The pool of human resources to fulfil the required skillsets is readily available. Ecosecurities are the technical leads in the preparation of this document and the application of the methodology. With 25 years in leading climate adaptation and mitigation projects, climate change policy, and carbon markets, the Ecosecurities team gunners experience required for this project.

Additionally, the RML team has experience in working with communities in the region and hence has wide experience in implementing project activities.

Table 11 Key skills required to implement project activities

Project Activity	Sub-project Activity	Key Skills Required
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Carbon stock measurements and monitoring	Aboveground and below ground biomass measurement, land cover mapping, climate monitoring, biodiversity monitoring, community monitoring, and fire monitoring	Forestry, GIS/ remote sensing, forest inventories, statistics, forest fire management and carbon monitoring, reporting, and verification (MRV)
Community engagement and development	Stakeholder consultation and engagement, livelihood development, and education program.	Community mobilization, conflict resolution, business management, adult education, livelihoods, and social science surveys
Biodiversity assessment and monitoring	Habitat conservation and management and biodiversity monitoring	Forest conservation, conservation biology, and biodiversity

2.4.3 Management Team Experience (VCS, 3.19; CCB, G4.2)

The RML management team in conjunction with its partners, possesses significant and unique skills and experience relevant to the implementation of large-scale land management and carbon projects in Africa as well as many years in Sierra Leone.

The team has a combined 35 years of experience managing forest plantations and conservation projects. Working with communities, government and quasi-government institutions, the team possesses vast stakeholder engagement, community impact and capacity building expertise.

The solid team of leaders brings together members with proven technical skills covering aspects of financial management, data analysis (remote sensing), forest resource and agricultural management. They are supported by implementing partners from government and non-governmental institutions with relevant authority and skills to successfully implement forest and biodiversity management, community impact programming.

2.4.4 Project Management Partnerships and Team Development (VCS, 3.19; CCB, G4.2)

RML will operate with other partners by Memoranda of Understanding for specific project activity implementation. The climate smart agriculture program for instance, will be in collaboration with the Sierra Leone Agricultural Research Institute (SLARI). SLARI will provide training to lead farmers enrolled on the program.

2.4.5 Financial Health of Implementing Organization(s) (CCB, G4.3)

RML and its partner companies and committees are legally established entities according to the Laws of Sierra Leone and none of them are involved in nor complicit in any form of corruption such as bribery, embezzlement, fraud, favouritism, cronyism, nepotism, extortion, and collusion.

With ample experience of managing, implementing, and reporting the finances for a large conservation project the proponents have created a detailed financial model for the development and financial management. Predicted credit sales and an accurate estimated annual budget demonstrate sufficient cash flow from predicted contracted sales to sustain the project through to the end of the crediting period.

2.4.6 Avoidance of Corruption and Other Unethical Behaviour (VCS, 3.19; CCB, G4.3)

As legally registered companies, the project proponent and other involved entities have the obligation to comply with relevant regulations, including anti-corruption law. The project has in place transparent financial transactions mechanisms, internal and external monitoring of physical and financial aspects of the project, rigorous funds auditing arrangements and promotion of a culture of transparency and ethical behaviour project wide.

2.4.7 Commercially Sensitive Information (VCS, 3.5.2 – 3.5.4; CCB Rules, 3.5.13 – 3.5.14)

No commercially sensitive information has been left out of the public version of the PD.

2.5 Legal Status and Property Rights

2.5.1 National and Local Laws (VCS, 3.1, 3.6, 3.7, 3.14, 3.18, 3.19; CCB, G5.6)

The project conforms to all national and local laws, statutes and regulatory frameworks regulations that are relevant to the project activities.

Law	Description	Project Compliance
The Customary Land Rights Act 2022	Provides for the protection of customary land rights, the elimination of discrimination under customary law and the management and administration of any land subject to customary law, the definition of community land. The Act covers the following matters: right to acquire land; elimination of discrimination concerning gender, tribe, religion, social and economic conditions, ethnicity and ensuring accountability and transparency in the allocation and management of the land rights	The project conforms to the provisions of the Act in the acquisition and utilization of project lands. Contractual agreements entered into reflect strict observance of the code.
Forestry Act: 1988, and the requirements for a forest plantation	This the principal legislation guiding the management and regulation of forestry and Forest Reserves in Sierra Leone. Provides for the gazetting and classification, utilization and management of forest and forestry activities.	The project complies with the provisions of the Act in principle and actuality in all forest activities and

		location of the same.
The Forestry Regulations- 1989	Provides that no protected forest shall be tampered with in any way as is stated in Section 21, subsection 2 of the Forestry Act-1988 (REF), without written permission from the Chief Conservator of the Forest. In Section 15 of the Forestry Regulations 1989, subsection 1, it is stated that a license may be issued by an inspector of the Forestry division to clear land in a classified forest. Sacred bushes are protected by the stipulated regulations of Section 40, whereby clearance of vegetation from land designated as a sacred bush, is prohibited except by clearance authority from the chief conservator.	Regulatory licenses and related documentation and permits have been obtained and maintained by the project. Periodic compliance monitoring is conducted.
The Environment Protection Agency Act – 2008 and its Amendment in 2010 and 2022	Provides for the establishment of the Environmental Protection Agency and a National Environment Protection Board. The Board facilitates coordination, cooperation, and collaboration among Government Ministries, local authorities, and other governmental agencies, in all areas relating to environmental protection. The EPA also requires the submission of ESIA report to the Executive Chairman of the Department. All mining companies, INGOs, NGOs or project developers, are required to carry out an ESIA, which must be approved before the beginning of any operations.	The project conducted and ESIA submitted to the Department and was approved.
The National Protected Area Authority (NPAA) and Conservation Trust Fund (CTF) Act, 2012	In Part III, Section 12 (2), of the Act, it states that the Authority, without prejudice to the generality of subsection 1 has responsibility to (a) ensure the protection of natural ecosystems and threatened biodiversity in Sierra Leone including the establishment and maintenance of representative and sustainable samples; (b) oversee the management of local and private nature reserves and sanctuary throughout Sierra Leone including zoos and wildlife, rescue and rehabilitation centres; (c) supervise the management of wildlife outside conservation areas; (d) regulate wildlife conservation and management throughout Sierra Leone in accordance with the Wildlife Conservation Act, 1972 (Act No. 27, 1972);	The project will comply with restrictions of protected areas and not disturb biodiversity around project area; conserve wildlife habitat

<p>The National Lands Policy (NLP), 2016</p>	<p>The aspiration of this policy is to move towards a clearer, more effective, and just land tenure system that shall provide for social and public demands, stimulate responsible investment, and form a basis for the nation’s continued development. Specifically, it enunciates Policy Statements in respect of the key components of the National Land Policy such as access to land and tenure, land use, regulation and the management of special land issues, land administration structures, land laws and the Constitution.</p>	<p>The location of the project area and activities is in line with the national land use plan and the Authority’s zonation as the none of them are carried out in undesignated areas.</p>
<p>Local Government and Administration, Act 2004</p>	<p>Provides for the establishment of the local government councils. The Local District or Town Council is the highest political authority in the locality with legislative and executive powers, and responsible for promoting the development of the locality and the welfare of the people in the locality with the resources at its disposal. The local councils are made up of several Wards. Each ward establishes a Ward Committee, which consists of every Councillor, the Paramount Chief of the Chiefdom and no more than ten others, at least five of whom shall be women, residents in the ward, and elected by the ward residents</p>	<p>The project stakeholder engagement activities include councils and chiefdoms under who’s jurisdiction it falls and complies with local regulations and demonstrates respect for traditional customs and norms</p>
<p>The Factories Act, 1974</p>	<p>This Act was signed by the President on the 22nd of May 1974 and the date of commencement was on the 30th of May 1974. It deals with health and safety measures as they concern any worker in a place of work that can be considered as a factory. Part 11, Section 3 defines “factory” any premise where persons are employed in manual labour for the purpose of making gains</p>	<p>Compliance with regulation on engagement of manual labour. Certification to be obtained and openness to inspection by government agencies.</p>
<p>Chiefdom Structure</p>	<p>Paramount Chiefs constitute an important component of governance. They are elected for life by Chiefdom Councillors, who in turn are elected by residents in each chiefdom. Each of the 149 chiefdoms in Sierra Leone has a Paramount Chief or a Regent Chief who is appointed upon the death of a Paramount Chief until a successor is elected. A Paramount Chief is appointed for general administration, the maintenance of law and order, and the development of their chiefdom. The primary</p>	<p>The project works in consultation with Chiefs in the 7 Chiefdoms. Chiefs or their representatives are present in stakeholder engagements and consent is sought</p>

	tasks of the Chiefdom Structure are for the distribution of land, collection of land taxes, and the settlement of disputes.	before decisions are made that fall in their administrative jurisdiction
International Agreements to which Sierra Leone is a signatory	The Stockholm Convention on Persistent Organic Pollutants Convention on Biological Diversity (CBD) Convention of the International Trade of Endangered Species-(CITES)	

2.5.2 Relevant Laws and Regulations Related to Worker's Rights (VCS, 3.18.2; CCB, G3.11)

There are various legislations that have been enacted to protect the workers in Sierra Leone, including:

The Employment and Employed Act, 1960 regulates relations between employers and employed, and safeguards health of the employed. Sets forth provisions relating to the formation and interpretation of contracts of service, the recruitment of native labour for foreign services, restrictions on the engagement of industrial workers, employment of women, adolescents, and children apprenticeship contracts. Also regulates the death, insolvency and change of residence of employer; breaches of contract and disputes between employer and employed, provisions as to agents; advances by employers.

The Companies Act 2009 provides for the regulation of companies. It provides guidelines on how companies are mandated to provide employees with safe working conditions; respect rights of employees irrespective of ethnicity, sex, religion, disability, colour experience and education.

The Minimum Wage Act 1997 provides for the assurance of pay and conditions for employees and for contract workers to always meet at least legal or industry minimum standards and sufficient to provide decent living wages.

Act No 6/1991 The Constitution of Sierra Leone establishes safeguards around having no forms of forced or trafficked labour and the respect of human rights in the employment process by employers.

Act No 6/1991 The Constitution of Sierra Leone establishes guidelines for the employer to respect the rights of all personnel to form and join trade unions of their choice and to bargain collectively. Where the right to freedom of association and collective bargaining are restricted under law, the employer facilitates parallel means of independent and free association and bargaining for all such personnel.

RML has a robust Human Resources management system that ensures that the goal to become the most desirable employer for the communities in proximity to the project area is achieved along with professional management, training, equipment, and continuous investment in staff. RML is continuously compliant with all labour and related laws of Sierra Leone.

RML employees are informed of their rights through various ways. These include:

- Sessions with HR on during induction and contract signing.

- For staff with limited English, extra measures will be taken to verbally translate contracts and address all queries and concerns by the employee.

RML has an open-door policy and clear communication and grievance redress mechanism to address labour related matters.
All employees are provided with a copy of the HR Manual

2.5.3 Human Rights (VCS, 3.19)

RML acknowledges and upholds the protection of the rights of Indigenous Peoples (IPs), Local Communities (LCs), and customary rights holders in accordance with relevant international human rights laws, such as the United Nations Declaration on the Rights of Indigenous Peoples and the International Labour Organization (ILO) Convention 169 on Indigenous and Tribal Peoples. we achieved this through various measures as follows:

- **Prioritizing Free, Prior, and Informed Consent (FPIC):** Before commencement of project activities on their lands, the RML team ensures that the FPIC of IPs, LCs, and customary rights holders was obtained. This involves multi-stakeholders' engagements in meaningful consultations and negotiations to seek their consent before implementation.
- **Recognizing Land and Resource Rights:** The project acknowledges and respects the land and resource rights of IPs, LCs, and customary rights holders. It ensures that their traditional territories and resources are not infringed upon by the reforestation activities. This includes recognizing and protecting their rights to land, territories, and natural resources.
- **Encouraging Participation and Inclusion:** The project actively involves IPs, LCs, and customary rights holders in the decision-making processes related to the project. Their traditional knowledge and expertise are highly valued and integrated into the project's design and implementation, ensuring their meaningful participation and inclusion.
- **Safeguarding Cultural Heritage:** The project takes measures to protect the cultural heritage and traditional practices of IPs, LCs, and customary rights holders. It ensures that the reforestation activities do not disrupt or diminish their cultural identity, traditions, and customs.
- **Promoting Capacity Building and Benefit Sharing:** The project supports initiatives for capacity building and ensures that IPs, LCs, and customary rights holders benefit from the reforestation project, both economically and socially. This includes providing training, employment opportunities for women and youths, implementation of community development action plan (CDAP). and benefits sharing.
- **Aligning with International Standards:** The project aligns its policies and practices with the principles outlined in the UN Declaration on the Rights of Indigenous Peoples and ILO Convention 169. This demonstrates its commitment to upholding international human rights laws and standards.

The project has demonstrated an unwavering commitment to recognizing, respecting, and promoting the protection of the rights of IPs, LCs, and customary rights holders in accordance with applicable international human rights laws and conventions.

2.5.4 Indigenous Peoples and Cultural Heritage (VCS, 3.18, 3.19)

The project recognizes, respects, and promotes the protection of Indigenous peoples and their cultural heritage through various measures thereby fostering a positive and mutually beneficial relationship with Indigenous communities:

- **Consultation and Engagement:** The project actively engages with local communities and seek their input, perspectives, and traditional knowledge regarding the reforestation, identification, and adaptability of indigenous species. This ensures that their voices are heard, and their cultural heritage is respected in the decision-making process.
- **Cultural Impact Assessment:** The project conducted a thorough EIA studies of the potential impact of project activities on Indigenous cultural heritage, HCVs such as sacred sites, cemetery etc, and traditional practices. This assessment informs the project's design and implementation to minimize any adverse effects on cultural heritage.
- **Preservation of Traditional Knowledge:** The project acknowledges and values the traditional knowledge and practices of Indigenous peoples related to forestry, land management, and biodiversity conservation. Efforts are made to integrate this knowledge into the project's activities, thereby promoting the preservation of Indigenous cultural heritage.
- **Recognition of customary Land Rights:** The project respects the land tenure rights of Indigenous communities and ensures that RML activities do not encroach upon their traditional territories or disrupt their way of life. This includes recognizing and protecting Indigenous land tenure and resource rights and adopting the Customary Land Rights Acts of 2022.
- **Capacity Building and Employment Opportunities:** The project provides opportunities for capacity building, training, and employment for Indigenous community members, thereby promoting the preservation of cultural heritage through the transmission of traditional skills and knowledge. Provision of scholarships and school learning materials for school going Children through our CDAP implementation.
- **Cultural Sensitivity in Project Design:** The project incorporates cultural sensitivity into its design and implementation, considering the cultural significance of the land, flora, and fauna to Indigenous communities. This involves adapting indigenous species and their growing techniques to align with traditional land management practices.
- **Collaboration and Partnership:** The project establishes collaborative partnerships with Indigenous and para legal organizations, traditional leaders, and cultural experts to

ensure that the protection of Indigenous people and cultural heritage is central to the project's objectives.

2.5.5 Statutory and Customary Property Rights (VCS, 3.18, 3.19; CCB, G5.1)

Sierra Leone has a dual land tenure system. In the Western region, land ownership is freehold and allows land sales and leases, while the rest of the country land is under leasehold. In the project zone, the landowners have absolute right, and the Paramount Chiefs are the custodians of the land. Leasehold in the Provinces is governed by The Provinces Land Act of 1961, which is based on the Protectorate Ordinance of 1927 and the Tribal Authorities Ordinance of 1938. Under these laws, land is the “property” of indigenous land-owning families who are legally known as “natives” and who hold usufruct rights on it. The custodians of the land are Paramount Chiefs and the Chieftom Councils, which hold land for and on behalf of the native community. Thus, land is inherited from one generation to another and is controlled by families, villages, townships, clans or chiefdoms, and each family member is entitled to a piece of land for farming⁷⁹.

In terms of legislation, the National Land Policy (NLP) 2016 of Sierra Leone provides the vision, principles, and policy components to give direction to and definition of the roles and responsibilities of various government and customary authorities, and other non-state actors, in land management. Specifically, it enunciates policy statements in respect of the key components of the NLP such as access to land and tenure, land use, regulation and the management of special land issues, land administration structures, land laws and the Constitution. The document addresses the major issues related to land management and administration in Sierra Leone, with a view to moving towards a clearer, more effective, and just land tenure system that shall provide for social and public demands, stimulate responsible investment, and form a basis for the nation’s continued development. It situates land management structures at community level and brings certainty to land transactions with the introduction of a compulsory title registration system.

The Customary Land Rights Act 2022 provides for the protection of customary land rights, the elimination of discrimination under customary law and the management and administration of any land subject to customary law, the definition of community land. The Act covers the following matters: right to acquire land; elimination of discrimination concerning gender, tribe, religion, social and economic conditions, ethnicity and ensuring accountability and transparency in the allocation and management of the land rights; family land title; community land and public land; protected, conserved and ecologically sensitive areas, including: protection from degradation of wetlands, wildlife habitats, virgin forests; prohibited activities in ecologically sensitive areas, including: mining, farming and plantation; additional sanctions in case of harm to ecologically sensitive areas; use of land adjacent to natural resources, such as forests grazing lands, rivers and; land tenure disputes.

The Forestry Act 1988 is the principal legislation guiding the management and regulation of forestry and Forest Reserves in Sierra Leone. Provides for the gazetting and classification, utilization and management of forest and forestry activities.

The lands on which project activities are implemented are private property managed by the landowners and government. These engaged through FPIC. The result of such FPIC engagements have been legal contracts.

⁷⁹ The Oakland Institute 2011 Report: Understanding Land and investment deals – Sierra Leone. Downloaded at <https://www.oaklandinstitute.org/understanding-land-investment-deals-africa-sierra-leone>

2.5.6 Recognition of Property Rights (VCS, 3.7, 3.18, 3.19; CCB, G5.1)

The evidence of right of use is manifested in the Contractual Agreements between RML and the landowners and government agencies. In respect of a GHG emission reduction, the unconditional, undisputed, and unencumbered ability to claim that the project will cause such reduction is given through the clauses pertaining to the project activities and monitoring arrangements in the Agreement. These assure the long-term security of the owner. The carbon rights belong to RML.

2.5.7 Free, Prior and Informed Consent (VCS, 3.18; CCB, G5.2)

<p>Description of process for obtaining consent</p>	<p>Regular company establishment requirements were completed including company registration with the Corporate Affairs Commission, National Revenue Authority registration and the securing of a TIN number.</p> <p>There is no specific carbon project consent requirement at this stage as the country is still developing the regulations and laws, but RML obtained a letter from the Ministry of Environment and Climate Change supporting the project and continue to engage widely.</p> <p>In addition, an ESIA was completed with an additional Biodiversity Study. This will be submitted to the EPA.</p>
<p>Outcome of FPIC process</p>	<p>The FPIC process is designed to ensure landowners fully understand their rights and obligations. The outcome of the FPIC process is the land lease agreements. Namati has been appointed by the community to protect their interests and to negotiate on their behalf. The Namati process is iterative with the final step a translated reading of the draft lease to secure landowner can approve and sign the agreements.</p> <p>There will be no encroachment outside the leased land and no resettlement will result for the leases. Community members are offered employment where needed but there is no obligation put on them.</p> <p>In addition, the company assists with targeted agriculture projects within the communities through the CDAP.</p>

2.5.8 Benefit Sharing Mechanisms (VCS, 3.18, 3.19;)

<p>Process used to design the benefit sharing plan</p>	<p>The process started by firstly getting approval from the Chieftom structures to engage with communities and landowning families. Community and social surveys were undertaken to better understand the communities and family structures and then to understand the most urgent needs of the people in the broader project area.</p> <p>Community committees have been established and Community Liaison Officers appointed to actively engage on an ongoing basis. Following this a CDAP was designed to react to some of the urgent and a benefit share percentage of 10% was agreed with the land-owning families in accordance with the new land act. Throughout this process Namati, an NGO that protects landowner rights on behalf of land-owning families, has been engaging with the communities and presented a master lease which includes benefit sharing and CDAP regulations.</p>
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<p>Summary of the benefit sharing plan</p>	<p>The benefit share equals 10% of the gross profit generated from the sale of carbon credits. The funds will be shared between the communities covered by the leases.</p>
<p>Approval and dissemination of benefit sharing plan</p>	<p>The benefit sharing is captured in the Landowner Lease Agreements as well as in the Master Lease Agreement. These agreements have been negotiated to an agreed position and then signed by the required stakeholders. During this process, and as is described in the FPIC process document, landowners are consulted, including in their language of preference to ensure they understand the terms they are agreeing to. This was done by RML but also by Namati in a separate process.</p>

2.5.9 Property Rights Protection (VCS, 3.18, 3.19; CCB, G5.3)

The project activities do not lead to any type of involuntary relocation or relocation because all the participants/owners own their land and present documents that accredit it.

Considering the project location and recognized boundaries, villages in proximity to the project area have ample land to farm and access sufficient resources. This will be safeguarded through constant communication with stakeholders.

2.5.10 Illegal Activity Identification (VCS, 3.19; CCB, G5.4)

The following will be considered illegal activities if a person(s) were to:

- fell, girdle, lop, taps, or burn a tree, or strips off the bark or leaves from, or otherwise damages the trees
- break up or clear for cultivation or any other purpose any land of the forest
- set fire (and leave burning) without taking reasonable precautions to prevent its spreading to the project area
- permit livestock to graze in and damage any trees or plants in the project area.
- extracts wood for timber or charcoal

The illegal activities will be countered by periodic monitoring by our enforcement teams.

Several measures are in place to curb these illegal activities including stricter law (local by-laws) enforcement through greater surveillance and patrolling. The agreements entered into with Landowners committees place ownership of forest protection in communities, empowering them to act. The project impact activities will provide alternative income to locals, reducing encroachment pressure.

2.5.11 Ongoing Disputes (VCS, 3.18, 3.19; CCB, G5.5)

The forest land was acquired fairly and legally, meanwhile, there are no ongoing disputes that have been informed about to the project developer during stakeholders' meetings. So, there are neither ongoing or unresolved conflicts or disputes over rights to lands, territories, and resources nor any disputes that were resolved and recorded during the last twenty years.

2.5.12 Approvals (CCB, G5.7)

The project has signed agreements with landowners for the project areas. Approvals from the Forestry Commission for the project implementation were also obtained. The project also has an approved Environmental Impact Statement. Documentation of these approvals is available.

2.5.13 Double Counting and Participation under Other GHG Programs (VCS, 3.23; CCB G5.9)

No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program, or any other form of community, social, or biodiversity unit or credit?

Yes No.

Registration in Other GHG Programs

Is the project registered or seeking registration under any other GHG programs?

Yes No

Projects Rejected by Other GHG Programs

Has the project been rejected by any other GHG programs?

Yes No.

2.5.14 Double Claiming, Other Forms of Credit, and Scope 3 Emissions (VCS, 3.24)

No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the *VCS Program Definitions* for definitions of emissions trading program and binding emission limit.

Yes No

No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the *VCS Program Definitions* for definition of GHG-related environmental credit system.

Yes No.

Supply Chain (Scope 3) Emissions

Do the project activities affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

Yes No

Is the project proponent(s) or authorized representative a buyer or seller of the product(s) (goods or services) that are part of a supply chain?

Yes No

Has the project proponent(s) or authorized representative posted a public statement on their website saying, “Carbon credits may be issued through Verified Carbon Standard project [project ID] for the greenhouse gas emission reductions or removals associated with [project proponent or authorized representative organization name(s)] [name of product(s) whose emissions footprint is changed by the project activities].”?

Yes No

2.6 Additional Information Relevant to the Project

2.6.1 Leakage Management (VCS, 3.11, 3.15)

The project will calculate and apply the appropriate leakage deductions based on the VCS Module for Estimating Leakage from ARR Activities VMD0054. Mitigation and avoidance measures will be implemented to ensure minimal to zero leakage. On way this will be done is to include more grazing areas that are under-utilized into the project expansion areas.

2.6.2 Further Information

No further information to provide.

3 CLIMATE

3.1 Application of Methodology

3.1.1 Title and Reference of Methodology (VCS, 3.1)

Type (methodology, tool, module)	Reference ID (if applicable)	Title	Version
Methodology	VM0047	VM0047 Afforestation, Reforestation and Revegetation	1.0
Module	VMD0054	Module for Estimating Leakage from ARR Activities	1.0
Tool	NA	AFOLU Non-Permanence Risk Tool	4.2

3.1.2 Applicability of Methodology (VCS, 3.1)

Reference ID/Title	Applicability condition	Justification of conformance
VM0047	Project activities increase vegetative cover.	Project activities will increase vegetation cover through reforestation.
	<p>Area based, census based, or a combination of the two quantification approaches may be used provided approach-specific applicability conditions are met.</p> <p>Approaches must be selected at the project start date and used for the entire project crediting period. Where the two approaches are used together, they must be applied in non-overlapping areas defined at the project start.</p>	Only an area-based quantification approach will be used to quantify changes in vegetation and biomass from the project's start date.

	<p>Project activities do not involve mechanical removal offsite or burning of significant stocks of preexisting dead wood (e.g., for site preparation). Where project site preparation includes chipping, mastication or machine piling, all material must remain onsite within the project boundary.</p>	<p>No mechanical removal offsite or burning of significant dead wood will be employed.</p> <p>All chipped vegetation material derived from clearing areas will be kept in the project area.</p>
	<p>Project activities do not take place in tidal wetlands (e.g., mangroves, salt marshes).</p>	<p>ARR activities do not take place in wetlands⁸⁰. The project area falls under degraded dry grasslands and abandoned farming areas. Additionally, all areas that are presently wetlands were excluded.</p>
	<p>Project activities that occur on organic soils or in wetlands and result in manipulation of the water table are not eligible. Planting species that do not naturally occur in organic soils or wetlands is considered a manipulation of the water table.</p>	<p>The project activities will occur on land comprising mainly Dystric Regosol, Orthic Ferralsols, and Xanthic Ferralsols. The project area has no histosols, which are considered organic or peat soils. The project will only plant indigenous species.</p> <p>In general, the project activities will not result in the manipulation of the water table because ARR activities will not include the change of hydrological conditions within the project area or wetland adjacent areas.</p>
	<p>Area-based approach Project activities produce continuous tree and/or shrub cover on any contiguous area exceeding one hectare</p>	<p>Project activities are intended to regenerate vegetation cover larger than one hectare and aim to produce continuous forest cover in areas where there is currently non-forest cover.</p>
	<p>Area-based approach Projects may include direct (e.g., manual planting, broadcast seeding) and indirect activities (e.g., activities that permit or facilitate natural regeneration, like herbivory enclosures)</p>	<p>Project include both direct and indirect activities which are described in Table 5.</p>
VMD0054	<p>Projects using this module must meet all applicability conditions of the methodology VM0047 Afforestation, Reforestation and Revegetation.</p>	<p>All applicability conditions of VM0047 were met as described in the items above.</p>

⁸⁰ Per the IPCC Guidelines for National Greenhouse Gas Inventories 2006, wetlands are defined as lands that are covered or saturated by water for all or part of the year (e.g., peatland), and that does not fall into the forest land, cropland, or grassland categories.

3.1.3 Project Boundary (VCS, 3.12)

The relevant GHG sources, sinks, and reservoirs for the project and baseline scenarios are presented in the table below. Since the dynamic baseline performance benchmark is applied to the project scenario, the baseline scenario is not here included.

Table 12 Baseline Stocks

Source	Gas	Included?	Justification/explanation	
Baseline	Aboveground woody biomass (trees and shrubs)	CO ₂	Yes	Major carbon pool associated with project activity
	Belowground woody biomass (trees and shrubs)	CO ₂	Yes	Major carbon pool associated with project activities
	Soil Organic Carbon	CO ₂	Yes	It is conservatively included since it is included in the project scenario. Nevertheless, there are no changes expected in the baseline scenario.
	Burning of biomass (whether by natural or anthropogenic causes)	CO ₂	No	Conservative to exclude
		CH ₄	No	Conservative to exclude
		N ₂ O	No	Conservative to exclude
	Emissions from nitrogen fertilizer	CO ₂	No	Conservative to exclude
		CH ₄	No	Conservative to exclude
		N ₂ O	No	Conservative to exclude
	Burning of fossil fuels	CO ₂	No	Conservative to exclude
		CH ₄	No	Conservative to exclude
		N ₂ O	No	Conservative to exclude
Project	Aboveground woody biomass (trees and shrubs)	CO ₂	Yes	Major carbon pool associated with project activities
		CH ₄	No	Not sequestered by AGB
		N ₂ O	No	Not sequestered by AGB
	Below ground woody biomass	CO ₂	Yes	Major carbon pool associated with project activities
		CH ₄	No	Not sequestered by BGB

Source	Gas	Included?	Justification/explanation
	N ₂ O	No	Not sequestered by BGB
Soil Organic Carbon	CO ₂	Yes	May be a significant source with the implementation of project activities overtime
Above-ground non-woody biomass	CO ₂	No	Not expected to be significantly impacted by project activities
Below ground-non-woody biomass	CO ₂	No	Not expected to be significantly impacted by project activities
Deadwood	CO ₂	No	Likely to increase from project activities. Conservatively excluded
Litter	CO ₂	No	Likely to increase from project activities. Conservatively excluded
Burning of biomass (whether by natural or anthropogenic causes)	CO ₂	No	Carbon stock decreases due to burning are accounted as a carbon stock change
	CH ₄	Yes	May be a significant source
	N ₂ O	Yes	May be a significant source
Emissions from nitrogen fertilizer	CO ₂	No	Conservative to exclude
	CH ₄	No	Conservative to exclude
	N ₂ O	Yes	De minimis
Burning of fossil fuels	CO ₂	No	De minimis
	CH ₄	No	De minimis
	N ₂ O	No	De minimis

The figure 17 below shows the project boundaries, indicating the geographical area and project area location. Additional areas will be incorporated as the project expands. The map also indicates the location of the donor pool produced to provide the control plots, in reference to the project area. The donor poll, project plots and control plots are part of the Performance Benchmark analysis (see next section 3.1.4for more details). Leakage areas are not shown as none is anticipated.

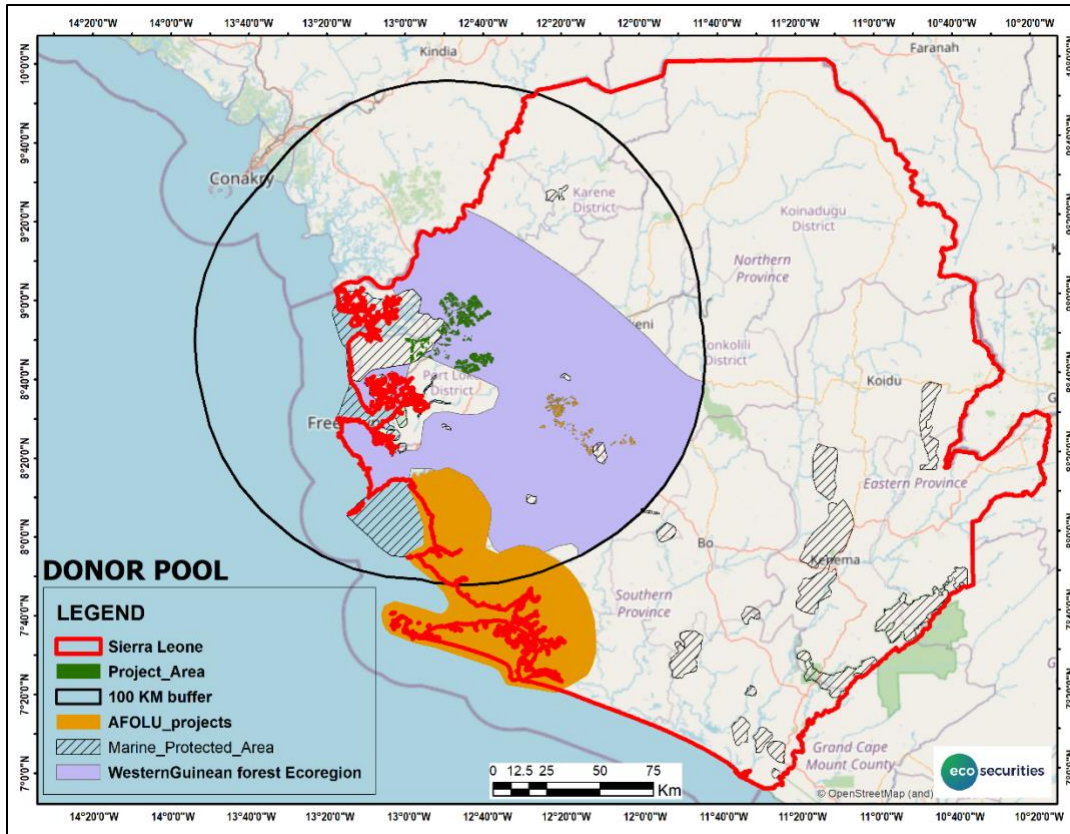


Figure 16. The layers used to delineate project specific donor pool following the criteria listed under VM0047. Areas falling outside of the country boundary, with existing AFOLU projects and not within the Western Guinean Forest ecoregion and

3.1.4 Baseline Scenario (VCS, 3.13)

The baseline scenario is represented by the business-as-usual vegetative stocking and land use activities observed in areas analogous (control plots) to the project area in biophysical, and social conditions following VM0047. The baseline land use activities are degraded grassland and inactive palm plantations. In these control plots, the vegetation growth is assessed using iterative remote sensing techniques.

The baseline scenario comprises business-as-usual changes in above-ground biomass in these carefully matched control plots after project implementation according to the area-based approach. For monitoring the changes in above-ground biomass, a suitable biomass stocking index (SI) was used for both the project plots and their corresponding counterfactuals. Performance benchmarking was conducted to determine the plausible baseline scenario, as described in the next section.

The ex-ante baseline estimation is calculated based on the control plots' annual stocking index (SI) mean values. For the controls, a static baseline is assumed at project implementation, or initial conditions are projected into the future. Such a characteristic is important, as the controls yield the SI evolution without treatment. On the other hand, project plots are being projected forward (10 and 50 years after project implementation) see section 3.2.6.1.

Performance Benchmark

The VCS Program Definitions v4.2., define performance benchmarks as benchmark against which the performance of individual projects is assessed to determine additionality and/or the crediting baseline. According to the applied VSC methodology, the performance benchmark is used for both demonstration of additionality and setting the crediting baseline. The performance benchmark is set equal to the average cumulative increase in estimated vegetative stocks (EVS) from their initial state, observed in designated control plots, relative to the project area. Therefore, the Performance Benchmark assessment will be calculated at each monitoring event.

The control area is appropriately matched to the project area through the incorporation of bio-physical and demographic parameters correlated with probability of forest restoration/natural regeneration and productivity. The performance benchmark is set *ex-ante*, based on observations over the preceding five-year interval, and updated every five years. Appendix 1 of the VCS methodology devises the steps to be followed to derive the performance benchmark.

Calculation of the Performance Benchmark

The performance benchmark, comparing the baseline scenario to the project scenario, provides a clear and quantifiable measure of the project's impact on net GHG emissions. The following steps were conducted independently to calculate the two different strata present in the project area: strata 1 - dry grasslands /grasslands, and strata 2 - middle-high vegetated land). For each stratum, 30 project units were selected and for each unit, a total of 100 control plots were selected based on spectral-temporal similarity, as illustrated in the Figure 18 below.

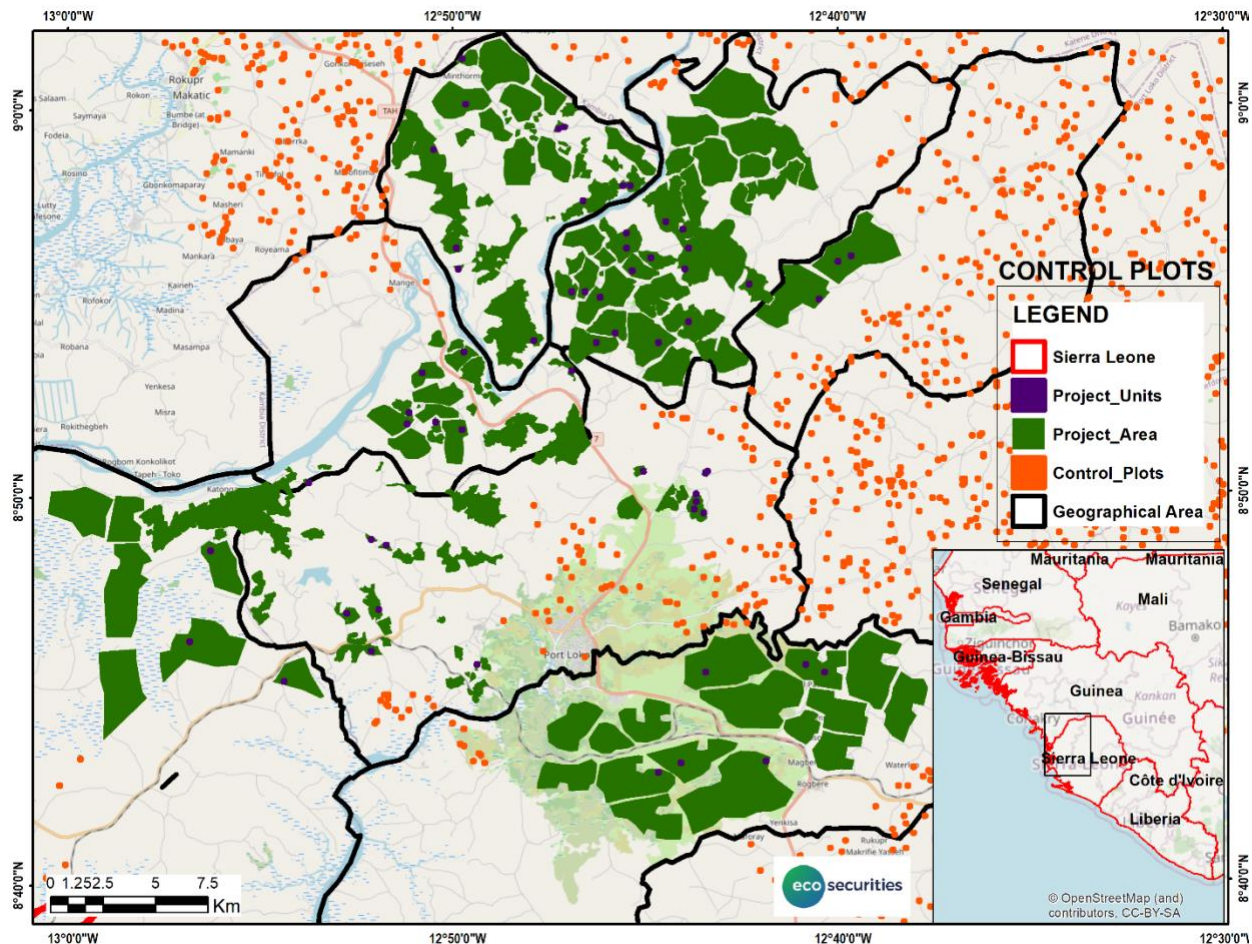


Figure 17. Control Plots

Steps to calculate the Performance Benchmark:

Step 1. Project plots definition.

In order to define the project plots, each project area was segmented into portions of 0.81 hectares, labelled “project plots”. A representative sample of n = 30 project plots was selected for each stratum and at least 75% of each unit was within the project area boundary.

Step 2. Control plots for each project plot definition.

a) Donor pool definition

The donor pool area from which control plots were sourced was generated considering a radius of 100 km around the project area centroid. The area was delineated within the same ecoregion, administrative boundary (country), land tenure and outside other AFOLU projects.

The factors and source data to delineate the donor pool area were;

- **Jurisdictional boundary:** it was maintained the areas located in Sierra Leone only; areas in Guinea were excluded from the donor pool;

- **Ecoregion:** only the Western Guinean Lowland Forests Ecoregion was maintained, the Guinean Mangroves ecoregion was excluded, the same for the areas within the sea zone;
- **Policy environment:** no operating government-funded program providing incentives for tree planting were found in the area
- **Outside any registered AFOLU project:** 2 AFOLU projects within the donor pool were excluded: one in the southwest of our project and other in Port Loko and Tonkolili districts, in the southeast to our project zone.
- **Land tenure:** the Marine Protected Area was excluded to ensure no public lands within the donor pool.
- **Distance from project plot:** areas beyond a 100 km radius of the centroid of the project plot were not included in the donor pool.

b) The eligible donor pool was partitioned into portions with the same size as the project plots (0.81 hectares = 90 x 90 m²).

c) For each representatively sampled project plot, the spectral-temporal similarity between the project plot and each eligible donor pool portion was calculated using optical satellite imagery - Normalised Difference Vegetation Index (NDVI) that represents the stocking index (SI). The NDVI is a spectral-derived index extracted from yearly Landsat (before 2017) or Sentinel (2017 and onwards) cloud-free satellite images. This stocking index is a GIS measurement that was applied to quantify the biomass stocks within the two strata. NDVI has a significant correlation between terrestrial carbon stock, and it is a well-known remote sensing metric to indicate biomass (see Appendix 2). The criterion used leverages the full annual time series of optical satellite imagery (from Landsat-8 and Sentinel-2) to appropriately match treatments to controls. As such, it utilizes all available spectral and temporal data, here combined into multi-spectral composite images at 30 m ground sampling distance (GSD). The table below summarizes the average Stocking Index (SI) value inside each stratum over the project).

d) The best matching 100 control plots were selected as “control units”. Care was taken to ensure (i) a minimum distance of 300 m between the final control units. It is also ensured (ii) that no controls are chosen inside of project areas or (iii) that two or more controls are at the same place (e.g., stemming from different project units). The process is visually explained in the Appendix 3, detailing how the matching procedure unfolds for a specific project area.

e) The similarity was calculated by the Euclidean distance between annual composites of the stocking index (SI) derived from optical images for all 8 years before the plantation period (2015 to 2022).

f) Based on the similarity scores of all donor pool portions, the portions were ranked from most to least similar. The selection was based on the similarity with the chosen SI, which falls into the lowest percentile for each stratum.

Step 3: Evaluate match quality and finalize matching.

The match quality was evaluated by quantifying the standardised difference of means (SDM) calculated between the selected controls and the corresponding project units as described in the equation below for the years 2014, 2017-2022:

$$SDM = ABS(\bar{x}_{wp,x} - \bar{x}_{bsl,x}) / \sqrt{\frac{\sigma_{wp,x}^2 + \sigma_{bsl,x}^2}{2}} \quad (A2)$$

Where:

- SDM = Standardized difference of means
 $\bar{x}_{wp,x}$ = Mean value of covariate x in the population of project plots
 $\bar{x}_{bsl,x}$ = Mean value of weighted sums of covariate x in the population of matched sets of control plots
 $\sigma_{wp,x}^2$ = Standard deviation of covariate x in the population of project plots
 $\sigma_{bsl,x}^2$ = Standard deviation of covariate x in the population of control plots

Overall match results are deemed valid where SDM for each covariate is ≤ 0.25 , illustrated in the tables below:

Table 13: SDM values for stratum 1 - dry grasslands / grasslands / unused lands.

Year	X_wp,x	X_bsl,x	Std_wp,x	Std_bsl,x	SDM
2014	192.59	192.70	7.85	7.81	0.014
2017	197.21	196.67	5.85	5.88	0.090
2018	185.50	185.77	7.62	7.74	0.036
2019	191.83	191.69	6.76	6.93	0.020
2020	187.35	187.07	7.58	7.68	0.036
2021	188.82	188.90	6.98	7.20	0.011
2022	189.95	189.63	7.39	7.45	0.030

Table 14: SDM values for stratum 2 - representing middle-high vegetated land.

Year	X_wp,x	X_bsl,x	Std_wp,x	Std_bsl,x	SDM
2014	211.73	211.98	5.38	5.24	0.046
2017	213.52	213.72	4.67	4.51	0.042
2018	206.41	206.86	5.24	5.33	0.085
2019	213.85	214.30	6.09	5.52	0.078
2020	209.95	210.49	4.94	4.75	0.111
2021	211.86	212.41	4.49	4.54	0.121
2022	213.73	214.07	4.36	3.94	0.082

The assessment of the Performance Benchmark will be calculated at each monitoring event as follows, given in Appendix 1 of the VM0047 methodology:

$$PB_t = \Delta SI_{control,t} \times \frac{1}{\Delta SI_{wp,t}}$$

Equation is fully described in section 3.2.1. *Baseline Emissions* (VCS, 3.15)

Where $\Delta SWP, i,t$ and $\Delta SI_{control,t}$ are measures for the stocking index of the project plot and the control plot respectively.

Ex ante trendline calculation

The baseline scenario is represented by the business-as-usual vegetative stocking and land activities (i.e. burn practice, which leads to deforestation and land degradation). As explained in the section before the SI were measured in both project plots and control plots (analogous area) with similar biophysical, and social conditions. This approach creates the most plausible baseline scenario because remote sensing provides transparent, continual, and quantifiable observations of changes in aboveground biomass allowing for the real-time comparison of project and baseline.

The overall SI index for the two strata were treated separately for the SDM calculations. The controls yield the SI evolution without project activities showed that it has been decreasing over the past 10 years prior to the project period.

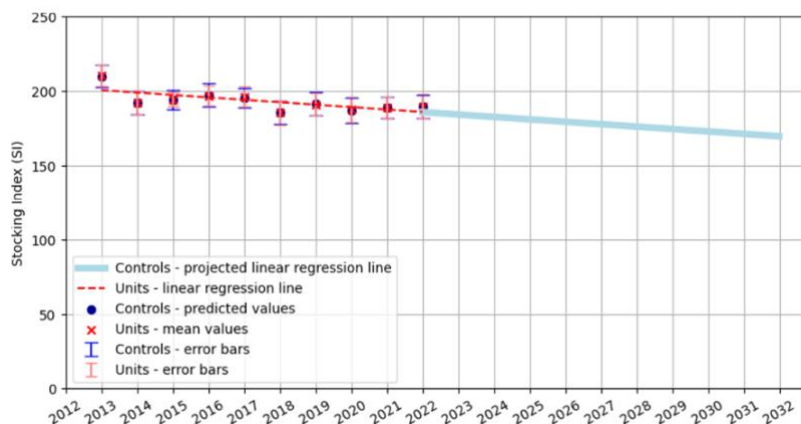


Figure 18. Project plots baseline calculation and controls projection based on the initial conditions: stratum 1

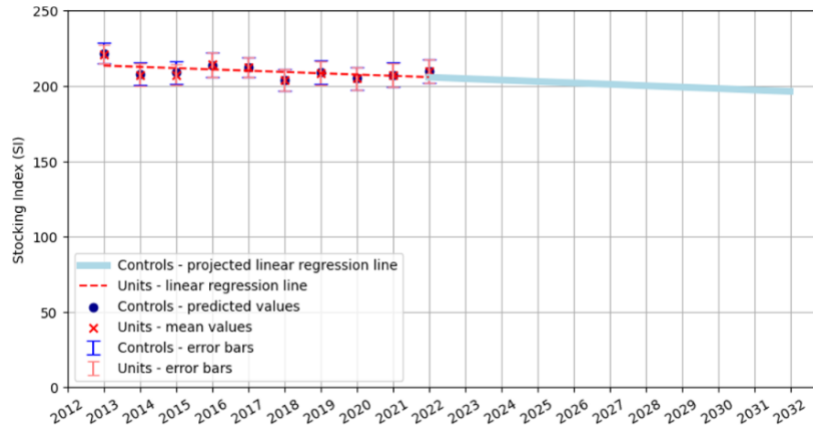


Figure 19. Project plots baseline calculation and controls projection based on the initial conditions: stratum 2.

Table 15 Linear regression slopes of plots and controls projections.

	Slope – Units	Slope - Controls
Stratum 1	-1.627	-1.619
Stratum 2	-0.848	-0.932

According to the VM0047 the 10 years period performance prior the project activities started (assuming a linear relationship) can be used to be projected in the next 10 years. Figures 19 and 20, and Table 15 show that the slope of $\Delta SI_{control}$ is less than zero (negative slope), showing that a decreasing on the SI over the next 10 years is expected in the control area.

3.1.5 Additionality (VCS, 3.14)

According to the VCS standard version 4.6:

1. “The project shall demonstrate regulatory surplus at validation and each project crediting period renewal. Regulatory surplus means that project activities shall not be mandated by any law, statute, or other regulatory framework, or for UNFCCC non-Annex I countries, any systematically enforced law, statute, or other regulatory framework.”
2. “Additionality shall be demonstrated and assessed in accordance with the requirements set out in the methodology applied to the project.”

The VM0047 requires a regulatory surplus and stepwise requirements set out in the section 3.1.1.2 see section below additionality methods,

3.1.5.1 Regulatory Surplus (VCS, 3.14)

Is the project located in an UNFCCC Annex 1 or Non-Annex 1 country?

- Annex 1 country non-annex 1 country

Are the project activities mandated by any law, statute, or other regulatory framework?

Yes No

3.1.5.2 Additionality Methods (VCS, 3.14)

According to the VM0047 methodology, the Area-based approach must apply the following steps to demonstrate additionality:

Step 1: Regulatory surplus

See section above 3.1.1.1.

Step 2: Performance benchmark

With the area-based approach, a performance benchmark compares the changes in the biomass stock in the project area to selected control plots, analogous to the project area in the absence of the activities.

Performance benchmarks are developed ex-ante for each geographic area and will be updated every five years. The benchmarks are calculated based on historic data observed over the preceding five-year interval. According to VM0047 the steps for establishing the performance benchmark must be documented in the project description in sufficient detail so that they can be repeated and validated. All of the following steps must be fully documented as part of the monitoring plan for project and control plots. The description of how performance benchmark was done is described in section 3.1.4.

Assessment of the Performance Benchmark at each monitoring event

In future monitoring events based on the performance benchmark ($SI_{\Delta SI_{wp,t}} - \Delta SI_{control}$) ensuing the details described in VM0047 methodology for each step will be done following this order:

- 1) Monitor stocking index on project and control plots.
- 2) Derive slopes for accumulated time series (from time $t = 0$ to time t) of stocking indices estimated across the sample populations of project and control plots.
- 3) Calculate performance benchmark.

Step 3: Investment barrier

Project must apply Step 3 only when there are revenues or financial incentives other than from the sales of carbon credits. Since currently there are not any incentives rather than carbon credits this step was omitted.

3.1.6 Methodology Deviations (VCS, 3.20)

The VM00047 methodology states that Pre-existing woody biomass must be measured at $t=0$, immediately prior to initiation of the project activity (e.g., before site preparation).

- Soil organic carbon content was not measured at t=0, immediately prior to initiation of the project activity as it was not required under the previous methodology. The initial stocks will be measured within the next 10 years period and before verification, since it is expected that SOC will increase this approach could be assume as conservative.
- According to the VMD0054 the historical reference period is the greater of either: 1) The 3-year period immediately preceding the project start date (or the project instance start date in the case of grouped projects); or 2) One complete crop rotation (where applicable). For the present project oil palm has been produced considering the long crop cycle of the palm trees, approximately 20-year period ranging from 2002 to 2022 was chosen. However, the unavailability of Very High-Resolution imagery / Aerial imagery over the first decade (2002-2011) rendered the analysis undoable over this period of time and was done from 2012 to 2022 instead.

3.2 Quantification of Estimated GHG Emission Reductions and Removals

3.2.1 Baseline Emissions (VCS, 3.15)

The carbon stock changes in the baseline scenario are accounted for by applying the crediting baseline performance benchmark value to the estimation of carbon dioxide removals quantification see section 3.2.2.1. The performance benchmark, defined as the business-as-usual increase in vegetative stocking relative to the project, is set based on data from representative control plots outside of the project area.

In order to measure future baseline emission statistical methods will be employed to compare changes in the stocking index between the project area and a control region. A detailed performance benchmarking is explained in the section 3.1.4.

3.2.2 Project Scenario (VCS, 3.15)

The calculations of carbon stock changes and project emissions differ by quantification approach, summarized in below:

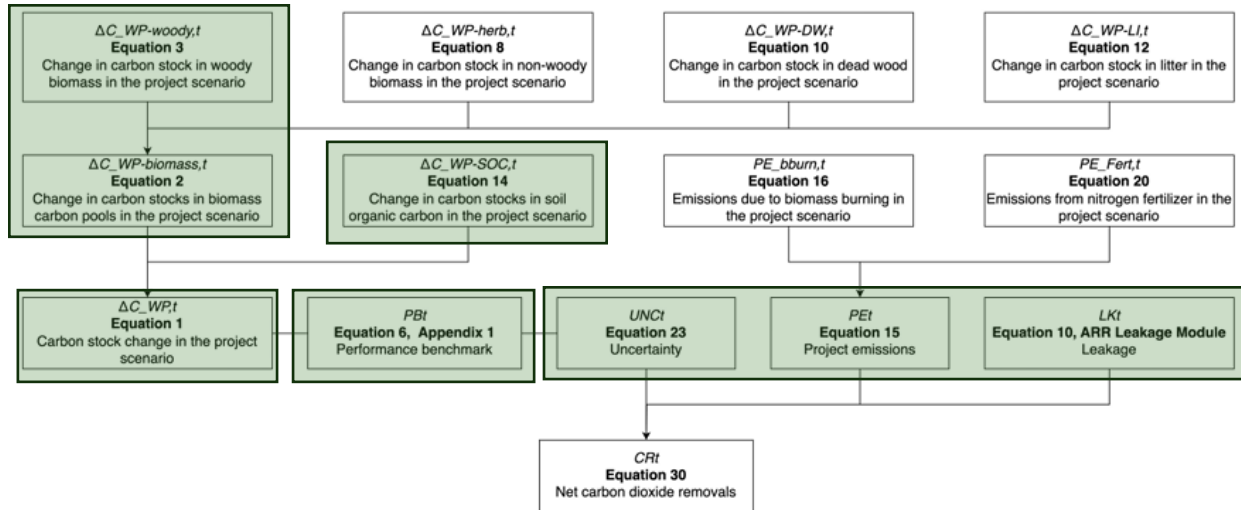


Figure 20. Summary of Project emissions calculations for Area-based Approach used in the project.

Only equations highlighted in green in Figure 21 were used in the project estimations, since those are the pool in the baseline and project scenario each stock change estimations are explained in the following sections.

3.2.2.1 Project Carbon Stock Changes

The project carbon stock changes will be estimated using the next equation.

$$\Delta C_{WP,t} = (\Delta C_{WP-biomass,t} + \Delta C_{WP-SOC,t}) \times \frac{44}{12}$$

- $\Delta C_{WP,t}$ = Project carbon stock change in year t (t CO₂e)
- $\Delta C_{WP-biomass,t}$ = Change in carbon stock in biomass carbon pools in the project scenario through year t (t C)
- $\Delta C_{WP-SOC,t}$ = Change in carbon stock in SOC in the project scenario through year t (t C)
- $44/12$ = Ratio of molecular weight of carbon dioxide to carbon (unitless)
- t = 1, 2, 3, ..., t years elapsed since the project start date

3.2.2.2 Carbon biomass (Woody Biomass)

The project will only use woody biomass. Estimation of woody biomass will be calculated using the next equation:

$$C_{WP-woody,t} = C_{WP-woody-AB,t} \times (1 + R)$$

$C_{WP-woody,t}$	=	Average carbon stock in woody biomass in the project scenario in year t (t C/ha)
$C_{WP-woody-AB,t}$	=	Average carbon stock in aboveground woody biomass in the project scenario in year t (t C/ha)
R	=	Root to shoot ratio (t root d.m./t shoot d.m.)
T	=	1, 2, 3, ..., t years elapsed since the project start date

Pre-existing woody biomass was not measured at $t=0$, immediately prior to initiation of the project activity. (Due to another methodology originally being used). The initial stocks will be measured within the next 10 years period and before verification, pre-existing woody biomass will be equal to the initial stock measurement.

At the time (t) of every verification, estimates may be updated for the 10-year period from time t to $t+10$ (i.e., every verification may be accompanied by an ex-ante estimate projecting 10 years into the future)

Ex-ante estimations procedures are explained in detailed in section 3.2.6.

3.2.2.3 Soil organic carbon

Stocks of soil organic carbon were estimated using proxy values. Future measurements will be done in the next 10 years. The changes on SOC stocks in the project scenario was estimated following the next equation and described steps:

$$\Delta C_{WP-SOC,t} = A \times (C_{WP-SOC,t} - C_{WP-SOC,t=0})$$

$\Delta C_{WP-SOC,t}$	=	Change in carbon stock in SOC in the project scenario through year t (t C)
A	=	Area (ha)
$C_{WP-SOC,t}$	=	Average SOC stock in year t (t C/ha)
t	=	1, 2, 3, ..., t years elapsed since the project start date

Ex-ante estimations procedures are explained in detailed in section 3.2.6.

3.2.2.4 Project emissions

Project emissions will be estimated using the next equation.

$$PE_t = PE_{bburn,t} + PE_{fert,t}$$

Where:

PE_t	=	Project emissions from biomass burning and fertilizer in year t (t CO _{2e})
$PE_{bburn,t}$	=	Project emissions due to biomass burning in year t (t CO _{2e})
$PE_{fert,t}$	=	Project emissions from nitrogen fertilizer in year t (t CO _{2e})

Project activities will use any fertilizer or fire for project activities therefore, PEbburn was assumed to be zero in all years of the project.

The formula to estimate the project emission was estimated using the next equation:

$$PE_{fert,t} = PEN_{direct,t} + PEN_{indirect,t}$$

Where:

PE _{fert,t}	=	Project emissions from nitrogen fertilizer in year t (t CO ₂ e)
PEN _{direct,t}	=	Direct nitrous oxide emissions due to fertilizer use in the project scenario in year t (t CO ₂ e)
PEN _{indirect,t}	=	Indirect nitrous oxide emissions due to fertilizer use in the project scenario in monitoring interval ending in year t (t CO ₂ e)
t	=	1, 2, 3, ..., t years elapsed since the project start date

A fertilizer NPK 20-20-20 was proposed to be used. The calculations of emission are detailed in the annexe Project emission fertilizer SLR. The relative contribution was calculated according to the Appendix 2 of VM0047, and the values was less than 5% therefore then these emissions were considered de minimis. All parameters and factors used in these estimations are reported in section 3.3.1 and further.

3.2.3 Leakage Emissions (VCS 2.5, 3.2, 3.6, 3.15, 4.3)

The VMD0054 Module for Estimating Leakage from ARR Activities, v1.0 states that:

When the effects of leakage from displaced agricultural production are expected to occur Leakage emissions from ARR activities must be assessed and calculated for a period of five years after the project start date, or project instance start date in the case of grouped projects.

The module proposes a step wise methodology to determine the leakage that are summarized in the next steps:

- Step 1: Determine Foregone Production in Project Area
- Step 2: Determine the Impact of Leakage Mitigation Activities
- Step 3: Determine Amount of New Land Brought into Production
- Step 4: Determine Change in Carbon Stocks in New Lands Brought into Production
- Step 5: Determine Leakage Emissions

Determine Foregone Production in Project Area

The baseline agricultural and fuelwood commodity production in the project area must be demonstrated using historical production records for each commodity during the chosen reference period. Use the following process to select historical production for each commodity.

STEP 1: Set the historical reference period:

The project area has been historically producing some livestock, mainly for local consumption, and palm oil. The historical reference period was set as approximately 20 years due to is a crop rotation time of oil palm and is greater than the 3-years period immediately preceding the project start date.

STEP 2: Document commodities displaced and production.

To identify all commodities that will be displaced in the project area using historical production records, the types of historical production records allowed by the VMD0054 V.10 are listed below:

- 1) Grower records (e.g., management logs, receipts or invoices, logs or files containing machine and/or sensor data); or
- 2) Remote sensing methods where requisite information on production can be reliably determined with these methods; or
- 3) The most recent regional (sub-national) average values derived from published census data; or
- 4) The most recent national average values derived from published census data; or
- 5) The most recent relevant commodity or ownership class where estimates have been disaggregated by those attributes and substantiated with a signed attestation from the farmer or landowner
- 6) For fuelwood production, use average above-ground biomass growth rates published by the IPCC applicable to the region if regional or national averages are unavailable.

To ensure that no meaningful crop-related event occurred within the project area in the years prior to the project implementation could be missed, a visual survey, based on historical aerial imagery, was conducted over the project area (Option 2).

Considering the long crop cycle of the palm trees, approximately 20-year period ranging from 2002 to 2022 was chosen. However, the unavailability of Very High-Resolution imagery/Aerial imagery over the first decade (2002-2011) rendered the analysis undoable over this period. Therefore, it focused on the aspect of the land from 2012 to 2022, which was carefully reviewed, looking for potential large scale cropland emergence especially palm tree plantations.

Only active cropland could be considered as a potential leakage trigger, following the visual inspection of the whole extent of the project area did not reveal any large-scale crop installation during the ten-year period before project implementation (2012-2022). The inactive palm tree plantations also do not raise any leakage issue, as per their definition.

One case is still worth mentioned that was detected: Very small-scale new palm tree plantations (around 5 hectares total), probably for personal /close neighbourhood use.

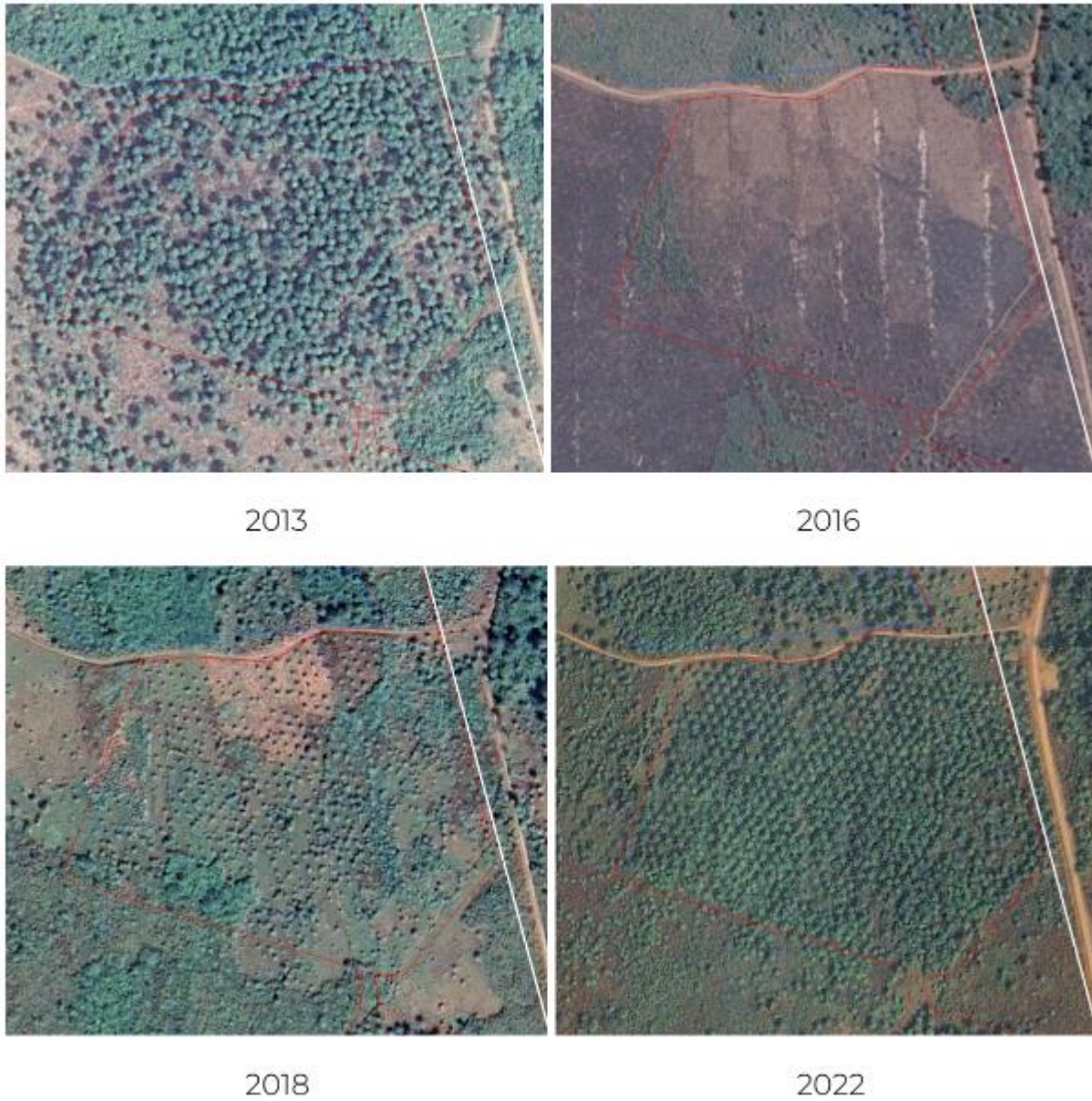


Figure 21. Showing the approximate 5 hectares area example of a plantation appearing during the 2012-2022 period. Mixed initial forest was cut off between 2013 and 2016. Since 2018, a palm tree plantation has been developing at the place of the initial wood.

The conclusion of Step 2 is that there will be negligible leakage. Therefore STEP 3 to STEP 5 were not further analysed and no leakage was assumed.

3.2.4 Uncertainty

Uncertainty associated with sample error will be quantified and accounted through application of quality assurance/quality control (QA/QC) procedures detailed in section 3.3.3. The performance benchmark is assumed to have zero uncertainty.

Uncertainty will be calculated by propagating errors associated with estimates of included pools as:

$$\begin{aligned}
 UNC_t = & MIN (100\%, MAX (0, (\sum_{p=1}^n (U_{p,t=0} \times C_{p,t=0})^2 + \sum_{p=1}^n (U_{p,t} \times C_{p,t})^2)^{\frac{1}{2}} \\
 & \times (\frac{1}{\Delta C_{WP-biomass,t} + \Delta C_{WP-SOC,t}}) - 10\%))
 \end{aligned}
 \tag{27}$$

Where:

UNC_t	=	Uncertainty in cumulative removals through year t (percent)
$U_{p,t}$	=	Percentage uncertainty (expressed as 90 percent confidence interval as a percentage of the mean) in carbon stock estimate of pool p (representing woody biomass, non-woody biomass, dead wood, litter and SOC) in the project scenario in year t (percent)
$C_{p,t}$	=	Carbon stock estimate of pool p (representing woody biomass, non-woody biomass, dead wood, litter and SOC) in the project scenario in year t (t CO _{2e})
$\Delta C_{WP-biomass,t}$	=	Change in carbon stock in biomass carbon pools in the project scenario through year t (t C)
$\Delta C_{WP-SOC,t}$	=	Change in carbon stock in SOC in the project scenario through year t (t C)
t	=	1, 2, 3, ..., t years elapsed since the project start date

3.2.5 Estimated GHG Emission Reductions and Carbon Dioxide Removals (VCS, 3.15, 4.1)

The procedure for quantifying net GHG emission reductions and removals during the monitoring period will use the area-based quantification approach as outlined in the Verra methodology VM0047. The monitoring will be done every year after 2023.

$$\begin{aligned}
 CR_t = & \left((\Delta C_{WP,t} \times (1 - PB_t) \times (1 - UNC_t)) - LK_t \right) - PE_t \\
 & - \left((\Delta C_{WP,t-1} \times (1 - PB_{t-1}) \times (1 - UNC_{t-1})) - PE_{t-1} - LK_{t-1} \right)
 \end{aligned}$$

CR_t	=	Carbon dioxide removals from the project activity in year t (t CO _{2e})
$\Delta C_{WP,t}$	=	Project carbon stock change in year t (t CO _{2e})

PB_t	=	Performance benchmark for the monitoring interval ending in year t (percent)
LK_t	=	Leakage through year t (t CO ₂ e)
PE_t	=	Project emissions from biomass burning and fertilizer in year t (t CO ₂ e)
UNC_t	=	Uncertainty in cumulative removals through year t (percent)
t	=	1, 2, 3, ..., t years elapsed since the project start date

3.2.6 Ex-Ante Estimation

According to the VM0047 the project description must include an ex-ante estimation of carbon dioxide removals and should meet requirements described below:

- Estimates were done for 10 years and extrapolated to 50 years (for crediting period and lifetime project estimation). Ex-ante estimation will be updated at each verification, and the projection in the future will be at least for 10 years.

- Projected changes in biomass were based on growth and yield models constructed with data and parameters that conservatively represent the project activity as mentioned in the section 933.2.6.1. Biomass ex-ante calculations. The output of the growth and yield model is provided as an estimate in value of tCO₂/ha.

- $\Delta SI_{control}$: The overall SI index for the two strata were treated separately for the SDM calculations. The controls SI evolution without project activities has been decreasing over the past 10 years prior to the project period. Therefore it was assumed that the performance benchmarking was zero.

Since leakage, project emissions and project benchmarking were equal to zero. The equation used to estimate GHG is described below.

$$CR_t = (\Delta CWP_{,t} \times (1 - UNC_t)) - (\Delta CWP_{,t-1} \times (1 - UNC_{t-1}))$$

CR_t	=	Carbon dioxide removals from the project activity in year t (t CO ₂ e)
$\Delta CWP_{,t}$	=	Project carbon stock change in year t (t CO ₂ e)
UNC_t	=	Uncertainty in cumulative removals through year t (percent)
t	=	1, 2, 3, ..., t years elapsed since the project start date

Total area planted

No harvest regimes for the ex-ante calculations were incorporated in modelling the project scenario, since they are not planned to happen.

The forest management activities planned for planting, that were included in the biomass modelling, are represented by the planting scenario below and were included in the ex-ante calculations, as described, as follows:

Year	Area (hectares)
2022	200
2023	1000
2024	3000
2025	4000
2026	5000
2027	3800
2028	3000
Total	20000

3.2.6.1 Biomass ex-ante estimations

For estimating biomass ex-ante, it was assumed that reformation of the forest will occur after the planting, therefore the Chapman-Richards equation described below was used with coefficients for moist forest⁸¹ which gives a conservative approach.

$$AGC = MAX * (1 - \exp(-k * year_t))^{1/(1-m)}$$

AGC	=	Carbon dioxide removals from the above ground biomass (t CO _{2e})
MAX	=	Asymptote maximum peak biomass yield (t CO _{2e})
k	=	Parameter used in modelling tree growth in dry forest (0,037)
Years	=	age of forest after planting (years)
t	=	1, 2, 3, ..., t years elapsed since the project start date
m	=	Parameter used in modelling tree growth in dry forest (0,5)

The MAX, which refers to the maximum biomass reached, was calculated using references for different peer review studies and reports containing the biomass values in regions with similar characteristics (Appendix 2) with an average value of approximately 537 (t CO_{2e}).

Belowground biomass was estimated using Mokany et al., (2006)⁸² root to shoot biomass ratios.

$$BGC = 0.489 * (AGC)^{0.890}$$

BGC	=	Carbon dioxide removals from the below ground biomass (t CO _{2e})
AGC	=	Carbon dioxide removals from the above ground biomass (t CO _{2e})

⁸¹ Winrock International. 2014. AFOLU Carbon Calculator. The Afforestation/Reforestation Tool: Underlying Data and Methods. Prepared by Winrock International under the Cooperative Agreement No. EEM-A-00-06-00024-00.

⁸² Mokany, K., R. J. Raison, and A. S. Prokushkin. 2006. Critical analysis of root:shoot ratios in terrestrial biomes. *Global Change Biology*, 12: 84-96.

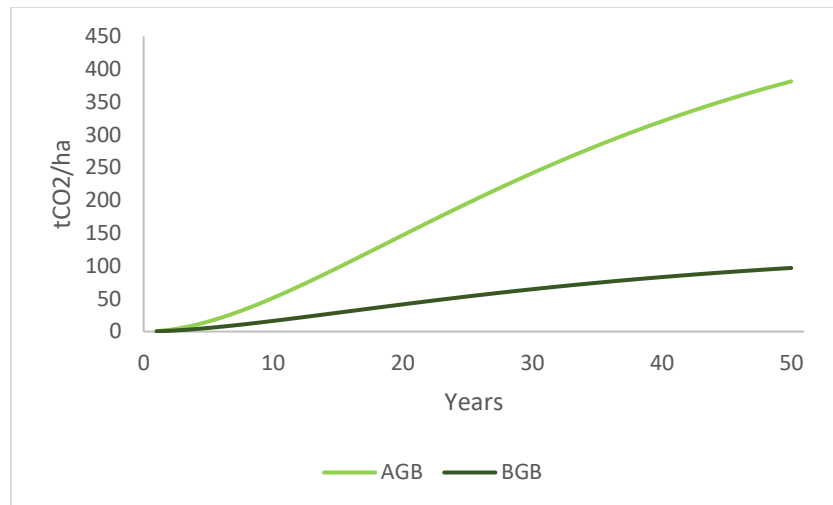


Figure 22. Estimated biomass growth in 50 years for SLR project in tCO2/ha.⁸³⁸⁴

The detailed model is explained in the annexed excel file Rewilding Sierra Leone VM0047.

SOC ex ante estimations

For SOC ex-ante calculations, the “Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities was used.” Using the next equations:

$$SOC_{Intital, i} = SOC_{REF, i} * f_{LU, i} * f_{MG, i} * f_{IN, i}$$

Where:

- SOC_{Intital, i} = SOC stock at the beginning of an A/R project activity in stratum i of the areas of land; t C ha⁻¹
- SOC_{REF, i} = Reference SOC stock corresponding to the reference condition in native lands (i.e. non-degraded, unimproved lands under native vegetation normally forest) by climate region and soil type applicable to stratum i of the areas of land; t C ha⁻¹
- f_{LU, i} = Stock change factor for land-use in stratum i of the areas of land; dimensionless
- f_{MG, i} = Stock change factor for management regime in stratum i of the areas of land; dimensionless

⁸³ Jeremy A. Lindsell, Erik Klop, Spatial and temporal variation of carbon stocks in a lowland tropical forest in West Africa, Forest Ecology and Management, Volume 289, 2013, Pages 10-17, ISSN 0378-1127, <https://doi.org/10.1016/j.foreco.2012.09.045>.

⁸⁴ Jeremy A. Lindsell, Erik Klop, Spatial and temporal variation of carbon stocks in a lowland tropical forest in West Africa, Forest Ecology and Management, Volume 289, 2013, Pages 10-17, ISSN 0378-1127, <https://doi.org/10.1016/j.foreco.2012.09.045>.

$f_{IN,i}$ = Stock change factor for input of organic matter in stratum i of the areas of land; dimensionless

$$SOC_{loss} = SOC_{Initial, I} * 0.1$$

Where:

$SOC_{loss, i}$ = Loss of SOC caused by ploughing/ripping/scarification under the A/R project activity, in stratum i of the areas of land; t C ha
0.1 The approximate proportion of SOC lost within the first five years from the year of site preparation

$$dSOC_{t,i} = \frac{SOC_{REF,i} - (SOC_{INITIAL,i} - SOC_{LOSS,i})}{20 \text{ years}}$$

Where:

$dSOC_{t,i}$ = The rate of change in SOC stock in stratum i of the areas of land, in year t; t C ha⁻¹ yr⁻¹

The $SOC_{REF,i}$ was assumed to be 84 tCha⁻¹ as showed in the national report to combat desertification of Sierra Leone⁸⁵ the values for $f_{LU,i}$, $f_{MG,i}$, $f_{IN,i}$ were 0,82, 1,15 and 0,92 respectively, assuming tropical moist and LAC soils conditions, and pre project activities of short-term or set aside cropland with reduced tillage. Since the estimated annual change of SOC was around 0,9 t Cha⁻¹ an annual rate of 0,8 t Cha⁻¹ SOC increased was conservatively assumed. In general, it was assumed that the land preparation will occur within the first year of planting.

The detailed model is explained in the annexed excel file Rewilding Sierra Leone VM0047.

3.2.7 Buffer credits

According to the Registration and Issuance Process, v4.4 of verra and the VC Standard 4.5 the number of credits to be deposited in the AFOLU pooled buffer account is determined by the non-permanence risk report assessed by the validation/verification body(s). The overall risk rating of the Non-permanence Risk tool is 23% and was used to calculate the buffer pool.

⁸⁵ United Nations Convention to Combat Desertification Performance review and assessment of implementation system Seventh reporting process report for Sierra Leone
<https://reporting.unccd.int/api/country/SLE/report/official/pdf/>

State the non-permanence risk rating (%)	22%
Has the non-permanence risk report been attached as either an appendix or a separate document?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
For ARR and IFM projects with harvesting, state, in tCO ₂ e, the Long-term Average (LTA).	No harvesting
Has the LTA been updated based on monitored data, if applicable?	<input type="checkbox"/> Yes <input type="checkbox"/> No Not applicable
State, in tCO ₂ e, the expected total GHG benefit to date.	
Is the number of GHG credits issued below the LTA?	<input type="checkbox"/> Yes <input type="checkbox"/> No Not Applicable

Table 16. Estimated total VCUS insurances of the SLR project.

Period	Estimated baseline emissions (tCO ₂ e)	Estimated project emissions (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated buffer pool allocation (tCO ₂ e)	Estimated reduction VCUs (tCO ₂ e)	Minimum uncertainty deduction 10% (tCO ₂ e)	Estimated removal VCUs (tCO ₂ e)	Estimated total VCU issuance (tCO ₂ e)
2022	0	0	0	0	0	0	0	0
2023	0	0	0	158	0	80	800	561
2024	0	0	0	1021	0	516	5,156	3,620
2025	0	0	0	3811	0	1925	19,247	13,512
2026	0	0	0	8396	0	4240	42,402	29,766
2027	0	0	0	14984	0	7568	75,678	53,126
2028	0	0	0	22024	0	11123	111,231	78,084
2029	0	0	0	29215	0	14755	147,551	103,581
2030	0	0	0	34437	0	17393	173,927	122,096
2031	0	0	0	38952	0	19673	196,730	138,104
2032	0	0	0	42868	0	21651	216,505	151,987
2033	0	0	0	46255	0	23361	233,611	163,995
2034	0	0	0	49170	0	24833	248,335	174,331
2035	0	0	0	51662	0	26092	260,921	183,166
2036	0	0	0	53774	0	27158	271,583	190,652
2037	0	0	0	55542	0	28051	280,513	196,920
2038	0	0	0	57000	0	28788	287,881	202,093
2039	0	0	0	58181	0	29384	293,841	206,277

2040	0	0	0	59110	0	29853	298,533	209,570
2041	0	0	0	59812	0	30208	302,083	212,062
2042	0	0	0	60312	0	30461	304,607	213,834
2043	0	0	0	60513	0	30562	305,623	214,547
2044	0	0	0	60087	0	30347	303,469	213,035
2045	0	0	0	58354	0	29472	294,716	206,891
2046	0	0	0	55910	0	28237	282,374	198,227
2047	0	0	0	52770	0	26652	266,516	187,094
2048	0	0	0	50223	0	25365	253,653	178,064
2049	0	0	0	48049	0	24267	242,674	170,357
2050	0	0	0	47536	0	24008	240,080	168,536
2051	0	0	0	46952	0	23713	237,130	166,466
2052	0	0	0	46307	0	23387	233,872	164,178
2053	0	0	0	45608	0	23035	230,346	161,703
2054	0	0	0	44865	0	22659	226,590	159,066
2055	0	0	0	44082	0	22264	222,638	156,292
2056	0	0	0	43267	0	21852	218,522	153,402
2057	0	0	0	42425	0	21427	214,270	150,417
2058	0	0	0	41562	0	20991	209,907	147,355
2059	0	0	0	40680	0	20546	205,457	144,231
2060	0	0	0	39786	0	20094	200,940	141,060
2061	0	0	0	38883	0	19638	196,376	137,856
2062	0	0	0	37973	0	19178	191,782	134,631
2063	0	0	0	37060	0	18717	187,172	131,395
2064	0	0	0	36147	0	18256	182,561	128,158
2065	0	0	0	35236	0	17796	177,960	124,928
2066	0	0	0	34329	0	17338	173,381	121,713
2067	0	0	0	33429	0	16883	168,833	118,521
2068	0	0	0	32536	0	16432	164,325	115,356
2069	0	0	0	31653	0	15986	159,864	112,224
2070	0	0	0	30780	0	15546	155,457	109,131
2071	0	0	0	29920	0	15111	151,110	106,079

3.3 Monitoring

3.3.1 Data and Parameters Available at Validation (VCS, 3.16)

The table below show all data and parameters that are determined or available at validation and remain fixed throughout the project crediting period. Data and parameters monitored during the operation of the project are included in [Section 3.3.2 \(Data and Parameters Monitored\)](#) below.

Data / Parameter	A
Data unit	ha
Description	Project area
Source of data	Calculated from GIS data
Value applied	Project-specific
Justification of choice of data or description of measurement methods and procedures applied	GIS and remote sensing data used for accuracy, provided geo-referenced points with clear landmarks
Purpose of data	Calculation of project emissions using the area-based quantification approach
Comments	The project area consists of several discrete land parcels. Each of these have a unique geographic identification as provided in kml file.

Data / Parameter	R
Data unit	dimensionless
Description	Root to shoot ratio (i.e., ratio of belowground (root) biomass to aboveground biomass, per unit area or per stem)
Source of data	A root-shoot ratio developed by Mokany et al. for use in tropical/subtropical moist forest/plantation will be used to estimate belowground biomass depending on whether the aboveground biomass is greater than or less than 125 tonnes ha ⁻¹ .
Value applied	See section 3.2.6.1
Justification of choice of data or description of measurement methods and procedures applied	See section 3.2.6.1
Purpose of data	Calculation of project emissions using the area-based approaches
Comments	None

Data / Parameter	CF
Data unit	t C/t d.m.
Description	Carbon fraction of dry biomass
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value applied	0.47

Justification of choice of data or description of measurement methods and procedures applied	IPCC is a reputable source approved under the VCS
Purpose of data	Calculation of project emissions using the area-based approaches
Comments	None

Data / Parameter	<i>EFNdirect</i>
Data unit	t N ₂ O-N/t N applied
Description	Emission factor for direct nitrous oxide emissions from N additions due to synthetic fertilizers, organic amendments, and crop residues
Source of data	Emission factor for direct nitrous oxide emissions from N additions due to synthetic fertilizers, organic amendments, and crop residues
Value applied	0.01
Justification of choice of data or description of measurement methods and procedures applied	IPCC is a reputable source approved under the VCS
Purpose of data	Calculation of project emissions using the area-based quantification approaches
Comments	Emission factor applicable to N additions from mineral fertilizers, organic amendments and crop residues

Data / Parameter	<i>EFNleach</i>
Data unit	t N ₂ O-N/t N leached and runoff
Description	Emission factor for nitrous oxide emissions from leaching and runoff
Equation	
Source of data	Table 11.3, Chapter 11 in Volume 4 of the <i>2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
Value applied	0.011
Justification of choice of data or description of measurement methods and procedures applied	IPCC is a reputable source approved under the VCS

Purpose of data	Calculation of project emissions using the census-based and/or area- based quantification approaches
Comments	None

Data/Parameter	<i>FracGASF</i>
Data unit	Dimensionless
Description	Fraction of all synthetic N added to soils that volatilizes as NH3 and NOx
Equations	See annex file project emissions fertilizer
Source of data	Table 11.3, Chapter 11 in Volume 4 of the <i>2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
Value applied	0.11
Justification of choice of data or description of measurement methods and procedures applied	IPCC is a reputable source approved under the VCS
Purpose of data	Calculation of project emissions using the census-based and/or area- based quantification approaches
Comments	None

Data/Parameter	<i>FracLEACH</i>
Data unit	Dimensionless
Description	Fraction of synthetic or organic N added to soils that is lost through leaching and runoff
Equations	See annex file project emissions fertilizer
Source of data	Table 11.3, Chapter 11 in Volume 4 of the <i>2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
Value applied	0.24
Justification of choice of data or description of measurement methods and procedures applied	IPCC is a reputable source approved under the VCS.
Purpose of data	Calculation of project emissions using the census-based and/or area- based quantification approaches
Comments	None

Data / Parameter	<i>EFNvolat</i>
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Data unit	t N ₂ O-N/(t NH ₃ -N + NO _x -N volatilized)
Description	Emission factor for nitrous oxide emissions from atmospheric deposition of N on soils and water surfaces
Equations	See annex file project emissions fertilizer
Source of data	Table 11.3, Chapter 11 in Volume 4 of the <i>2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
Value applied	0.01
Justification of choice of data or description of measurement methods and procedures applied	IPCC is a reputable source approved under the VCS
Purpose of data	Calculation of project emissions using the census-based and/or area- based quantification approaches
Comments	None

Data / Parameter	GWP_{CO_2} – Carbon Dioxide
Data unit	Dimensionless
Description	Global warming potential for carbon dioxide
Source of data	Default factor from the latest IPCC Assessment Report
Value applied	1
Justification of choice of data or description of measurement methods and procedures applied	IPCC is the key source for GWP factors
Purpose of data	Calculation of project emissions using the area-based quantification approach
Comments	None

Data / Parameter	GWP_{CH_4} -Methane
Data unit	Dimensionless
Description	Global warming potential for Methane

Source of data	Default factor from the latest IPCC Assessment Report
Value applied	28
Justification of choice of data or description of measurement methods and procedures applied	IPCC is the key source for GWP factors
Purpose of data	Calculation of project emissions using the area-based quantification approach
Comments	None

Data / Parameter	GWP_{N20} – Nitrous Oxide
Data unit	Dimensionless
Description	Global warming potential for Nitrous oxide
Source of data	Default factor from the latest IPCC Assessment Report
Value applied	265
Justification of choice of data or description of measurement methods and procedures applied	IPCC is the key source for GWP factors
Purpose of data	Calculation of project emissions using the area-based quantification approach
Comments	None

3.3.2 Data and Parameters Monitored (VCS, 3.16)

Data / Parameter	PB _t
Data unit	Percentage
Description	Performance benchmark applicable from year <i>t</i> through year <i>t</i> + 4 up to year T
Source of data	Remotely sensed in the control area
Description of measurement methods and procedures to be applied	The performance benchmark is equal to the average cumulative increase in estimated vegetative stocking (EVS) from the initial state, observed in the counter factual, relative to the project area.
Frequency of monitoring/recording	Every 5 years
Value applied	Determined ex ante
Monitoring equipment	GIS, remote sensing
QA/QC procedures to be applied	Data cleaning, data processing protocol
Purpose of data	Calculation of baseline and project emissions
Calculation method	VM0047 Equation A6
Comments	None

Data / Parameter	Up,t
Data unit	Percentage
Description	Percentage uncertainty (expressed as 95% confidence interval, as a percentage of the mean) in carbon stock estimate of pool p in the project scenario in year t
Source of data	GIS analysis of the project area boundaries
Description of measurement methods and procedures to be applied	For the area-based quantification approach, pools p includes woody biomass, herbaceous biomass, dead wood, harvested wood products, litter, and SOC. Where conservative default values of SOC are applied, parameter <i>USOC,t</i> assumed to equal zero.
Frequency of monitoring/recording	5 years

Value applied	Determined ex post
Monitoring equipment	Remote sensing
QA/QC procedures to be applied	General data cleaning for GIS processes
Purpose of data	Calculation of project emissions (uncertainty)
Calculation method	<p>Uncertainty will be calculated as per the Project methodology $U_{woody, t}$ will be represented by model error in the relationship (ratio or regression) between the remote sensing metric and aboveground biomass, referencing the 95% confidence interval of the ratio or twice the root mean squared error of the regression.</p> <p>Where conservative default values of SOC are applied, parameter $USOC, t$ is assumed to equal zero.</p> <p>Confidence interval calculated by applying unbiased estimators appropriate to sample design. For examples, see Cochran, W.G. (1977). Sampling techniques. John Wiley & Sons.</p>
Comments	For the area-based quantification approach, pools p includes woody biomass, non-woody biomass, dead wood, litter and SOC.

Data / Parameter	$SI_{control,t}$ and $SI_{wp,t}$
Data unit	Unspecified
Description	Stocking index in scenario (control plot j or project plot i) at time t
Source of data	Remotely sensed in the control area
Description of measurement methods and procedures to be applied	SI is an unspecified remote sensing metric that has demonstrated correlation with terrestrial aboveground carbon stocks (percentage canopy cover interpreted from aerial imagery). With seasonality variation consider in collecting remote sensing data. Polygons are of equal size with at least 75 percent of each polygon located within the project area boundary.
Frequency of monitoring/recording	At least annually
Value applied	Determined ex post
Monitoring equipment	Remote sensing
QA/QC procedures to be applied	Best practice suggestions used from: Global Forest Observations Initiative (2016). Integration of remote-sensing and ground-based

	observations for estimation of emissions and removals of greenhouse gases in forests: Methods and guidance from the Global Forest Observations Initiative, edition 2.0. U.N. Food and Agriculture Organization ⁸⁶
Purpose of data	Calculation of baseline emissions
Calculation method	Equation A5
Comments	None

Data / Parameter	$C_{WP-woody-AB,t}$
Data unit	t C/ha
Description	Average aboveground woody biomass stocks in the project scenario in year t (area-based quantification)
Source of data	Field measurements and correlaions with remote sensing indexes
Description of measurement methods and procedures to be applied	Will use plot-based sampling with ration sampling approach combining limited direct plot-based field measurements and remote sensing analysis.
Frequency of monitoring/recording	Every 5 years or more frequently depending on the monitoring plan
Value applied	Determined ex post
Monitoring equipment	Remote sensing, field measurement equipment/records
QA/QC procedures to be applied	Adopt good practice guidelines found in: <ul style="list-style-type: none"> • <i>Kershaw Jr, J. A., Ducey, M. J., Beers, T. W., & Husch, B. (2016). Forest Mensuration. Fifth edition. John Wiley & Sons.</i> • <i>Avery, T. E. & Burkhart, H. E. (2015). Forest Measurements. Fifth edition. Waveland Press.</i>
Purpose of data	Calculation of project emissions using the area-based quantification approach
Calculation method	Calculated as the average of sample measurements see section 3.2.2.2 Carbon biomass (Woody Biomass) for details

⁸⁶ <https://www.fs.usda.gov/research/treesearch/56461>

Comments	VT0005 Tool for measuring aboveground live forest biomass using remote sensing, v1.0 does not apply
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Data / Parameter	$C_{WP-SOC,t}$
Data unit	t C/ha
Description	Average soil organic carbon (SOC) stock in year t
Source of data	Field Measurements
Description of measurement methods and procedures to be applied	<p>Measured SOC will be determined from samples collected from sample plots located within the project area.</p> <p>All organic material (e.g., living plants, litter) will be cleared from the soil surface prior to soil sampling. Soil will be sampled to a minimum depth of 30 cm. SOC stocks will be estimated from measurements of both SOC content and bulk density taken at the same time. Estimates generated will:</p> <ol style="list-style-type: none"> 1) Be demonstrated to be unbiased and derived from representative sampling; and 2) Ensure accuracy through employment of quality assurance/quality control (QA/QC) procedures
Frequency of monitoring/recording	<p>At time $t = 0$ and subsequently at every verification (every five years). SOC may be measured less frequently than other pools (but not less frequently than every 10 years) and reported as zero during intervening monitoring and verification events where soil disturbance from the project activity (i.e., from site preparation):</p> <ol style="list-style-type: none"> a) Occurs no more than once during the project crediting period (i.e., at site preparation);
Value applied	Determined ex post
Monitoring equipment	Field measurement, remote sensing
QA/QC procedures to be applied	<p>Adopt good practice guidelines found in:</p> <p>IPCC (2003) Good Practice Guidance for Land-Use, Land-Use Change and Forestry (GPG-LULUCF) and FAO Soils Portal</p>
Purpose of data	Calculation of project emissions using the area-based quantification approach
Data/Parameter	$NC_{wp,SF,t}$

Data unit	t N/t fertilizer
Description	N content of synthetic fertilizer applied in the project in year t
Equations	See annex file project emissions fertilizer
Source of data	N content is determined following fertilizer manufacturer's specifications.
Description of measurement methods and procedures to be applied	Not directly measured. Recorded from fertilizer manufacturer's specifications and evidenced in management records, receipts or invoices.
Frequency of monitoring/recording	Monitoring must be conducted at least every five years or prior to each verification event where verification occurs more frequently.
QA/QC procedures to be applied	Any quantitative information on management practices must be supported by one or more forms of documented evidence pertaining to the project area and relevant monitoring period (e.g., management logs, receipts or invoices).
Purpose of data	Calculation of project emissions using the census-based and/or area- based quantification approaches
Calculation method	Not calculated
Comments	None

3.4 Monitoring Plan (VCS, 3.16, 3.20)

Quantification Approach

As the project is using the area-based quantification approach, data will be measured using a combination of direct on-the-ground measurements and remote sensing methods and collated during each monitoring period. A database will be maintained and made accessible This data will relate to:

- 1) A description of the stocking index and the process to derive it;
 - 2) A list of project plots including unique IDs, locations, size and configuration and time series of stocking index values from time $t = 0$ to time t .
 - 3) A list of control plots including unique IDs (referencing unique ID of corresponding project plot to which they are matched), locations, size and configuration, weights, and time series of stocking index values from time $t = 0$ to time t ; and
 - 4) Remote sensing datasets and time stamps used to derive stocking index values.
- Remote sensing analysis and field measurements will be conducted to obtain all project data and key parameters as per VM00047 requirements. This data will be aggregated, recorded, and stored in the RML database. Data or work packages obtained from third parties will be stored similarly. At each monitoring event the data will be reported in the VCS Monitoring Report Template.

Accounting Boundary

The extent of the accounting boundary that will be monitored is described in section 2.

Parameters to be Measured

See section 3.3.1

Data to be Collected, frequency of monitoring variables

See section 3.3.2.

The monitoring of the project implementation will take place at least every five years after the project registration in order to ensure the continuity of the benefits. Periodic verification and quantitative monitoring of the project will take place no longer than five years.

Verification of project emissions

Project emissions from all strata in the project boundary will be monitored periodically using GIS/remote tools and software for the carbon pools selected.

The project will quantify and monitor the non-CO₂ GHG emissions resulting from the occurrence of forest fire within the project boundary, whose accumulated area affected by such fires in a year is $\geq 5\%$ of the Project Area. These events will be monitored, and the affected area will be recorded.

Emission of non-CO₂ GHG resulting from the loss of aboveground tree biomass due fire will be calculated in each verification period, by using the above ground biomass in trees of relevant strata calculated in the previous verification and the default values for the combustion factor, the emission factors, and the global warming potential.

The procedures for handling non-conformances will be developed and informed in the validated monitoring plan. Any sampling approaches used, including target precision levels, sample sizes, sample site locations, stratification, frequency of measurement will be subjected to robust QA/QC procedures.

Data Collection, Storage and Reporting

To guarantee the quality of the information collected during the monitoring event the standard operating procedures described in the monitoring plan will be adhered to. All inventory and field work is carried out in accordance with the requirements established in the IPCC GPG LULUCF guidelines, where applicable to the project.

Statistical criteria, the principals of sampling and forest inventory will be utilized as quality assurance /quality control procedure for inventory operations, including field data collection and data management.

Once the field sampling portion of each monitoring is completed the data will be aggregated, collected, analysed and results store in RML database.

Organizational Structure, roles, and responsibilities

Once established, every plantation will have a unique identifier and a spreadsheet will be maintained with all relevant plantation information: species planted and percent representation of each species, area of

the plantation, date(s) planted, and plantation strata (year). The boundaries of each plantation will be delineated using GIS.

The organizational structure, responsibilities and competencies of the personnel that will be carrying out monitoring activities.

Operational and management structure

The operational structure and responsibilities for the project are divided into three basic departments:

- General management
- Technical management
- Operators.

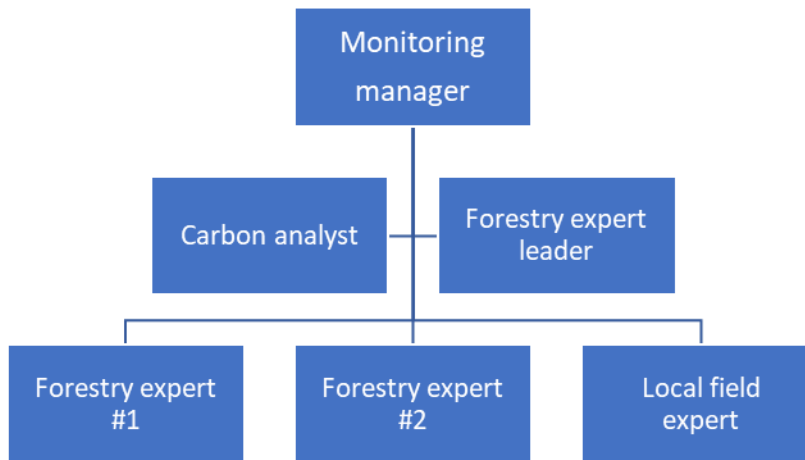


Figure 23 Operational monitoring management structure

Once the staff has been contracted for monitoring the project activities, the data collecting process will start. The field teams, of at least four people will collect data. Additional people may be employed to improve the performance of the field crews when conditions require greater human resources. The responsibilities for each member of the team are summarized in the table below.

Team member	Duties
Monitoring manager	Management and supervision, quality QA, QC
Carbon analyst	Analysis and compilation of remote sensing and field data as per VM0047 requirements
Forestry expert (team lead)	Organizing all the phases of the fieldwork, from the preparation to the data collection. This includes preparing the field work by carrying out bibliographic research, preparing field forms and maps, planning the tasks for the crew, administering of the location of plots, ensuring that field forms are properly filled in and that collected data is reliable, organizing meetings after field work in order to sum up daily activities, and creation of a work safety plan. The plot visit order for data collection will vary according to accessibility. This is determined during the preparation phase. The plots will have unique IDs

	following: # (=Stratum number) + # (=Plot number).
Forestry expert #1 (assistant to the team lead)	Help the crew leader to carry out his/her tasks, standard take necessary measurements and observations, make sure that the team's equipment is always complete and operational, supervise and guide workers.
Forestry expert #2	Field measurements
Local field expert	Local guide in navigating project area

Procedures for internal auditing and QA/QC

The following QA/QC procedures will be adopted:

- a) Training will be provided to the staff to guarantee the implementation of the monitoring plan, all the relevant staff is obliged to take the training course before the operation starts;
- b) The monitoring team will check the monitoring equipment regularly to make sure their normal operation and routine calibration will be conducted by the monitoring team before each monitoring activity. Ensuring that the net GHG emission removals as a direct result of project activities are Monitored,

Reported and verified using the best practices and as credibly and precisely as possible.

Monitoring is focused on the growth rates and biomass accumulation of the tree species, and accurate reporting on such factors.

- c) If the validated monitoring plan cannot be conducted during the following monitoring process due to some reason, an updated monitoring plan should be submitted to VVB during the corresponding verification by indicating the relevant deviation of the original plan and the reason for the deviation.

- d) For technical aspects, QA/QC will be done by benchmarking best practice guidelines that are published for each variable being monitored such as authored by Kershaw Jr, J. A., Ducey, M. J., Beers, T. W., & Husch, B. (2016). *Forest Mensuration*. Fifth edition. John Wiley & Sons.

Generally, a conservative approach will be maintained in all assumptions, results and data reported on.

Procedures for internal auditing

The data and calculations will be reviewed by team members preferably not involved in each part of process, e.g., carbon stocks calculations will be reviewed by staff not directly involved in the field data collection.

Field data collection

The staff involved in the measurement of carbon pools will be fully trained in field data collection and analysis. SOPs will be developed for each step of the field measuring and followed so that measurements are comparable over time. If different interpretations of the SOPs exist among the field teams, they will be jointly revised to ensure clearer guidance. This procedure will be repeated during the field data collection. To verify that plots have been installed and the measurements taken correctly, a minimum of 10% of randomly selected plots will be re-measured by a supervisor with a team that was not involved in the initial measurement sampling.

The proper entry of data into the data analyses spreadsheets is required to produce reliable carbon estimates. All data sheets will include a "Person in charge" field. Direct communication between all staff

involved in measuring and analysing data will be used to resolve any apparent anomalies before final analysis of the monitoring data can be completed. If there are any problems with the monitoring plot data that cannot be resolved, the plot will not be used in the analysis. Expert judgment and comparison with independent data will be used to ensure that results are in line with expectations. Additionally, field data will be reviewed by the crew leader of the monitoring team (Operational and management structure) further ensuring that the data and analysis are reliable.

Due to the long length of the project and the speed at which technology changes, raw data archiving is essential. Data will be archived in several forms and copies of all data will be provided to each project participant. Original copies of the field measurement (data sheets and electronic files) will be stored in a secure location. Copies of all data analysis and models, the final estimate of the amount of carbon sequestered, any GIS products, and the measuring and monitoring reports, will be stored in a dedicated and safe place (preferably offsite).

Electronic copies of all data and reports will be updated periodically and converted to any new format required by future software or hardware. An employee involved in the field measurements will be assigned to implement this updating. The data collected shall be archived for a period of at least two years after the end of the last crediting period of the project activity. The main activities to be developed for the QA/QC process, are described in the table below.

Table 17 Procedures for internal auditing and QA/QC process

QA/QC activity	Procedures
Check that assumptions and criteria for the selection of emission factors and other estimation parameters are documented.	Cross-check descriptions of project activity, emission factors and other estimation parameters with information on source and sink categories and ensure that these are properly recorded and archived
Check for transcription errors in data input and reference.	Confirm that bibliographical data references are properly cited in internal documentation. Cross-check a sample of input data (either measurements or parameters used in calculations) for transcription errors.
Check that removals are calculated correctly.	Redo a representative sample of removal calculations. Selectively mimic complex model calculations with abbreviated calculations to judge relative accuracy
Check that parameter and units are correctly recorded and that appropriate conversion factors are used.	Check that units are properly labelled in calculation sheets. Check that units are correctly carried through from beginning to end of calculations. Check that conversion factors are correct. Check that temporal and spatial adjustment factors are used

9.5	Confirm that the appropriate data processing steps are correctly represented in the database. Confirm that data relationships are correctly represented in the database. Ensure that data fields are properly labelled and have the correct design specifications. Ensure that adequate documentation of database and model structure and operation are archived
Check that the movement of inventory data among processing steps is correct	Check that removal data is correctly reported when preparing summaries. Check that removal data is correctly transcribed between different intermediate products
Check that uncertainties in removals are estimated or calculated correctly	Check that qualifications, assumptions, and expert judgments are recorded. Check that calculated uncertainties are complete and calculated correctly, following the methodology requirements
Undertake review of internal documentation	Check that there is detailed internal documentation to support the estimates and to enable reproduction of the emission, removal estimates. Check that inventory data, supporting data, and inventory records are archived and stored to facilitate detailed review. Check integrity of any data archiving arrangements of outside organizations involved in inventory preparation
Check time series consistency	Check for temporal consistency in time series input data for biomass estimation. Check for consistency in the algorithm/method used for calculations throughout the time series
Undertake completeness checks	Confirm that estimates are reported for all years. Check that known data gaps that may result in incomplete emissions estimates are documented and treated in a conservative way
Compare estimates to previous estimates	Current inventory estimates should be compared to previous estimates, if available. If there are significant changes or departures from expected trends, re-check estimates and explain the difference

3.4.1 Dissemination of Monitoring Plan and Results (VCS, 3.18; CCB, CL4.2)

All verification documentation is made available to communities and other stakeholders. Project activities are discussed at community consultation meetings, annual stakeholder reports, and the project staff will

prepare summaries of the monitoring plan and monitoring results to be disseminated to stakeholders, mainly engaged landholders and landholders' associations.

The monitoring plans for this project will be shared as a publicly available appendix to this project document on the VCS / CCB project databases. Verified monitoring reports will also be made publicly available through the same online database.

3.5 Optional Criterion: Climate Change Adaptation Benefits

The project seeks to be validated to the Gold Level for climate change adaptation benefits.

Regional Climate Change Scenarios (CCB, GL1.1)

Although drought is not documented in Sierra Leone because it has not occurred in the past, it is recognised in many circles as a potential, long-range issue for water management, agricultural and food productivity, health, and environmental protection. Sierra Leone is also vulnerable to climate change due to high sea level rise, extreme rainfalls, coastal erosion, and flooding⁸⁷. A general circulation models is used to understand regional climate change scenarios⁸⁸ as well as the UNDP Climate Change Country Profiles published by McSweeney et al. (2010).⁸⁹

Projections of future climate change are primarily reported using temperature and rainfall variables with the regional models outputting statistics related to how both temperature and rainfall are likely to change in the next 30 to 90 years.

Temperature

Mean annual temperature has increased by 0.8°C since 1960. It is projected to increase by 1.0 to 2.6°C by the 2060s and 1.5 to 4.6°C by the 2090s. The projected rate of warming is most rapid in the northern inland region of western Africa than the coastal region. All projections indicate substantial increases in the frequency of days and nights that are considered 'hot'⁹⁰ in current climate. The mean annual temperature anomaly is illustrated in Figure below.

⁸⁷Massaquoi, A. S., 2018. Drought Management Plan: A Contingency Plan for Sierra Leone. United Nations Convention for Combating Desertification Global Support Mechanism (UNCCD GSP), Bonn.

⁸⁸ Climate projection data is modelled data from the global climate model compilations of the Coupled Model Inter-comparison Projects (CMIPs), overseen by the World Climate Research Program. Data presented is CMIP6, derived from the Sixth phase of the CMIPs. Source : <https://climateknowledgeportal.worldbank.org/country/sierra-leone/climate-data-projections>

⁸⁹ McSweeney, C., New, M. & Lizcano, G. 2010. UNDP Climate Change Country Profiles: Sierra Leone. Available at https://www.geog.ox.ac.uk/research/climate/projects/undp-cp/UNDP_reports/Sierra_Leone/Sierra_Leone.hires.report.pdf.

⁹⁰ 'Hot' day or 'hot' night is defined by the temperature exceeded on 10% of days or nights in current climate of that region and season

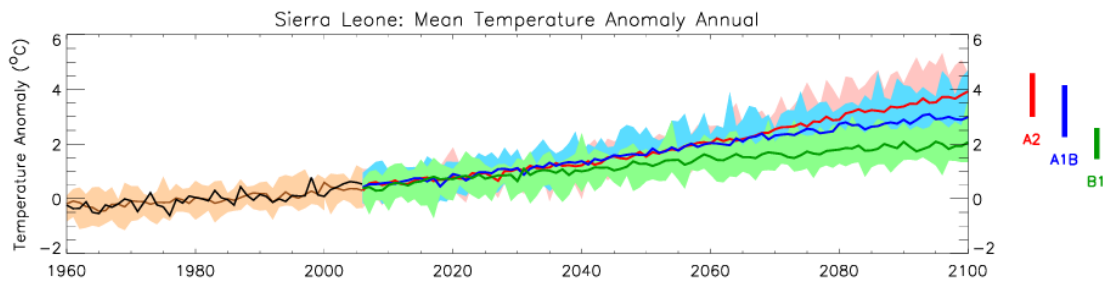


Figure 24 Trends in annual and seasonal mean temperature for the recent past and projected future. All values shown are anomalies, relative to the 1970-1999 mean climate. Black curves show the mean of observed data from 1960 to 2006, Brown curves show the median (solid line) and range (shading) of model simulations of recent climate across an ensemble of 15 models. Coloured lines from 2006 onwards show the median (solid line) and range (shading) of the ensemble projections of climate under three emissions scenarios. Coloured bars on the right-hand side of the projections summarize the range of mean 2090-2100 climates simulated by the 15 models for each emissions scenario.

Precipitation

Projections of mean annual rainfall averaged over the country from different models in the ensemble project a wide range of changes in precipitation for Sierra Leone, but tend towards over all increases, particularly in June, August, September (JAS) and October, November, December (OND). Rainfall in JAS is projected to change by -27 to +29% by the 2090s, and -19 to +33% in OND.

The proportion of total annual rainfall that falls in heavy⁹¹ events tend towards increases in the ensemble projections. Seasonally, this varies between tendencies to decrease in January, February, March (JFM) and to increases in JAS and OND. 1- and 5-day rainfall maxima in projections all tend towards increases, particularly in JAS. The range of changes in projections from the model ensemble covers both increases and decreases in all seasons (Figure 26).

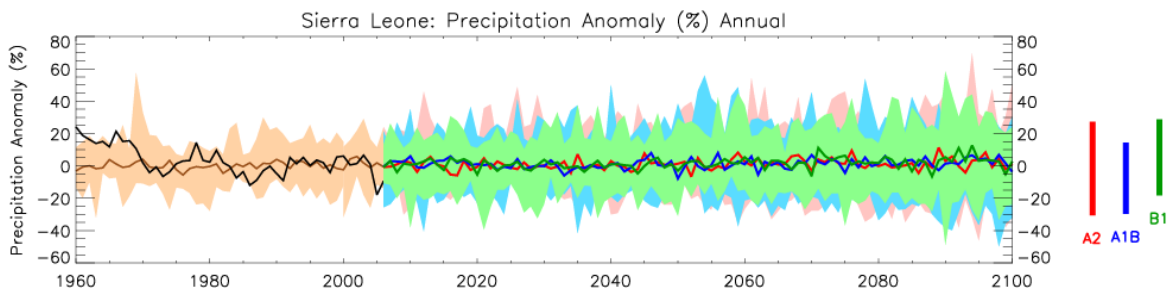


Figure 25. Trends in monthly precipitation for the recent past and projected future. All values shown are percentage anomalies, relative to the 1970-1999 mean climate.

These regional climate scenarios could in absence of the project lead to changed land use patterns including farm abandonment due to crop failure and urban migration, leading to degraded lands under regular wildfire pressure switch to low yielding, drought resistant crops without tree cover crop⁹².

3.5.1 Climate Change Impacts (CCB, GL1.2)

⁹¹ A 'Heavy' event is defined as a daily rainfall total which exceeds the threshold that is exceeded on 5% of rainy days in current the climate of that region and season.

⁹² World Bank in Sierra Leone (2021). URL: <https://www.worldbank.org/en/country/sierraleone/overview#1>.

The above-mentioned threats are already impacting both communities' well-being and biodiversity conservation status. Community well-being in and around the Project Zone, communities are currently at high vulnerability to climate change, especially from extreme rainfall and drought, due to their high dependency on farm income. Extreme rainfall can lead to crop damage, root damage, flooding, soil erosion and landslides. Drought can lead to crop failure and soil degradation. This in turn may lead to critical food shortages, the Climate change impacts will further have a negative effect on the livelihoods of these people, as their resilience to shocks is very low.

A reduction in the amount of dry season water available in the ecosystem—in the case of a drought entails reduction in the amount of available habitat to species. This could result in habitat compression and degradation around remaining water sources. More erratic rainfall could also compromise biodiversity by affecting fire regimes, if more fuel is created in heavier rainfall periods, but longer hotter dry seasons might exacerbate late season hot fires. Extreme weather and storms create additional pressure in wildlife habitats and vulnerable species, risking migration of adapted species.

3.5.2 Measures Needed and Designed for Adaptation (CCB, GL1.3)

Project benefits seek to reduce vulnerability of local communities to climate change through income diversification. The project will help communities adapt to climate change by giving them more reliable sources of income than farming. A large portion of community members will also be employed for tree planting and fire prevention/fighting activities, which will also provide reliable income at above average wages.

4 COMMUNITY

4.1 Without-Project Community Scenario

4.1.1 Descriptions of Communities at Project Start (CCB, CM1.1)

There are several communities located within the project sites. The community boundaries are along natural features such as rivers, historic symbols, and seasonal streams. Sierra Leone is a culturally diverse nation, home to approximately 18 ethnic groups⁹³, with the Temne and Mende peoples being predominant. Most of the families have religious belief of Islam and are thus homogeneous in social composition. Since inter-marriages among these families are common with people regularly moving from one community to another, the word community does not indicate a separate ethnicity or religion but merely denotes a geographical unit inhabited by a group of families.

The most widely spoken language in the area is Temne, though few people speak Krio, the lingua franca as well furthermore, in relation to literacy, there is unequal access to education by place of residence. Close to 75 percent of the urban population had been to school, 44.8 percent were attending school at the time of the census and 69.7 percent were literate. In contrast, 46.2 of the rural population had been

⁹³ <https://sierraleone.unfpa.org/sites/default/files/pub-pdf/National%20Analytical%20Report.pdf>

to school, 32.8 percent were attending school at the time of the census and 37.3 percent were literate. This strongly suggests that there is unequal access to education between the rural and urban areas.⁹⁴

The population of Sierra Leone is young with 40.8 per cent of the population under 15 years, 55.7 per cent aged 15-64 years and 3.5 per cent aged 65 years and above.

It is observed that there is greater population of women than men. Most male household heads interviewed reported to have two or three wives. A far higher proportion of the females (85.2 per cent) compared with the males (63.4 per cent) were illiterate. A similar trend is common with regard to access to the internet.

Malaria, typhoid fever, joint body pains among others are recorded as the most prevalent in these communities. According to the World Health Organization, Sierra Leone's maternal mortality rate (1,120/100,000 live births) is one of the highest in the world⁹⁵.

In terms of infrastructure, 15 out of the 27 communities have primary schools of classes 1 to 6 and 1 Junior Secondary School. Children living in communities where there are no schools had to travel by foot every morning to a nearby community for schooling. There are few private shops that sell small grocery items. Otherwise, people must go to a weekly market fair known as Bamoi Luma, about 30 km away to access the market. Only a few available health centres provide services in these communities. Just like schooling, most people must travel to nearby villages to access medical care. In the absence of access to electricity, firewood is the main source of energy for cooking while paraffin lamps are used for lighting during the night.

In terms of access to drinking water, some communities depend on bore wells constructed by government agencies and local NGOs. However, there are quite a few communities without bore wells, most often, women and girls had to walk far distances to access water from rivers and streams for drinking and domestic purposes. The 2015 census report shows that a large percentage of the rural population use unprotected sources of water (stream, riverbed, ordinary well) for domestic use. Access to proper sanitation services is limited, with pit latrines and communal toilets being common in rural regions.

The mean household size was 5.6 persons in 2015. The mean household size varied from 4.7 persons in the Western Region to 6.0 in the Northern Region. There were more male than female heads, 71.9 per cent compared with 28.1 per cent. Nearly a half of the households were extended households, while nuclear households and single-person households were 38.6 per cent and 6.4 per cent respectively. There is no centralised housing area and pattern in these communities as most families spread out and live in widely scattered homesteads, which are constructed after clearing part of the bush. A typical housing facility is constructed from mud and zinc roofs with a central area for dwelling and storage of household belongings.

Agriculture is the largest employer with 80 percent of the population working in the sector. Subsistence farming serves as the main source of livelihood for people in these communities. The main crops grown

⁹⁴ <https://sierraleone.unfpa.org/sites/default/files/pub-pdf/National%20Analytical%20Report.pdf>

⁹⁵ iAHO and WHO, Analytical Fact sheet, 2023. Available at [iAHO Maternal Mortality Regional Factsheet.pdf \(who.int\)](#)

are rice, cassava, and vegetables. Rice is the most important staple crop in Sierra Leone with 85 percent of farmers cultivating rice during the rainy season and an annual consumption of 76 kg per person⁹⁶.

Almost all households in these communities share a close relationship with forest and land resources which play an important role in their livelihoods. For example, apart from using various forest products such as firewood, charcoal etc., forest lands are also cleared for growing food crops. Streams and rivers are used not only for catching fish but also for drinking and domestic purposes. There has been low yield in agricultural production due to variation in rain pattern and other climatic conditions. Furthermore, the report reveals that farmers only rely on traditional methods of farming, as there has not been any capacity training on best agricultural practices organized by the agricultural ministry of local NGOs.

Traditionally, farmers used to follow shifting cultivation wherein agricultural productivity was maintained by rotating crops. An area was cleared by cutting down standing vegetation and burning the site (slash and burn) before it was put under cultivation. Typically, farmers would grow crops on a piece of land for a few years before it was left fallow for 10 – 20 years to regain productivity. There is no use of manure or inorganic fertilizer on crops because of its unavailability and high cost of price. Food insecurity is seen as an indicator of poor agricultural production due to climatic conditions and the use of traditional agricultural practices. All respondents admit that the rainy season, with emphasis on the months of July to August, is known to be the period of food unavailability in these communities.

It is quite important to note that a previous project, the Sierra Leone Agriculture (SLA) signed a 50-year lease in May of 2010 for 41,582 hectares of land for the development of palm oil for biofuels, displacing over 30,000 residents and farmers, mostly women, in the Northwest district of Sierra Leone. This project failed and consequently, a lot of people were not able to receive their salaries.

The issue of formal unemployment among youths is worsening. The initial phase of the Rewilding Project is providing contractual employment to only a few community members especially in the area of land preparation, nursery, and slashing. Quite a good number of youths are engaged in commercial motorbike services (Okada). Essentially, the communities in the project zone are poor with scarce social services⁹⁷.

4.1.2 Interactions between Communities and Community Groups (VCS, 3.19; CCB, CM1.1)

Multi-Stakeholders engagement Platforms (MSPs) were conducted for a collective decision making by the Landowners thus reaching a decision through the customary decision-making processes of the affected Indigenous People or communities. This was to ensure that Consents were sought and granted or withheld in accordance with their unique formal or informal political-administrative dynamic of each community/chiefdom with a body/structure called Chiefdom Council which comprised of the Paramount Chiefs (PCs), Members of Parliament (MPs), and Landowners representatives among others.

⁹⁶https://books.google.co.zm/books?id=3PZite6EADYC&q=rice+sierra+leone&pg=PA48&redir_esc=y#v=snippet&q=rice%20sierra%20leone&f=false

⁹⁷ Rewilding company, Community Needs assessment report, 2023

During this process, Indigenous people and local communities were allowed to participate through their own freely chosen representatives, while ensuring the participation of youth, women, the elderly, and persons with disabilities as much as possible.

Throughout the stages of engagement, a paralegal NGO (NAMATI) were involved as representatives of landowners/communities. They considered them as their lawyers. NAMATI also engaged landowners/communities on several times separately in the absence of company representatives. Multistakeholder engagements withheld the following conditions;

1. Landowners determined the process, timeline, and decision-making structure.
2. Information was offered transparently and objectively at the request of the Landowners.
3. The process is free from coercion, bias, conditions, bribery, or rewards.
4. Meetings took place at locations and times and in languages and formats determined by the Landowners
5. Community members were free to participate regardless of gender or age.

4.1.3 High Conservation Values (CCB, CM1.2)

High Conservation Value	Scarcies river estuaries and Port Loko forest reserve as high conservation value areas.
Qualifying Attribute	<p>Scarcies river estuary was designated a “Wetland of International Importance” on December 13, 1999, under the Ramsar Convention on Wetlands and it consists of both marine and intertidal zones. Restricted fishing is allowed using hook-and-line and bottom set gillnet fishing. It is the Little Scarcies that attracts migrant fishers, making it the primary source of fish for the local communities. Despite the relatively low level of fishery dependence, the significance of fish as a food source cannot be understated.</p> <p>Major threats to the site include (i) unsustainable clearing of mangroves for firewood, rice farming and construction materials resulting in the largest decrease in Mangrove cover in Sierra Leone (46%); (ii) dumping of untreated waste from industries in the Freetown area; and (iii) oil spillage from tankers unloading at the main port. Deforestation is the main challenge in Port Loko forest reserve. In 2010, Port Loko had 364kha of tree cover, extending over 61% of its land area. In 2021, it lost 8.89kha of tree cover, equivalent to 5.31Mt of CO₂ emissions.</p>
Focal Area	Managing, maintaining, and enhancing these high conservation value areas, including the Port Loko forest reserve and Scarcies river estuary, require rewilding efforts and halting deforestation and degradation. Additionally, it is crucial to ensure the sustainable use of water bodies within these areas.
High Conservation Value	Commercial Plantations (oil palm and mango) that are essential for the livelihoods of communities

Qualifying Attribute	The local communities heavily rely on these trees for their socioeconomic well-being. The oil palm holds immense importance as it is a common ingredient in regional cuisines and possesses a large market in Sierra Leone. Mango fruits appear during the rainy season, coinciding with the start of farming and a scarcity of food resources for households. Mangoes play a crucial role in sustaining farming activities and contribute to the limited food supply and income during this time.
Focal Area	Managing, maintenance and enhancement of these high conservation value areas is needed as well as ensuring that these trees are used in a sustainable manner and will adapt to climate change

High Conservation Value	Cultural and Religious groves
Qualifying Attribute	Cultural and Secret society bushes and shrines are evident in some of the settlements investigated in the survey area. The generally dense secondary forest vegetation cover of the project area provides a favourable environment for both male and female secret society activities and these are especially of the Bondo, Poro and Ojeh traditional societies which are the most common in the area.
Focal Area	Project Area

4.1.4 Without-Project Scenario: Community (CCB, CM1.3)

Without the implementation of the project, the land would remain in a state of degradation, thereby keeping the local community at its current level of well-being. This would result in no potential increase in income or improvement in the social services of the seven chiefdoms.

Continued deforestation and forest degradation would lead to more land becoming bare within the project zone, releasing more carbon dioxide into the atmosphere. In addition, a growing population will lead to more land pressure and environmental degradation, accelerating climate change and hence a decline in ecosystem functions. Climate change will also cause more droughts and crop failures, exacerbating food insecurity. Consequently, the community would experience deteriorating environment conditions and ecosystem health, leading to a decline in overall well-being.

The main economic activity in the area would be limited to agriculture, an activity that does not generate enough employment opportunities or profits for the community. This is because communities do not have adequate land or the right technology which results in poor farming practices⁹⁸ thus keeping productivity low resulting in low incomes, food insecurity and persistent poverty.

There would be less opportunities for improving the community's living standards as well as opportunities for economic growth. This means that the social services and facilities will not improve in quality and

⁹⁸ RML Community Needs Assessment Report 2023

quantities hence resulting to a larger population moving to urban places, leaving a declining population to scrape out a subsistence living from the farms resulting to more economic and housing instability. Since employment opportunities in the area are mostly informal⁹⁹ there will be high levels of non-compliance with the minimum wage standard and for this reason the income received by rural inhabitants is very low. This type of work generates a deterioration in people's health as people tend to work extra hours to cater for their basic needs.

Educational conditions are also reduced for the young population of the area, preventing the formation of human capital, and motivating the displacement of the young population to areas with better educational and work opportunities. Traditional beliefs and gender inequality are important barriers to change, which can be addressed through education, however the lack of employment and income opportunities provide little incentives for families to invest more in education.

4.2 Net Positive Community Impacts

4.2.1 Expected Community Impacts (CCB, CM2.1)

It is expected that the community impacts will transcend project zone boundaries and generally impact even communities not directly involved in the project. Increased economic development of project beneficiaries can stimulate the local economy and lead to positive knock-on effects for the livelihoods of offsite stakeholders. The tables below outline some of the community impacts.

Community group	Landowners (Lessors)
Impact(s)	Annual Rent Income
Type of benefit/cost/risk	Direct Income Benefit
Change in well-being	Annual cash income (above the average income) improving their standard of living. Reduction in poverty levels at household level

Community group	Plantation Workers (Seasonal and Permanent)
Impact(s)	Increased employment opportunities Knowledge, education in improved forest management, conservation Enhanced work skills Opportunities for women and youth

⁹⁹ Danish Trade Union Council for International Development Cooperation., 2014. Sierra Leone Labour Market Profile 2014.

	Communities empowered and increased awareness in sustainable natural resources management
Type of benefit/cost/risk	Direct Income and skills Benefit
Change in well-being	Formal employment relationships and the income earned can allow households to pay school fees, and other home essentials. This results in an improved standard of living, reduced poverty, and good quality of life at household and community levels. Less pressure from illegal activities because of being preoccupied, guaranteeing natural resources and biodiversity sustainability. Restoration of dignity for the vulnerable and marginalized

Community group	Small-scale farmers
Impact(s)	Climate smart agriculture
Type of benefit/cost/risk	Actual resilience to droughts and pests, diversification of crops, adaptation to climate Income earned from sale of surplus produce
Change in well-being	Improved food security and household nutrition Income from sales improves quality of life Diversity of crops, drought resilience, diversification of diet, improved health

Community group	Communities in the Project Zone
Impact(s)	Increased perception/recognition of the value of forest resources Increased employment and education opportunities Infrastructure projects
Type of benefit/cost/risk	Benefits related to improved water access, access to education, access to small enterprise capital, and support for agricultural businesses
Change in well-being	Reduced incident of disease, higher number of youth and girls attaining education, increased income and business success, overall good standard of living

4.2.2 Negative Community Impact Mitigation (VCS, 3.19; CCB, CM2.2)

Generally, there are no material negative community impacts. However, a potential negative impact is the possibility of conflicts arising out of perceptions of unfair distribution of benefits. A mitigation measure of this is the clearly communicated process of benefit sharing and access to benefits through the community structures and adherence to agreements facilitated by community representatives. Regular community meetings based on FPIC policy are an effective tool to significantly contribute to coherence.

In line with the precautionary principle, they will continuously monitor operations using best practice system and process standard to ensure proper management of waste to avoid polluting the surrounding environment or project area that would affect the quality of life of communities dependent on the water bodies and land.

The project activities and community monitoring plan when implemented will minimize exposure of communities especially the marginalized groups. Should any unforeseen impacts arise, such a design framework ensures the effects are mitigated timeously and appropriately.

4.2.3 Net Positive Community Well-Being (VCS, 3.19; CCB, CM2.3, GL1.4)

The table below outlines the net-positive community interventions. Refer to Section 2 for the metrics related to each.

Category	Without project scenarios	With project scenarios
Employment	Low employment opportunities - The immediate threat to community livelihoods was found to be low income and employment opportunities. In the absence of the project, these are expected to worsen and thereby increase poverty and livelihood vulnerability	<p>Increased employment opportunities - The project will provide short- and long-term employment opportunities for residents that will increase household income, hence improving their standard of living transitioning to a sustainable modern lifestyle.</p> <p>Women, people living with disabilities will be given equal opportunity. The income at household level is assurance of families' resilience under the climate crisis in case of catastrophe.</p> <p>This will reduce the poverty ratio.</p> <p>The portion of carbon credit revenue that goes to the communities can boost local economies thus creating additional employment opportunities as the project and activities expand.</p>
School Education Support	Access to quality education, retention, and completion of school (at 56%) remain challenging especially for rural communities due to the cost, and poor living conditions at home. The literacy levels are at an all-time low, increasing	The project will offer scholarships to exceptional students to ensure they complete their education and increase the pool of literacy in the community and country, with 1,840 benefiting.

	<p>continuation of illegal or unsustainable practices.</p>	<p>This help with natural resource management and improve the quality of life especially for the girl child.</p>
<p>Women Empowerment in the region</p>	<p>Women in Sierra Leone face a lack of economic independence, high illiteracy as well as entrenched customs and traditions. The gender inequity is high, as women have little access to finance, land, and natural resources benefits.</p>	<p>The welfare of women will improve as the project will target 50% of project activity (agriculture, training, cookstoves, water, governance) participants to be women.</p> <p>This will endeavour will seek to end or minimize the gender stereotype, raising high the economic and social status of women. They will have increased capital and decision-making power.</p>
<p>Sustainable agriculture support</p>	<p>Survey conducted in the project area shows that the local people are increasingly confronted to the following challenges related to agriculture and rural development:</p> <p>Poor yields and agricultural productivity due to effects of climate change and unsustainable traditional farming methods; degradation of soil; decreasing food security.</p> <p>Without the project, there will be no action towards conserving forest resources and ecosystem services in the project area, no capacity building in sustainable agricultural practices and environmental awareness with communities and no land use planning in the project zone leading to the continued uncontrolled conversion of forests to the farm bush cycle and extensive ecosystem degradation.</p>	<p>The climate smart agriculture support program aims to train local farmers in sustainable methods, increase productivity and maximize yields in the staple crops of cassava, rice, and groundnuts. Farmers will be supported with capital and farming inputs.</p> <p>This adaptation measure ensures resilience of crops across all seasons, families are food secure to manage under harsh climatic conditions, improved nutrition for a healthy and good quality life generally,</p> <p>The alternative livelihood reduces pressure on overexploitation of natural resources -wildlife, fish and will restore biodiversity richness in the region</p>
<p>Access to clean water</p>	<p>Today only about 32% of the rural population has access to a reliable water supply. Young women and little girls often must endure treks for long distances to fetch and head carry just a small amount of water for drinking.</p> <p>This has led to high rates of malnutrition, environmental degradation, as well as water-borne diseases arising from poor sanitary conditions, and, ultimately, wastage of a lot of resources in fetching water.</p>	<p>The project will provide clean, safe water points in each of the participating communities.</p> <p>This will see increased accessibility of safe and adequate water supply communities; improved availability of water for an irrigation system to sustain agricultural activities; reduction of time consumed in fetching water especially for women and school going children which can be better spent on activities such as household work, school and working on farms to supplement their daily avenues of income.</p>

	These cases of malnutrition and water-borne diseases lead to high rates of infant mortalities ¹⁰⁰ .	
Clean cookstoves distribution	34% of the population in Sierra Leone cooks with firewood or charcoal. This leads to deforestation of the already depleted forest resources and biodiversity loss. The many hours cooking using this fuel negatively impacts the health of the women ¹⁰¹ .	Improved cookstoves will be distributed to reduce deforestation, with the efficiency reduce exposure to disease risk. The health and quality of life of women will be good. Transition to clean energy source is part of the SDGs that this initiative will seek to achieve.

4.2.4 High Conservation Values Protected (CCB, CM2.4)

The high conservation value areas will be protected by rewilding activities, as these fall within the project zone that is protected, as well as community environmental awareness raising for ones that are of community importance. The potential degradation of the high conservation value area is much higher in the without the project scenario as the high conservation value would not have formal protection.

4.3 Other Stakeholder Impacts

4.3.1 Impacts on Other Stakeholders (VCS, 3.18, 3.19; CCB, CM3.1)

The project will have positive impacts to the local government and residents of Port Loko as the project activities can help to ensure that governmental and non-governmental entities in the municipality pay greater attention and prioritize the improvement of socio-economic conditions of the villages in the vicinity of the project. In addition to generating potential partnerships for the development of community projects that benefit the communities. In addition, the project promotes protection of natural resources and therefore seeks synergies with other entities to initiate research aimed at monitoring the high conservation value areas.

4.3.2 Mitigation of Negative Impacts on Other Stakeholders (VCS, 3.18, 3.19; CCB, CM3.2)

The project has no negative impacts related to other stakeholders that have been identified. However as described in earlier sections the adaptive management and monitoring plans will continuously map and monitor effects of the project on other stakeholders and has the capacity to address them if at all they are identified.

4.3.3 Net Impacts on Other Stakeholders (VCS, 3.18, 3.19; CCB, CM3.3)

¹⁰⁰ Available at: <https://sdgs.un.org/partnerships/improving-access-clean-water-sierra-leone>

¹⁰¹ Renewable Energy Action Plan – Sierra Leone, 5th January 2015

The project activities are designed and aimed at addressing the gaps in the wellbeing of the communities by providing solutions in key areas such health and employment, benefitting both project beneficiaries and other stakeholders. Therefore, there are no negative impacts related to project activities on other stakeholders that have been identified or foreseen.

4.4 Community Impact Monitoring

4.4.1 Community Monitoring Plan (CCB, CM4.1, CM4.2, GL1.4, GL2.2, GL2.3, GL2.5)

Category	Target variable	Indicator	Data source/Sampling method	Monitoring Frequency+ Reporting
Employment	Increase job opportunities	Number of non-permanent and permanent jobs created. SDG 1.1	Socioeconomic surveys	Annually, Project annual reports and Monitoring reports
	Develop labour skills in workers	Number of workers that have received technical training for the development of their work. SDG 4.4	Human resource management reports	Annually,
	Labor conditions	Number of workers that are trained in risk management. SDG 3.9	Human management reports	Project annual reports and Monitoring reports
	Occupational safety	The accident rate during the project. SDG 8.8	Human management reports	Annually, Project annual reports and Monitoring reports
	Women Empowerment in the region	Number of jobs for women and proportion of women in managerial positions. SDG 5.5	Progress Report. Tracking number of women impacted through qualitative and quantitative studies	Annually, Project annual reports and

			with sampling of the beneficiaries.	Monitoring reports
	Higher Household Income for people in the project region	Average income of small-scale food producers, by sex and indigenous status. SDG 2.3	Socioeconomic survey	Each verification, Monitoring report
Education	School support to deserving students through scholarship scheme implementation	Number of students receiving scholarships and obtaining a degree at senior secondary school level. SDG 4.3	Progress Report	Every school term or semester, Project annual reports
Climate smart agriculture	Ensure food security, economic well-being, and effective climate change adaptation	Number of farmers trained on new and improved ways of farming to adapt to climate change. SDG 1	Socioeconomic survey Report with number of farmers trained and questionnaire and interview with farmers	Annually, Project annual reports, Monitoring report
Access to clean water	Provide access to clean and safe drinking water for communities through well construction	Number of people being sick because of unsafe drinking water consumption. SDG 6	Hospital records and interview with communities	Annually, Project annual reports, Monitoring report
Cookstoves distribution	Reducing carbon emission and forest degradation, improving air quality and health	Number of households receiving clean cookstove and using it. SDG 7, SDG 13	Survey and direct observation and monitoring	Annually, Project annual reports, Monitoring report

4.4.2 Monitoring Plan Dissemination (CCB, CM4.3)

The monitoring plan will be made publicly available for the communities on the internet. The monitoring plan will also be uploaded to the Verra platform. The results of the monitoring plan will be written up as monitoring reports which will also be uploaded to the Verra registry prior to each verification. The monitoring plan summary will be translated into local languages, printed, and shared with the village councils of the chiefdoms. The results of each monitoring report will be summarized and presented in local meetings.

4.5 Optional Criterion: Exceptional Community Benefits

The project seeks to be validated at the Gold Level for exceptional community benefits.

4.5.1 Exceptional Community Criteria (CCB, GL2.1)

The Rewilding Maforki Project intends to achieve “exceptional community” impacts according to both criteria. Firstly, the communities (landowners) in the project area are recognized as having management rights to land in the project area, and rights to claim that their activities will generate / cause the project’s climate, community, and biodiversity benefits. This is confirmed in Sections 2.5 and 2.1.8, above, which, document that community stakeholders are recognized in the Laws of Sierra Leone, as well as according to local customs /culture / traditions - as having the rights to manage land in the project area, and to undertake activities to generate the projects’ impacts and benefits.

Secondly, the project zone is located in Port Loko, Sierra Leone, a country where, according to the World Bank 2020 World Development Report, 76% of the population live on less than \$3.20 a day, with the Northern Province accounting for the higher part of this rate. This is based on indicators: welfare of children and youth; work and housing conditions; access to domiciliary public services. With low income comes food insecurity with the World Food Program estimates to be at 57% for Sierra Leone, as the population depends mainly on meagre subsistence farming using traditional methods. The levels of education as likewise low, especially with 56% of lower secondary school education completion rate. The gender inequality index stands at 0.64, indicating a gender stereotypical society.

Furthermore, sections community, 4.1.1 and 4.1.4 describe in detail the without-project scenario and how the impact activities designed for the project respond to these important needs.

4.5.2 Short-term and Long-term Community Benefits (CCB, GL2.2)

The short-term and long-term net positive well-being benefits are discussed in detail section on 4.2. Short term benefits include employment being provided currently during the land preparation, nursery and plating phases of the project enabling locals to have reliable income. The long-term benefits will come from the implementation of climate smart agriculture and education support programs.

The expansion of reforestation activities, as well as revenue from the sale of carbon credits accruing to communities guarantees the long-term benefits and further community development, better living conditions and welfare.

4.5.3 Community Participation Risks (CCB, GL2.3)

The risks identified from community meetings led to the design and structuring of the project and activities optimized to mitigate them and documented in agreements and standard operating procedures.

Participation Risk	Mitigation Risk Mitigation
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Problems in allocation of project benefits	<p>The allocation of project benefits is stipulated in the agreements and the performance criteria thereof. However, a process will be in place to conduct community needs assessments and a steering committee be elected to manage the process and distribution of project benefits prior to receipt.</p> <p>The community representatives will undergo capacity building training in governance, financial and project management annually.</p>
Biased participation/elite capture in project activities	<p>The recruitment and engagement process are open and public, giving equal opportunity. The FPIC policy ensures such processes are supervised. A tracking system of participants and beneficiaries rules out bias.</p>

4.5.4 Marginalized and/or Vulnerable Community Groups (CCB, GL2.4)

Community Group	Women and the elderly
Net positive impacts	<p>Women are disproportionately affected by unemployment, underemployment, and poor employment conditions within the project area. In Sierra Leone, the labour force participation rate among females is 51.1% and among males is 55.6% for 2022. This shows that since 1990, female labour force participation has decreased ¹⁰².</p> <p>The project is set to provide job opportunities for about 4,100 local people within the project zone, women will make 50% of this workforce, providing them reliable income. 600 women farmers will be supported in the climate smart agriculture program. Soft loans will enhance their small-scale business capital.</p> <p>They will also comprise the majority beneficiaries of the improved cookstove and water distribution, improving health and welfare.</p>
Benefit access	<p>The project is open to all participants that live in and around the project area. Gender stereotyping is addressed through the periodic community sensitization and control over the composition of the co-operatives to include women and the elderly</p>
Negative impacts	<p>Based on project's theory of change and consultative process with communities for participative project design, there are no negative community impacts observed and hence there is no need for mitigation. However, the project will closely monitor community impacts of the project via its social monitoring plan and apply adaptive, participative management should any negative community impact require mitigation.</p>

¹⁰² <https://genderdata.worldbank.org/countries/sierra-leone/>

Community Group	Small holder farmers
Net positive impacts	<ul style="list-style-type: none"> • Improved incomes from alternative livelihoods. • Improved access to critical infrastructure (water, education). • Improved farm/crop management and linkages to markets. • Increased capital from soft loans
Benefit access	Ensure transparency in benefit distribution and planning for long term development. Representative participant shortlisting process
Negative impacts	The project will closely monitor community impacts of the project via its social monitoring plan and apply adaptive, participative management should any negative community impact require mitigation, rather to all inclusive.

Community Group	Young people in rural area
Net positive impacts	<p>The youth will be considered in the 1,500 jobs both directly and indirectly, and as either permanent or casual workers within the project zone.</p> <p>Access to quality education, retention and completion of school remain challenges for children in Sierra Leone, especially the girl child. Starting in 2023, the project will therefore provide school support through scholarships to outstanding students each year, who pass the National Primary School Examination (NPSE) and the Basic Education Certificate Examination (BECE).</p> <p>Access to finance for small enterprises</p>
Benefit access	<p>The project is open to all participants that live in and around the project area, communication of opportunities is made through community meetings.</p> <p>Other barriers to education -lack of income, distance to water sources and cooking firewood will be addressed in the other interventions</p>
Negative impacts	Based on project's theory of change and consultative process with communities for participative project design, there are no negative community impacts observed and hence there is no need for mitigation. However, the project will closely monitor community impacts of the project via its social monitoring plan and apply

	adaptive, participative management should any negative community impact require mitigation.
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4.5.5 Net Impacts on Women (CCB, GL2.5)

As a company, RML acknowledges the significance of creating a positive community impact and, therefore, places a high priority on fulfilling all necessary requirements to achieve net impacts on women. Such considerations encompass, but are not limited to, equal employment opportunities, livelihood empowerment as well as access to capital and markets. This inclusive approach ensures that women have equal opportunities to be recruited and participate in all of project’s activities, have access to finance and natural resource benefits and take up leadership roles.

In addition, our monitoring system is gender responsive and helps the project to collect gender classified data, track gender results, assess impacts as well as monitor access, participation, and benefits among males and females and incorporate remedial action that redresses any inequalities in project implementation.

4.5.6 Benefit Sharing Mechanisms (CCB, GL2.6)

The widely consulted benefit sharing mechanism was set up as a system for the landowners and community in general to gain rights over their natural resources and subsequently fairly and equitably.

Process used to design the benefit sharing plan	<p>The process started by firstly getting approval from the Chiefdom structures to engage with communities and the landowning families. Community and social surveys were undertaken to better understand the communities and family structures and then to understand the most urgent needs of the people in the broader project area. Community committees have been established and Community Liaison Officers appointed to actively engage on an ongoing basis.</p> <p>Following this a Community Development Action Plan (CDAP) was designed to react to some of the urgent needs (attached) and a benefit share percentage of 10% was agreed with the land-owning families in accordance with the new land act. Throughout this process Namati, an NGO that protects landowner rights on behalf of land-owning families, has been engaging with the communities and presented a master lease which includes benefit sharing and CDAP regulations. Also find attached the full Participatory Mapping and FPIC process. Included in the FPIC is detailed the process of negotiating lease rates, CDAP and benefit sharing.</p>
Summary of the benefit sharing plan	<p>The benefit share equals 10% of the gross profit generated from the sale of carbon credits. The funds will be shared between the communities covered by the leases.</p> <p>The CDAP is a roadmap with specific allocations per CDAP activity and is included in a plan. On an annual basis there will be further engagement with the communities through the committees to ensure the allocations are still</p>

	appropriate and address the most urgent needs.
Approval and dissemination of benefit sharing plan	The benefit sharing is captured in the Landowner Lease Agreements as well as in the Master Lease Agreement. These agreements have been negotiated to an agreed position and then signed by the required stakeholders. During this process, and as is described in the FPOIC process document, landowners are consulted, including in their language of preference to ensure they understand the terms they are agreeing to. This was done by RML but also by Namati in a separate process.

4.5.7 Benefits, Costs, and Risks Communication (VCS, 3.18; CCB, GL2.7)

The benefits, costs and risks are communicated through various means based on our holistic FPIC and stakeholder engagement process. This includes:

- The initial project concept was presented to local communities respecting the principles and practice of community consultative process. Farmer households, including women and community minorities were invited for feedback on the project concept, and interested landowners offered to further the discussions.
- With landowners, through the rewilding land lease agreement discussion, negotiation, and eventual signing.
- With the local plantation staff, through the interview process, the onboarding process (i.e., hiring paperwork, safety manual, etc.), through regular meetings;
- Through regular meetings with Chiefs, and community members
- Training and building capacity of relevant project staff to fully comprehend the benefits, costs, and potential risks associated with the project and the community and stakeholder groups who would be impacted.
- Empower the communities and stakeholders to establish a relevant forum at their level to tackle these issues

4.5.8 Governance and Implementation Structures (CCB, GL2.8)

RML along with its consultants are responsible for the project design and oversee its implementation from project registration to application of project co-benefits. This is done according to agreements with landowners who are enforce the responsibilities in line with protection of project area. The Landowners' Committee represent the communities and landowners, planning for livelihood, project activities, facilitating meetings for decision making. NAMATI is a paralegal firm that works with communities for protection of their rights in the project. Considering that the project is implemented in Chiefdoms, Paramount and Regent Chiefs are the final authority in natural resource utilization and benefit sharing, thus they endorse community submissions and guide process thereof.

The government line Ministries of agriculture, forestry and environment play regulatory roles, enforcing regulations. These are also consulted to provide extension (case of agriculture) and training services related to the project activities. There will be vendors and service providers engaged by RML for in the management of the livelihood projects – climate smart agriculture, SME loans, school loans, etc.

Further the project will organize community groups into co-operatives to participate in the livelihood interventions, they will have elected representors with offices of responsibility to successfully deliver on the

objectives of the impact activities and the project at large. The project also has put in place a robust feedback and grievance redress mechanism.

4.5.9 Smallholders/Community Members Capacity Development (CCB, GL2.9)

Capacity building for local Governance Structures.

Representatives of landowners, co-operatives and other community working groups will undergo bi-annual training on Governance, accountability, natural resources management, project, and financial management by RML and experts in the various fields to successfully govern these community-based structures of administration.

Capacity building to smallholders / community members on project implementation.

The small-scale farmers / community members (co-operatives) participating in climate smart agriculture and related project activities will be trained in the various fields. This includes training on improved governance; financial management; management and operation of water supply facilities; improved agriculture.

Many of the employees hired on the plantations will be trained in agroforestry, forest protection and climate change. Overall, the capacity of the community will be built as the project design is responsive to such needs throughout the project cycle.

5 BIODIVERSITY

5.1 Without-Project Biodiversity Scenario

5.1.1 Existing Conditions (VCS, 3.19; CCB, B1.1)

The rural population in Sierra Leone, incorporate natural resources and high diversity of species in the local agriculture production, regardless of whether the agro ecosystems are based on permanent cropping, predominantly pastoral or mixed. This helps to provide resilience in the face of adverse trends or shocks and offers a greater choice of livelihood options. Many wild plants and animals have significant economic value by preventing the need for cash expenditure on food, medicines and construction needs as well as providing ready sources of cash to poor households, often yielding a better income than local wage labour. Despite the importance of biodiversity for local communities, Sierra Leone's biodiversity has been subjected to both direct and indirect serious threats.

Direct threats include habitat loss and fragmentation of natural habitats due primarily to deforestation, wetland drainage and infrastructural development. Indirect threat includes overgrazing, poor mining practices, poor farming practices, inappropriate use of agrochemicals, pollution, bush fires, population pressure, civil conflict, poverty, illiteracy, lack of resources, limited trained human power, inappropriate policies, institutional weakness as well as socioeconomic factors¹⁰³

¹⁰³ Government of Sierra Leone (2017), Sierra Leone's Second National Biodiversity Strategy and Action Plan 2017-2026. Accessed on <https://www.cbd.int/doc/world/sl/sl-nbsap-v2-en.pdf>

Additionally, the lack of adequate information is a challenge to understand the current diversity of species and their conservation status in the project zone. A list of the critically endangered (CR), and endangered (EN) species of Sierra Leone was used as proxy to determine the status of biodiversity in the project zone (Appendix 2). Currently there are 44 species of endangered or critical endangered flora and 80 fauna species in Sierra Leone. Fishes have the highest number of species reported among all the groups within the fauna.

Table 18. Number of Fauna species in critical endangered and endangered IUCN categories in Sierra Leone.

Class	ARTHROPODA		CHORDATA						MOLLUSCA	
	INSECTA	MALACOSTRACA	AVES	ACTINOPTERYGII	CHONDRICHTHYES	AMPHIBIA	MAMMALIA	REPTILIA	BIVALVIA	GASTROPODA
Critically Endangered		2	3	3	15		3	2	1	1
Endangered	1	1	4	10	20	1	9	2		2
Grand Total	1	3	7	13	35	1	12	4	1	3

To gain a comprehensive understanding of the project zone’s flora and fauna, a thorough review of secondary data, including articles and research reports has been conducted. On top of that, a biodiversity assessment has been performed in 2023. The findings of this assessment have been compiled in a Biodiversity report¹⁰⁴.

The project zone is characterized by a limited variety of species. The loss of biodiversity has been attributed to the following anthropogenic activities:
including:

Land use: This is mainly caused by poor farming practices such as recurrent bush fires, shifting cultivation, increased population and shortened fallow periods that lead to land degradation. Other land use causes are urban development and industrial mining which affect land resources, resulting in deforestation and a significant threat to biodiversity. Habitat loss has consistent, strong, negative effects on biodiversity and on species richness¹⁰⁵ and has been caused by a growing population in the area that’s puts pressure on the land resource where people severely degrade to create room for agricultural land. For example, this region has lost 46% of its mangrove cover between 1990-2016 at a depletion rate of 1.8% per year. The uncontrolled clearance is done to make room for rice farming upstream in both Great Scarcies and Little Scarcies Rivers while women in the area use the mangrove wood for producing smoked fish¹⁰⁶.

Mineral management: The project area is endowed by several minerals including diamonds, iron ore, rutile, and gold. These minerals are under active exploration or production by either artisanal or industrial-

¹⁰⁴ Biodiversity assessment report done by Environmental Management Services (SL) Limited, 2023

¹⁰⁵ Laurance, W. F. (2002). Hyper dynamism in fragmented habitats. *Journal of Vegetation Science*, 13(4), 595-602.

¹⁰⁶ <https://www.wabicc.org/wp-content/uploads/2018/08/The-Scarcies-Region.pdf>

scale mining¹⁰⁷. The lack of any effective reclamation programs for the mined area means that there has been a significant decrease in habitat resilience¹⁰⁸.

Bush meat and pet trade: Illegal bush meat hunting that has been commercialized by gangs and has led to a sharp decline in the primate population in the region. The threatened West African manatee (*Trichechus senegalensis*) is heavily hunted for its meat and because it is considered as pest by rice growers and fishermen¹⁰⁹.

The project area is being encroached upon at an alarming rate. This constant pressure from development not only depletes forest resources but also impacts indigenous species and water quality.

Flora

The project zone was originally wood savannah. Currently it has scattered wild oil palm trees, with only a few planted oil palms, elephant grass, and other tree species. Around settlements, secondary forests and along water ways some gallery forest can be found. During a recent survey, the dominant plant species identified were *Imperata cylindrica*, *Lophira lanceolata*, *Croton hirus*, *Elaeis guineensis*, and *Mangifera indica*.

The Bureh, Kasseh, Maconteh, and Dibia regions are primarily characterized by farm bush and secondary forests, whereas the Bakeh Loko and Kamasondo chiefdoms are dominated by farm bush and savannah woodland.



Figure 26 Landscape and vegetation type in Kamasondo Chiefdom. Source: Biodiversity report 2023

Among the surveyed chiefdoms¹¹⁰, *Elaeis guineensis*, commonly known as the African oil palm, emerges as the dominant species, followed by *Mangifera indica*, or the mango tree. It is worth noting that one of the species identified in the survey, *Terminalia ivorensis*, is of conservation concern. This species has been listed as vulnerable in the IUCN Red List Category.

The project area also encompasses the Scarcies River, estuaries and the Port Loko forest reserve ecosystems. The Scarcies River estuary makes 7.6% of Sierra Leone mangroves with the most dominant

¹⁰⁷ "Support to Small-Scale Artisanal Mining Activities in Sierra Leone," February 2005 (Programmatic Environmental Assessment for USAID)

¹⁰⁸ Koroma A. P., 2004. "Causes of Forest Loss and Degradation and Issues of Unsustainable Forestry in Sierra Leone."

¹⁰⁹ https://portals.iucn.org/library/sites/library/files/documents/Co-SL-Env-004_.pdf

¹¹⁰ Biodiversity assessment report done by Environmental Management Services (SL) Limited, 2023

mangrove species being *Avecinnia germinans*. Other species include, *Rhizophora racemosa*, *R. mangle*, *R. harrisonii*, *Conocarpus erectus*, *Avicennia africana*, and *Laguncularia racemosa*¹¹¹.

The Scarcies River estuary has experienced the largest decrease in mangrove cover in Sierra Leone and this is mainly due to the transformation of mangrove areas to rice farming. There is heavy dependence on mangrove rice cultivation which makes 12% of the total quantity of rice produced in Sierra Leone¹¹².



Figure 27 Pictures of Scarcies river

Mammals

The Port Loko region host an important amount of mammal species, including the western chimpanzee (*Pan troglodytes verus*), the Black and White Colobus (*Colobus polykomos polykomos*)¹¹³ ¹¹⁴ and the Blue Duiker (*Philantomba monticola*)¹¹⁵. In and around the Scarcies river which runs throughout the region some species such as the West African Manatee (*Trichechus senegalensis*)¹¹⁶. Though many of these species are restricted by law, the threat from hunters keeps increasing, thus causing a decrease of mammal populations. Based on the biodiversity survey conducted, a total of 16 species have been identified in the project area. Notably 3 species, namely *Mastomys natalensis*, *Euxerus erythropus*, and *Funisciurus pyrropus*, were directly observed during field surveys.

Fishes

In the biodiversity study conducted, a total of 21 fish species were discovered, belonging to fourteen different families. The dominant family of fish species observed in the study was *Mormyridae*. It is important to note that two species from this survey, *Clarias laeviceps* and *Malapterurus teugelsi*, have been listed in the IUCN Red List Category as "Vulnerable".

Butterflies

¹¹¹https://www.researchgate.net/publication/322702165_Climate_Change_Vulnerability_Assessment_in_Mangrove_regions_of_Sierra_Leone_Abridged_Version

¹¹² Baggie, I., Sumah, F., Zwart, S. J., Sawyerr, P., Bandabla, T., & Kamara, C. S. (2018). Characterization of the mangrove swamp rice soils along the Great Scarcies River in Sierra Leone using principal component analysis. *Catena*, 163, 54-62.

¹¹³ Harding, R. S. (1984). Primates of the Kilimi area, northwest Sierra Leone. *Folia Primatologica*, 42(2), 96-114.

¹¹⁴ http://www.tacugama.com/wp-content/uploads/2017/12/2014_Garriga_PortLoko_HWC_final_report.pdf

¹¹⁵ COAST, I. (1988). GUINEA: Ziam Massif BR (part) Mt. Nimba BR (part) SIERRA LEONE: Gola FoR complex. Antelopes: Global Survey and Regional Action Plans, 13, 145.

¹¹⁶ Reeves, R., Tuboku-Metzger, D., & Kapindi, R. (1988). Distribution and exploitation of manatees in Sierra Leone. *Oryx*, 22(2), 75-84. doi:10.1017/S0030605300027538

A remarkable total of 61 butterfly species belonging to 5 different families were discovered in the biodiversity study. Among these families, the highest number of species recorded was from *Nymphalidae*, with a total of 30 species identified.

Reptiles and amphibians

About 11 reptile species belonging to 7 different families were recorded as well as of 10 amphibian species from 5 different families (Figure 29 shows encountered species). The African Dwarf Crocodiles (*Osteolaemus tetraspis*)¹¹⁷ can be found.



Figure 28. Reptile (on the left) and amphibian (on the right) recorded during the biodiversity survey

Species and habitat	
<p>Species: e Hippopotamus amphibius¹¹⁸, Eurasian Curlew, African Manatee¹¹⁹</p> <p>Scarcies River Estuary (Key Biodiversity Area)</p>	<p>The project biodiversity intervention focuses on restoring biodiversity connectivity as well as eco-habitats. This will be achieved through:</p> <ul style="list-style-type: none"> • Increase in forest cover will enhance biodiversity corridors, reviving species habitats • Controlling poaching and illegal trade through the effective enforcement of wildlife law • Building capacity of enforcement agencies in natural resources management • Awareness raising amongst stakeholders • Training and capacity building of communities and other stakeholders in sustainable management of natural resources <p>Mobilization of human, technical, and financial resources for biodiversity conservation.</p>

¹¹⁷ <https://portals.iucn.org/library/sites/library/files/documents/1998-012.pdf>

¹¹⁸ Available at : <https://digitalcommons.mtu.edu/cgi/viewcontent.cgi?article=1031&context=etdr>

¹¹⁹ Available at : https://www.researchgate.net/publication/350857049_THE_IUCN_RED_LIST_OF_THREATENED_SPECIES-_African_Manatee_Assessment_Errata_version

5.1.2 High Conservation Values (CCB, B1.2)

Due to the degradation of the project zone the reforestation areas do not currently possess a significant number of High Conservation Values (HCV). Nevertheless, as biodiversity is expected to increase as a result of the project activities, a new assessment of HCV in the project area will be done as part of the future biodiversity monitoring. Some regional HCV has been identified within the project zone using the HCV Network approach¹²⁰.

The project area hosts key biodiversity and ecological attributes that are of global importance. The project area contains or provides potential habitat for the country's species which are endangered, vulnerable, or threatened and are included in the IUCN list.

High conservation value	Species diversity and ecosystem services
Qualifying attribute	<p>Important forest reserve listed by the Sierra Leone Government in 1949¹²¹. High species diversity: Plants, large mammals, birds</p> <p>Terminalia ivorensis is widely harvested from the wild and has been introduced into many other tropical countries as a promising timber plantation species. The bark is also harvested from the wild for local use as a medicine and dyestuff. The plant is threatened by habitat loss and poor regeneration¹²². This species is of conservation concern and has been listed as vulnerable in the IUCN Red List Category</p>
Focal area	<ul style="list-style-type: none"> • Port Loko forest reserve • Rewilding Maforki Project Areas
High conservation value	Ecosystems and habitat
Qualifying attribute	<p>Area that provides habitat for different fauna and flora species</p> <p>It's a marine protected area recognized under Key Biodiversity Areas (KBA) and Ramsar Convention¹²³ with the 3rd largest natural harbour in the world and it's considered an important bird habitat. The area hosts migratory waterbird species, namely Ringed and Kentish Plovers, Sanderling, Curlew Sandpiper, Whimbrel, Greenshank and Redshank, and Western Reef Heron. It also holds 19% of the country's Mangrove forests¹²⁴. Pollution from oil spillages, sand</p>

¹²⁰ <https://www.hcvnetwork.org>

¹²¹ <https://slforestry.org/forest-reserves/>

¹²² <https://mansfeld.ipk-gatersleben.de/apex/f?p=185:3:4292127278597336>

¹²³ <https://rsis.ramsar.org/ris/1014>

¹²⁴ <https://www.wabicc.org/wp-content/uploads/2018/08/The-Sierra-Leone-River-Estuary.pdf>

	mining and cutting down mangroves for firewood has been destroying this habitat.
Focal area	<ul style="list-style-type: none"> • Sierra Leone river estuary • Project zone surroundings of project area.
High conservation value	Critical for meeting basic community needs – provisioning service
Qualifying attribute	<p>Two species, <i>Clarias laeviceps</i> and <i>Malapterurus teugelsi</i> (catfish), were identified as being of conservation concern and listed in the IUCN Red List Category as Vulnerable. Despite the relatively low level of fishery dependence, the significance of fish as a food source cannot be understated, as it continues to provide sustenance and nourishment to the communities living in these rural settlements.¹²⁵</p> <p>Communities that rely on fishing in the Little Scarcies River can benefit from learning about species identification and conservation methods to protect these valuable resources. In addition, water quality will be monitored within the concession area.</p>
Focal area	<ul style="list-style-type: none"> • Little Scarcies River estuary • Rewilding Maforki Project Area

5.1.3 Without-project Scenario: Biodiversity (CCB, B1.3)

The baseline scenario is the same as the conditions existing prior to the project initiation, therefore the description is delivered in Section 3.1.5 (Additionality). The area would remain with no with no specific reforestation/conservation activity implemented. The project area will remain grassland, shrubland, with some patches of abandoned oil palm plantation. Additionally, further degradation of the remaining land that include trees, shrubland and grassland is expected due to cattle grazing. Also, encroachment by illegal migrant farmers could lead to undesirable social conflicts and the exposition of the area to increased risk of fire.

Without the implementation of the rewilding project, it is likely that the communities residing around the project area will continue their regular routines, such as cutting down trees upstream to clear land for different crops cultivation, utilizing wood for cooking and fish processing, and engaging in salt mining activities to sustain their livelihoods. This will lead to a decline in forest coverage in the area, resulting in diminished habitat and refuge for both wildlife and plant species, consequently causing a reduction in their populations.

¹²⁵ Environmental management services (SL) limited, Biodiversity assessment report, 2023.

5.2 Net Positive Biodiversity Impacts

5.2.1 Expected Biodiversity Changes (VCS, 3.19; CCB, B2.1)

The project aims to achieve biodiversity restoration objectives by expanding forest cover. As a result, the project area has not been cleared or drained of existing natural ecosystems as a management practice. This initiative is anticipated to have a positive impact on the expansion of habitat areas, ultimately leading to the restoration of ecosystem processes between flora and fauna species.

The project has outlined specific objectives for biodiversity conservation within the project zone:

- Restore forest cover and reduce habitat fragmentation;
- Maintain and increase the integrity of the species corridor;
- Increase habitat and refuge for vulnerable species of fish *Clarias laeviceps* and *Malapterurus teugelsi*
- Increase on-site biodiversity and reforestation areas;
- Improved the natural resources management by local communities and facilitate their sustainable use;
- Raise awareness of environmental-related issues in local communities;
- Promote scientific research and monitoring of natural resources.

The expected positive impacts of project on biodiversity can be evaluated through defined biodiversity indicators that will be monitored and can be summarized as follows:

Biodiversity element	Forest cover and habitat
Estimated change	Positive - The increase in forest cover through rewilding activity and consequently enrichment as wildlife and other species habitat
Justification of change	In the project scenario, degraded open lands are being reforested to mitigate deforestation and degradation of forests in Sierra Leone. Therefore, it will contribute to re-establish and maintaining habitat for flora species as well as connectivity between flora and fauna populations.

Biodiversity element	Terrestrial fauna biodiversity
Estimated change	Positive - The wildlife in the project zone that had been significantly reduced will increase their population.
Justification of change	Afforestation activities would increase habitat for terrestrial fauna. Additionally, environmental restoration will be achieved along waterways and wildlife corridors using native tree species.

Biodiversity element	Aquatic fauna enrichment
Estimated change	Positive - The fish species in the area that had been significantly reduced will increase in population in the area.

Justification of change	Scientific and rational activities can adjust the hydrological cycle, reduce drought, and flood risk; promote soil nutrient cycle, improve ecological environment, and provide refuge for the fish species. Therefore, the species of fish could be increased due to the better environment of habitat.
Biodiversity element	Flora
Estimated change	Positive - Increase a more diverse environment using native flora. Slowdown of the loss of floristic biodiversity by reduction uncontrolled bushfires and slash & burn agriculture.
Justification of change	The rewilding will be undertaken on degraded land which will increase the forest cover. The reestablishment of several native species, in the project zone, will help to create diverse habitats for local flora and fauna.
Biodiversity element	High Conservation Areas
Estimated change	Positive - Maintenance protection and quality enhancement of existing HCVs
Justification of change	The project will provide alternative means of livelihoods for the communities around the project area, and this will help reduce the pressure of resources of the HCVs. Without the project, these areas would continue to be degraded.

5.2.2 Mitigation Measures (VCS, 3.19; CCB, B2.3)

An afforestation project entails some level of disturbance, in this case during the planting stage. The most impact is expected to be at the early stages with minimal to zero disturbance at the later stages of the project. The rewilding activity will implement afforestation activities through scientific and reasonable methods, local species will be used for rewilding, and efforts will be made to protect the existing vegetation as much as possible.

An active and regular biodiversity monitoring program will be implemented to assess periodic increases for specific species and inform management activities across the project area. By regularly monitoring key indicators, such as species populations, habitat quality, and ecosystem health, we can adapt and refine the biodiversity management strategies accordingly.

In addition, the project management team are well averse to forest management and have established an integrated management system for the implementation of the project. I.e., technical training of employees, fire prevention and insect control which will reduce instances and intensity of required interventions.

Some activities related to land preparation and planting have been identified and could potentially negatively impact the biodiversity. Below are a set of potential mitigation action that will be implemented to prevent any negative impact of the project on biodiversity.

Table 19. Impacts on mitigation actions on biodiversity in the project zone

Impact	Mitigation action
Habitat and biodiversity loss due to vegetation clearing	<ul style="list-style-type: none"> • Retain flooded grassland and swampy areas. • Maintain and conserve the tiny forest patches within the site. • Established tree nurseries of some indigenous plant species for restoration. • Rescue and relocate any animals found stranded due to habitat loss. • Create awareness among local communities to stop grassland fires
Displacement and mortality of less mobile fauna following vegetation clearance	<ul style="list-style-type: none"> • Clear vegetation in a way that allows animals to flee to nearby suitable habitats. • Ensure fleeing wildlife is not harassed or killed. • Create awareness among local community against wildlife harassment.
Dust pollution during vegetation clearing and ground preparation for planting	<ul style="list-style-type: none"> • Dust suppression during the dry season by spraying water on the ground to avoid dust emissions.
Influx of invasive alien plant species	<ul style="list-style-type: none"> • A thorough one-off cleaning of all equipment used from one site to another. • Monitor and physically remove invasive species when detected as they appear. • Create awareness among local staff on the danger of invasive.

5.2.3 Net Positive Biodiversity Impacts (CCB, B2.2, GL1.4)

The focus on degraded land ensures a positive increase in the forest cover over a period that will improve wildlife habitat and protection of shrinking population of Flora and Fauna species. The rewilding project is planning to plant 1,200 ha in its first 2 years (2022-2023). No exotic species will be introduced at any stage of the rewilding to ensure connectivity to the already existing ecosystem.

The project is located near the two estuaries that host over 15% of the country's mangrove forest with a rich biodiversity that is facing increased pressure from increased local community interference. The project aims to increase forest cover and empower the local communities economically, which will effectively reduce the risk of continued deforestation and degradation of the ecological zones and biodiversity hotspots.

An improvement in the climatic conditions in the area will reinforce water conservation from the catchment areas, preventing soil erosion by reducing surface run off. This offers great habitat potential to a lot of species as compared to degraded land that was prone to fires, lack of enough food and water. A lot of undergrowth species will also reemerge alongside the forest.

Net positive impacts are summarized in the table below.

Table 20. Comparison of with and without Biodiversity impacts

Without-project scenario	With project-scenario	Net Effect
Degradation of abandoned grassland	Increase in forest cover that will be sustainably managed. Increase in forest cover will restore the habitat, promote species diversity, and increase their population. It will also improve soil quality	Positive
Depletion of forest habitat	Creation of connectivity for forest dependent wildlife	Positive
Depletion of aquatic habitat and pressure on fish species	Increase in habitat and refuge for endangered fish species	Positive

5.2.4 High Conservation Values Protected (CCB, B2.4)

The proposed project activities will enhance conservation and HCV areas are expected to be negatively affected. The project protects the HCVs around it by moving the focus of the communities around it through the provision of sustainable economic activities and capacity building. The HCVs will be protected from human interference and reduced pressure on their resources. These will be protected and conserved as per HCV Resource Network Common Guidance¹²⁶ for the Management and Monitoring of High Conservation Values and the criteria and indicators of the CCB Standards Third Edition.

5.2.5 Species Used (VCS, 3.19; CCB, B2.5, B2.6)

The species used or intended to be used are native species, naturally occurring in the region. The project does not propagate non-native species, invasive species in the nurseries no will such be planted.

Table 21. Species intended to be planted

Species introduced	Classification	Justification for use	Adverse effects and mitigation
African Mahogany (<i>Azelaia africana</i>)	Native	Native	NA
Hog plum (<i>Spondias mombin</i>)	Native	Native	NA

¹²⁶ Available at:

https://globaluploads.webflow.com/624493bb51507d22cf218d50/6286866d8bbf4719b4e1d5af_HCV_Mgmt_Monitoring_final_english.pdf

Neem tree (<i>Azadirachta indica</i>)	Native	Native	NA
Tamarind (<i>Tamarindus indica</i>) - 2023 plantings only	Native	Native	NA
Silk-cotton tree (<i>Ceiba pentandra</i>)	Native	Native	NA
Gold Coast Bombax (<i>Bombax buonopozense</i>)	Native	Native	NA
Afara (<i>Terminalia superba</i>)	Native	Native	NA
African laburnum (<i>Cassia sieberiana</i>)	Native	Native	NA
West African albizia (<i>Albizia ferruginea</i>)	Native	Native	NA
Boundary tree (<i>Newbouldia leavis</i>)	Native	Native	NA

5.2.6 Invasive Species (VCS, 3.19; CCB, B2.5)

No invasive species have been identified in the project area. However, the effective management described in section, ensures that should there be an emergence of invasives species, the management practices already act as a preventative measure avoiding proliferation of such species.

5.2.7 GMO Exclusion (CCB, B2.7)

No GMO will be used at any stage of this project.

5.2.8 Inputs Justification (VCS, 3.19; CCB, B2.8)

Name	NPK fertiliser
Justification of use	Used in the nursery and during first year of planning to assist with early establishment
Potential adverse effect	The fertiliser provides nutrients to the plants and as it is only used in the planting process and in a small quantity there is no concern from an environment point.

Name	Phosphorus P205
Justification of use	Used in the nursery to assist with early establishment

Potential adverse effect	Used in very small quantities in a controlled environment.
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5.2.9 Waste Products (VCS, 3.19; CCB, B2.9)

In the operational areas of the project, waste management is prioritized, particularly targeting organic waste, paper, and plastic. To effectively manage these waste streams, the project will implement comprehensive strategies. Organic waste will be directed towards composting systems, allowing to produce nutrient-rich compost. Paper waste will be prioritized for recycling, promoting resource conservation, and reducing environmental impact. As for plastic waste, the project will emphasize proper segregation and collection, with a strong emphasis on recycling and responsible disposal methods. Through these waste management practices, the project aims to minimize environmental pollution, promote sustainability, and create a cleaner and healthier project area.

5.3 Offsite Biodiversity Impacts

5.3.1 Negative Offsite Biodiversity Impacts (CCB, B3.1) and Mitigation Measures (CCB, B3.2)

As the project activities will increase the area of the habitat and improve the habitat's quality, only positive biodiversity impacts are envisioned. Therefore, there are no potential negative offsite impacts on biodiversity. The projects adaptive management system will ensure that any unforeseen impacts are sufficiently mitigated.

5.3.2 Net Offsite Biodiversity Benefits (VCS, 3.19; CCB, B3.3)

The project has a net positive impact on biodiversity within the project zone and the surrounding ecosystem. As outlined in the comparison of with-project and without-project scenarios, the project's interventions are implemented in key biodiversity and ecosystem services areas, thus by virtue of their connectivity, the benefits will be extensive across the region over time.

5.4 Biodiversity Impact Monitoring

5.4.1 Biodiversity Monitoring Plan (CCB, B4.1, B4.2, GL1.4, GL3.4)

The project has set up an evaluation and monitoring plan that will be effective to the project activities set out. Measurable indicators have been established already and linked to the desired output. The indicators will be used to evaluate outputs, outcomes and impacts at different times of the project cycle i.e. (short, mid, and long) term effects.

Table 23 presents the monitoring plan, and the evaluation will be done at various periods. A survey using a standard template will be used in stakeholder consultations which is available. Each indicator will also be checked annually by the management team with an objective of checking the biodiversity changes attributes in line with the project. The effectiveness of the measures taken to maintain or enhance High

Conservation Values will be monitored through the permanence of forest cover, connectivity in the conservation areas, and presence of endangered or endemic species.

Table 22. Monitoring plan for biodiversity

Indicator type	Description	Monitoring indicator	Indicator unit	Monitoring method	Monitoring frequency
State variables	The quantity and quality of forest in the project area	Increased Forest cover	Ha	Forest inventory, Assessment of forest cover change via time series of classified satellite imagery	Before every verification
		Species of vegetation	N/A	Forest inventory, measure sample spots, remote sensing classification	Before every verification
		Increased connectivity between protected areas		Remote sensing	Every 3 years
	Species abundance	Animal population associated with forest – mammals, birds, amphibians	N°	Monitor the observed numbers of key animal species of concern and vulnerable through ground surveys, point counts, camera trapping and occupancy modelling, seasonally	Before every verification
		Fish Species Abundance, optimal habitat	N° Abundance	Longitudinal fishermen surveys, data collection of morphometric and meristic measurements of species specimens. waste monitoring Participatory monitoring strategy for use of community natural resources	Annually
	HCV	High Conservation Values	Intactness	Ground patrols of HCV areas,	Annually
Pressure variables	The frequency or intensity of anthropogenic impacts that are directly harmful to biodiversity in the project zone	Number of fires occurred	N°	Monitoring using real time remote sensing updates and periodic ground patrols with standard observation data entry	Annually
		Effectuated forest area suffered insects and disease	Ha	Monthly plant health inspection in-field	Annually

Response variables	The frequency or intensity of project interventions relevant to biodiversity	Forest area under prevention control from fires	Ha	Ground patrols to inspect firebreaks and fire prevention equipment functionality; Remote sensing fire alerts	Annually
		Forest area under prevention control from insects and diseases	Ha	Regular staff inspection	Annually
		Forest area recovered from fire, insects, or diseases	Ha	Remote Sensing data, Plantation staff inspection records	Annually
		Number of trees replants	N/A	Plantation staff records	Annually
		Soil health	N/A	Remote sensing, soil sampling	Annually

New goals will be reconsidered after 5 years by the project proponent after a thorough evaluation is completed. The monitoring indicators will be evaluated in terms of effectiveness, biodiversity, and community impacts.

The evaluation should comprise of;

- Comparing the results versus the contribution of the project on a cost –benefit ratio.
- Involving stakeholders to seek verification for the results of the project.
- Involving the community in validating the results of the indicators and bringing forth their feedback.
- Designing an implementation plan for the biodiversity management activities.

5.4.2 Biodiversity Monitoring Plan Dissemination (CCB, B4.3)

The monitoring plans, biodiversity assessment results documents will be published and made available to communities and VVBs.

Additionally, a contact person with phone numbers will be published in case any stakeholders want to directly contact the project proponent and raise opinions. The monitoring plan and the monitoring manual will be available to communities and other stakeholders. The information will also be included in the Project Implementation Report.

5.5 Optional Criterion: Exceptional Biodiversity Benefits

The project is seeking gold level certification for exceptional biodiversity benefits due to the presence of at least four vulnerable species in the area according to the IUCN. Community interviews and proximity to key biodiversity areas such as the Scarcies Estuary suggest the presence of more endangered species that surveys and further research will validate.

The Convention on Biological Diversity establishes that protected areas are an essential part of global and national conservation efforts. Considering the location of the Rewilding Maforki Project to a key biodiversity area – the Scarcies Estuary and its tributaries - that cut across the major area of the project zone, as well as the national forest reserves, the project is central to the conservation of species and the ecosystem restoration.

5.5.1 High Biodiversity Conservation Priority Status (CCB, GL3.1)

The project meets gold level high biodiversity conservation priority status as there is presence of IUCN listed species in the project area. The area is characterized by a total of 7 species of concern. These species are either endemic from Sierra Leone or from west Africa¹²⁷.

Table 23. Species encountered in project area and IUCN classification

Scientific Name	Common Name	Threat Category
<i>Clarias laeviceps</i>	Catfish	VU
<i>Malapterurus teugelsi</i>	Electric Catfish	VU
<i>Terminalia ivorensis</i>	Black Afara	VU
<i>Hippopotamus amphibius</i>	African Hippo	VU
<i>Tragelaphus scriptus</i>	Bushbuck	LC
<i>Cephalophus maxwellii</i>	Maxwell's duiker	NT

Table 24 Vulnerable tree species to be planted by the project

Tree Species	Common name	Elevation Range/Height (masl)	IUCN Red list classification
<i>Azelia Africana</i>	African Mahogany	10-18 m	VU

5.5.2 Trigger Species Population Trends (CCB, GL3.2, GL3.3)

Generally, it is expected that the population of the threatened species in and around the project area will be maintained and or increased through the conservation measures to be implemented and depending on the ecological dynamics of the habitats during the project lifetime.

No population assessment could have been done of the trigger population as it will be biased to estimate the population for a short period of study (wet season). An estimation can only be done after completing a circle (both dry and wet season surveys). Therefore, a comprehensive wet and dry season survey will be

¹²⁷ <https://www.iucnredlist.org>

conducted to estimate the population and compare any variation in number and diversity of species between the two seasons.

Trigger species	Electric Catfish (<i>Malapterurus teugelsi</i>) Catfish (<i>Clarias laeviceps</i>)
Population trend at start of project	Per the IUCN Red List, the species is decreasing, Vulnerable.
Without-project scenario	The enforcement capacity of the Ministry of Livestock and fisheries is limited, encouraging the overexploitation of waters for local fish consumption and trade ¹²⁸ . The species are migratory, and the lack of restriction affects the population. There is general reduction in fish stocks ¹²⁹ .
With-project scenario	The project will implement monitoring and control activities in collaboration with local fishermen that will ensure sustainable fishing practices. The increase in income from other activities will lessen the pressure of overfishing and see an improvement in the population. Increased fish stocks will in turn enhance aquatic biodiversity and secure protein nutrition for the households.

Trigger species	Black Afara (<i>Terminalia ivorensis</i>)
Population trend at start of project	Decreasing, Vulnerable.
Without-project scenario	Forests continue to be degraded and fragmented, thus population of the species directly affected with the historical unsustainable land uses, declining at a fast rate.
With-project scenario	Clearing of larger areas for agricultural expansion is lessened, also in setting up project area, no tree cutting is done, standing forests are let. This will ensure to maintain native forest assemblage critical to conserving faunal dependent species.

Trigger species	Bushbuck (<i>Tragelaphus scriptus</i>) Maxwell's duiker (<i>Cephalophus maxwellii</i>)
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¹²⁸ Action Plan for coastal protection measures Sierra Leone 2021-2023. Available at: <https://www.undp.org/sites/g/files/zskgke326/files/2023-03/undp-sle-action-plan-coastal-protection-measures-2022-2023.pdf>

¹²⁹ UNICEF Climate Landscape for Children Sierra Leone Analysis. Available at: <https://www.unicef.org/sierraleone/media/1461/file/Climate%20Landscape%20Analysis%20for%20Children.pdf>

Population trend at start of project	Decreasing, Least Concern
Without-project scenario	The decline in the range and numbers of Bushbuck is probably due to a combination of factors. These factors include hunting by humans, habitat destruction, and diseases.
With-project scenario	Monitoring (e.g., phototrapping, trailing, etc.,) and law enforcement by the project and partners such as the National Protected area Authority and the community leadership will ensure reduced pressure of poaching coupled with support of alternative livelihood interventions. Given the nature of the project, it will result in reduction of habitat fragmentation, creating a corridor between key ecological reserves in the region.

Trigger species	Hippopotamus (<i>Hippopotamus amphibius</i>)
Population trend at start of project	Decreasing, Vulnerable
Without-project scenario	With a current total population as low as 100 hippos in the Little Scarcies river ¹³⁰ , random changes in survivability (within the year and between years) could lead to a sharp decrease in sexually viable animals. Sexually mature females produce one calf about every two years, and it takes up to 10 years to reach the point of reproductive maturity. A few chance deaths of mature adults have significantly affected the hippo population largely caused by habitat degradation.
With-project scenario	The conservation of habitat will ensure the enhancement of river and watershed ecosystems such as the Little Scarcies, coupled with their large size and unique foraging habits these ecosystem engineers create a large “conveyor belt” of nutrients which in turn creates fertile ground for proliferation of fish species. The project aims to create a safe refuge and suitable habitat for hippos, with the primary objective of increasing their population through successful reproduction. Monitoring and law enforcement by the project and partners such as the National Protected Area Authority (Wildlife Division) and the community leadership will ensure reduced pressure of poaching coupled with support of alternative livelihood interventions. Given the nature of the project, it will result in reduction of habitat fragmentation, creating a corridor between key ecological reserves in the region.

¹³⁰ Lewison, R. L. 2011. Family Hippopotamidae (Hippopotamuses). Pages 308 - 319 in D. E. Wilson, and R. A. Mittermeier, editors. Handbook of the Mammals of the World. Vol 2. Hoofed Mammals. Lynx Edicions, Barcelona, Spain.

6 Appendix 1: IUCN REDLIST, SIERRAL LEONE

Scientific Name	Kingdom	Phylum	Order	Class	Category
<i>Afrithelphusa afzelii</i>	ANIMALIA	ARTHROPODA	DECAPODA	MALACOSTRACA	Critically Endangered
<i>Afrithelphusa leonensis</i>	ANIMALIA	ARTHROPODA	DECAPODA	MALACOSTRACA	Critically Endangered
<i>Aetomylaeus bovinus</i>	ANIMALIA	CHORDATA	MYLIOBATIFORMES	CHONDRICHTHYES	Critically Endangered
<i>Carcharhinus longimanus</i>	ANIMALIA	CHORDATA	CARCHARHINIFORMES	CHONDRICHTHYES	Critically Endangered
<i>Fontitrygon ukpam</i>	ANIMALIA	CHORDATA	MYLIOBATIFORMES	CHONDRICHTHYES	Critically Endangered
<i>Mecistops cataphractus</i>	ANIMALIA	CHORDATA	CROCODYLIA	REPTILIA	Critically Endangered
<i>Eretmochelys imbricata</i>	ANIMALIA	CHORDATA	TESTUDINES	REPTILIA	Critically Endangered
<i>Rhinolophus ziama</i>	ANIMALIA	CHORDATA	CHIROPTERA	MAMMALIA	Critically Endangered
<i>Galeorhinus galeus</i>	ANIMALIA	CHORDATA	CARCHARHINIFORMES	CHONDRICHTHYES	Critically Endangered
<i>Glaucostegus cemiculus</i>	ANIMALIA	CHORDATA	RHINOPRISTIFORMES	CHONDRICHTHYES	Critically Endangered
<i>Pristis pectinata</i>	ANIMALIA	CHORDATA	RHINOPRISTIFORMES	CHONDRICHTHYES	Critically Endangered

Scientific Name	Kingdom	Phylum	Order	Class	Category
<i>Pristis pristis</i>	ANIMALIA	CHORDATA	RHINOPRISTIFORMES	CHONDRICHTHYES	Critically Endangered
<i>Rhinobatos albomaculatus</i>	ANIMALIA	CHORDATA	RHINOPRISTIFORMES	CHONDRICHTHYES	Critically Endangered
<i>Rhinobatos irvinei</i>	ANIMALIA	CHORDATA	RHINOPRISTIFORMES	CHONDRICHTHYES	Critically Endangered
<i>Sousa teuszii</i>	ANIMALIA	CHORDATA	CETARTIODACTYLA	MAMMALIA	Critically Endangered
<i>Rhinobatos rhinobatos</i>	ANIMALIA	CHORDATA	RHINOPRISTIFORMES	CHONDRICHTHYES	Critically Endangered
<i>Rhynchobatus luebberti</i>	ANIMALIA	CHORDATA	RHINOPRISTIFORMES	CHONDRICHTHYES	Critically Endangered
<i>Sphyrna lewini</i>	ANIMALIA	CHORDATA	CARCHARHINIFORMES	CHONDRICHTHYES	Critically Endangered
<i>Squatina aculeata</i>	ANIMALIA	CHORDATA	SQUATINIFORMES	CHONDRICHTHYES	Critically Endangered
<i>Squatina oculata</i>	ANIMALIA	CHORDATA	SQUATINIFORMES	CHONDRICHTHYES	Critically Endangered
<i>Torpedo bauchotae</i>	ANIMALIA	CHORDATA	TORPEDINIFORMES	CHONDRICHTHYES	Critically Endangered
<i>Enteromius bagbvensis</i>	ANIMALIA	CHORDATA	CYPRINIFORMES	ACTINOPTERYGII	Critically Endangered
<i>Ladigesia roloffi</i>	ANIMALIA	CHORDATA	CHARACIFORMES	ACTINOPTERYGII	Critically Endangered

Scientific Name	Kingdom	Phylum	Order	Class	Category
<i>Scriptaphyosemion etzeli</i>	ANIMALIA	CHORDATA	CYPRINODONTIFORMES	ACTINOPTERYGII	Critically Endangered
<i>Loxodonta cyclotis</i>	ANIMALIA	CHORDATA	PROBOSCIDEA	MAMMALIA	Critically Endangered
<i>Gyps africanus</i>	ANIMALIA	CHORDATA	ACCIPITRIFORMES	AVES	Critically Endangered
<i>Gyps rueppelli</i>	ANIMALIA	CHORDATA	ACCIPITRIFORMES	AVES	Critically Endangered
<i>Necrosyrtes monachus</i>	ANIMALIA	CHORDATA	ACCIPITRIFORMES	AVES	Critically Endangered
<i>Pleiodon ovatus</i>	ANIMALIA	MOLLUSCA	UNIONIDA	BIVALVIA	Critically Endangered
<i>Sierraia outambensis</i>	ANIMALIA	MOLLUSCA	LITTORINIMORPHA	GASTROPODA	Critically Endangered
<i>Globonautes macropus</i>	ANIMALIA	ARTHROPODA	DECAPODA	MALACOSTRACA	Endangered
<i>Aetobatus narinari</i>	ANIMALIA	CHORDATA	MYLIOBATIFORMES	CHONDRICHTHYES	Endangered
<i>Cnemaspis occidentalis</i>	ANIMALIA	CHORDATA	SQUAMATA	REPTILIA	Endangered
<i>Carcharhinus obscurus</i>	ANIMALIA	CHORDATA	CARCHARHINIFORMES	CHONDRICHTHYES	Endangered
<i>Carcharhinus signatus</i>	ANIMALIA	CHORDATA	CARCHARHINIFORMES	CHONDRICHTHYES	Endangered

Scientific Name	Kingdom	Phylum	Order	Class	Category
<i>Cetorhinus maximus</i>	ANIMALIA	CHORDATA	LAMNIFORMES	CHONDRICHTHYES	Endangered
<i>Echinorhinus brucus</i>	ANIMALIA	CHORDATA	SQUALIFORMES	CHONDRICHTHYES	Endangered
<i>Gymnura altavela</i>	ANIMALIA	CHORDATA	MYLIOBATIFORMES	CHONDRICHTHYES	Endangered
<i>Isurus oxyrinchus</i>	ANIMALIA	CHORDATA	LAMNIFORMES	CHONDRICHTHYES	Endangered
<i>Isurus paucus</i>	ANIMALIA	CHORDATA	LAMNIFORMES	CHONDRICHTHYES	Endangered
<i>Chelonia mydas</i>	ANIMALIA	CHORDATA	TESTUDINES	REPTILIA	Endangered
<i>Mobula birostris</i>	ANIMALIA	CHORDATA	MYLIOBATIFORMES	CHONDRICHTHYES	Endangered
<i>Choeropsis liberiensis</i>	ANIMALIA	CHORDATA	CETARTIODACTYLA	MAMMALIA	Endangered
<i>Rhinolophus guineensis</i>	ANIMALIA	CHORDATA	CHIROPTERA	MAMMALIA	Endangered
<i>Cephalophus jentinki</i>	ANIMALIA	CHORDATA	CETARTIODACTYLA	MAMMALIA	Endangered
<i>Coelotilapia joka</i>	ANIMALIA	CHORDATA	PERCIFORMES	ACTINOPTERYGII	Endangered
<i>Cercopithecus diana</i>	ANIMALIA	CHORDATA	PRIMATES	MAMMALIA	Endangered

Scientific Name	Kingdom	Phylum	Order	Class	Category
<i>Hylomyscus baeri</i>	ANIMALIA	CHORDATA	RODENTIA	MAMMALIA	Endangered
<i>Schistolais leontica</i>	ANIMALIA	CHORDATA	PASSERIFORMES	AVES	Endangered
<i>Smutsia gigantea</i>	ANIMALIA	CHORDATA	PHOLIDOTA	MAMMALIA	Endangered
<i>Phataginus tricuspis</i>	ANIMALIA	CHORDATA	PHOLIDOTA	MAMMALIA	Endangered
<i>Mobula hypostoma</i>	ANIMALIA	CHORDATA	MYLIOBATIFORMES	CHONDRICHTHYES	Endangered
<i>Mobula mobular</i>	ANIMALIA	CHORDATA	MYLIOBATIFORMES	CHONDRICHTHYES	Endangered
<i>Mobula tarapacana</i>	ANIMALIA	CHORDATA	MYLIOBATIFORMES	CHONDRICHTHYES	Endangered
<i>Mobula thurstoni</i>	ANIMALIA	CHORDATA	MYLIOBATIFORMES	CHONDRICHTHYES	Endangered
<i>Enteromius liberiensis</i>	ANIMALIA	CHORDATA	CYPRINIFORMES	ACTINOPTERYGII	Endangered
<i>Pan troglodytes</i>	ANIMALIA	CHORDATA	PRIMATES	MAMMALIA	Endangered
<i>Pseudotolithus senegalensis</i>	ANIMALIA	CHORDATA	PERCIFORMES	ACTINOPTERYGII	Endangered
<i>Leptocypris taiaensis</i>	ANIMALIA	CHORDATA	CYPRINIFORMES	ACTINOPTERYGII	Endangered

Scientific Name	Kingdom	Phylum	Order	Class	Category
<i>Marcusenius meronai</i>	ANIMALIA	CHORDATA	OSTEOGLOSSIFORMES	ACTINOPTERYGII	Endangered
<i>Amphilius sp. nov.</i> 'Little Scarcies drainage'	ANIMALIA	CHORDATA	SILURIFORMES	ACTINOPTERYGII	Endangered
<i>Amphilius sp. nov.</i> 'Moa River drainage'	ANIMALIA	CHORDATA	SILURIFORMES	ACTINOPTERYGII	Endangered
<i>Enteromius foutensis</i>	ANIMALIA	CHORDATA	CYPRINIFORMES	ACTINOPTERYGII	Endangered
<i>Lycaon pictus</i>	ANIMALIA	CHORDATA	CARNIVORA	MAMMALIA	Endangered
<i>Psittacus timneh</i>	ANIMALIA	CHORDATA	PSITTACIFORMES	AVES	Endangered
<i>Polemaetus bellicosus</i>	ANIMALIA	CHORDATA	ACCIPITRIFORMES	AVES	Endangered
<i>Terathopius ecaudatus</i>	ANIMALIA	CHORDATA	ACCIPITRIFORMES	AVES	Endangered
<i>Mustelus mustelus</i>	ANIMALIA	CHORDATA	CARCHARHINIFORMES	CHONDRICHTHYES	Endangered
<i>Oxynotus centrina</i>	ANIMALIA	CHORDATA	SQUALIFORMES	CHONDRICHTHYES	Endangered
<i>Paragaleus pectoralis</i>	ANIMALIA	CHORDATA	CARCHARHINIFORMES	CHONDRICHTHYES	Endangered

Scientific Name	Kingdom	Phylum	Order	Class	Category
<i>Raja undulata</i>	ANIMALIA	CHORDATA	RAJIFORMES	CHONDRICHTHYES	Endangered
<i>Rhincodon typus</i>	ANIMALIA	CHORDATA	ORECTOLOBIFORMES	CHONDRICHTHYES	Endangered
<i>Rostroraja alba</i>	ANIMALIA	CHORDATA	RAJIFORMES	CHONDRICHTHYES	Endangered
<i>Torpedo mackayana</i>	ANIMALIA	CHORDATA	TORPEDINIFORMES	CHONDRICHTHYES	Endangered
<i>Afropomus balanoidea</i>	ANIMALIA	MOLLUSCA	ARCHITAENIOGLOSSA	GASTROPODA	Endangered
<i>Sierraia expansilabrum</i>	ANIMALIA	MOLLUSCA	LITTORINIMORPHA	GASTROPODA	Endangered
<i>Pseudagrion mascagnii</i>	ANIMALIA	ARTHROPODA	ODONATA	INSECTA	Endangered
<i>Chiloglanis kolente</i>	ANIMALIA	CHORDATA	SILURIFORMES	ACTINOPTERYGII	Endangered
<i>Chiloglanis dialloi</i>	ANIMALIA	CHORDATA	SILURIFORMES	ACTINOPTERYGII	Endangered
<i>Sclerophrys taiensis</i>	ANIMALIA	CHORDATA	ANURA	AMPHIBIA	Endangered
<i>Simirestis staudtii</i>	PLANTAE	TRACHEOPHYTA	CELASTRALES	MAGNOLIOPSIDA	Critically Endangered
<i>Triclisia macrophylla</i>	PLANTAE	TRACHEOPHYTA	RANUNCULALES	MAGNOLIOPSIDA	Critically Endangered

Scientific Name	Kingdom	Phylum	Order	Class	Category
<i>Ritchiea afzelii</i>	PLANTAE	TRACHEOPHYTA	BRASSICALES	MAGNOLIOPSIDA	Critically Endangered
<i>Lebbiea grandiflora</i>	PLANTAE	TRACHEOPHYTA	MALPIGHIALES	MAGNOLIOPSIDA	Critically Endangered
<i>Eriocaulon adamesii</i>	PLANTAE	TRACHEOPHYTA	POALES	LILIOPSIDA	Critically Endangered
<i>Vigna desmodioides</i>	PLANTAE	TRACHEOPHYTA	FABALES	MAGNOLIOPSIDA	Endangered
<i>Tieghemella heckelii</i>	PLANTAE	TRACHEOPHYTA	ERICALES	MAGNOLIOPSIDA	Endangered
<i>Tieghemella africana</i>	PLANTAE	TRACHEOPHYTA	ERICALES	MAGNOLIOPSIDA	Endangered
<i>Placodiscus pseudostipularis</i>	PLANTAE	TRACHEOPHYTA	SAPINDALES	MAGNOLIOPSIDA	Endangered
<i>Habenaria jaegeri</i>	PLANTAE	TRACHEOPHYTA	ASPARAGALES	LILIOPSIDA	Endangered
<i>Raphionacme caerulea</i>	PLANTAE	TRACHEOPHYTA	GENTIANALES	MAGNOLIOPSIDA	Endangered
<i>Stylochaeton pilosus</i>	PLANTAE	TRACHEOPHYTA	ALISMATALES	LILIOPSIDA	Endangered
<i>Pterocarpus erinaceus</i>	PLANTAE	TRACHEOPHYTA	FABALES	MAGNOLIOPSIDA	Endangered

Scientific Name	Kingdom	Phylum	Order	Class	Category
<i>Heteradelphia paulojaegeria</i>	PLANTAE	TRACHEOPHYTA	LAMIALES	MAGNOLIOPSIDA	Endangered
<i>Hypolytrum cacuminum</i>	PLANTAE	TRACHEOPHYTA	POALES	LILIOPSIDA	Endangered
<i>Apodiscus chevalieri</i>	PLANTAE	TRACHEOPHYTA	MALPIGHIALES	MAGNOLIOPSIDA	Endangered
<i>Croton dispar</i>	PLANTAE	TRACHEOPHYTA	MALPIGHIALES	MAGNOLIOPSIDA	Endangered
<i>Habenaria jacobii</i>	PLANTAE	TRACHEOPHYTA	ASPARAGALES	LILIOPSIDA	Endangered
<i>Napoleonaea alata</i>	PLANTAE	TRACHEOPHYTA	ERICALES	MAGNOLIOPSIDA	Endangered
<i>Eremospatha dransfieldii</i>	PLANTAE	TRACHEOPHYTA	ARECALES	LILIOPSIDA	Endangered
<i>Cola angustifolia</i>	PLANTAE	TRACHEOPHYTA	MALVALES	MAGNOLIOPSIDA	Endangered
<i>Bothriocline fruticosa</i>	PLANTAE	TRACHEOPHYTA	ASTERALES	MAGNOLIOPSIDA	Endangered
<i>Combretum fulvum</i>	PLANTAE	TRACHEOPHYTA	MYRTALES	MAGNOLIOPSIDA	Endangered
<i>Mostuea adamii</i>	PLANTAE	TRACHEOPHYTA	GENTIANALES	MAGNOLIOPSIDA	Endangered
<i>Vernonia nimbaensis</i>	PLANTAE	TRACHEOPHYTA	ASTERALES	MAGNOLIOPSIDA	Endangered

Scientific Name	Kingdom	Phylum	Order	Class	Category
<i>Omphalocarpum ahia</i>	PLANTAE	TRACHEOPHYTA	ERICALES	MAGNOLIOPSIDA	Endangered
<i>Bryaspis humularioides</i>	PLANTAE	TRACHEOPHYTA	FABALES	MAGNOLIOPSIDA	Endangered
<i>Cinnobotrys felicis</i>	PLANTAE	TRACHEOPHYTA	MYRTALES	MAGNOLIOPSIDA	Endangered
<i>Pavetta leonensis</i>	PLANTAE	TRACHEOPHYTA	GENTIANALES	MAGNOLIOPSIDA	Endangered
<i>Rinorea djalonensis</i>	PLANTAE	TRACHEOPHYTA	MALPIGHIALES	MAGNOLIOPSIDA	Endangered
<i>Dichaetanthera echinulata</i>	PLANTAE	TRACHEOPHYTA	MYRTALES	MAGNOLIOPSIDA	Endangered
<i>Schizachyrium djalonicum</i>	PLANTAE	TRACHEOPHYTA	POALES	LILIOPSIDA	Endangered
<i>Eugenia liberiana</i>	PLANTAE	TRACHEOPHYTA	MYRTALES	MAGNOLIOPSIDA	Endangered
<i>Schizachyrium penicillatum</i>	PLANTAE	TRACHEOPHYTA	POALES	LILIOPSIDA	Endangered
<i>Sericanthe trilocularis</i>	PLANTAE	TRACHEOPHYTA	GENTIANALES	MAGNOLIOPSIDA	Endangered
<i>Pleioceras afzelii</i>	PLANTAE	TRACHEOPHYTA	GENTIANALES	MAGNOLIOPSIDA	Endangered

Scientific Name	Kingdom	Phylum	Order	Class	Category
<i>Dalbergia hepperi</i>	PLANTAE	TRACHEOPHYTA	FABALES	MAGNOLIOPSIDA	Endangered
<i>Okoubaka aubrevillei</i>	PLANTAE	TRACHEOPHYTA	SANTALES	MAGNOLIOPSIDA	Endangered
<i>Droogmansia chevalieri</i>	PLANTAE	TRACHEOPHYTA	FABALES	MAGNOLIOPSIDA	Endangered
<i>Drimia sudanica</i>	PLANTAE	TRACHEOPHYTA	ASPARAGALES	LILIOPSIDA	Endangered
<i>Aspilia chevalieri</i>	PLANTAE	TRACHEOPHYTA	ASTERALES	MAGNOLIOPSIDA	Endangered
<i>Dissotis leonensis</i>	PLANTAE	TRACHEOPHYTA	MYRTALES	MAGNOLIOPSIDA	Endangered
<i>Dactyladenia smeathmannii</i>	PLANTAE	TRACHEOPHYTA	MALPIGHIALES	MAGNOLIOPSIDA	Endangered
<i>Vepris laurifolia</i>	PLANTAE	TRACHEOPHYTA	SAPINDALES	MAGNOLIOPSIDA	Endangered

7 Appendix 2: Literature Review, Correlation between Biomass and NDVI

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González-Alonso, F., Merino-De-Miguel, S., Roldán-Zamarrón, A., García-Gigorro, S., Cuevas, J. M. (2006) Forest biomass estimation through NDVI composites. The role of remotely sensed data to assess Spanish forests as carbon sinks, *International Journal of Remote Sensing*, 27:24, 5409-5415, DOI: 10.1080/01431160600830748

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Mey Boudoug, J. C, Gore, M. (2021). Biodiversity Conservation and Carbon Sequestration in Agroforestry Systems of the Mbalmayo Forest Reserve. 37. 91-103. 10.7747/JFES.2021.37.2.91.

8 APPENDIX 3: Matching process for control plots

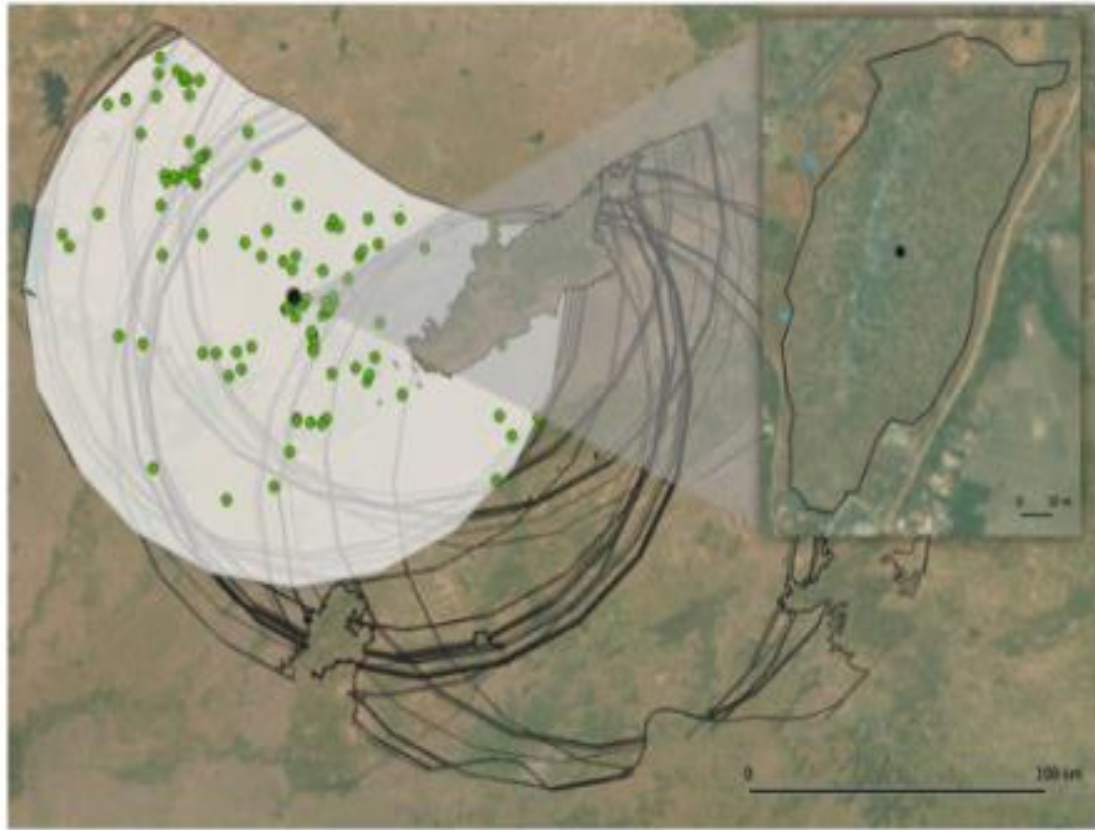


Figure 29. The figure illustrates the detailed matching process for a specific project area. Subdivided plots are meticulously matched with controls, ensuring a comprehensive representation. The 100km search limit, not a perfect circle due to exclusion zones, is

Controls are chosen from a larger set of matched control plots that satisfy the criteria mentioned earlier. The subsequent plot displays a portion of the matched, controls alongside the specifically selected ones.

The matching process is conducted for all project areas, guaranteeing that:

- (i) a minimum distance of 300m is maintained between the final control units,
- (ii) no controls are selected within project boundaries, and
- (iii) no overlapping controls exist in the same location, even across different project units.

