THE GOLA REDD PROJECT MONITORING & IMPLEMENTATION REPORT I

Document Prepared By: the RSPB on behalf of the Gola Rainforest Conservation LG (the project proponent)

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V2 15-September-2015

Project Title	*The Gola REDD Project*
Project location	*Gola Rainforest National Park, Kailahun & Kenema Districts in Eastern Province and Pujehun District in Southern Province, Sierra Leone*
Project Proponent	Gola Rainforest Conservation LG. Contact person: Alusine Fofanah, tel: 00 232 78661027, asfofi@yahoo.co.uk / alusine.fofanah@golarainforest.org
Auditor	Rainforest Alliance, contact: Campbell Moore cmoore@ra.org; (443) 975 8351
Project Start Date	*Start date 1st of August 2012, ends on the 31st of July 2042, totalling a project lifetime of 30 years.*
Version	*V2*
Report ID	*V2*
Date of Issue	*15-September-2015 this version of the document issued*
Project ID	*Undergoing VCS Validation.ID will be provided once registered*
Monitoring Period	*01-August-2012 to 31-December-2014*
History of CCB Status	Undergoing validation. Validation field audit completed in 2014
CCB Standards being used for this verification	CCB Standards 2nd Edition

Brief summary of the CCB benefits generated since start data to current monitoring period	*Conservation actions as a direct result of the Gola REDD project has: 1) protected 60 threatened species, 8 endangered and 1 critically endangered species, 2) preserved 68,515 ha of tropical forest with a net GHG emission reduction (not including the 10% buffer account) of 1,197,521t CO2e between August 1st 2012 and the first Monitoring event at the end of 2014 (it is conserving 5,028,197 tonnes of CO2-e during the first 10 years of the project), 3) provided livelihood support to the 122 impoverished communities that surround the GRNP through, for example, (i) 42 cocoa farmer groups established with 1075 registered members, (ii) 35 farmer field schools established with 450 registered members to improve productivity on existing crop fallow land, (iii) 12 savings and internal lending committees with 293 registered members and (iv) awarded 222 scholarships for secondary education.*
Gold level criteria being used and summary	*Gold levels for Climate Change Adaptation: it enhances resilience to climate change stresses amongst 122 Forest Edge Communities whilst maintaining critical ecosystem services such as water, land and soil resources. Gold level for Biodiversity: the project protects 1 Critically endangered species and 8 endangered species.*
Prepared By	*The RSPB on behalf of the Gola Rainforest Conservation LG (the project proponent)*
Contact	*Nicolas Tubbs, RSPB UK Headquarters, Tropical Forest Unit, The Lodge, Sandy, Bedfordshire, SG19 2DL, UK.* Nicolas.tubbs@rspb.org.uk *0044 1767 680551*
Date of completion of PIR	*V2, 15-September-2015*

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1 GENERAL

1.1 Summary Description of the Project (G3)

The Gola REDD project conserves the forested areas of the Gola Rainforest National Park (GRNP) in south east Sierra Leone. The GRNP and adjacent forests are Sierra Leone's largest remaining area of Upper Guinea Tropical Forest, a forest type recognised as a global biodiversity hotspot (Myers et al 2000). The area contains 60 threatened species, including 8 endangered and 1 critically endangered species (Klop et al. 2008, Hillers 2013). Conservation actions as a direct result of the Gola REDD project protect these species, preserve 68,515 ha of tropical forest and conserve 5,028,197 tonnes (and 4,394,315 tonnes after buffer credits are removed) of CO_2-e during the first 10 years of the project, as well as provide livelihood support to the 122 impoverished communities that surround the GRNP.

Although the Forestry Division within the Government of Sierra Leone's Ministry of Agriculture, Forestry and Food Security (MAFFS) is responsible for the management of the nation's forests, including GRNP, current funding levels results in a lack of capacity and finances to effectively manage forest areas protected by legislation resulting in encroachment and widespread deforestation within the country's protected areas. For example, in 2011, $115,814 was allocated to the Forestry Division (GoSL budget 2009-2013;49) to manage all 48 Forest Reserves and National Parks.

Gola Rainforest Conservation LG, a not-for-profit company was established to manage the Gola REDD project and act as the project proponent. The Company was founded by three partners: The Government of Sierra Leone represented by the Ministry of Agriculture, Forests and Food Security (MAFFS), The Royal Society for the Protection of Birds (RSPB) and The Conservation Society of Sierra Leone (CSSL). These three partners, under the banner of the Gola Forest Programme, have been working with the local communities of the 7 Chiefdoms surrounding the GRNP since 2002. The Gola REDD project seeks to sell credits validated by the Verified Carbon Standards (VCS) and the Climate, Community and Biodiversity Alliance (CCBA) to provide a stream of sustainable revenue sufficient to significantly reduce emissions from unplanned deforestation activities. Revenues from the sale of credits are to be used to;

i) improve the conservation strategy and enhance the management effectiveness of the GRNP;

ii) enable sustainable resource management throughout the project zone by engaging in a suite of livelihood improvement activities with local communities;

iii) develop a monitoring program that provides robust information to underpin management decisions and a research program that allows GRNP to become recognized as an international centre of excellence and;

iv) build a conservation trust fund that provides a means of ensuring conservation actions last beyond the lifetime of the project.

The Gola REDD project recognizes both the moral and pragmatic necessity of actively involving local communities in all aspects of project development and implementation. Local stakeholders were identified and involved in project development including Paramount Chiefs, section and village Chiefs, landowning families and Forest Edge Communities – communities in the leakage belt bordering the project area. These stakeholders and others are directly involved with the implementation of activities throughout the lifetime of the project. A comprehensive package of benefits to ensure the integrity of the project area and leakage belt was agreed with local stakeholders. The package includes direct payments to landowning families and Paramount Chiefs, sustainable livelihood projects focused on land use planning and co-management, sustainable agriculture, saving and lending schemes, and a

community development fund for villages beyond the project zone in each of the 7 Chiefdoms, as well as ecotourism

can be both socially and environmentally beneficial. It is envisioned that it will pave the way for future projects of a similar nature that will provide Sierra Leone with a viable sustainable alternative to forest conversion and biodiversity loss.

Project vision

The Gola REDD project is a catalyst for peace, prosperity and national pride in Sierra Leone, ensuring that the globally important habitats, biodiversity and environmental services of the GRNP and wider Gola landscape are conserved and that neighbouring communities are active environmental stewards of the natural resource base that underpins and enhances their livelihoods.

Project purpose

To conserve the forests, biodiversity, ecological processes and services of the GRNP and wider landscape for the benefit of nature and people.

Goals

To facilitate the achievement of the project's vision and ensure that the project achieves net positive benefits for climate, communities and biodiversity, project activities will focus around three goals:

1. Conservation strategy and effective management for the GRNP

Goal: To strengthen the conservation strategy and effective management of the GRNP and enable the project to be a stimulus for building National policies and regulations as well as informing relevant regional and international platforms of conservation best practice.

2. Sustainable natural resource management

Goal: To enable local people to become environmental stewards of the natural resource base that underpins their livelihoods through education, capacity building, land use planning and activities that enhance the socio-economic benefits derived from the sustainable use of the project zone's forests and agricultural land.

3. Research and monitoring

Goal: To develop and maintain a comprehensive social and biodiversity database and monitoring system to ensure the availability of accurate, relevant and timely information to inform and enhance project management and the effective protection of the forest and delivery of anticipated social and biodiversity goals.

A further goal of the project is to build capital in a trust fund that can be used after the end of the carbon project to continue conservation management. This goal falls outside of the implementing team's management goals which are described above and instead is part of the strategy of the Gola Rainforest Conservation LG. A dedicated trust fund for GRNP post-project management will be established which will be capitalized during the project's lifetime by a percentage of 'excess' revenues from the sale of credits that remain after the costs of project implementation.

1.2 Project Location (G1 & G3)

The Gola REDD project is located in the south east of Sierra Leone. The nearest entry point to the project area is 30km south-east of the district headquarter town of Kenema and 260 km east of Freetown, the nation's capital. The eastern area of the project lies adjacent to the Moro and Mano Rivers and the international border with Liberia. To the south, the area is bisected by the Kenema-Zimmi highway. The project lies within three districts: Kailahun and Kenema in Eastern Province and Pujehun in Southern Province (see Figure 1).

The forest in Gola REDD and surrounding area are the largest area of lowland tropical forest remaining in Sierra Leone and form part of the Upper Guinea forest ecosystem which is classified as one of the 25 most important biodiversity hotspots in the world (Myers et al. 2000). The Gola forests are a key stronghold for a large number of endangered and threatened bird and mammal species and are also politically important as they form part of a larger 'trans-boundary peace park' envisioned by the Government of Sierra Leone and Liberia to assist in establishing permanent peace in a previously troubled cross-border region[1].

The project area is divided into 3 blocks; Gola North, Gola Central and Gola South (see Figure 1). The geodetic coordinates of the project boundaries for each of the 3 blocks that form the project area as required by the VCS AFOLU requirements (V3.4) are found in the KML file in the reference/annex folder. The map projection for project boundaries and all spatial analysis is:

Mapping Projection

Projected Coordinate System:
WGS_1984_UTM_Zone_29N

Projection: Transverse_Mercator

False_Easting: 500000.00000000

False_Northing: 0.00000000

Central_Meridian: -9.00000000

Scale_Factor:0.99960000

Latitude_Of_Origin: 0.00000000

Linear Unit: Meter

Geographic Coordinate System: GCS_WGS_1984

Datum: D_WGS_1984

Prime Meridian: Greenwich

Angular Unit: Degree

[1] In 2009 the Presidents of Sierra Leone and Liberia made a joint declaration of their intention to create a transboundary peace park to conserve the Gola forests in Sierra Leone and Liberia.

The total size of the REDD project area is 68,515 hectares of forest in 2011 (The non-forest areas of the Gola National Park are 1,199ha consist primarily of rivers and a number of rocky outcrops known as inselbergs.) The boundary has been demarcated on the ground in coordination with the Forest Edge Communities living adjacent to the boundary. There are 86 communities sharing a boundary with the project area and all have signed an agreement with the project over the location of the boundary (Marris et al 2013) (Figure 1). The boundary has been cleared and is being regularly brushed by casual workers which will facilitate the detection of the boundary.

Following requirements set out in VM0007 BL-UP Module, the spatial boundaries required from the Gola REDD project are: the Project Area (PA) (68,515ha), and Leakage Belt (LB) (62,932) (

Figure 1, also see the Map Projection above). See the Baseline Report for a detailed description of these boundaries (Netzer and Walker 2013) and the KML and KMZ folders for the geodetic polygons.

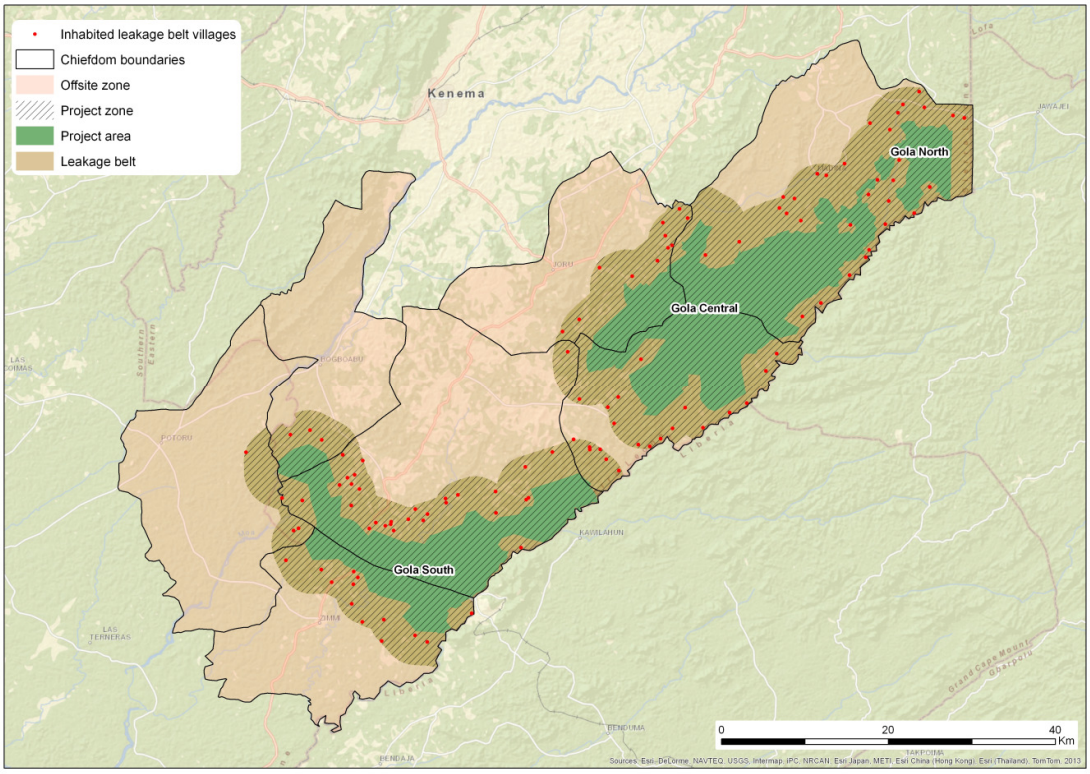


Figure 1 Boundaries of the project area, leakage belt (which together form the project zone under the CCB standard) and offsite zone (as defined by CCB standard), the map is based on the projects geodetic coordinates.

Hydrology

The Gola REDD project covers important catchment areas for the Moro, Mano, Mahoi and Moa Rivers which are the main water supplies for local villages and towns (Figure 2).

The north eastern area of the project zone is drained by the Moro River which runs along the eastern boundary. The region is fairly well drained with elevated hilly terrain; only 8-9% of its area is under streams, swamps or poorly drained terraces.

The central area of the project zone is also drained by the Moro River running along the eastern boundary. This part of the project zone is intersected by a series of water courses and seasonally dry valleys. The most important water course to originate in this part of the project zone is the Mogbai River which flows east into the River Moro and has a catchment of approximately 52 km^2 and an area of swampy terrain.

As the Moro River flows south, it flows into the Mano River which runs along the eastern boundary of the southern area of the project zone. The eastern section of this area feeds the Mano River via a series of small rivers and streams that are no longer than 15 km, for example the Watuma, Wemango and Weadia, and as a result is fairly well drained. The central area in the south is drained by a network of small streams which feed into the Mahoi River. The western part of the southern area is poorly drained with up to 18% of the area classed as waterway, swamp or poorly drained land. Streams in this area feed into the adjoining Moa River.

The watershed services provided by the project zone are vital to local and regional economies which are based on subsistence and cash crops.

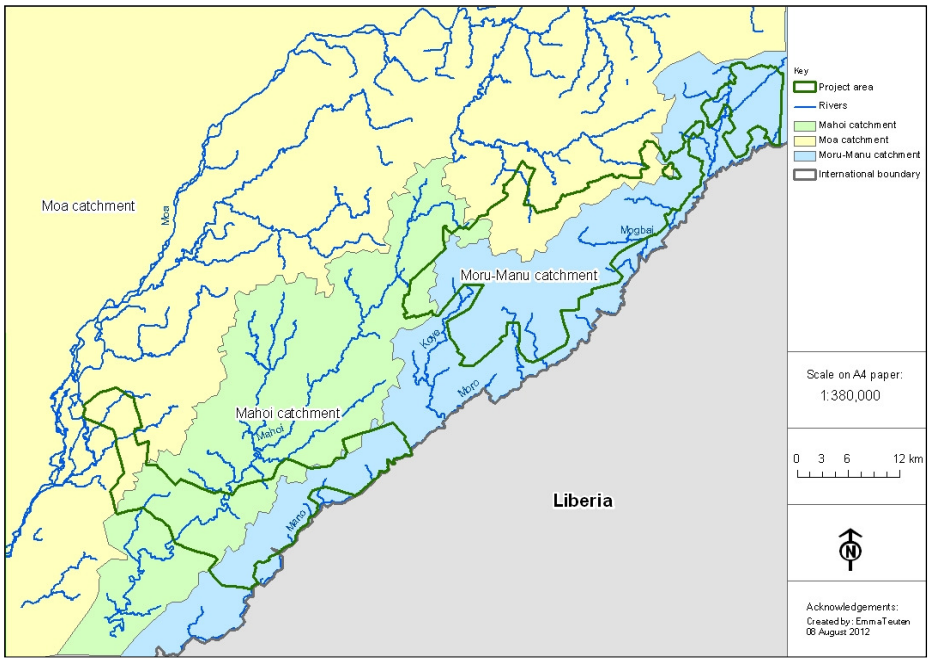


Figure 2 Watersheds of the project zone

Geology and Soils

The Gola REDD project zone is characterized by ancient crystalline rocks of the Archaen subdivision of the Precambrian period (Wilson, 1965). The granite greenstone complex, common in this area, contains iron and magnesium rich metamorphic rocks overlying a quartz-rich granite basement. Metamorphism gave rise to local occurrences of granulitic materials which are characteristic in parts of the project area. Most of the ores of chromium, gold and iron are located in the strips of metamorphic rocks that permeate the dominating granite (see Figure 3).

The soils in the project zone are mostly derived from granite. They are usually freely draining sands and gravels, with varying proportions of lateritic gravel. Four types of soil are recognized in the project area (Iles et al 1993):

1. Kulufaga. Rocky hill complex of moderate to high relief on Precambrian granite complex and local amphibolites; shallow sandy clay loams with locally deeper reddish clay loams;

2. Kailahun. Strongly dissected high level plains of low to very low relief and scattered isolated hills, on Precambrian granite complex and local granulites; moderately shallow to deep, sandy clay loams to clays often containing much gravel;

3. Blama. Dissected plains of extremely low relief with scattered small hills and terraces, on Precambrian granite complex and local granulites; moderately deep, very gravelly reddish clay loams to clays;

4. Sandaru. Variable dissected complex of plains and rocky hills of low to moderate relief, on Precambrian granite complex; moderately shallow to deep, sandy clay loams, gravelly on hilly terrain.

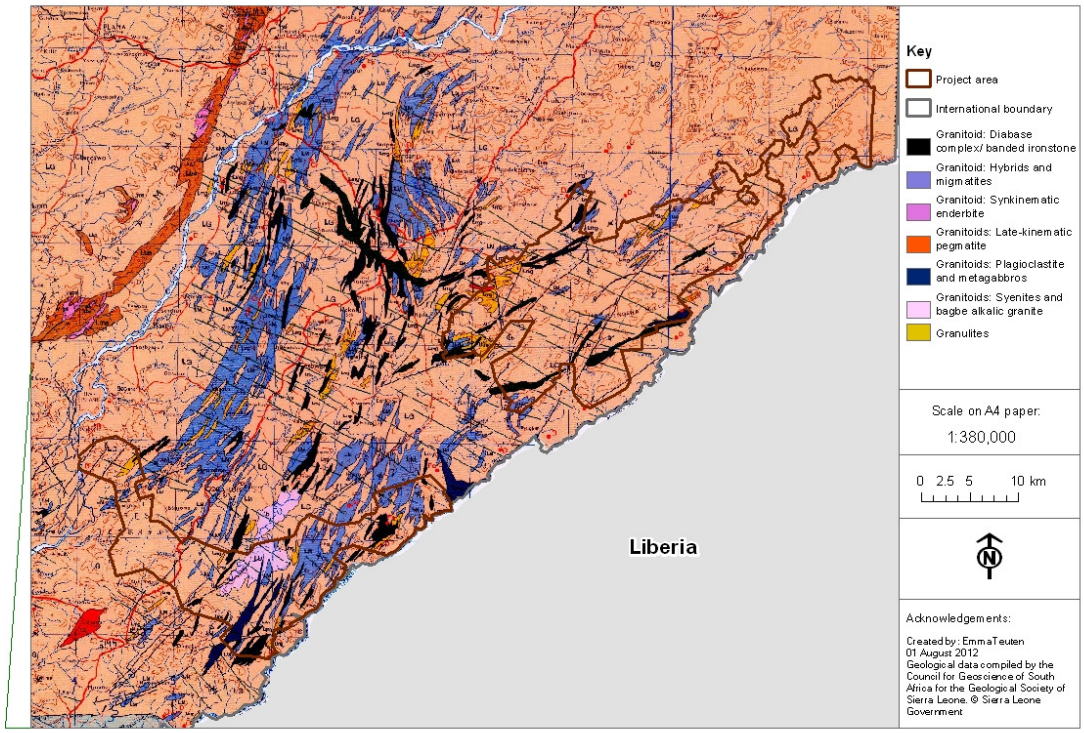


Figure 3 Geology of the project zone

Geomorphology

The central area of the project zone contains the most varied geomorphologic features (Figure 4). Extensive rolling hills in this area give rise to form more rugged terrain and isolated rocky outcrops, some of which exceed 130m in length and 22% are over 330m in elevation. Over 9% of this area consists of steep slopes. The highest point, which reaches 427m, is known as Sangie Mountain. Slopes exceeding 27 degrees are common, and slopes of upto 45 degrees occur in the North and Eastern parts of this area.

The southern part of the project zone is lower than the central and northern area and becomes progressively lower and more uniform in slope from east to west. The highest point in this area is Bagla Hills at 330m in the east. The hilly terrain in this area is crossed by numerous watercourses which form steep sided water valleys.

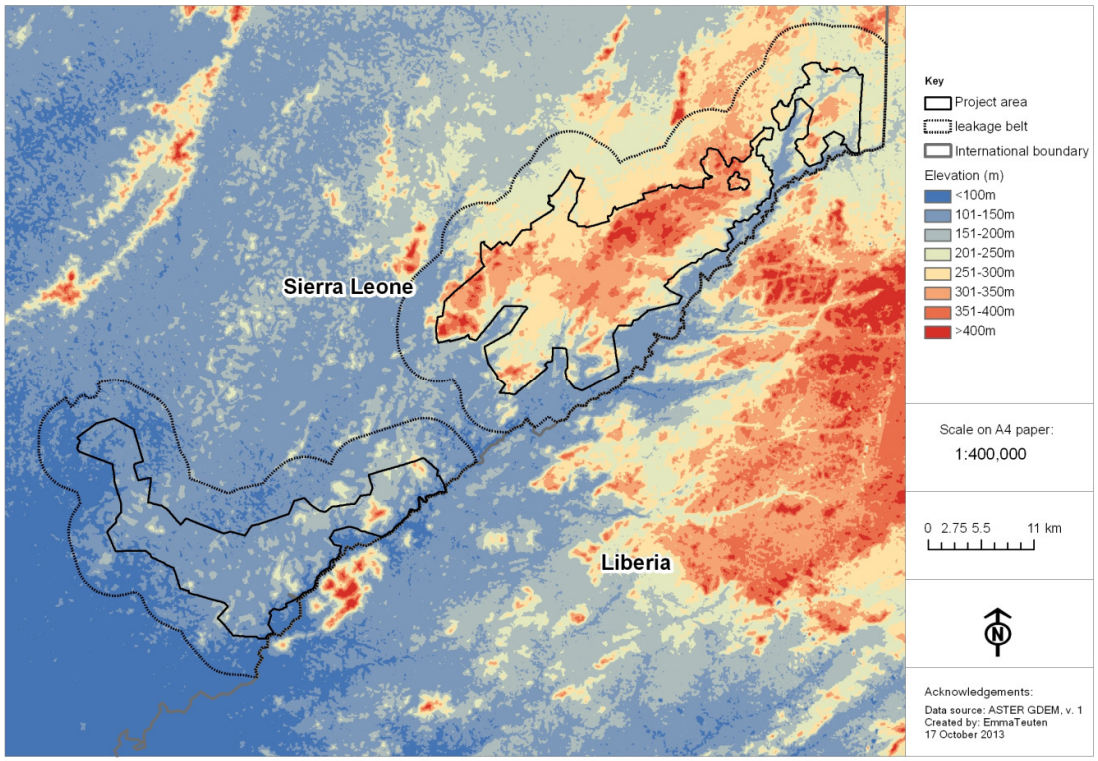


Figure 4 Geomorphology of the project zone

Climate

The project zone lies within the wet tropical climatic zone. Historical and recent precipitation data is available from towns and villages in the project and offsite zone. White (1972) reports mean annual rainfall values of 2576 mm at Daru, 2605 mm at Pendembu and 2770 mm at Kenema. Based on this data, mean annual rainfall is likely to be 2500-3000mm. In 2006 the total annual rainfall for Kenema was 2188 mm, which is lower than the historical average. During 2007 rainfall was measured within the forest of the project zone at 3 sites each month (Figure 5) and the mean annual total for the 3 sites was 3117mm (Klop et al 2008), slightly higher than the historical average. Rainfall was recorded in every month; there is a pronounced dry season from December to March during which rainfall was less than 50 mm per month. The wettest months are July and August when rainfall was over 550mm per month.

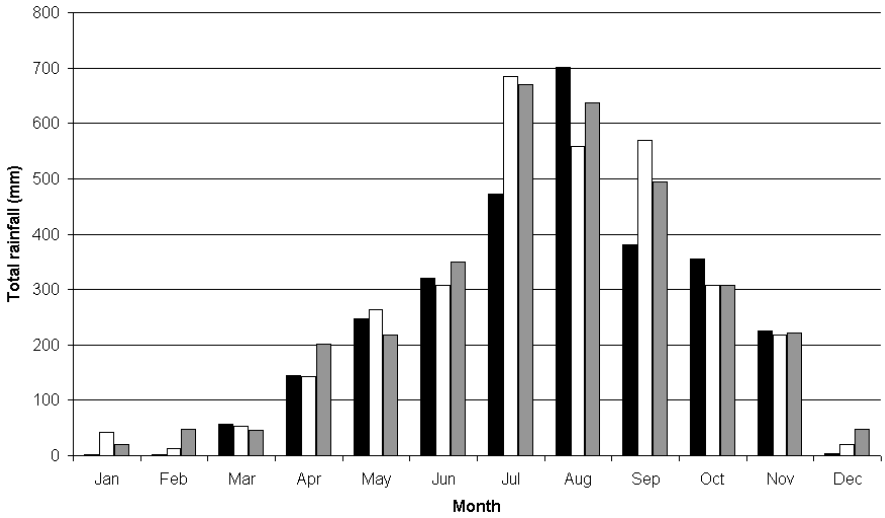


Figure 5 Annual rainfall data for the project zone (based on 2007 data, from 3 stations in the project zone: Source Klop et al. 2008).

Boundaries of the project area and project zone

The Gola REDD project consists of a project area of 68,515 hectares and a leakage belt 62,932 hectares(this is the area of forest in 2011). Together the project area and leakage belt make up the project zone as defined under the CCB.

The project uses the following definitions to describe the different areas of the project (see

Figure 1):

Project area – the area within the demarcated boundary of the GRNP, over which the Gola Rainforest Conservation LG, the project proponent, has management control. There are no communities living in this area. The project area consists of 3 separate blocks; a northern, central and southern block (see Figure 1). On the ground the boundaries have been cleared following protocols for demarcation (Marris et al. 2013), in coordination with the Forest Edge Communities living adjacent to the area. Boundaries were cleared and are regularly brushed by casual workers to facilitate the detection of the boundary. The land cover shows that within the GRNP boundaries in 2011 there was 68,515ha of forest and 1,199ha of non-forest. The forested area is the carbon accounting area as per the VCS methodologies. The non-forest areas consist primarily of rivers and a number of rocky outcrops known as inselbergs. The 1,199ha of non-forest are physically part of the project area and are therefore included in conservation management actions (i.e. biodiversity in these areas is being protected) but these areas are not included in carbon accounting as per the VCS methodologies.

Leakage belt – the forested and non-forested area that immediately surrounds the project area, extending for 4km around each block of the project area except on the eastern side where it is truncated by the Sierra Leone-Liberian border. The leakage belt was defined to meet the requirements of the VCS methodology VMD0007. The leakage belt contains 122 inhabited Forest Edge Communities[2] (see Figure 1).

Project zone – the area covered by both the project area and the leakage belt (see Figure 1).

[2] A Forest Edge Community is defined as a community lying adjacent to the project area and within the leakage belt of the project zone. Many Forest Edge Communities (86 out of 122) also share a direct boundary with the project area. These are the communities that were identified as being potentially affected by the project through PRA.

Offsite zone – the area beyond the project zone and extending to the boundaries of the 7 Chiefdoms. It contains approximately 373 communities and 130,478 people (based on the population census of 2004) (see Figure 1). One does need to consider however that since 2014, Sierra Leone has been victim of the largest ever recorded Ebola outbreak, resulting in thousands of deaths. Therefore, the population estimate across the 7 chiefdoms is expected to have been impacted also.

Project activities relating to conserving and strengthening the management of the project area (Goal 1, described in 1.1), will occur within the project area (the three forest blocks of the GRNP). Project activities involving the Forest Edge Communities that are directed towards sustainable natural resource management (Goal 2, objectives 1 to 6, described in 1.1) take place in the 122 communities of the leakage belt of the project zone, Goal 2, objective 6 occurs in both the project zone and offsite zone. Project activities relating to research and monitoring (Goal 3, described in 1.1) take place throughout the project zone and in some parts of the offsite zone.

1.3 Project Proponent (G4)

The project proponent is the Gola Rainforest Conservation LG, a not for profit company formed by 3 partners; the Government of Sierra Leone, represented by the Ministry of Agriculture, Forests and Food Security, the Conservation Society for Sierra Leone (CSSL) and the Royal Society for the protection of Birds (RSPB). The company's objectives are dedicated to the conservation of the Gola forests, the protection of biodiversity and working with local communities towards sustainable development objectives and equitable distribution of benefits from the revenues created by the project. The project is implemented on the ground by the GRNP management department of the Gola Rainforest Conservation LG.

Table 1 The project proponent

Organization name	The Gola Rainforest Conservation LG
Contact person	Alusine Fofanah
Title	Protected Area Manager
Address	164 Dama Road, Kenema, Sierra Leone
Telephone	00 232 78661027
Email	asfofi@yahoo.co.uk / alusine.fofanah@golarainforest.org

An overview of the structure of the company and agreements is in Figure 6. The RSPB (one of the project partners) was designated as the technical lead for developing the project. During project development a number of organizations partnered with the project and still have for implementation; a summary of these organizations and individuals can be found in Section 1.4 along with a description of the roles and responsibilities of the members of the Gola Rainforest Conservation LG.

The project is being implemented by the 'GRNP management' department of the Gola Rainforest Conservation LG. An organogram for GRNP management and the roles and responsibilities of key staff members is outlined in Section 1.4.

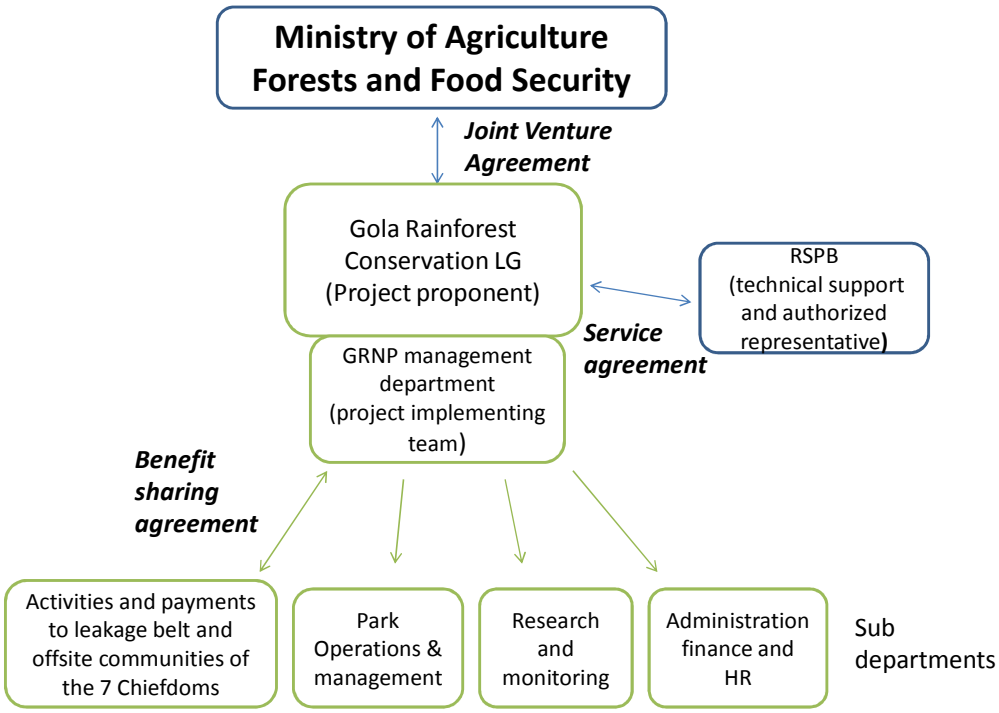


Figure 6 Structure of Gola Rainforest Conservation LG.

1.4 Other Entities Involved in the Project (G4)

A number of other entities are providing various types of technical support in the implementation of the project. These entities were contracted or signed Memorandums of Understanding to link them with the project. The project proponent is responsible for contracting and payments to these entities.

Table 2 Other entities involved in the project

Organization name	**The Forestry Division of the Ministry of Agriculture, Forestry and Food Security of the Government of Sierra Leone (GoSL)**
Role in the project	• Member of the Gola Rainforest Conservation LG and representative sits on the board of directors • Advocate the project with Government stakeholders • Take measures to ensure that the Government does not take any actions that are likely to compromise the project • Undertake periodic reviews of the landowners registry • Support any enforcement activities (shared role)
Contact person	William Bangura
Title	Forestry Division Director
Address	Ministry of Agriculture, Forestry and Food Security, Ground Floor, Youyi Building, Brookfields, Freetown
Telephone	00232 76673455
Email	bozoleewb@yahoo.com

Organization name	**Conservation Society of Sierra Leone (CSSL)**
Role in the project	• Member of the Gola Rainforest Conservation LG and representative sits and on the board of directors • Support the implementation of community environmental awareness program and other areas to be defined
Contact person	Dr Sheku Kamara
Title	Executive Director
Address	4C Old Railway Line, Tengbeh Town, Freetown, Sierra Leone
Telephone	00232 78434897
Email	shekukamara2014@gmail.com

Organization name	**Paramount Chief Representative (Traditional Authorities)**
Role in the project	• One of the board of directors • Provide an enabling environment for the project amongst villages • Disseminate project information in a transparent and timely fashion (shared role) • Enforcement activities (shared role) • Monitoring activities (shared role)
Contact person	Chief Alameen Kanneh
Title	Paramount Chief Representative
Address	The Paramount Chief, Baoma, Koya Chiefdom, Kenema district. OR No. 3 Kaisamba Terrace, Education Quarter, Kenema Town.
Telephone	00232 76364429
Email	PCKanneh05@yahoo.com/ pckanneh05@gmail.com

Organization name	**Network for movement for justice and development (NMJD)**
Role in the project	• Act as third party for the project grievance mechanism
Contact person	Dennis Lansana
Title	Programme Manager
Address	Bo Highway, Kenema, Sierra Leone
Telephone	00232 76 76 51 69
Email	denisngotho_lansana@yahoo.co.uk

Organization name	**The Royal Society for the Protection of Birds (RSPB)**
Role in the project	• Member of the Gola Rainforest Conservation LG and a representative sits and on the board of directors • Act as authorized representative on behalf of the Gola Rainforest Conservation LG • Technical lead in the development of the documentation required to verify the project under VCS and CCB standards • Market and negotiate the sale of any project credits • Provide technical and management assistance to the project implementers through out the projects lifetime
Contact person	Nicolas Tubbs
Title	Tropical Forest Conservation Manager
Address	RSPB UK Heaquarters, The Lodge, The Tropical Forest Unit, Sandy, Bedfordshire, SG19 2DL, UK.
Telephone	0044 1767 680551
Email	Nicolas.tubbs@rspb.org.uk

Organization name	**Winrock International**
Role in the project	• Provide technical support during project verification, particularly in the development of the mapping and modelling components of the project
Contact person	Michael Netzer
Title	Program Associate
Address	2121 Crystal Drive, Suite 500, Arlington, Virginia 22202-3706,USA
Telephone	001 8056167903
Email	mnetzer@winrock.org

Organization name	**Cambridge-Wageningen Research Group**
Role in the project	• Provide support in developing the community consultations phase of project development • Provide support in monitoring of the impacts on communities in the project zone
Contact person	Dr Maarten Voors
Title	Postdoctoral Fellow
Address	University of Cambridge, Department of Land Economy, 19 Silver Street, Cambridge, CB3 9EP, UK
Telephone	0031 624090140
Email	Maarten.voors@wur.nl

Organization name	**Climate Focus**
Role in the project	• Provide support in analyzing the legal context of the project • Provide support developing agreements between entities and communities involved in the project
Contact person	Darragh Conway
Title	Legal Counsel
Address	Sarphatikade 13, 1017 WV, Amsterdam, The Netherlands
Telephone	0031 207601261
Email	d.conway@climatefocus.com

Organization name	**Welthungerhilfe (WHH)**
Role in the project	• Project implementing partner for improving crop productivity (Goal 2, Objective 1) and rehabilitating cocoa plantations (Goal 2, Objective 2) • Responsible for monitoring the outputs and outcomes for the above two activities
Contact person	Dr Hans-Peter Mueller
Title	Project Manager
Address	137 Bo-Kenma Highway, Bo, Sierra Leone
Telephone	00232 78775666
Email	Hans-peter.mueller@welthungerhilfe.de

Other entities involved in project implementation include:

1. The 7 Gola Community Development Committees who are responsible for reviewing and approving project proposals that utilise the funds from the Community Development Fund following the projects guidelines and for monitoring the implementation and outcome of the projects.

2. The 3 district councils who ensure community development activities are aligned with regional development efforts and Forest Edge Communities who provide support in monitoring illegal activities in the project area.

Technical Skills and Resources to implement the project (G4.2)

The Gola Rainforest Conservation LG oversees the overall management of the project and the 3 partners of the company bring a variety of technical skills to the project that provide support to the 'GRNP management' department which is responsible for the day to day management and implementation of the project. The Forestry Division provides the technical knowledge of policy and legislation required to implement the project, for example the co-management activity, CSSL provides support in developing the environmental awareness raising required to empower local communities to become effective environmental stewards and the RSPB provides the technical backstopping for a range of activities from research to financial management.

The GRNP management team is divided in five sub-departments: Finance, Administration, Park Operations, Research & Monitoring and Community Development. Each department is headed by a Superintendent who all report to the Protected Area Manager. The Protected Area Manager is supported by an international Chief Technical Advisor and other international specialist Advisors who have specific fields of expertise and support, assist and enhance each department's capacity, working side by side with the relevant Superintendent(s). The GRNP management team oversees the work of 168 employees who are spread across the five departments (100+ of which come from communities in the 7 Gola Chiefdoms). The Protected Area Manager oversees the development and implementation of the Annual Operations Plan developed by senior staff in coordination with the directors of Gola Rainforest Conservation LG and community stakeholders, as well as for transparently and effectively managing the project's budget. The roles and responsibilities of key positions are shown in Table 3.

Many GRNP management team staff have extensive experience in their respective areas as they have been involved in conservation and development activities within the Gola Forest Reserves since conservation initiatives began on the ground in 2004/05. Individuals in post have grown into their current respective roles with many climbing their way up in the GRNP management structure thanks to their experience, dedication and leadership skills.

A wide range of technical skills is required to implement the project successfully, covering aspects of financial management, natural resources management and agricultural practices so the list below is not exhaustive and the project's management needs to be receptive and responsive to any further technical skills that are identified during the lifetime of the project. To illustrate such responsiveness, the 2014 Ebola outbreak required extensive training and capacity building on health and safety measures and precautions, but also on key awareness raising messages to share with local stakeholders, particularly local communities.

Community Development

The community development team has established a long working relationship with the local communities in the seven Gola chiefdoms surrounding the project area. One community development staff is assigned to cover each chiefdom, and that staff member is from that same chiefdom. As a result the team has an extensive understanding of the community context and the individuals have developed a wide range of skills to engage local stakeholders. This team oversees the implementation of activities with communities in the project zone and offsite zone.

Since 2007, the community development team has been responsible for a wide range of livelihood interventions, ranging from infrastructure development, to seed provision and agricultural processing improvements. Some of the activities introduced in the Forest Edge Communities require specialist knowledge and experience, particularly in agriculture and finance and whilst some of the community development team have agricultural degrees, strategic partnerships were sought with organizations with more extensive local experience.

An agreement was signed with WeltHungerHilfe, (WHH) a German agricultural development organization, to secure their involvement and the resourcing of interventions. Additionally an intern programme was developed with WHH so the team's staff can build its own capacity and benefit from the partners' expertise. The team strongly benefited from close collaboration with a wide range of partners in addition to WHH, including the Cambridge-Wageningen team of social scientists. The Cambridge team carried out extensive baseline surveys of the Forest Edge Communities (in 2010 and started another in 2014) and collaborated with the community development team in developing the community engagement plans and methodologies and in the development of the project's monitoring activities, as well as training the community development team in survey work and monitoring and evaluation.

Land use mapping with Forest Edge Communities in the leakage belt and co-management areas represent significant pieces of work for the project and whilst the team has the skills to engage with the communities, additional technical skills are still required for land use mapping and co-management. As such an international Technical Advisor was recruited to provide and transfer these additional skills and the team will work with WHH to trial methodologies.

Carbon and Biodiversity research and monitoring

The research team developed considerable expertise in biodiversity assessments, carbon measurement and monitoring. The team is provided with technical guidance from an international Technical Advisor based in country and with support from the Conservation Science Department of the RSPB. Together the team has a long track record of publishing in peer reviewed journals. The interpretation of satellite images required for monitoring deforestation in the project zone is carried out by the RSPB's Data Unit.

Table 3 Roles and responsibilities of key GRNP management staff

Title	Number of staff	Role & Responsibilities
Protected Area Manager	1	Planning, implementation, coordination and supervision of the project. Ensures that each sub-department delivers activities and meet specific objectives on time and within budget. Represents the project with stakeholders and actively engages with government at regional and national levels. With the Chief Technical Advisor, staff and stakeholders the Protected Area Manager develops the annual operating plans and budget and the 5 year management plan
Chief Technical Advisor	1	Provides technical advice and support to the Protected Area Manager on a range of issues to ensure that all activities are in line with objectives and targets and to assist in the development of monitoring and reporting activities and outcomes to the Gola Rainforest Conservation LG Directors. The CTA has financial responsibility to the Directors for the appropriate use of funds for the implementation of activities and ensures that all Technical Advisors to the project deliver activities on time and within budget.
Technical Advisor Co-management, Livelihoods & Agriculture	1	Provides technical advice and support on co-management, land use planning and community work including agriculture and environmental education to the community development team, working closely with the Community Development Superintendent. Gives particular attention to the monitoring and evaluation of all livelihood activities as per objectives time lines and budget set and oversees the implementation of partners activities
Technical Advisor Research & Monitoring (Conservation Scientist)	1	Provides technical advice and support to the Research and Monitoring team on biodiversity and carbon research and monitoring, working closely with the Superintendent of this department. Responsible for ensuring that the biodiversity monitoring plan is implemented and the data collected and stored in a timely and accurate manner.
Technical Advisor Park Operations	1	Provides technical advice and support on co-management inside the project area, ranger deployments, boundary demarcation and maintenance as well as the related data management with a particular focus on remote sensing. Works closely with Park Operations and Administration to provide support to the Superintendents of each sub-department.
Finance Superintendent	1	Establishes, implements and ensures that the project complies with and delivers on internal and external financial requirements. Provides monthly as well as more extensive quarterly expense reports to project management. Responsible for the financial report to be provided annually to the Directors of the Gola Rainforest Conservation LG and to Government authorities.
Administration Superintendent	1	Establishes, implements and ensures that the project complies with and delivers on all internal procedures, processes and policies for the effective implementation and monitoring of the project. Responsible for the purchase and maintenance of project assets, ranging from the project's fleet of vehicles to office running costs.

Title	Number of staff	Role & Responsibilities
Park Operations Superintendent	1	Establishes, implements and supervises the patrolling of the national park, assuring it is effective and complies with all procedures and policies. Works with the Technical Advisor of park operations to ensures the NP's boundary is maintained/demarcated and to deliver activities in an efficient and timely manner within the designated budget.
Research & Monitoring Superintendent (biodiversity)	1	Establishes, implements and supervises the biological research and monitoring activities of the research and monitoring team. Ensuring that activities are aligned with the annual operating plans and objectives of the project and are delivered effectively and efficiently within the allocated budget.
Community Development Superintendent	1	Establishes, coordinates, implements and supervises the community development activities, assuring they deliver all project requirements on time and within budget. This ranges from the management of the Community Development Fund to the improvement of agricultural practices.
GIS and database manager	1	Mapping, data processing and management. Reports to the Park Operations Superintendent.
Human resource manager	1	Oversees all human resource issues and ensures the project complies with legislation, policies and welfare as outlined in the Gola staff manual. Reports to the Administration Superintendent. Focuses on project staff's welfare as well as health and safety.
Communications Officer	1	Coordination and implementation of communication activities, ranging from writing press releases to delivering radio shows. Responsible for maintaining a coherent and targeted message to all stakeholders related to the project. Responsible for maintaining a database of all related inputs, with a particular focus on photo imagery and footage.
Tourism Officer	1	Development of community ecotourism activities to ensure consistent packages are offered to visitors. Guide and assist visitors but also promote the project zone as an ecotourism destination at a national level. Ensures that all funds generated from visitors are effectively distributed to the communities and Government.
Community Development Relations Officer	8	Implement and monitor community/livelihood activities. Allocated a specific Chiefdom where based permanently. Serve as a permanent and first point of contact between local communities and the project. Reports to the Community Development Superintendent.
Research Technicians	6	Implement research & monitoring activities inside the NP as well as in the leakage belt. Report to the Research & Monitoring Superintendent.
Forest Rangers	50	Patrol the National Park and monitor illegal activities. If required, arrest perpetrators of any illegal activities inside the NP. The team is divided into units that patrol, units that carry out monitoring activities and units that maintain the boundary.

1.5 Project Start Date (G3)

The Gola REDD project lifetime is 30 years, started on 1st August 2012 when donor funding ended and so would all conservation work had the RSPB not provided temporary bridging finance. This is the same as the GHG accounting period.

1.6 Project Crediting Period (G3)

The Gola REDD project's crediting period started the 1st of August 2012 and ends on the 31st of July 2042, totaling a project lifetime of 30 years.

Table 4 Implementation schedule of key dates in project development (G3.4).

Date	Milestone
2008	Conclusion of 1st feasibility study; a REDD project is the most viable funding option for Gola
2009	Dissemination of results study to stakeholders; Meetings with partners, Chiefs and civil society to discuss the way forward
2011	Launch of National Park by President Ernest Bai Koroma; Due process followed to upgrade the Gola Production forest reserves to a National Park (see Fofanah 2012)
2012 – 2013	Project start date (August 2012) Beginning of community consultation process for project design and development; Meetings with Paramount Chiefs to launch the process Collection and analysis and report writing of all baseline data
2014-2015	Project validation to VCS and CCB standards
2015	Social, Biodiversity and Climate/VCS monitoring events and reports generated Project verification to VCS & CCB standards Dissemination of verified monitoring report
2017	Social, Biodiversity and Climate/VCS monitoring events and reports generated Project verification to VCS and CCB standards Dissemination of verified monitoring report
2018	Management Plan update
2019	Social, Biodiversity and Climate/VCS monitoring events and reports generated Project verification to VCS and CCB standards Dissemination of verified monitoring report Baseline revision process for VCS Management Plan update

2 IMPLEMENTATION OF DESIGN

The Gola REDD Project has implemented its climate, community and biodiversity activities as described in the PDD and project monitoring plan. Despite the Ebola outbreak which drove the country into a state of emergency (2014), the Gola REDD Project has delivered major achievements as can be seen in the overview provided in 2.2 and detailed in Annexes.

2.1 Sectoral Scope and Project Type

The Gola REDD Project falls under VCS sectorial scope 14: Agriculture, Forestry and Other Land Uses. It is a frontier Avoided Unplanned Deforestation (REDD AUDD) project and is not grouped. It is classified as frontier deforestation because the land surrounding the Gola REDD Project is a frontier configuration because, although patchy, deforestation is slowly progressing towards the frontier of the National Park.

2.2 Description of the Project Activity (G3)

The three main project goals have been broken down in the following tables into objectives and activities. The rationale and relevance to achieving the project's purpose and vision is described. The management plan breaks down each activity into actions. The management plan is reviewed and revised every five years during the 30 year project cycle in consultation with project partners, staff and key community stakeholders.

Each year project management staff develop an annual operations plan based on the five-year management plan and the results of the previous year's activities. In this way the project continually evaluates its progress and risks and adapts its activities accordingly to ensure that the project is on target to meet its goals and objectives.

It is worth highlighting that 2014 was defined by external and entirely unforseen circumstances which affected the project. During this period West Africa suffered from the worst-ever recorded Ebola outbreak, resulting in over 11,000 deaths at the time this report is written. This is the first Ebola outbreak recorded in Sierra Leone and it resulted in a State of Emergency with a collapsing health system and economy. Overall, official forecasts for GDP growth in 2014 have been revised downwards since the onset of the epidemic, by 3.2 percentage points in Guinea, 4.8 percentage points in Liberia, and 6.4 percentage points in Sierra Leone (UNDP, 2014). In the agricultural sector, the epidemic has had a substantial role in interrupting trade of basic commodities, resulting in a rise in their prices in non-producing areas. The price of basic commodities sharply increased, such as rice and cassava by 30% and 50% respectively (WHH, 2014). The state of emergency announced by the Government of Sierra Leone with the support of the international community meant that community gatherings were forbidden, schools were closed and movements were severely restricted. Hence, the project's livelihood activities had to be suspended as of the 20th of June 2014 (when cases of Ebola in Kenema were confirmed positive), even though food relief parcels were distributed and regular communication with local communities was maintained throughout. Regular ranger patrols were also suspended, yet extraordinary patrols did take place on an as-required basis. These activities resumed as normal in January 2015. The detailed impact of this international humanitarian crisis on each of the project's activities can be found in 'Gola REDD Project, Project Implementation Report' Annex 1 and 2.

1. Conservation strategy and effective management for the GRNP

Goal: To strengthen the conservation strategy and effective management of the GRNP and enable the project to be a stimulus for building National policies and regulations as well as informing relevant regional and international platforms of best conservation practice

Objectives	Activities	Main Achievements (See Annexes for more)
1. Protect the integrity of the GRNP	1.1 Forest ranger teams to carry out regular forest patrols to deter, prevent and control illegal activities 1.2 Strategic patrol planning to optimise coverage of the protected area while targeting areas of high conservation value and ensuring a timely response to known and potential threats 1.3 Maintain clear and permanent boundary demarcation 1.4 Maintain and where necessary establish infrastructure such as forest ranger stations, road access and park headquarters 1.5 Develop robust communication channels with neighbouring communities and local authorities that enable threats and grievances to be efficiently and effectively addressed GHG Reduction contribution: Governance is improved as a result of increased awareness and capacity built into national and project stakeholders enabling effective management and greater engagement with local communities in the co-management of natural resources.	54 ranger patrols conducted, 675 patrol days, 3236km covered 556 out of 910 1km UTM gridsquares patrolled (61%) 33concrete pillars erected along the GRNP/project area boundary
2. Enable effective management through implementation of best practice administrative and financial systems and the provision of necessary staff training and equipment	2.1 Maintain robust procurement and accounting policies and procedures 2.2 Ensure financial planning and reporting is in compliance with company requirements 2.3 Ensure that recruitment follows Human Resource policy of equal opportunities and best practice	Rangers participated in 3 trainings 124 staff handbooks distributed Nine training events involving 119 staff in total As of the end of the verification period 11,3% of employees were women, now with a total of 19 women out of 168 employees.

Objectives	Activities	Main Achievements (See Annexes for more)
	2.4 Provide staff with training and professional development opportunities to ensure the project's capacity needs are met and that staff are able to progress in their careers. 2.5 Develop, implement, evaluate and report on annual operational plans 2.6 Provide a secure work environment for staff and visitors GHG Reduction contribution: Governance is improved as a result of increased awareness and capacity built into national and project stakeholders enabling effective management and greater engagement with local communities in the co-management of natural resources.	77.8% of new appointments were internal promotions New Management Plan and Annual Operational Plan developed
3. Strengthen communications and actively promote the project with local, regional and national stakeholders (and wherever possible in international arenas)	3.1 Document and disseminate best management practices (through meetings, publications, workshops and the project website) 3.2 Advocate for the replication of the project to support wider conservation initiatives nationally and in the sub region 3.3 Establish and maintain strong links, dialogue and collaboration between the project and key local, provincial and national stakeholders 3.4 Establish the necessary legal framework for the implementation of co-management and other activities required by the project GHG Reduction contribution: Governance is improved as a result of increased awareness and capacity built into national and project stakeholders enabling effective management and greater engagement with local communities in the co-management of natural resources.	Seven workshops, meetings and forums held with Government

2. Sustainable natural resource management

Goal: To create an enabling environment for neighbouring communities to act as committed environmental stewards of the natural resource base that underpins their livelihoods through activities that enhance, generate value from and materialize the benefits derived from the project zone's forests and sustainable land use practices.

Objective	Activities	Main Achievements (See Annexes for more)
1. To improve productivity on existing crop fallow land	1.1 Assess current land use systems and design intervention strategies that are inclusive of the most vulnerable 1.2 Develop and implement training workshops for farmer field schools and provide inputs to establish and maintain farmer capacity for best practices in sustainable agriculture 1.3 Pilot innovations to increase productivity in demonstration plots 1.4 Research human-wildlife conflict (HWC) and pilot awareness mechanisms and measures to reduce impact (to link in with objective 2) 1.5 Provide comprehensive ongoing training and supervision of agriculture officers 1.6 Implement the monitoring plan and adapt activities according to results of evaluations <u>GHG Reduction contribution:</u> Improving the productivity on land that is already part of the traditional bush fallow cycle reduces deforestation and benefits household food security and income, this is part of the project strategy to achieve a net positive impact for project zone communities.	35 Farmer Field Schools established with 450 registered members representing 32 Forest Edge Communities 42 Master Farmers selected 36 Master Farmer training workshops covering outplanting, copr and pest management, harvesting storage and marketing techniques 2340kg of groundnuts and 1475kg of lowland rice seed distributed
2. To improve productivity and farmer income from cocoa production and other diversified sustainable income generating activities	2.1 Assess existing agricultural commodity value chains and identify gaps for agricultural products, Non-timber forest products, sustainable forest products and constraints for Forest Edge Communities 2.2 Provide training and inputs for the production/collection, post-harvest processing and marketing needs of the identified crop	16villages participated in cocoa mapping 127 active cocoa plantations and 70 abandoned cocoa plantations were mapped 42 cocoa farmer groups established with 1075 registered members representing 50 Forest Edge

Objective	Activities	Main Achievements (See Annexes for more)
	2.3 Increase organization and capacity of small holders to enable increased trade and income e.g. through certification, and or cooperatives 2.4 Develop and promote the Gola area as an eco-tourism destination that benefits and involves local communities 2.5 Implement the monitoring plan and adapt activities according to results of evaluations GHG Reduction contribution: Income generation schemes that diversify and increase the financial and non-financial benefits available from forest resources places a shared value on standing forests and provide an alternative to unsustainable resource use thus reducing deforestation in the leakage belt whilst providing net positive benefits to communities.	Communities 90 Master Farmers trained 22 of the cocoa farmer groups met to receive training on nursery establishment and management from their Master Farmers. These meetings were attended by at least 557 different cocoa farmer group members. 152 youths trained in cocoa rehabilitation
3. To enable Forest Edge Communities to achieve financial independence	3.1 Establish savings and internal lending group(s) within participating villages 3.2 Provide training, guidance and monitoring of each groups committee and activities 3.3 Train Private Service Providers within each group to establish further groups within each village 3.4 Implement the monitoring plan to monitor outputs, outcomes and impacts of activities as compared to the baseline scenario on livelihoods and wellbeing in accordance with the specific indicators detailed in the social monitoring plan and longitudinal and activity monitoring procedures documents. Adapt activity if barriers or issues are uncovered through monitoring (e.g. additional training) GHG Reduction contribution: Enabling villagers to have access to pot of funds that can be used to finance alternative livelihoods or used in times of emergency provides improved and diversified incomes thus reducing poverty and providing net positive benefits to FECs.	Twelve SILC groups (Savings & Internal Lending Committee) established involving 14 Forest Edge Communities 293 registered members (129 males, 164 females) Twenty six workshops/meetings held Each group elected its governing body and was supplied with materials

Objective	Activities	Main Achievements (See Annexes for more)
4. To provide an enabling environment and capacity for Forest Edge Communities to sustainably manage forest areas	4.1 Capacity building and awareness raising of importance of Natural Resource Management in villages in the project zone (to link in with objective 5) 4.2 Identification, prioritization and engagement of cluster Forest Edge Communities for CBNRM work 4.3 Review and update in a participatory manner existing by-laws on traditional land use practices 4.4 Establish co-management areas inside project area (GRNP) with resource use agreements and at community request, in the leakage belt (to link in with objective 2, activity 1) 4.5 Identify and promote the strengthening of traditional governance systems to enable communities to participate more effectively in the protection and of the GRNP and enforcement of its laws and regulations. GHG Reduction contribution: Effective CBNRM mitigates leakage in the project zone and preserves habitat connectivity between the forest blocks and forests in Liberia thus contributing to both climate and biodiversity objectives. From a community perspective land use planning ensures that natural resources which underpin many livelihood activities are available in perpetuity. Tenure security in the form of use rights and access is enhanced inside the park through the designation of community use zones and co-management agreements	4 consultations held on co-management initially with 6 Forest Edge Communities and then 3 Mapping of land use within and outside of GRNP was initiated for 3 Forest Edge Communities
5. To enhance environmental awareness and promote community participation in the management of the GRNP	5.1 Develop and implement an education strategy with modules dedicated to targeted topics and audiences 5.2 Establish and maintain a network of school nature clubs 5.3 Develop a GRNP volunteer program in Forest Edge Communities for unemployed youth 5.4 Identify and support environmental stewards in neighbouring communities 5.5 Conduct annual awareness raising and educational roadshows and	222 scholarships for secondary education awarded 2013-2014 6 environmental roadshows attended by 1460 people 33 Nature Clubs supported, of which 8 took part in roadshows and 7 in field-visits to the GRNP.

Objective	Activities	Main Achievements (See Annexes for more)
	other events to reach remote Forest Edge Communities 5.6 Monitor the success of the educational programme following the monitoring plan and selected indicators, adapt as required GHG Reduction contribution: Promoting understanding and knowledge of the values of the GRNP and forests is a necessary pre-requisite for enabling the emergence of environmental stewardship in local communities.	
6. Implement and monitor mechanisms that equitably compensate stakeholders and promote incentives for conservation practices in the project zone and offsite zone	6.1 Implement the distribution of funds and activities outlined in the Benefit Sharing Agreement (BSA) 6.2 Develop structures and monitoring procedures to ensure effective and transparent distribution of funds and in-kind benefits 6.3 Support Gola Community Development Committees (GCDC) in develop procedures and criteria to select development projects for funding 6.4 Provide advice and capacity building to GCDCs 6.5 Oversee the fair election of GCDCs 6.6 Support the Government in updating the GRNP landowner register 6.7 Assess pupil access and participation in secondary schools. Develop criteria for scholarship selection and provide scholarship package to community selected students 6.8 Assess and implement where possible other strategies for providing educational support to remote Forest Edge Communities which fall outside the current school coverage GHG Reduction contribution: The development and maintenance of an agreement and mechanisms that reward and incentivise stakeholders to reduce deforestation and compensate others for foregone rights in an equitable, effective and transparent manner is essential to prevent elite capture and to foster support for the project.	16 proposals submitted and approved: 9 are completed and 7 are ongoing $9500 distributed to each of the 7 Chiefdoms funds

3. Research and monitoring

Goal: To develop and maintain a comprehensive social and biodiversity database and monitoring system to ensure the availability of accurate, relevant and timely information to inform and enhance project management and the effective protection of the forest and delivery of anticipated social and biodiversity goals.

Objectives	Activities	Main Achievements (See Annexes for more)
1. To carry out specific studies to fill critical gaps in information on biodiversity, ecological processes and social-ecological systems	1.1 Carry out ecological research into key species and recommend management interventions if required 1.2 Develop conservation action plans for key species and habitats 1.3 Carry out socio-economic research to understand community dynamics 1.4 Promote national and international research involvement in the project zone <u>GHG Reduction contribution:</u> Governance and effectiveness are improved as a result of such specific studies and then serve to build capacity into national and project stakeholders, in turn enabling themselves effective management and greater engagement with local communities in the co-management of natural resources.	Desktop review of cropraiding mitigation approaches Camera trap survey implemented in 81 plots in Gola central in 2012-2014 (focus on terrestrial mammals and birds, including HCV species), with data from 31 of these plots serving as baseline data for future camera trapping Monitoring of 70 Picathartes colonies in breeding seasons 2012/2013 and 2013/2014 Pygmy hippo research and conservation project implemented in 2013-2014 Tai toad/amphibian monitoring project implemented in 2013-2014 Bird point counts (147) implemented in 2013-2014 Maps on distribution of key species provided to management with recommendations for conservation priority areas Internship facility provided to 19 students from Njala University and Eastern Polytechnic Thesis subjects and supervision/support provided to 1 BSc student and 2 MSc students

Objectives	Activities	Main Achievements (See Annexes for more)
2. Establish and maintain a biophysical and socio-economic database	2.1 Design, implement and maintain a database to capture all data collected 2.2 Analyse and report on data GHG Reduction contribution: Governance and effectiveness are improved as a result of robust database management from which critical results can be extracted from to then inform management as well as to build capacity into national and project stakeholders.	Socio-economic database developed Biodiversity monitoring database developed and stored in the central database at GRNP and in the Conservation Data Management Unit at RSPB Biodiversity monitoring data analysed and various reports produced on camera trapping, Picathartes monitoring, Tai toad/amphibian monitoring, pygmy hippo research and conservation project (Hillers 2013). Student internship reports
3. To carry out monitoring of key species, habitats, ecological processes and socio-economics to determine and evaluate the project's progress and impacts	3.1 Carry out regular monitoring of pre-identified and agreed sets of indicators for climate change, forest cover, biodiversity and community development 3.2 Carry out regular analysis and report on available data 3.3 Disseminate reports and results to stakeholders and the scientific community GHG Reduction contribution: Governance and effectiveness are improved as a result of robust and extensive monitoring which also serves to build capacity into national and project stakeholders, in turn enabling themselves effective management and greater engagement with local communities in the co-management of natural resources.	Recording of weather data (temperature and rainfall) from 4 raingauges around GRNP and Kenema Pygmy hippo peer reviewed article submitted Report on Tai toad/amphibian monitoring shared with stakeholders Report on Pygmy hippo research and conservation project shared with stakeholders MSc and BSc theses shared with stakeholders Biodiversity Monitoring Report on several taxonomic groups, including bats and butterflies (Hillers 2013)

Objectives	Activities	Main Achievements (See Annexes for more)
4. To promote GRNP as a centre for national and international research on tropical rainforest ecosystems and integrated conservation and development approaches to protected area management	4.1 Set up the required infrastructure for national and international research to be held in the project zone 4.2 Develop and implement an education program for schools and visitors to the centre to build environmental awareness 4.3 Establish collaborative partnerships on agreed research questions 4.4 Facilitate independent research projects within the project zone , the results of which must be shared with local communities through the CDRO-FEC meetings, workshops and be published on the project website 4.5 Promote and advocate research results GHG Reduction contribution: Promoting understanding and knowledge of the values of the GRNP and forests here is a necessary pre-requisite for enabling the emergence of environmental stewardship in local stakeholders.	Completion of 4 buildings (canteen, two 10 bedroom houses, 1 3-bedroom house) MoU developed with Njala/Eastern Polytechnic for scientific and teaching collaboration Development of application procedure, documents and protocol for external researchers (though not yet approved by partners) Facilitation of external research from Kew Gardens with Njala University (Botanical Survey), butterfly survey (Belcastro), bat and malaria research (MPI for Infectious diseases Berlin, with Lassa fever lab in Kenema)

2.3 Management of Risks to Project Benefits (G3)

The Gola project used the risk assessment tool created by the VCS to assess the risk and determine the appropriate risk rating for the project. Through applying the tool, the project scored a risk rating of 9. However, following the guidelines the minimum risk rating a project can have is 10, the Gola REDD project has therefore applied a risk rating of 10 in determining the number of VCS credits that are to be deposited into the AFOLU pooled buffer account (VCS non-permanence risk report).

Risks were assessed by type and included both internal risks; project management, financial viability, opportunity cost, project longevity and external risks; land ownership, community engagement and natural risks. Mitigation measures are in place for any identified risks as explained below.

Internal Risks (G3.5)

Project Management;

The project is overseen by the Gola Rainforest Conservation LG established by 3 partners who have been working together to conserve the integrity of the project area for wildlife and for people since agreements were signed in 2001. The 3 partners are the Ministry of Agriculture, Forestry and Food Security, represented by the Forestry Division of the Government of Sierra Leone, the Conservation Society of Sierra Leone (CSSL) and the Royal Society for the Protection of Birds (RSPB). The RSPB took the technical lead in developing the Gola REDD project on behalf of the partners.

The RSPB is a UK based conservation organization which currently oversees a portfolio of conservation projects in 52 countries in Africa, Asia and Europe in partnership with national BirdLife partners, national governments, universities, other non-governmental organizations and committed individuals to promote wildlife conservation based on scientific research. The RSPB considers human induced climate change to be the biggest long term threat to biodiversity and supports policies and measures that reduce anthropogenic emissions. The RSPB has a long history of involvement in the international climate change debate and works with BirdLife International Partners to pilot projects, which aim to reduce emissions from deforestation in developing countries.

The day to day management of the project is carried out by a team of 168 local and international RSPB staff (all except 4 are local staff) with a wealth of conservation and development education, training and experience within Sierra Leone and elsewhere. The project follows a 5 year management plan that is developed through consultation with local communities and Chiefs. An annual operations plan based on the Management Plan is developed by the project staff and outlines the yearly activities, project risks and monitoring strategies. Progress is evaluated quarterly to ensure any issues are detected at an early stage and activities adapted together with project staff.

The implementation of leakage mitigation activities (livelihood projects) was carried out by a combination of project staff and Welthungerhilfe staff depending on the activity and timing of its implementation (Tatum-Hume and Witkowski 2013). Agricultural interventions were designed jointly with Welthungerhilfe, an organization with significant experience in developing farmer capacity and increasing agricultural productivity in Sierra Leone. There is always a risk that communities may fail to benefit from the designed activities if there are any human induced barriers that prevent the activity being adopted that were not anticipated during the design phase of the activity or if the sustainable farming practices that are introduced do not result in an anticipated increase in yield and income. Thus the satisfaction and the uptake of new techniques and changes in productivity by community members were included in monitoring plans of the project activities (outputs and outcome monitoring procedures document). Potential barriers considered and mitigated for during the design phase were included for example; elite capture (the activities are open to everyone in the community to avoid this

issue); landless households may not be involved in earlier rounds of agricultural activities as they were found to be poorer households and risk adverse to trialing new agricultural techniques (landless households are provided with improved varieties of seed if they are unable to take part in the first round of activities to try to help increase productivity), female headed households and farmers may not be able to join farmer field school groups (female farmers were actively sought to join the groups and field schools aimed for a minimum of 20% female participants[3]). Where any agricultural interventions or other activities were seen to be at risk to community benefits the activities were adapted accordingly. The technical capacity of the project staff and adaptive management process put in place for the project justify a low risk category associated with the management of the project (VCS non-permanence risk report and appendices).

Financial Viability

The project partners and staff successfully managed private and donor funds during early conservation work and in the development of the REDD project. Revenues from the sale of carbon credits are expected to be sufficient to cover the costs of implementing the project and any excess revenues will be held in trust funds to be used to manage the GRNP beyond the lifetime of the project. One of the project partners, the RSPB, has been providing bridging finance until carbon revenues are available resulting in a minimal financial viability risk to the project (financial analysis available to auditor).

Opportunity cost

The most profitable alternative land use is identified as the mining of the Bagla Hills area in the southern block of the project area for iron ore. This activity is likely to be 100% more profitable for any commercial mining company than conservation activities, although the impact on neighbouring communities is hard to assess. The risk of mining occurring however is very low as: 1. the project area is a National Park and legislation does not readily permit such activities to take place inside a National Park, 2. the Ministry of Mines publically declared that no mining will take place in the project area 3. the project proponent (the Gola Rainforest Conservation LG) entered into a public-private partnership agreement with the Government of Sierra Leone further securing the management of the project area for conservation purposes.

Project longevity

A legal agreement is in place for the project proponent to manage the project area for the lifetime of the carbon project i.e. the next 30 years. As a National Park the regulations are in place to protect the area beyond the lifetime of the project, but regulations alone are not enough to prevent deforestation. The partners will therefore create a trust fund to build capital over the lifetime of the project that will then be used to continue the conservation management once carbon financing ends. The risk of project activities not being maintained is therefore low (legal agreements available to auditor).

[3] A higher percentage was not targeted as women do not traditionally farm all crops types or cocoa

External risks (G3.5)

Land ownership and resource rights

The Government of Sierra Leone represented by the Ministry of Agriculture, Forestry and Food Security owns the carbon rights and management rights to the project area. These rights were legally transferred to the project proponent by way of a public-private partnership agreement to enable the sale of credits. Families within the 7 Chiefdoms are recognized as traditional landowners to the project area and were consulted to secure outstanding carbon rights and were paid compensation via the REDD benefit sharing agreement. There are therefore no risks associated with land ownership or management for the project.

Community Engagement

The VCS considers the project to be at risk if it has not adequately consulted with households reliant on the resources of the project area. Within the leakage belt of the project zone there are 122 communities. Consultations with communities in both the project zone and the offsite zone revealed that households in these communities were not reliant on the project area but used it periodically for farming, hunting, logging, mining, fishing and gathering NTFPs. Consultations to develop the project activities were undertaken with the project zone communities and project staff visited all the Forest Edge Communities in the leakage belt to describe the project and gain consent for the project and for the activities that are now being implemented with them over the projects lifetime. Household and focal group surveys to inform the development of project and leakage mitigation activities were carried out with 30% of villages within the project zone. All communities visited endorsed the REDD project (MoUs available to auditor).

Any negative impacts of conservation activities on local communities were mitigated via compensation mechanisms set up by the project that include a range of direct payments and livelihood activities with both project zone and offsite communities.

Political risk

The V.C.S rates political risk by the governance scores determined by the World Bank indicators. Sierra Leone achieves a high political risk rating. The project considers that this risk is mitigated by the fact that the Government is an active partner in the project and demonstrated its long term commitment towards reducing anthropogenic GHG emissions through participation in international climate change negotiations, public declarations made by the President Dr Ernest Bai Koroma and the recent steps towards developing a National REDD mechanism. The Forestry Division is currently benefitting from an EU grant to develop REDD technical capacity within the division and is committed to updating policy and building institutional capacity to meet UNFCCC requirements.

Natural Risks

Analysis of natural risks including fire, extreme weather, pests and disease and geological activity revealed that the project zone is under very low risk from natural disasters. To mitigate any possible risk the project actively monitored fire outbreaks using the MODIS satellite early warning system, patrol teams were sent out to investigate any outbreak and react accordingly. In Sierra Leone wild fires are a more common occurrence in the North of the country where there are areas of extensive grassland. Natural risks that may affect the leakage mitigation activities (livelihood projects) introduced to the Forest Edge Communities include the impacts of climate change and crop raiding by wild animals. Agricultural techniques that are being introduced to communities to increase productivity are designed to be ‘climate smart’ and to increase the resilience of communities and households to climate change for example short-duration rice varieties and agro-forestry systems both enhance the resilience of the farming system. Through land use planning the project encourages the protection of

water catchments and inland valley swamps which contributes to reforestation and improved water availability in the swamps. Protection of the project area itself and the maintenance of connectivity between the forest blocks also helps community resilience by ensuring the long term availability of ecosystem-services including provisional services (food stuff and materials) and regulating services (water quality and availability and micro-climatic conditions). Human wildlife conflict mitigation measures are about to be trialed with communities based on the results of wildlife conflict research before the most effective measures are scaled up and introduced to all Forest Edge Communities. Both natural risks to leakage mitigation activities were monitored and further mitigation measures will be introduced should any further risks be identified.

The project therefore has a low natural risk for conservation and livelihood activities.

Project benefits beyond the project lifetime (G3.7)

As explained above, the establishment of the National Park early in the project planning process created the necessary legal framework for maintaining and enhancing the benefits of the project beyond its lifetime and the Government of Sierra Leone is committed to the long term vision of the project, as evidenced by Presidential declarations for example at the launch of the GRNP in 2011 (Koroma 2011). Further to this, the project has a number of related strategies to ensure that climate, biodiversity and community benefits extend far beyond the 30 year life of the project. Firstly the partners are setting up a dedicated trust fund which will be capitalized during the project lifetime and be used to continue conservation management in the project zone after the project ends (Project agreements are available to the auditor upon request). Secondly, the project will work with the Forestry Division of Sierra Leone, one of the project partners, and other government agencies (e.g. the Environmental Protection Agency and the NPAA) to ensure that the project is grandfathered into any future national mechanism and that social and biodiversity safeguards are incorporated. Thirdly, the project works to empower local communities to become active environmental stewards of the project zone through environmental awareness raising, co-management and enhancing their ability to obtain both financial and in-kind benefits from the forest. As a result, natural resource governance becomes embedded into community values and sustainable management extends beyond the lifetime of the project.

2.4 Measures to Maintain High Conservation Values (G3)

The project zone possesses a number of High Conservation Value (HCVs) which are dependent on large areas of contiguous forest. The project vision is to protect and enhance natural resources within the project zone and all project goals and objectives are channeled towards achieving this vision. With the forest protected, the forest dependent HCVs are maintained and in many cases enhanced.

The first major step to ensuring that the HCVs are maintained was achieved with the recognition of the unique value of the project area which was upgraded to the status of National Park from that of a Production Forest Reserve as part of the preparation of this project; however this was entirely reliant on having an effective REDD project without which no sustainable financing is possible. Although this occurred before the official project start date it was part of the process to align management practice with policy to enable a REDD project (see above Table 4 for timeline of key events). As a production forest reserve the primary objective for the area was timber production. By upgrading the status of the reserves into a National Park, the highest level of legal protection possible in Sierra Leone was given to the project area. Strengthening the protection strategy and effective management of the Park is one of the three main goals of the project. This is partly achieved through regular patrolling the project area but also through involving neighbouring communities in the co-management of areas of the Park

and developing sustainable land use plans and practices for the leakage belt, which is part of the second goal of the project - sustainable natural resource management throughout the project zone.

The integration of conservation and development goals ensure that HCVs are maintained and enhanced in the project zone which consists of the GRNP and the wider landscape of the Forest Edge Communities in the leakage belt. As HCV have been identified by past research work, the project prioritizes these areas for patrolling efforts within the GRNP and for community activities in the leakage belt, ensuring communities are aware of and feel pride for the HCV attributes in their area.

2.5 Project Financing (G3 & G4)

Project Financing

Financing was secured from the EU to develop the Gola REDD project and the additional funds required to develop the project and sustain conservation work until carbon revenues are available were provided by one of the project partners (the RSPB). The partners are holding negotiations to sell the credits that will be generated by the project after the first verification and are confident that sales will cover the required core annual budget ($1,686,117) with excess revenues being placed in a trust fund to ensure that the project area is protected beyond the lifetime of the project. (A financial model is available to the auditor upon request).

Financial health of implementing organization

The project is implemented by the GRNP Management department of the Gola Rainforest Conservation LG. The financial staff have a robust track record in financial management (audit reports from earlier conservation work available to audit team upon request). Though the experience of meeting specific bilateral and multilateral donor requirements, when operating as the Gola Forest Programme, the team has ample experience of managing, implementing and reporting the finances for a large conservation project. A financial analysis of project viability is available to the auditor.

2.6 Employment Opportunities and Worker Safety (G4)

Capacity building and project training

New employees partake in an induction period during which they are provided the necessary orientation and training for their new role. Annually the Human Resources Manager compiles capacity assessments of project staff to ascertain the training requirements. Training was provided in-house, by project partners or by external organizations. To illustrate this with an example, since January 2014, staff and key community stakeholders were involved in the following training activities:

Training Event	Brief description	Number of GRNP participants
Security Guard HF Radio Communications	Training on basic HF radio operation by Park Operations HF Radio Ranger, to enable HQ Security Guards to operate GRNP HF network base-station outside of office hours	5
Security guard refresher training	Annual security guard refresher training, delivered by senior Park Operations staff and including modules on: understanding your job; public relations; law enforcement rules and regulations; reporting & court proceedings.	33
MS Word	Basic training in word processing using MS Word (20 hrs)	07
MS Excel	Basic training in data handling using MS Excel (20 hrs)	25
MS Power-point	Basic training in designing presentations using MS PowerPoint (20 hrs)	13
MS Access	Basic training in data-basing using MS Access (20 hrs)	01
NP Management and Ecotourism	Course in USA, supported by US Department of State International Visitor Leader Program. Involved visits to a series of US National Parks to examine services, infrastructure, community & private partnerships etc. Attended by GRNPs Superintendent CD.	01
Ebola Awareness	1-day training course provided by GOAL Ireland and intended to raise awareness of Ebola virus disease, its prevention, and current rules/regulations. Attended by GRNP drivers, admin department, and management team.	24
Ebola Awareness	Repeat of 1-day training course provided by GOAL Ireland and intended to raise awareness of Ebola virus disease, its prevention, and current rules/regulations. Attended by GRNP Rangers.	10

In addition, lectures were given from project staff to local universities and internships were provided by the project on a wide range of topics including research methodologies, species identification, survey and monitoring techniques. This involved 19 internships since August 2012, but also 1

Bachelor Degree and 1 Masters Degree were supervised. Support was given to another Masters Student to complete his thesis and whose field research took place in the National Park.

Environmental road shows consisting of visual and audio presentations and performances are organised by GRNP staff in villages throughout the project zone (principally within FECs). These aim to cement an understanding of the Gola project and key conservation and sustainable development messages with project zone communities. Despite the Ebola outbreak heavily hindering this line of work, six roadshows were conducted during 2014.

Capacity building on a range of issues were provided to communities through project activities including training in improved farming techniques (production and post-production), land use mapping and co-management (see Annex 1).

The Gola management team relied on a project reference guide to provide a basic overview of the project to new employees (Gola Rainforest National Park Reference Guide) and an induction process is in place to ensure that there is a handover of knowledge between old and new employees and that new staff received necessary training which is identified through 3 month and 6 month reviews (see Gola Employee Handbook 2013).

Local Community capacity building

Capacity building with local communities to increase local participation in the implementation of the project took place in a number of ways outlined below:

1. Through livelihood activities which aimed to build the capacity of farmers living in Forest Edge Communities to engage in sustainable agricultural practices and financial management that address the key focal issues (poverty and food security) whilst maintaining the natural resource base. Training in improved agricultural practices is introduced via Farmer Field schools in both cocoa production and crop production. Training in financial management was introduced via savings and lending schemes (see Annex 2). Cocoa farmer field schools for example included 4 areas of training during the first year of activity implementation (a) in nursery training which includes seed selection and growing seedlings, (b) in farm management which includes rehabilitation of land and how to prune properly, (c) in out-planting and tree husbandry and (d) production/ processing, marketing and certification. Follow on trainings are to be provided to Master farmers and to farmers interested in achieving certification for the cocoa farm (see Tatum-Hume and Witkowski 2013). Livelihood activity trainings are to be introduced in all 122 Forest Edge Communities during the first 6 years of the project. Livelihood projects are aimed primarily at farmers as this is the group affected most by conservation management activities. Farmers from non-landowning families who have time constraints and are not able to participate in the initial round of capacity building are involved through seed sharing schemes, and once there are proven benefits within the community will be involved through follow on livelihood activity training. Training was provided by WHH.

2. Through the training of Gola Community Development Committees. For the wider population living in the 7 Gola Chiefdoms (the offsite zone), the Community Development Funds are the primary way that they can access benefits from the Gola REDD project. The Gola Community Development Committees are responsible for equitably distributing these funds to projects that meet the set criteria. Building the capacity of these committees so that they can transparently distribute the funds and communicate with the wider population about the fund is therefore important for the project and regular training and evaluation of the committees is part of the in-house training provided to communities.

Table 5 Examples of community training that were introduced via the Gola REDD project to build capacity and involvement with the project

Project activity	Training provided	Link with the Gola REDD project
With Forest Edge Communities (Leakage belt of the project zone)		
Cocoa rehabilitation	Nursery training, farm management, out-planting, processing, marketing and certification	Capacity building amongst cocoa farmers helps rehabilitate cocoa farms that were abandoned during the civil war thereby increasing cocoa productivity and farmer income whilst maintaining forest cover and biodiversity.
Crop production	Seed selection and vegetable establishment, field preparation and planting out, crop and pest management and weed control, processing, marketing and storage	Building the capacity of farmers to produce and store food crops improves the key focal issues (food security and poverty) and decrease the amount of forest converted into farm bush
Savings and Lending schemes	Financial management; numeracy skills, book keeping, policies and procedures	Lack of finances were identified by communities as a barrier to more sustainable activities. This activity builds financial assets, particularly amongst women and enable greater involvement other project activities.
Environmental roadshows	Carbon, climate change, the Gola REDD project, the role of forests in the provision of ecosystem services, project activities	This activity aims to promote a collective understanding of the ethos of the project and share the idea that protecting the forest provides local as well as global benefits in order to gain a united effort to prevent deforestation.
With Communities in the Offsite and Project Zone		
The 7 Gola Community Development Committees	Proposal development, financial management, monitoring and evaluation	The committees are responsible for the equitable disbursement of the Gola Community Development funds which comprise of a proportion of revenues from the sale of carbon credits to provide finances for sustainable development projects in the 7 Chiefdoms

Recruitment policy

The Gola REDD project is committed to providing equal opportunities for community members and in ensuring that no employee, or applicant for a job, receives less favourable treatment on the grounds of age, colour, disability, ethnic origin, gender, illness, marital status, political opinion, race, religion or belief" (Gola employment policy). This commitment is demonstrated through our employee handbook and through practice which both ensure that, for example, recruitment, access to training, promotion opportunities, pay, benefits, terms and conditions of employment, disciplinary and redundancy procedures all reflect the equal opportunities policy. Preferences for employment are given to applicants from the seven Gola chiefdoms, for example if applicants score equally in the interview process and one applicant is from the communities and one is not, the employment preference is given to the applicant from the communities. If a man and woman are ranked equally in the interview process and both come from the 7 chiefdoms, the woman was given employment preference (Gola Employees Handbook 2013 p9). All community development relations officers are from the 7

Chiefdoms and all forest rangers are from Forest Edge Communities. Sub-station caretakers are always from the local community.

There are currently 168 Gola staff employed with over 100 from the 7 Gola Chiefdoms, mainly comprising the Community Development team and forest rangers. The project also utilizes a significant amount of casual labour for various small projects and activities from local communities as well as for supporting research and monitoring activities.

Occupational risk and worker safety

The GRNP Employee handbook has a dedicated section on 'Health and Safety' and includes a register of the hazards facing GRNP staff. Many hazards are mitigated through risk assessments for particular activities, including 'Forest working' (applying to Rangers and Research Technicians), and 'Travel & Transport' (applying to most staff but particularly drivers and positions involving fieldwork). Risk assessments are reviewed and updated annually (for current risk assessments see 'Updated post-validation' document folder). Forest working is a particularly risky activity (see Annex 1 sections 8.3 & 8.8 for details of accidents during 2014), and through the risk assessment field teams are required to carry safety equipment including first aid kits and communications equipment (e.g. VPN phones, satellite phones, HF Radio transceivers).

The Gola Employee Handbook states: "GRNP is committed to ensuring, as far as is reasonably practical, the health, safety and welfare of its employees, volunteers and visitors by working positively to prevent work-related injury and ill-health, and promoting healthy and safe working practices. The nature of the projects work means it is not possible to eliminate all risk and we aim to reach a reasonable balance between safety, conservation, education and access" (Gola staff handbook p23).

Additionally the project provided each member of staff with a health & safety card which provides all emergency contact details and an emergency plan is in place should a serious incident arise. All information concerning risk and risk mitigation measures are communicated during induction, refresher trainings and spotlight presentations.

Staff that work as park rangers undertake a week long refresher training every year which includes sessions on engagement and health and safety to ensure front line staff are following project guidelines and minimizing risks especially when engaging with armed encroachers (see Sinclair, 2014, Ranger refresher training handbook). Due to the Ebola outbreak, the 2014 refresher training did not take place, though one was carried out in May 2015.

Research Technicians all have access to the Standard Operating Procedures for the various research activities of the Gola REDD project. Each SOP includes a section on "Field Safety". At the onset of each new field activity, a training is given, including the distribution of the respective SOPs.

2.7 Stakeholders (G3)

Stakeholder identification and involvement (G3.8)

To identify the stakeholders around the project area that can potentially be affected by REDD project activities a stakeholder analysis profile matrix was completed. This was complemented by a rainbow stakeholder analysis which clarified not only which stakeholders can potentially be affected by project activities, but also which stakeholders might affect project activities (see Figure 7). The aim of the rainbow analysis was to highlight the nature of each group's impact to and from the project so that plans can be included in the project design to mitigate negative impacts and pinpoint with whom the project must engage to ensure long term protection of the project area. Information was used from the stakeholder analysis profile matrix, the Gola Project Context Report (Witkowski et al 2012c), the threats Report (Witkowski 2012) as well as the perspectives of various stakeholders (NGO, government and community actors) to determine who and/or what has the ability to affect the success of the project. In addition, a rights holder analysis was carried out to identify all those stakeholders with rights to the land and resources in the project area (See Gola Project Context Report; Witkowski et al 2012c). All of these analyses were validated through consultation (see Table 6).

Table 6 Stakeholder analysis, carried out at the beginning of the project design process 2012

Stakeholder Analysis Profile Matrix			
Stakeholder or Stakeholder sub-group	**Interest in the project**	**Effect of project on their interests**	**Capacity/ Motivation to Participate**
GoSL - regional representatives	Political leaders of region where project is being implemented - This includes MPs (constituency level) and Permanent Secretary (regional level), and District Council and Councilors (district level)	Project impacts their constituencies and provides positive benefits for constituents.	Low
National and International Development organizations (both non and for profit)	Some are already working in the Gola area and may be engaged to help with livelihood activities designed as part of the REDD project. These organizations include CRS, PAGE, WHH, GOAL, and Tropical Forest Farms, among others	Positive - some of project's community development activities may be implemented by them	Medium
Regional Traditional Leaders	This includes Paramount Chiefs, Chiefdom speakers, Section chiefs and Town chiefs. The Paramount Chief is the highest traditional leader and head of chiefdom. There are 7 Chiefdoms around GRNP, and some of each Paramount Chief's villages are Forest Edge Communities, others are offsite; buy in is critical.	Project affects people in their constituency, which includes both the project zone and offsite communities	High
Traditional Landowning families of the Gola Forest	Families recognized by customary law as the land owners of the Gola Forest before the existence of the Reserve or National Park. The head of the family receives annual payments under the benefit sharing agreement to compensate them for loss of use and royalty payments	Positive; the project ensures that their traditional rights are recognized and provide direct financial benefits	Medium

Stakeholder Analysis Profile Matrix			
Gola Community Development Committees	Responsible for implementation of the Community Development Fund. One exists in each chiefdom - members are elected and include a teacher, farmer, women's leader, youth, hunter, logger, and Forest Edge Community representative. There are also several permanent members, including representatives for the Paramount Chief, MP, and District Councilor	Project provided the funds for the chiefdom development fund that all communities can apply to for support for development projects	High
Offsite communities	Communities within the 7 Chiefdoms around the project zone; potential agents of deforestation within the leakage belt	Positive - these communities received benefits under the benefit sharing agreement in the form of the community development fund, scholarships etc.	Medium
Forest Edge Communities	Communities living closest around the edge of GRNP; most likely agents of deforestation	Project affects them and the activities they can do in the GRNP, project engaged with these communities to develop project activities	High

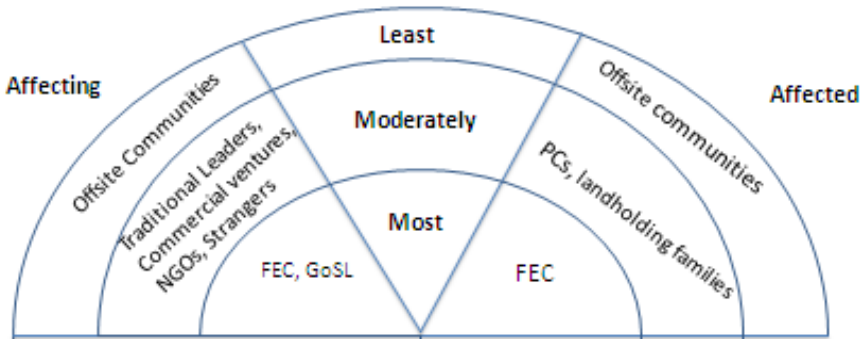


Figure 7 Rainbow stakeholder diagram of Gola project stakeholders who may affect and be affected by project activities

The analysis showed that in order to mitigate the potential threats the project needed to engage with a broader range of stakeholders than just the affected rights holders and most impacted group to gain political support at both local and national levels. There is a need to address wider natural resource governance issues in the region and within the Government to ensure the long term success and sustainability of the Gola project.

The critical groups of legal, customary and ethical local rights-holders that are important to engage with for the purposes of the development of the REDD project, as they can both affect it and be affected by it, are therefore the:

1. **Paramount Chiefs** - The seven paramount chiefs are the traditional custodians of the land and leaders of the people. They therefore have great influence over land use patterns in their

respective Chiefdoms and under legislation would have been entitled to receive logging royalties had the project area remained a production forest reserve.

2. **Heirs of the original landowners of GRNP** (project area) – The members of this group consist of the families represented by the family heads registered in the GRNP landowner register (2013). The family heads represent their respective family units and are recognised as the traditional land owners of the area within the National Park by the project, the Government and by other local stakeholders. The traditional landowning families, whilst important stakeholders in the project are not seen as the primary threat to the project or as most impacted by project activities as they passed their management rights to the Government in the 1920's when the majority of the reserve was first created and have therefore not had user rights or customary rights to the land in nearly 100 years. Like the Paramount Chiefs they were entitled to royalties had the project area remained a production forest reserve (although they did not receive any royalties from the timber companies that had concessions in Gola when it was a production forest reserve).
3. **Forest Edge Communities –** These communities either have a direct physical boundary to the GRNP or are within the leakage belt. Because of customary resource use and permission patterns, the current and potential impacts of the project on their livelihoods and the threats they pose to the project zone, these stakeholders are considered to be the key group with whom to engage. Some of the family units associated with landowning families of the project area are living in the Forest Edge Communities.

Identification of and engagement with rights holders (G3.8)

*Paramount Chiefs***:** These seven individuals were clearly identified in the seven chiefdoms. To ensure adequate consultation was held with the paramount chiefs to seek their input into the carbon project and achieve their consent to move forward, a series of meetings were held with the group of Paramount Chiefs in Kenema. These meetings started in February 2012 meetings are the traditional method of consultation with and between Paramount Chiefs, predating any conservation work, which is why this method was adopted by the project as the best form for REDD project discussions. This was followed up by a series of three additional Paramount Chief meetings. In order to ensure a community perspective in high level decision making about the project, the Paramount Chiefs created a GRNP Paramount Chief Council to facilitate meetings with project staff and to enable better discussions between Paramount Chiefs on land management issues within their chiefdoms and to foster a necessary sense of collective ownership and cooperation among the 7 chiefdoms with the project. A representative of this council was officially elected by all paramount chiefs to attend meetings of the project partners (the Forestry Division of the Government, CSSL, RSPB) as well as other additional meetings which required the presence of the Paramount Chiefs. Additional meetings attended by the Paramount Chief representative are not reported here but include four partner meetings held during 2012 and 2 in 2013 and one in 2014 which discussed carbon project development and management arrangements.

Landowners: An effort was made by the Forestry Division and the Eastern and Southern Provincial Secretaries with support from the GRNP management team to identify all the landowners in 2008 to enable landowner payments to be made under a benefit sharing agreement made in 2008.

During the carbon sensitization meetings in the seven Gola chiefdom headquarter towns with the Paramount, Section and Town Chiefs in 2012, it was requested that the existing landowner register be updated due to omissions and changes since 2008 when the first landowners registration took place. This updating process helped ensure that the right landowning families are being compensated for loss of usage and royalty rights to the land in the GRNP, to present the Gola REDD project and concepts of REDD and to arrange the transfer of any residual carbon rights in return for compensation. A series of two meetings with landowners were held in each chiefdom during August

and September 2012. In addition, many of the family units of the landowning families are still residing in Forest Edge Communities and are therefore also engaged in project development and implementation through Forest Edge Community outreach activities described below.

Forest Edge Communities: As discussions with stakeholders took place during 2012, it was determined that the most accurate criterion for Forest Edge Communities is those lying adjacent to the park with a direct boundary with GRNP. A small number of villages that lie within the leakage belt but do not share a direct boundary with the project were also classified as Forest Edge Communities due to their proximity to the project area[4]. During community sensitization meetings about the carbon project held by the project in March/April 2012 initial lists of Forest Edge Communities were drawn up. Input on these lists was then sought from project staff who spend substantial amounts of time on the ground, many of whom grew up in the chiefdoms. This was followed by confirmation of the lists with the Paramount Chiefs who flagged that 31 communities were not listed and were claimed by chiefdom authorities to be Forest Edge Communities. The lists were further triangulated through ground-truthing during household surveys and focus group exercises (described below). They were also verified at every opportunity possible during June-October 2012 by members of GRNP's community development team during visits to the project zone and with as many stakeholders as possible during meetings or at GRNP's office (i.e.: section chiefs, town chiefs, ward development committee representatives, FMC members, etc.). 9 out of the 31 communities put forward by the local authorities proved to be Forest Edge Communities indeed. GPS coordinates were taken, the number of permanent houses/huts were collected to assess whether the location was permanently inhabited, when possible information was collected on inhabitants and pictures were taken to show the structures. The 9 communities added are shown in the table below:

Community	Section	Chiefdom
Bakama	Pelegbambeima	Malema
Butemba	Pelegbambeima	Malema
Kpadema	Pelegbambeima	Malema
Guabu/Gombu	Joru	Gaura
Tobu	Faama	Nomo
Bondehun	Gorahun	Tunkia
Maalema	Gorahun	Tunkia
Njanema	Daru	Tunkia
Tokpombu	Dakona	Barri

During the same field work it became clear that one of the FECs in the list of the initial 114 FECs, was not inhabited. As a result it was removed from the list:

Location name	Section	Chiefdom
Susuma	Pelegbambeima	Malema

To finalize the list, two processes were used. One was the signing of a boundary agreement between Forest Edge Communities and the GRNP as the boundary was demarcated. The second validation occurred in October 2012 when the lists were presented at chiefdom level meetings in which the

[4] There are 122 forest edge communities, 86 of them share a direct boundary with the park, 36 lie within the leakage belt of the project zone but do not share a direct boundary.

Paramount Chief, Gola Community Development Committees, Section Chiefs, and Forest Edge Community chiefs participated.

Therefore, there is an increase from 114 to 122 in number of FECs that need to be included in the project. 122 is the final number of FECs. It is project policy that future new settlements will not be included in the project. This policy is put in place to discourage people to establish new settlements with the main target to receive extra benefit from the project, e.g. FEC-scholarships.

Communication about the Gola REDD project started with meetings that included Forest Edge Community village and section chiefs in March and April 2012. Subsequently, visits to 13 randomly selected known Forest Edge Communities in June and July 2012 were made to discuss the ideas of climate change and a carbon project and conduct household surveys. The surveys collected information on what activities the Forest Edge Communities were doing in the reserve area before the regulations were more stringently enforced, the impact of conservation enforcement, challenges the communities face, and what ideas people had about what might be done to reduce deforestation pressures and support livelihoods. Information into village organizations, governance, and resource use was also solicited.

Next, 11 focus groups which included 22 different villages were formed. Both small and large communities were included in meetings which were carried out during August and September 2012 to discuss the carbon project, seek insight into the 'with' and 'without' project scenarios, focal issues, and desired activities to support livelihoods whilst reducing deforestation pressure.

The GRNP community development team also took advantage of the boundary demarcation process and other outreach activities to ensure that all communities bordering the reserve were informed of the project and had the opportunity to provide feedback and ask questions. Forest Edge Communities which had not been part of any other REDD development activities (i.e. the HH surveys and focus groups) were visited later in 2012 to introduce the concepts of climate change and carbon projects, discuss the potential impacts, and seek community consent to move forward with the design of the REDD project.

After information and feedback from communities was compiled and project design progressed, a meeting was held in each chiefdom headquarters during October 2012 with the Paramount chiefs, section chiefs, and all Forest Edge Community chiefs. During these meetings, an update on progress of the carbon project was given as was an overview of findings from the consultations and how the project plans to work with the Forest Edge Communities. Participants were asked to validate the information summarized and provide input to the project goals and the benefit sharing agreement.

In 2013 a 'roadshow' involving various activities from drama and dance to videos and presentations was developed as part of the process of cementing an understanding of the Gola project and key conservation and sustainable development messages. It was then trialed in May and June 2013 in 10 communities within the project zone. Between 150 and 300 villagers attended each roadshow which were very well received. In late 2013 and 2014 presentations of the project were given in all Forest Edge Communities as part of the public comment period and the implementation plan for the first 6 years of activities was discussed and the community and the GRNP management team will enter into an informal agreement to define their roles in the Gola REDD project.

A longitudinal socio-economic survey was completed in early 2014 (involving a sample of 60 communities, see 'Social Impact Monitoring REDD Baseline Report'), as a baseline against which the impacts of the REDD project livelihood activities can be measured. This work was led by the University of Cambridge and Wageningen University. A Community Development Relations Officer for each chiefdom who works in the chiefdom they hail from is tasked with 6-monthly visits to the FECs to open communication channels, raise awareness, and monitor project implementation (activities and

impact) in collaboration with Gola Community Development Committees.[5] However, the Ebola outbreak during 2014 prevented many such visits from being carried out in the field.

Offsite Communities: All villages in the seven chiefdoms that are not classified as Forest Edge Communities are considered as part of the offsite zone. There are approximately 380 villages in this zone. As representatives of offsite communities, all section chiefs were invited to sensitization meetings on the carbon project in March and April 2012 and asked to pass on the information to the communities in their sections. These offsite communities are also represented by the Gola Community Development Committees, who are in continual contact with the GRNP. In May-July of 2012 elections were held to elect new Gola community development committee representatives as the previous representatives had been in place for almost four years. The newly elected representatives received training on climate change and the carbon project, and also accompanied the GRNP community development relation officers during their sensitization visits to villages when possible. Communication with these communities was maintained through discussions with the Gola community development committees and the traditional governance system (town, section, and paramount chiefs). In addition, these communities continued to be compensated through the community development fund in the new Benefit Sharing Agreement, which was improved to ensure greater impact, transparency, and more equitable distribution of benefits. The distribution of funds from the community development fund for example was carried out in accordance with the Gola community development fund guidance manual that sets out criteria for the selection of projects and for monitoring the dispersal of funds and the implementation of the projects (GRNP 2013). Section chiefs and Gola community development committee representatives attended meetings in October 2012 regarding the carbon project and the benefit sharing agreement, and members of the community development team conducted small sensitizations when they were in offsite communities. Finally, surveys were carried out in October 2012 with 40 of these villages to understand the impacts of conservation measures on offsite communities.

NGOs and Local Government: Several steps were taken to ensure that the broader set of stakeholders was informed and had the opportunity to participate in or provide feedback on the design and implementation of the Gola REDD project. These stakeholders include local government officials and other NGOs. Several stakeholders were invited to a workshop and training in January 2012 to kick-off the carbon project design stage. Additionally a GRNP Forum is held at least once per year which includes private sector and NGO stakeholders working in the seven Gola Chiefdoms. This however did not take place in 2014 due to the Ebola outbreak, but did take place early 2015. It enables the project to keep other stakeholders up to date on project progress and seek their feedback. Informal consultations and communication with these stakeholders also took place through meetings, workshops and joint participation in other events and this will continue during the lifetime of the project.

[5]One Gola Community development committee exists in each of the 7 Chiefdoms, and its members have multiple responsibilities, including serving as a liaison between the communities and the GRNP, and assisting with the implementation of the community development fund which is part of the Benefit Sharing Agreement. Members are elected every three years and include a teacher, farmer, women's leader, youth leader, hunter, logger, and a forest edge community representative. There are also seats for the local MP, District Council Representative and paramount chief representative. Each village nominated representatives, who were then voted on at the section level, and finally the chiefdom level.

CCB public comment period (G3.9)

Community roadshows played an innovative and key role in communicating the project to communities in the project zone. As the majority of community members are illiterate, roadshows were conducted in Mende, the local language and disseminated information on climate change, carbon trade, the grievance mechanism and the project objectives and livelihood activities with the Forest Edge Communities through video, picture presentations, drama, songs and competitions. Additionally, between May and December 2013, the 122 Forest Edge Communities were visited by the community development team to explain the project using some of the roadshow techniques and to elicit any comments as part of the outreach for the public comment period.

Community notice boards located in each of the 39 section towns have a summary of the Gola project and a diagram of the grievance mechanism to orientate community members on the project and methods of providing comments. As the local language Mende is not a written language, all notices are in English which is the official language of Sierra Leone.

Meetings were held during the public comment period in each Chiefdom with the Paramount Chiefs, Section Chiefs and village Chiefs to communicate the project goals, objectives and activities and the plan for implementation, comments and feedback were noted in the grievance log.

Radio shows on various local radio stations during the public comment period communicated the projects goals, objectives and activities and an open session for questions and comments was held after each show.

The project documents are available in the project office for review and comments and a member of staff is always available to answer questions.

Grievances and conflict resolution (G3.10)

At the start of the REDD project design process (2012), a comprehensive grievance mechanism was developed and put in place to ensure that a clear, standardized process for addressing major unresolved conflicts and grievances existed during project development and continues to function throughout the lifetime of the project. This process has an independent third party option (managed by the Network for Movement for Justice and Development – NMJD), ensures responses are provided in appropriate time frames, and guarantees that all grievances are adequately addressed and documented. The proposed process was discussed and revised with local government officials, Paramount, section, and town chiefs, and Forest Edge Communities to ensure its suitability and adequacy before being implemented. Once amended as per feedback received, it was well publicized amongst the communities and other stakeholders through all the meetings and events. In order to ensure that all Forest Edge Communities are fully aware of how to use the mechanism, the Grievance mechanism is one of the key messages of the FEC communication strategy delivered by the Community Development Relations Officers (CDRO) to the Forest Edge Communities. A formal meeting is held with each FEC at least every 6 months by the FECs designated CDRO. The meetings included 4 areas of discussion[6], one of which is the grievance mechanism. Discussions about the grievance mechanism included how the mechanism works and who community members can make a grievance to (highlighting the third party option) and a cross check of what grievances were made by any community members both via the traditional mechanism or Gola Community Development Fund member (option 1) and via Gola or NMJD staff (option 2 or 3). Regular formal meetings along with other communications media (via the radio, other staff members etc helped establish the grievance

[6] See the CDRO communication strategy with FECs document in the Ongoing FEC communications folder which is an annex to Tatum-Hume et al 2013a

mechanism and other key project messages. NMJD have proven to be a suitable third party mediator as they are a respected local development organization that is independent of the Gola REDD project. They have extensive experience in conflict mediation and core to their work is the provision of community support to strengthen governance through their community integrity program with a focus on women and youth.

Additionally the GRNP office in Kenema holds an open door policy, and information on the REDD project and climate change is available to any visitors. All GRNP staff attended trainings in climate change and REDD project development given by the Carbon Coordinator throughout 2012 and a staff project reference manual was created for orientation. Also many of the GRNP staff, particularly the community development team and forest rangers are in continual contact with local communities and so are key conduits of information to and from the GRNP office. They responded to the questions they were able to in the field, and more serious issues were brought back to headquarters to be resolved. Finally, the seven Gola Community Development Committees were trained in carbon project concepts by the community development team and served as additional communication conduits and liaisons between the communities and the GRNP.

A notebook with all grievances received, responses offered and actions taken is publicly available in the GRNP office. (See Tatum-Hume et al 2013a for the mechanism and further details). The Technical Advisor for Park Operations was responsible for overseeing the implementation of the mechanism.

3 LEGAL STATUS

3.1 Compliance with Laws, Statues, Property Rights and Other Regulatory Frameworks (G4 & G5)

Laws and regulations governing workers rights (G4.5)

The Regulation of Wages and Industrial Relations Act 1971 sets out the basic framework of employment regulation in Sierra Leone. This is supported by collective agreements between trades unions and certain industrial sectors. The Gola REDD project is subject to the regulations agreed by the Agriculture Trade Union Group Negotiating Council on 11 April 1985 and published in the Sierra Leone Gazette on 13 June 1986. The industry groups covered by this agreement include Agriculture, Plantation and Forestry workers. The regulations are updated and published in the Sierra Leone Gazette approximately every three years, the most recent being 2011. The 1985 Regulations, with the 2011 update, cover all aspects of employment including:

- Contracts of Employment
- Working hours
- Pay, overtime and time off in lieu
- Annual leave and public holidays, compassionate leave
- Sick leave
- Maternity leave
- Medical facilities & allowances
- Redundancy, Disciplinary and Grievance procedures
- Health & safety, protective clothing etc.
- Casual & temporary workers

In addition The Workers Compensation Act 1971, which specifies levels of compensation for workers injured at work, The Anti-corruption Act 2008, The Minimum Wages Act 1971, the current Tax and safety regulations, the 1991 Constitution of Sierra Leone and the National Social Security and Insurance trust Act, No. 5**.** also apply.

A summary of how the project meets all applicable laws is found in Table 7.

The Gola project complies with all of the above legislation and workers are informed of the legislation and their rights by the Gola Employees Handbook. The handbook is available in a written format but also in audio format for any employees that are illiterate. The legislation is due to be updated, possibly in 2015, at which time the project will review the new legislation and update its employees handbook as appropriate.

Table 7 Legislation, requirements and project compliance

Legislation	Article/ Section	Requirement	Gola Compliance	Evidence of Compliance
The **Regulation of Wages and Industrial Relations Act 1971** is the primary legislation affecting employment in Sierra Leone. The detailed requirements are set out in the **'Notice of Terms and Conditions of Employment agreed by the Agriculture Trade Group Negotiating Council 1986'**, and subsequent amendments. The most recent amendment was in 2011. The Agriculture Trade Group specifically applies to Plantation and Forest workers.	1 (5 in 2011 revision)	**Working Hours:** Maximum working week to be 40 hours Monday to Friday 7.5 hours per day, Sat 4.5, max Variable by written agreement	Implemented. Maximum working week is 40 hours, Monday – Friday 8 – 4.30 with 30 minutes for lunch	Staff Handbook Section 2 & Contract of Employment
Ditto	1 (5d in 2011 revision	**Working hours** for Security Guards – maximum is 12 hrs per day, 5 days per week	Implemented. Maximum working week for Security Guards is 12 hours per day, 5 days pw	Staff Handbook, Section 2 & Contract of Employment
Ditto		**Temporary & Casual Workers** must be automatically absorbed into permanent staff after 12 months service. Are eligible for redundancy after 6 months continuous service.	Implemented Q4 2013	Staff Handbook, section 2
Ditto	6	**Public Holidays** (usually 9) & gazetted holidays must be paid	Implemented. All 9 public holidays and additional gazetted holidays are paid	Staff Handbook, section 4 & Contract of Employment
Ditto	7	**Overtime.** Any period of time worked in excess of normal working hours , and work on Sundays & Public holidays to be treated as overtime when work	Implemented Q4 2013.	Staff Handbook, section 3

Legislation	Article/ Section	Requirement	Gola Compliance	Evidence of Compliance
		authorised by employer		
Ditto	8 (6 in 2011 revision)	**Probationary period.** All workers serve a 6-month probationary period on appointment, which may be extended for not more than another 3 months. Employment may be terminated by either party. If satisfactory, must be incorporated into permanent staff & confirmed in writing.	Implemented. All workers serve a 6 month probationary period which can be extended for another 3 months if necessary.	Staff Handbook section 2
Ditto	9 & 10 (18 in 2011 revision)	**Urgent Private Affairs leave staff** Up to 7 days additional paid 'family' leave, deducted from next year's allowance, after 12 months service. If less than 12 month's service, 48 hours emergency leave, of which 24 paid	Implemented. 7 days paid additional leave or 1 paid & 1 unpaid is less than 12 month's service	Staff Handbook section 4, & Contract of Employment
Ditto	11 (10 in 2011 revision)	**Annual Leave Allowances** 1-3 years' service = 21 days 3-5 years' service = 26 days 5+ years' service = 32 working days	Implemented. Annual leave allowance as per regulations	Staff Handbook, section 4 & Contract of Employment
Ditto	11	**Payment of outstanding annual leave on termination.** Entitled to proportionate leave if leaving through no fault of their own	Implemented, Outstanding leave paid pro rata on termination	Staff Handbook section 4 & Contract of Employment
Ditto	13	**Entitlement to Paid Sick leave** 1-5 years service – 6 weeks full pay, followed by 6 weeks half pay 5-10 years service - 7 weeks full pay, 7 weeks half pay Over 10 years' service 8 weeks full pay 8 weeks half pay Subject to medical certificate	Implemented, as per regulations	Staff Handbook section 4 & Contract of Employment
Ditto	14	**Paid Maternity leave** After 1 year of service, entitled to 10 weeks paid maternity leave,	Implemented. 10 weeks paid maternity leave,	Staff Handbook section 4 & Contract of

Legislation	Article/ Section	Requirement	Gola Compliance	Evidence of Compliance
		which may be extended on recommendation of a doctor or deducted from annual leave allowance	extendable on recommendation of doctor or deducted from following year leave allowance	Employment
Ditto	16	**Medical Allowance.** Staff accrue medical allowance for every day they work, which can be used for medical expenses for themselves & immediate family**.**	Implemented, medical allowance introduced in 2012 for medical expenses for employee, partners, offspring, parents and siblings.	Staff Handbook section 5 & Contract of Employment
Ditto	53	**HIV/AIDS** Discrimination forbidden. Awareness training provided in keeping with National Policy	Implemented Awareness training provided in 2011, to be repeated in 2014	Staff Handbook section 13
Ditto	17 (30 in 2011 Revision)	**Protective clothing** Employer to provide protective clothing as required by Risk assessment	Implemented. Uniforms, waterproofs and other protected clothing provided as necessary.	Staff Handbook section 6
Ditto	22 (34 in 2011 revision)	**Disabled employees** Employer to try to find alternative employment if employee disabled at work	Implemented. GRNP undertake to continue to employ disabled employees if at all possible.	Staff Handbook section 6
Ditto	23 (27in 2011 Revision)	**Technical training.** Training to be encouraged and aided by employer	Implementated Q4 2013	Staff Handbook section 8
Ditto	24	**Redundancy.** Staff to be redeployed whenever possible, must use fair system for selection for redundancy. Redundancy compensation to be calculated as follows: 1-5 years service – 16 days pay	Implemented Redundancy arrangement meet all the requirements of the regulations	Staff Handbook section 10

Legislation	Article/ Section	Requirement	Gola Compliance	Evidence of Compliance
		for each complete year 5-10 years service – 20 days pay over 10 years service – 25 days pay plus outstanding annual leave & medical allowance, + End of Service Gratuity		
Ditto	26	**End of Service Gratuity.** On leaving GRNP, staff receive a gratuity as follows: 2-5 years - 18 working days pay for each complete year of service 5-10 years service - 20 working days Over 10 years service - 25 working day	Implemented. Staff who leave GRNP receive end of service gratuity as set out in the regulations.	Staff Handbook section 10
Ditto	52 in 2011 revision	**Death in Service.** If a staff member dies while in service all their outstanding benefits shall be paid to their next of kin	Implemented. Next of kin receive all outstanding benefits	Staff Handbook section 10
Ditto	30	**Disciplinary procedure** Disciplinary procedures to follow set process	Implemented. GRNP Disciplinary procedure meets & exceeds requirements	Staff Handbook section 11 & Contract of Employment
Ditto	33	**Grievance Procedure** Grievance procedures to follow set process	Implemented. GRNP grievance procedure meets requirements of regulations	Staff Handbook section 12 & contract of employment
Ditto	38	**Acting appointments.** Staff who temporarily act up into more senior positions are to be paid the rate for the senior post	Implemented Q4 2013	Staff Handbook section 3
Ditto	45	**Certificate of service.** Staff who leave to be provided with certificate giving basic details of employment	Implemented. Certificate of service includes name position date of birth and	Staff Handbook section 11

Legislation	Article/ Section	Requirement	Gola Compliance	Evidence of Compliance
			period of employment.	
Ditto	29 of 2011 Revision	**Personal Safety & Health Hazards.** Employers to provide suitable protective clothing	GRNP has developed a system of Hazard identification, risk reduction and risk assessment which exceeds the legal requirements. Implementated Q4 2013	Health & safety policy, Hazard Register, Risk Assessments & Staff Handbook section 6
Ditto	41	**Pay Increase.** Legislation specifies increase, when revised – but this may not keep up with inflation. GRNP's policy is to give annual cost of living increases unless there is a shortage of funding. There is also an objective fair pay system based using a Job Evaluation system	Implemented. GRNP's pay policy implemented in 2012	Staff Handbook section 3
Ditto	57 in 2011 revision	**Advance of salary** Up to 4 months advance to be repaid over 12 months, provided total amount is less than end service benefit	Implemented. GRNP has well established staff loan policy.	Staff Handbook section 3
Ditto/**Workman's Compensation Act 1971**		Industrial Accident compensation	Implemented. In case of death or injury to an employee, compensation is paid according to the detailed arrangements in the Act	Staff Handbook section 6
Anti-Corruption Act 2008		GRNP fits the definition of a 'Public Body' under the act.	GRNP employment and financial procedures help to prevent corruption by its staff and by	Staff Handbook (all sections)

Legislation	Article/ Section	Requirement	Gola Compliance	Evidence of Compliance
			those in positions of responsibility for the organisation.	
UK Employment Law, including Employment Rights Act 1996, Employment Act 2010, Health & Safety at Work Act 1974, Bribery Act 2010, Equality Act 2010, Immigration, Asylum & Nationality Act 2006, etc		All expatriate workers are employed by RSPB on UK-compliant contracts of employment. All employees receive a copy of the 'Employee Handbook' on appointment and amendments are posted on the intranet, which can be accessed in Gola.	Fully Implemented	Contract of Employment and RSPB Employee Handbook
1991 Constitution of Sierra Leone and the National Social Security and Insurance trust Act, No. 5.	Section 8, Subsection 3(f)	**Retirement benefit** The project contributes 10% of each staff member wages into NASSIT every month (5% is contributed by the staff member). Payment is stopped if the staff member leaves.	Fully implemented	Contract of employment, staff handbook and GRNP financial report (in confidential financial analysis folder)

Laws and regulations governing property rights (G5.1)

National and local laws relevant to project implementation are:

National Forest Laws

The Forestry Division within the Ministry of Agriculture, Forestry and Food Security (MAFFS) is responsible for the management of forest areas in Sierra Leone including forest reserves and national parks. The principal policies and laws relevant to the management of forest areas are the Wildlife Conservation Act of 1972, the Forestry Act of 1988 and the Forestry Act Regulations in 1990 and the recently passed National Protected Areas Authority Act 2012.

The Wildlife Conservation Act of 1972 established significant provisions for the conservation of wildlife ranging from the constitution of strict nature reserves, game reserves, and national parks, to prohibition of hunting of animals generally except with license and permit. It also contains enforcement and penalty provisions. The Wildlife Conservation Act of 1972 stipulates in Part 2 Section 5 the constitution of national parks. The purpose of a National Park in Sierra Leone is 'propagating conserving and managing wild animal life and wild vegetation, and protecting sites, landscapes or geological formations of scientific or aesthetic value for the benefit and enjoyment of the public'. The first goal of the project is to implement effective protection measures of the National Park to ensure that the forest is conserved and that biodiversity is protected, thus demonstrating that the project is aligned with the Wildlife Conservation Act.

The Forestry Act of 1988 and its Regulations for 1990 established provisions for the administration and management of the Forest Reserves, Community forests and National Parks. It also established fees for licenses and law enforcement provisions. The project established a register of landowning families of the National Park and entered into a benefit sharing agreement with the families and other local stakeholders to provide compensation for lost royalties and rights in the project area and is therefore aligned to the Forestry Act of 1988.

As a National Park, the objective is *inter alia* to conserve wildlife and vegetation, and activities such as farming, logging and mining are prohibited. Since the project intends to conserve the forest and wildlife, and all Management Plans will be reviewed by the National Protected Areas Authority (NPAA)[7] the project is aligned with National Forest Laws. The Forestry Division followed regulations in upgrading the forest reserves to National Park status (Fofanah 2012)

REDD regulations

The Government currently does not have any guidelines or regulations in place for REDD projects. A legal analysis carried out by Climate Focus which reviewed the legal regulations surrounding the implementation of carbon projects in the Gola area concluded that specific legislation was not required to develop a REDD project in the project area.

The project works directly with the Government of Sierra Leone and the Ministries and agencies that will be involved in the development of any national framework and will comply with any future REDD regulations.

Environmental Protection Agency Act

This act established the Environmental Protection Agency (EPA) to 'provide for the effective protection of the Environment and for other related matters'.

Under the act, projects that make 'substantial changes in renewable resource use (e.g. conversion of land to agricultural production, forestry or to pasture land, rural development, timber production)' are required to carry out an Environmental Impact Assessment (EIA). As the project has not made any substantial changes to the renewable resources of the area, and will not have any negative impacts on renewable resources an EIA was not required.

National Protected Area Authority Act

A recent act enacted in 2012, provided for the establishment of a National Protected Area Authority (NPAA) and Conservation trust fund to 'promote biodiversity conservation, wildlife management, research, to provide the sale of ecosystem services in National Protected Areas and to provide for other related matters. The NPAA has just begun being constituted (2015) and the project works closely with this body to ensure that project activities are aligned with Government policy as the authority's main function is to 'exercise oversight authority over National Parks and Protected Areas designated for conservation purposes' (part III, 12 (1)) and has responsibility to 'promote REDD projects in Sierra Leone' (part III, 12 (2)f), and evaluate and approve National Protected Areas annual operation plans and budgets (part III,

[7] The National Protected Areas Authority Act (2012), establishes an authority to exercise control over National Parks and protected areas designated for conservation purposes, to coordinate wildlife management and biodiversity conservation, research and education.

12 2 p(v)) amongst other objectives. It is written into the legal agreements between the project and the Government that the project complies with all relevant legislation and works with the MAFFS and the NPAA to ensure that the project is aligned with Government strategy.

Local Bylaws

Chiefdoms and communities surrounding the project area have a host of local laws and bylaws that may affect various aspects of project implementation as some are related to land use. The project always consulted with and requested permission from local communities and traditional authorities before initiating any meeting or activity to ensure compliance with, and respect for, traditional systems.

International treaties and agreements

The Gola REDD project complies with the following international treaties which Sierra Leone is party to:

- The Convention on Biological Diversity (party to, not signed)
- The African Convention on the Conservation of Nature and Natural Resources (signed but not ratified)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora
- The Convention Concerning the Protection of the World Culture and National Heritage
- RAMSAR convention
- Convention on the Conservation of Migratory Species of Wild Animals (signed on MoU for the West Africa Elephant)
- New York Convention on Climatic change
- The Vienna Convention for the Protection of the Ozone layer
- Montreal Protocol on substances that deplete the Ozone layer
- The United Nations Framework for Climate Change Convention
- The Rio Declaration on Environment and Development

The Gola Rainforest Conservation LG entered into a public-private partnership with the Ministry of Agriculture, Forestry and Food Security which outlines the terms of the relationship between the Gola Rainforest Conservation LG (project proponent) and the central government. Under the terms of the agreement the company must comply with all relevant laws and to ensure this happens, the Government closely observes the management activities of the company.

Documentation of project approval (G5.2)

Government approval

The Forestry Division of the Ministry of Agriculture, Forestry and Food Security of the Government is one of the members of the Gola Rainforest Conservation LG (the project proponent), the company was created to manage the project. In addition the Company signed a public-private partnership agreement with the Ministry of Agriculture, Forestry and Food Security (MAFFS) of the Government of Sierra Leone, (the Ministry responsible for the management of national parks and protected areas), to manage the project area as a REDD project for the lifetime of the project, the agreement includes the transfer of

carbon rights to enable the sale of carbon credits (Joint venture agreement and deeds available to auditor). Agreement to enter into both the company and the joint venture agreement was approved by Cabinet and has therefore has full approval from Government to be implemented.

Traditional Authority Approval

The traditional authorities are the Chiefs of the 7 Chiefdoms surrounding the project area. The Paramount Chief is the ultimate authority in each Chiefdom where they serve as the custodians of land in the chiefdom, amongst other functions (Witkowski et al 2013c). Regular meetings were held between the Gola paramount chief council and the project staff regarding the development of the carbon project and other activities and approval was gained throughout the project development process for various key components to the project design. This included initial approval to develop the project and begin the community consultation process with section and village chiefs and wider community members (February 2012), for the REDD Benefit Sharing Agreement and Forest Edge Community activities (May, September, and October 2012), for the landowner carbon rights agreements (August 2012).

Approval for the location and clearing of the project boundary was obtained from Forest Edge Communities through the boundary demarcation process (see Marris et al 2013) and for the development of the REDD project through Forest Edge Community sensitization meetings and the stakeholder consultation process (Tatum-Hume et al 2013a). Approval from the heads of the traditional landowners for the project and the transfer of any outstanding carbon rights was gained through meetings and the signing of the landowner agreements. Approval for the implementation of project activities with the Forest Edge Communities was gained through informal agreements with the 122 Forest Edge Communities in 2013.

3.2 Evidence of Right of Use (G5)

Title to carbon rights

A legal analysis of carbon rights was undertaken by Climate Focus, an independent expert in international and national climate law and policies. The report concluded that through the various stages of the project area being established as a reserve and later as a National Park, the Government had developed a strong claim to the carbon credits within the project area (Climate Focus 2011, section 3). However, there was some uncertainty as to whether all rights had been obtained and so following legal advice, the project consulted with Paramount Chiefs and the landowners registered on the GRNP landowner register to explain the project and request an agreement to be signed between the Government and each head of a landowning family landowners to transfer any outstanding carbon rights to the government in exchange for an annual payment outlined in the REDD benefit sharing agreement (Forestry Division 2013). In total, 234 agreements were signed with all 234 heads of landowning families listed in the landowner register providing the government with legal documentation that they have uncontested title to the carbon rights.

The project proponent (the Gola Rainforest Conservation LG) entered into a public-private partnership agreement with the Government which details the transfer of management rights and carbon rights to the project proponent for the lifetime of the project. A deed was also signed to secure the transfer of carbon rights which is registered in Sierra Leone

3.3 Emissions Trading Programs and Other Binding Limits (CL1)

Avoiding double counting of emission reductions

The Government of Sierra Leone has clear and uncontested rights to manage the project area and is the exclusive owner of carbon rights to the project area. The Government of Sierra Leone entered into a public-private partnership with the project proponent to transfer these rights to enable the project to sell the credits generated by the project activities. The public-private partnership agreement stipulates that the Government will not directly market, sell or otherwise deal with the Gola carbon credits or enter into any similar agreement with another party of the Gola project area. Therefore, there is no risk the credits will be sold by another entity.

3.4 Participation under Other GHG Programs (CL1)

The Gola REDD project being validated with the VCS, with the objective of generating voluntary carbon credits (VCUs), the project is registered on the VCS project database and on a dedicated registry system which will check other GHG programs to ensure that the same offset has not been registered elsewhere.

An internal registry will also be created and maintained by the project proponent which contains information on each sale of VCU's made throughout the projects lifetime. This will enable the proponents to transparently demonstrate to the Government and other stakeholders the transactions made by the project.

3.5 Other Forms of Environmental Credit (CL1)

This is not applicable to this project, the project will not participate in any other GHG program, the project will only seek to have any credits generated via the VCS to be tagged by the Climate, Community and Biodiversity Standard. The project has no intention to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program. No such credit has been or will be cancelled from the relevant program since the public-private partnership agreement stipulates that the Government will not directly market, sell or otherwise deal with the Gola carbon credits or enter into any similar agreement with another party of the Gola project area. Therefore, there is no risk the credits will be sold by another entity.

3.6 Projects Rejected by Other GHG Programs (CL1)

The project has not applied and hence has not been rejected by any other GHG program.

3.7 Respect for Rights and No Involuntary Relocation (G5)

Documentation of project property rights (G5.1)

Management rights to the project area have been held by the Government of Sierra Leone since the Gola Forest Reserves were gazetted, a process which began in the 1920s. A change in management practice from that of a Forest Reserve with production objectives to a reserve with conservation objectives was negotiated and agreed to during 2001-2003 through a series of meetings and agreements between the project partners and local communities (see Witkowski et al 2012c for the rights holder analysis and for the description of consultations that occurred during early conservation work). Customary rights to use the land within the reserves for farming and other purposes were altered when the agreed conservation measures were put into practice. The proclamation of the National Park in December 2011 in anticipation of the REDD project did not alter the management rights regime that had been previously agreed to and established with the onset conservation activities. The project proponent, Gola Rainforest Conservation LG through a public-private partnership agreement obtained the management and carbon rights to the project area for the lifetime of the project from the Government of Sierra Leone (public-private partnership agreement available to project auditors upon request) and is therefore not encroaching on Government, community or private property.

The project adopted 5 key principles of free, prior and informed consent to guide community engagement activities at the beginning of project development in 2012. To work towards free, prior and informed consent the project undertook a series of consultations with each of the identified stakeholder groups. Extensive efforts were made to consult with the traditional leaders, landowning families, and Forest Edge Communities in the leakage belt during each of the key design phases of the project in order to obtain free, prior and informed consent from local stakeholders with customary rights to develop a REDD project, secure any outstanding carbon rights, establish an agreement to distribute project benefits, as well as in the design and implementation of project activities. To date, all major groups of customary rights holders as well as other stakeholder groups actively participated in consultations and gave consent to the development and implementation of the Gola REDD project. Since the National Park was established early in the project planning process and prior to the development of project documents, the team was unable to secure prior consent for its establishment from all stakeholder groups but the Forestry Division followed due process in establishing the Park which included a community consultation and comment period, the details of which are outlined in the Government of Sierra Leone regulation report (Fofanah 2012).

Moving forward, the Gola project works with local stakeholders to maintain consent during project implementation. All project activities conducted in the leakage belt are being fully discussed and agreed upon with each individual community before any implementation takes place in that community. The Gola project intends to strengthen its relationship with the Forest Edge Communities to ensure that community members feel ownership not only over the livelihood support efforts, but also over co-management for the community use zones of the National Park.

Involuntary relocation (G5.4)

Relocation of people

When the development of the Gola project began in 2012, there were no people residing within the boundaries of the National Park. Two communities, Wagikor and Ngendema, are located on land which has been excised from the boundaries of the National Park. Wagikor is currently inhabited and is a Forest Edge Community and therefore receives the Forest Edge Community livelihood activities but the residents of Ngendema no longer live there; the project does not require the involuntary relocation of people.

Relocation of activities

The deployment of forest rangers mid-2004 began the enforcement of conservation measures that were agreed to in 2001-2003 and prevented local people from carrying out any illegal use of the forest. The baseline scenario of agricultural encroachment was prevented from occurring from 2004 and it was therefore at this point that conservation work required Forest Edge Communities to relocate farming or other activities they had inside the reserve boundaries. Local stakeholders were consulted prior to the implementation of conservation activities, granted permission for the change in management regime and were compensated for any relocation of activities via the benefit sharing agreement of 2007, although Forest Edge Communities were not provided any direct compensation under this agreement (see Witkowski et al 2012c).

In the early stages of REDD project development it became apparent that the gazette boundary for the National Park was not clearly demarcated on the ground and that there were likely to be a number of communities that had established farming activities within the gazetted boundary. The team therefore developed a set of protocols to determine the location of the entire boundary in consultation with each community along the border. As a result of this extensive exercise 86 villages were found to share a direct boundary with the Park and meetings were held in each village between the project team, the farmers and village elders to establish the project boundary (see boundary demarcation report, Marris et al 2013). In 12 villages farming activities were found to be occurring within the gazetted area of the National Park. To avoid relocating livelihood activities the team moved the location of the boundary to a new, agreed location resulting in a reduction in size of the National Park (ibid). All 86 Forest Edge Communities with joint boundaries signed agreements over the location of the National Park (project area) and the newly agreed boundary will be re-gazetted as the actual boundary for the National Park. The project therefore has a conflict-free, mutually agreed boundary with all boundary communities.

3.8 Illegal Activities and Project Benefits (G5)

Smallholder agriculture is the most widespread activity in the project zone and is the principal threat to project impacts through encroachment into the project area or an increase in agriculture activities in the project zone as a result of leakage. To defuse the threat of encroachment and avoid leakage a two-pronged approach is being used. Firstly forest rangers continue to be deployed throughout the project area to patrol the forest blocks and ensure the integrity of the forest. Secondly the team in coordination with the Forest Edge Communities developed a number of livelihood activities designed to increase the productivity and income of the Forest Edge Communities whilst maintaining forest cover. These activities are being implemented with all the Forest Edge Communities.

Other illegal activities that are occurring in some areas of the project zone include mining and selective logging. Artisanal mining and small scale logging may affect the climate goals as these activities result in forest degradation, they also may attract migrants to the area in search of economic opportunities. The project team works with Forest Edge Communities to promote environmental awareness and land use planning in the project zone in order to develop a long term strategic approach to natural resource management and encourage the communities to understand the trade-offs between conservation and unsustainable development.

4 APPLICATION OF METHODOLOGY

4.1 Title and Reference of Methodology

This project is within sectoral scope 14 "Agriculture Forestry and Other Land Use" of the VCS. It is a frontier Avoided Unplanned Deforestation (REDD AUDD) project and is not grouped.

VM0007 REDD Methodology Modules (REDD-MF) (v1.4).

4.2 Deviations from the Monitoring Plan

Two deviations in methodology were requested and accepted during the Validation:

1. Deviations to allow 2006 field work

Fieldwork to collect carbon stock data was carried out in permanent plots between January 2006 and March 2007 across the project boundary. The VCS requires a project to use baseline carbon stock data from within 5 years of the project start date and thus the data collected in 2006 falls outside of this time requirement. However, in 2012, 62 plots within the project area were revisited and biomass measurements took place to validate the 2006 data. This fieldwork found the 2006 biomass inventory to be accurate and reliable and that carbon stocks had increased between 2006 and 2012 in both Gola south and Gola central (Tatum-Hume et al. 2013b). Using the 2006-2007 data is therefore conservative as estimated carbon stock values are lower than the 2012 data estimates. The deviation requested is to use the more conservative 2006 carbon stocks for the strata 'Gola Central and Gola North' of the project area. However, in the stratum 'Gola South' carbon stock data estimates from field data collected in 2012 will be used (and subsequent measurements of enhancement will therefore be compared to the 2012 carbon stock data).

2. Deviation in the definition of the RRD

This was a request for a deviation in the VCS Methodology VMD0007 Module BL-UP to amend the boundary definition of the Reference Region for Deforestation (RRD) For the Gola Rainforest National Park REDD project. This deviation is in response to limitations in the Methodology language that do not provide for an RRD to be developed for a Reference Region for Location (RRL) that has different policy and regulations between the Project Area (PA) and Leakage Belt (LB).

Currently the Methodology states "Policies and regulations having an impact on land-use change patterns within the RRD and the **project area** must be of the same type or have an equivalent effect at the start of

the historical reference period, taking into account the current level of enforcement." Because the Methodology specifies only the PA, the RRD is limited in its ability to define an area that is representative of both the PA and LB (i.e. the spatial domains that make up the RRL) if policies and regulations are not similar. The deviation requested;

1) clarification in the language to allow the RRD to be similar to both the PA and LB, and

2) where policy and regulations affect the rate of deforestation in the PA and LB, and it is conservative to apply different rates, then 2 different rates shall be applied.

This Methodology deviation is meant to ensure an accurate RRD, and a conservative deforestation rate. The context of this deviation arises from the fact that the GRNP (formally the Gola forest reserve) is a discrete unit of land that has different policy and regulations than the surrounding area of land that make up the LB, which is held under the Chiefdoms and local communities surrounding the GRNP. Without REDD funds the GRNP would be subject to the insufficient funding that is typical for other forest reserves in Sierra Leone and would effectively be a "paper park" and subject to a similar baseline deforestation as other forest reserves in Sierra Leone (See Section 2.5). Analysis of forest reserves has shown that they are largely unprotected and not actively managed due to insufficient funding available from the Government of Sierra Leone (GoSL). This has led to illegal deforestation within the forest reserves which is acknowledged by national and local officials and has been detected using remote sensing. However, it is clear from remote sensing analysis that deforestation inside the forest reserves remains slightly lower than just outside the forest reserves (See Section 1.1.1.1 in Netzer and Walker 2013). Furthermore, Participatory Rural Analysis (PRA) with local communities around forest reserves shows that while there is very limited to no enforcement of forest reserve regulations, local people are aware of the boundary and the illegality of farming in the reserve. This knowledge likely results in the slightly lower deforestation within forest reserves. Therefore because of these different policies and regulations there are slightly different deforestation rates in the forest reserves (most similar to the PA) than in the LB (most similar to areas around the FRs).

Given these differences the project requests a deviation in the VMD0007 BL-UP to develop an RRD with 2 boundaries:

1) the boundary of the forest reserves which are most similar to the PA, and

2) a buffer area surround the forest reserves that are most similar to the LB.

Deforestation rates for forest reserves was applied to the PA, and deforestation rates from areas surrounding the forest reserve was applied to the LB. This ensures that the deforestation rates in the PA are conservative and representative of other forest reserves.

For this deviation it is requested that the RRD be defined as the total area of forest reserves and buffer areas and that the separation of the total RRD into *forest reserve RRD* (FR-RRD) and *buffer area RRD* (BUFF-RRD) only be applied to the policy and regulation requirements (Section 1.1.1.1 e), and the rate of deforestation (Step 2 BL-UP).

The changes that were requested in the methodology for this deviation are presented as underlined orange text:

Section 1.1.1.1 Reference region for projecting rate of deforestation (RRD).

For the criteria e the methodology deviation shall have the below changes:

a. Policies and regulations having an impact on land-use change patterns within the RRD and the project area and leakage belt must be of the same type or have an equivalent effect at the start of the historical reference period, taking into account the current level of enforcement.

STEP 2.2 Estimation of the annual areas of unplanned baseline deforestation in the RRD

For the estimation of baseline deforestation the text shall have the below changes:

The modelled annual area of deforestation in RRD ($A_{BSL,RRD,unplanned,t}$) shall be calculated across the historical reference period. Where the criteria "e policy and regulation" is different between the project area and leakage belt, the RRD boundary shall be made representative of the general patterns of unplanned deforestation that are influencing both the project area and its leakage belt. If it is demonstrated that deforestation rates in the area similar in policy and regulation to the project area are lower than those of the area of similar in policy and regulation to the leakage belt, then two deforestation rates shall be calculated and applied 1) for the area similar in policy and regulation to the project area (ABSL,PA-RRD,unplanned,t), and 2) for the area similar in policy and regulation to the leakage belt (ABSL,LB-RRD,unplanned,t). The methodology provides three approaches:

STEP 2.3 Estimation of annual areas of unplanned baseline deforestation in the project area

The projected unplanned baseline deforestation in the RRL is estimated as follows:

$$ABSL,RR,unplanned,t = ABSL,RRD,unplanned,t^* PRRL$$

Where different deforestation rates are applied to the PA and LB due to differences in policy and regulation the baseline deforestation in the RRL shall be calculated as two rates:

$$ABSL,PA\text{-}RR,unplanned,t = ABSL,PA\text{-}RRD,unplanned,t^* P_{PA\text{-}RRL}$$

$$ABSL,LB\text{-}RR,unplanned,t = ABSL,LB\text{-}RRD,unplanned,t^* P_{LB\text{-}RRL}$$

4.3 Project Boundary (G1)

Geographical boundaries Project area

The project area is divided into 3 forest blocks – Gola North, Gola Central and Gola South. Boundaries roughly follow the original boundaries of the Forest Reserves that were gazetted between 1926 and 1963 (Fofanah 2012). Deviations to the original boundary are described in the boundary report (Marris et al. 2013). On the ground the boundaries have been cleared following protocols for demarcation (Marris et al. 2013), in coordination with the Forest Edge Communities living adjacent to the area. Boundaries were cleared and are regularly brushed by casual workers to facilitate the detection of the boundary.

The current land cover show that within the GRNP boundaries in 2011 there was 68,515ha of forest (98% of GRNP) and 1,199ha of non-forest (Figure 8). According to VMD0007 BL-UP the actual Project Area where carbon accounting takes place must be 100% forest at the start of the project (time zero). Therefore, the project area contains all forested land within the GNRP boundaries in 2011 at 68,515ha.

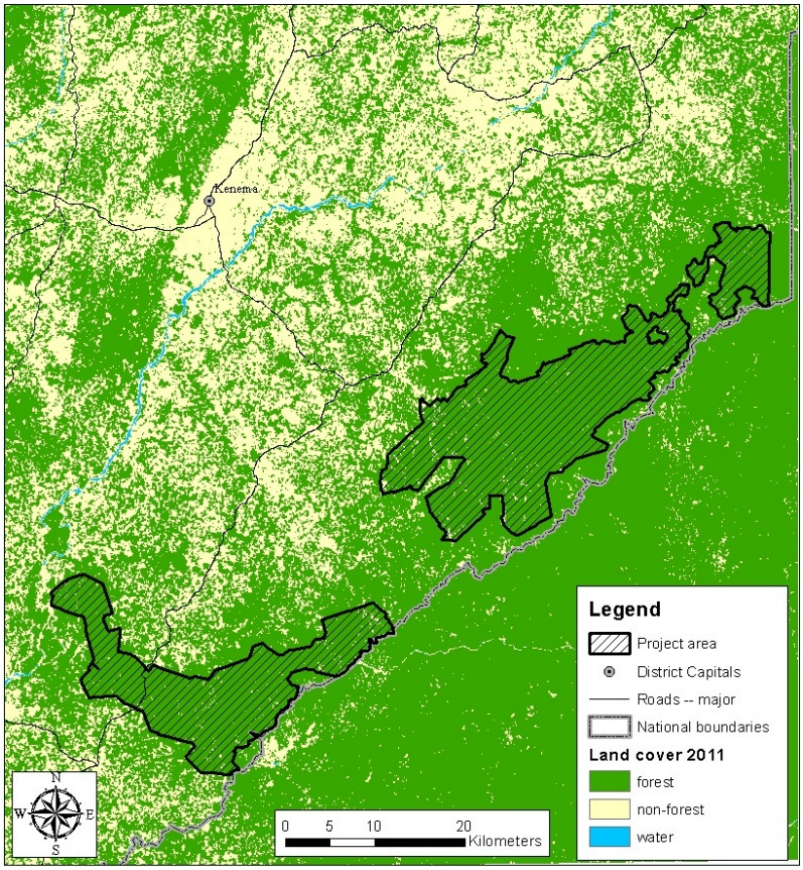


Figure 8 Project area boundary with land cover 2011.

The project area is defined as all forest within the boundary of the GRNP at the start of the baseline period.

Table 8 Size of project area and each forest block

Block	Size of forest (ha)
Gola North	5,349
Gola Central	37,710
Gola South	25,455
Total	68,515

Leakage Belt

To meet the VMD0007 leakage belt area requirements, the final Leakage Belt is defined as all forest areas within 4km buffer around the Project Area excluding area outside Sierra Leone, Tiwai Island Wildlife Sanctuary, and areas that extended beyond the 7 Chiefdoms that surround the GRNP (Figure 9). Justification for selecting the Leakage Belt area can be found in Netzer and Walker 2013.

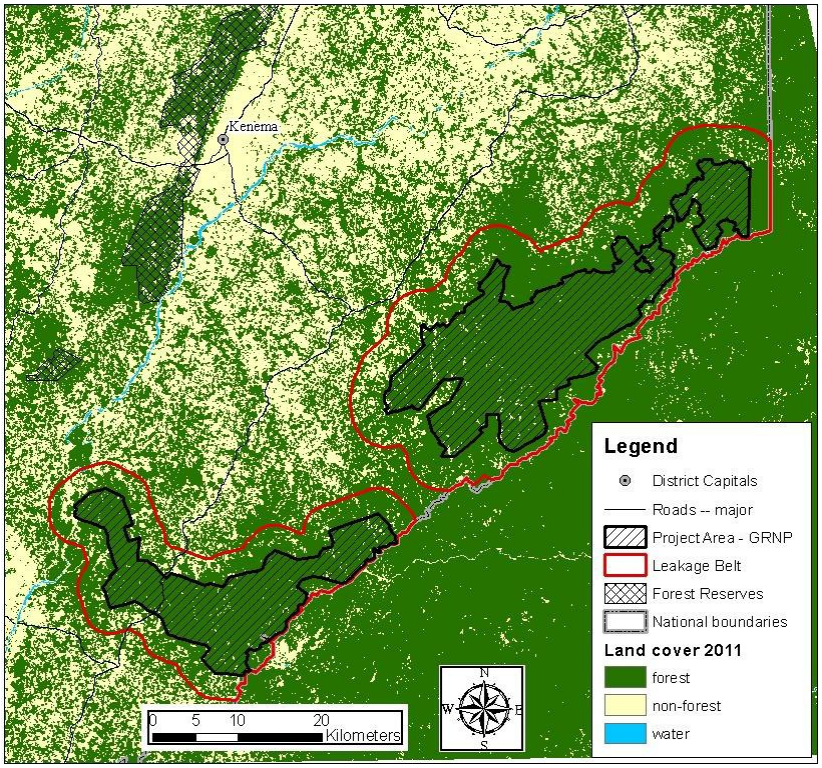


Figure 9 Leakage Belt for the project

Carbon pools

The project is required to account for any significant decrease in carbon stock in the project scenario and any significant increases in the baseline scenario, therefore based on these requirements the following pools have been included in pre-deforestation and post-deforestation strata.

Sources of GHG included in carbon accounting for the project

	Source	Gas	Included?	Justification/Explanation
Baseline	Biomass burning	CO_2	Yes	However, carbon stock decreases due to burning are accounted as a carbon stock change
		CH_4	Yes	
		N_2O	Yes	Included
	Combustion of fossil fuels	CO_2	No	Conservative to exclude
		CH_4	No	Potential emissions are negligibly small
		N_2O	No	Potential emissions are negligibly small
	Use of Fertilizers	CO_2	No	Potential emissions are negligibly small
		CH_4	No	Potential emissions are negligibly small
		N_2O	No	Conservative to exclude
Project	Biomass burning	CO_2	Yes	But carbon stock decrease due to burning are accounted as a carbon stock change
		CH_4	Yes	Emissions will be accounted when fires occur
		N_2O	Yes	Emissions will be accounted when fires occur
	Combustion of fossil fuels	CO_2	No	According to VM0007, can be neglected if excluded from baseline accounting

4.4 Baseline Scenario (G2)

The baseline scenario is identified following "VT0001 Tool for the Demonstration and Assessment of Additionality in Agriculture, Forestry and Other Land Use (AFOLU) project activities" through extensive stakeholder surveys, and through a spatial analysis of land cover change in Sierra Leone following the methods described in VM0007. Based on these analyses, it was determined that the most likely baseline scenario is the conversion of forest by smallholder agriculturalists. Detailed surveys of the common land use practices of such agriculturalists found that the average fallow period was found to be 7 years in areas close to the project boundary and 7.5 years in the surrounding areas (Witkowski et al 2012a, Cuni-Sanchez 2012b).

To estimate the rate at which baseline forest would have been deforested, all Forest Reserves in Sierra Leone with comparable environments were analyzed for their relevance as a reference region (i.e. comparable) to the project area and leakage belt. Forest Reserves were assessed to identify if there were significant differences in deforestation rates between different types of Forest Reserves (production and protection). There was found to be no significant difference between reserves. Forest Reserves that had known industrial logging or mining activities in the last 10 years were excluded. Forest Reserves with no legal distinction were also excluded. Each Forest Reserve was assessed using PRAs, and published reports to establish similarities to the project area and leakage belt. After selecting Forest Reserves that were most similar, buffer areas around the Forest Reserves were established. Mimicking the requirements for the definition of the leakage belt the buffer areas were made to be 90-100% the area of the corresponding forest reserve. These areas (Forest Reserves and buffer areas) were

identified as the reference region for establishing the expected rate of deforestation in the project area and leakage belt. The resulting baseline deforestation rate was 1.62% for Forest Reserves and a 2.74% for buffer areas, with an overall rate of 2.08%.

A high proportion of the labour force in Sierra Leone is dependent on land for agricultural subsistence activities; 75% according to the National Poverty Reduction Paper (2005:33) and 90% of the farming population are small holder farmers according to the National Rice Development Strategy (National Rice Development Strategy 2009: 5). However, subsistence activities are highly inefficient (Goodman 2008), and fewer than 5% of farmers have access to fertilizers, insecticides and herbicides which could help boost productivity (National Rice Development Strategy 2009:7). Both biotic and abiotic factors such as disease, pests, low soil fertility and poor extension services limit farmers yields and factors such as poor crop management, inappropriate storage facilities and poor market access limit farmers' ability to sell produce (National Rice Development Strategy 2009:7). In the region of the project area agricultural yields were calculated to have a value of $70 per hectare (Goodman 2008), which is very low compared to other West African countries such as Ghana at $180 per hectare (Grieg-Gran 2008). Low productivity combined with an increasing population's demand for food - an average 2.8% pa growth rate was recorded for Sierra Leone by the World Bank between 2004 and 2010 (World Bank 2010), and 2% average growth rate in Forest Edge Communities around the project area (Bulte et al. 2013) - results in a need for more land to farm as cash poor rural households struggle to afford imported rice prices (National Rice Development Strategy 2009).

4.5 Additionality (G2)

Additionality is demonstrated following the Verified Carbon Standards (VCS) tool 'VT0001 Tool for the Demonstration and Assessment of Additionality in Agriculture, Forestry and Other Land Use (AFOLU) project activities' which applies a stepwise approach.

STEP 1 – IDENTIFICATION OF ALTERNATIVE SCENARIOS

Step 1a. Identify credible alternative land use scenarios to the proposed VCS AFOLU project activity Scenarios

The following 8 alternative scenarios were identified for the project;

1. Continuation of Forest Reserve designation and issuance and implementation of selective logging concessions

Historically the project area (GRNP) was designated by the government as a timber production area. Gola East and West reserves were gazetted as Forest Reserves in 1926 (now known as Gola South), Gola North in 1930 (now known as Gola Central) and extensions added in 1956 and 1963 (now known as Gola North) (See Figure 10). Two large scale timber companies worked in the Gola project area, the Forest Industries Corporation (FIC) and The Sierra Leone Timber Industry and Plantation Company (SILETI) (Illes et al 1993). FIC worked in the accessible areas in the western section of Gola Central in 1961, 1978 and during the period 1984-1986. Some 19% of Gola Central was exploited during this period (Illes et al 1993). Gola South was more extensively logged by both FIC and SILETI during the 1960's, 70's and 80's, operations finishing in 1989 (Iles et al 1993).

Although the most accessible timber has been removed, Iles et al. (1993), estimated that 28,000 m³/year could be sustainably extracted. Currently there is ban on timber exports; only timber products with added value can currently be exported from Sierra Leone but a high tax levy on each container acts as a disincentive to commercial operators (Sheku Mansaray, Forestry Division pers. comm.). Currently any small scale logging or larger scale commercial logging operations are therefore selling wood to the national market. Although there are limitations, the project area still has the potential to be commercially logged as an alternative land use scenario.

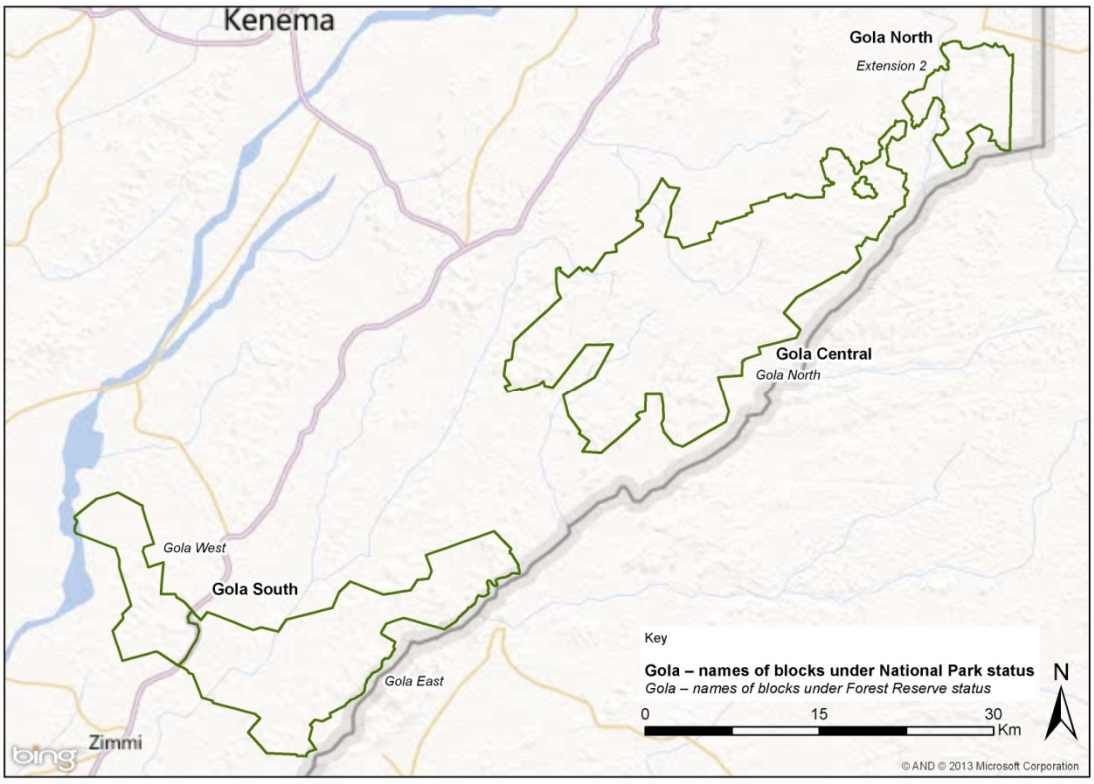


Figure 10 The GRNP with current and historical block names as a Forest Reserve and as a National Park

2. Continuation of the Forest Reserve designation lacking operation budget resulting in an influx of small-scale logging operations

Small scale logging operations remove selected trees from within the project area, causing localised degradation. Timber prices on the local market offer an attractive incentive for small-scale logging activities in a country where unemployment, especially among male youths is high (Peters et al 2010:6,7). Without the project small scale illegal timber extraction would take place, it is thought that such activities would be highest in areas where no community forests remain and areas which are most accessible and have good timber stocks (Witkowski 2012). Small scale logging operations therefore represent an alternative land use scenario and such activities would result in degradation, paving the way for further degradation and deforestation processes.

3. Continuation of Forest Reserve designation with issuance and implementation of industrial mining concession operations in parts of the reserve

Before the civil war during the 1960's and 70's the mineral sector provided Sierra Leone with 70% of its foreign exchange earnings and of 20% of the GDP (National Recovery Strategy 2002:7). Minerals continue to be of key importance to the economy of Sierra Leone, as highlighted by the priority given to the sustainable development of the country's mineral wealth in the National Recovery Strategy (2002:55) and the Poverty Reduction Strategy Paper (2005:93). Mineral exports contributed to 54.3% of Sierra Leone's total exports in 2010 (ICMM 2012).

Mining concessions overlie the boundaries of other Forest Reserves; the Kangari Hills Forest Reserve for example is partly overlain by the Baomahun licence for Gold Mining where operations are owned and run by Cluff Gold (Cluff Gold report 2010: 8). Licenses for prospecting minerals have also been issued by the Ministry of Mines within the project zone in the past (see Figure 11). Subsequent investigations into the companies purporting to own the licences revealed that many are no longer operating and the Ministry of Mines reports that there are no active mining licences in the Gola Forests (pers. comm. Director of Mines Jonathan Sharkah on 22 January 2013). The only possible threat is therefore over known deposits of iron ore contained in the Bagla Hills in the Southern block of the project area. The Bagla Hills contain a viable large scale deposit of iron ore (SRK Consulting 2007) which would be extracted by open cast mining methods (SRK consulting 2007), if a licence was issued and would cause multiple direct and indirect impacts on the environment (MINEO 2000; 5).

Only the southern block of the project area therefore has the potential to be industrially mined as an alternative land use scenario.

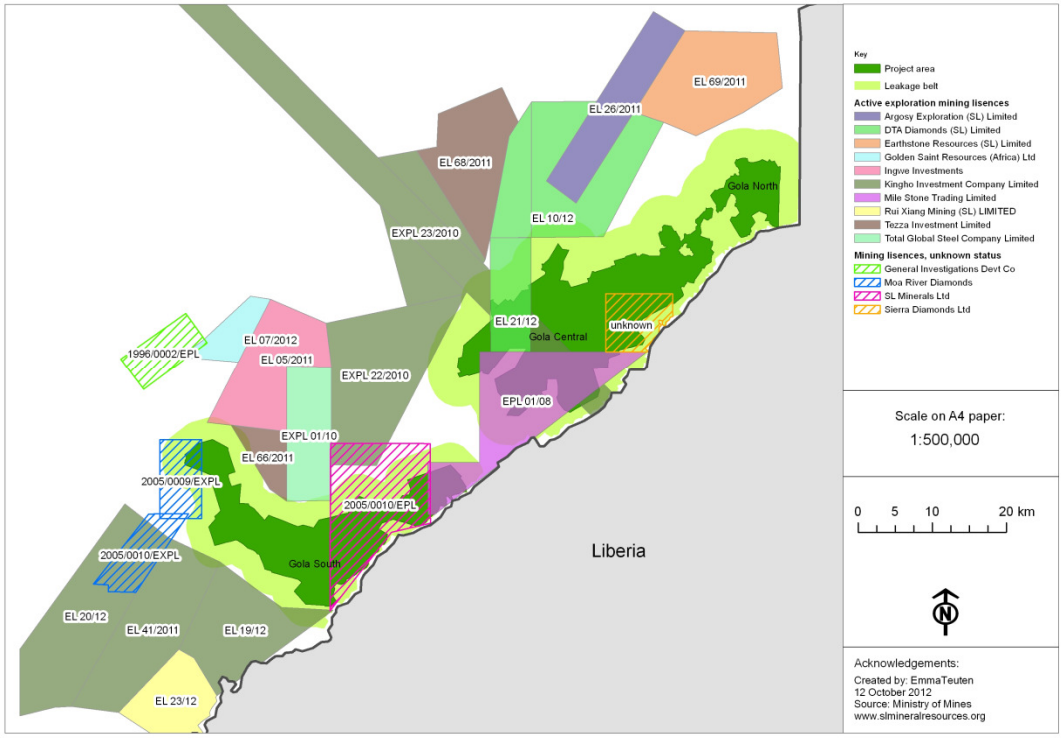


Figure 11 Mining licenses previously issued in the project zone (source: Ministry of Mines website; www.slmineralresources.org)

4. Continuation of the Forest Reserve designation lacking operation budget resulting in an influx of artisanal miners

Mining activities carried out locally by artisanal miners looking for gold and diamonds have been reported from within and around the borders of the project area, (Witkowski 2012). In particular, the Chiefdom of Nomo experienced high levels of artisanal mining during 2011 when 70 miners were arrested from within the project area by the patrol teams (Witkowski 2012). There was military involvement in these illegal activities and the Forest rangers received threats from organised groups of artisanal miners. Artisanal mining is carried out in small, shallow pits (approximately 1m deep), using rudimentary tools and results in forest degradation rather than large scale deforestation (Witkowski 2012). Such activities represent a potential alternative land use scenario for small parts of the project area, where there are believed to be small accessible deposits of minerals.

5. Continuation of the Forest Reserve lacking operational budget resulting in unplanned deforestation: small scale degradation and deforestation resulting in shifting cultivation by small holder agriculturalists

Smallholder agriculture is widely cited in the literature as a primary driver of deforestation in Sub-Saharan Africa (EC 2010, Union of Concerned Scientists 2011, Gibbs et al 2010). Although in some countries this may be an over-generalization (Ickowitz 2006), in Sierra Leone there is a strong case that the conversion of forest into the farm fallow cycle is one of the primary drivers of forest loss. Climatic conditions would allow Sierra Leone to support forest cover in approximately 60% of its land area but current forest cover is estimated at only 5% (NBSAP 2003). Extensive loss of national forest has been driven primarily by the conversion of forest land into the bush fallow cycle; subsistence agriculture being the principal livelihood of 80% of the labour force in Sierra Leone (USAID 2007). The Ministry of Agriculture, Forestry and Food Security (MAFFS) also highlights the conversion of forest to agriculture as one of the key drivers of deforestation (PRSPII 2008:144). Estimates that 600,000 hectares of forests have been cleared for shifting cultivation (National long term perspective studies 2004; 29); Sierra Leone received the world's lowest Environmental Performance Index rank in 2010 (163/163).[8]

A high proportion of the labour force in Sierra Leone is dependent on land for agricultural subsistence activities; 75% according to the National Poverty Reduction Paper (2005:33) and 90% of the farming population are small holder farmers according to the National Rice Development Strategy (National Rice Development Strategy 2009:5). However, subsistence activities are highly inefficient (Goodman 2008), and fewer than 5% of farmers have access to fertilizers, insecticides and herbicides which could help boost productivity (National Rice Development Strategy 2009:7). Both biotic and abiotic factors such as disease, pests, low soil fertility and poor extension services limit farmers yields and factors such as poor crop management, inappropriate storage facilities and poor market access limit farmers' ability to sell produce (National Rice Development Strategy 2009:7). In the region of the project area agricultural yields were calculated to have a value of $70 per hectare (Goodman 2008), which is very low compared to other West African countries such as Ghana at $180 per hectare (Grieg-Gran 2008). Low productivity combined with an increasing population's demand for food - an average 2.8% pa growth rate was recorded for Sierra Leone by the World Bank between 2004 and 2010 (World Bank 2010), and 2% average growth rate in Forest Edge Communities around the project area (Bulte et al. 2013) - results in a

[8] The EPI "ranks 25 performance indicators tracked across ten policy categories covering both environmental public health and ecosystem vitality. These indicators provide a gauge at a national government scale of how close countries are to established environmental policy goals." 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 Center for Environmental Law and Policy.

need for more land to farm as cash poor rural households struggle to afford imported rice prices (National Rice Development Strategy 2009).

Deforestation as a result of farming activities has occurred in the past in the project area before conservation management activities began in 2004 (Witkowski 2012) and is considered to be the continuation of the pre-project land use. Farming encroachment into the project area (then a Forest Reserve) occurred in many areas for various reasons. In some cases it occurred as farmers wanted to expand their farming activities and project boundaries were not clear. As there was no management presence on the ground there were little consequences felt by farmers for encroaching (Witkowski 2012). In other cases families wished to re-exert their historical right to farm inside the reserves (Davies and Richards 1991:29) and so created small plantations or farms inside the Forest Reserves, and in other cases new villages and farms were created within reserve boundaries either during the war when people were seeking a safe place to go, or pre-war by families looking for a new place to live and farm (Musa Swaray, town Chief and Forest ranger, pers. comm., Witkowski 2012). The soils found in newly cleared areas of forest are widely perceived to have much higher fertility and therefore produce better yields which has driven the conversion of forest areas (Witkowski 2012, Davies and Richards 1991:27,29), and whilst areas of primary forest are harder to clear without labour and equipment, without the project the degradation caused by small scale logging and mining activities would open up the area and more readily allow access for small holder agriculturalists. A similar pattern of agricultural encroachment is seen in the other Forest Reserves selected as the Reference Region for the project (Showers 2012, Cuni-Sanchez 2012b, Netzer and Walker 2013).

Without the project activities gradual encroachment into the project area is likely as well as the appearance of new communities inside the project area; smallholder agriculture is therefore an alternative land use scenario.

6. Continuation of the Forest Reserve designation lacking operation budget resulting in an influx of plantation agriculture

The GoSL is actively promoting agricultural investment opportunities for national and international investors. Cash crops such as rice and cocoa as well as the production of agrofuels such as sugar cane and palm oil are targeted as investment opportunities in rural areas. A newly created government agency, the Sierra Leone Investment and Promotion Agency (SLIEPA), assists investors and offers generous incentives (SLIEPA presentation). Large scale plantations (above 16,000 hectares) are in the process of being established in the Kailahun and Pujehan districts (two of the three districts in the project area). Socofin S.L. for example is making an investment of $100 million for 12,000 hectare rubber and oil palm plantation in the Pujehun District (Green Scenery report 2011) and smaller scale investments are being made within the project zone (e.g. Tropical Farms who purportedly have a 1200ha concession for cocoa production per comm.. Tropical Farms). Without the project, plantations would be a credible alternative land use scenario for the project area.

7. Continuation of the Forest Reserve designation lacking operation budget resulting in degradation due to charcoal and fuel wood collection

The majority of the population uses firewood and charcoal for cooking; over 80% of energy is derived from biomass and it is estimated that 4 million cubic meters of wood biomass is extracted annually to meet domestic energy requirements in Sierra Leone (UNDP 2007). According to the Assistant Director of Forestry, firewood collection and charcoal production are two of the drivers of forest degradation in Forest Reserves in Sierra Leone (Garnett 2012), though such activities are illegal unless the trees are already

downed or dead. Species such as *Parinari excelsa* (Chrysobalanaceae) are used to make charcoal and this species is one of 10 most common trees found in the project area (Klop et al 2008). Neither fuel wood collection nor charcoal production were revealed as primary drivers of deforestation or degradation in the project area as there is ample farmbush closer to the communities for collection and wood collected in the forest is considered too wet (Witkowski et al 2012b). Small areas of forest may become degraded without the project in the project area but charcoal and fuel wood collection are not likely alternative land use of the project area.

8. Designation of area as National Park and committed long term financial resources allowing for protection of forest resources

In recognition of the importance of biodiversity, Sierra Leone signed and ratified the Convention on Biodiversity and on numerous occasions the current President, Dr Ernest Bai Koroma, publically committed to conserving the country's natural forest resources for the ecosystem services they provide (Koroma 2009, 2011). The GoSL could therefore have upgraded the project area into a National Park in the absence of the project. As discussed later in G2.2, steps two and three, the GoSL does not have the financial resources to protect the project area or the other gazetted areas of forest in Sierra Leone. The strategic priorities for investment of the Government of Sierra Leone revolve around consolidating peace and rebuilding the economy after the debilitating civil conflict (Poverty Reduction Strategy Paper II, 2008.); conservation is a low priority. The protection of Forest Reserves in Sierra Leone is not part of the Forestry Division's strategic plan (FD strategic Plan 2012-2014, Showers 2012:12), and therefore no budget is available from Central Government for activities relating to the management or protection of Forest Reserves or National Parks in Sierra Leone. In 2011, $115,814 *was* allocated to the Forestry Division in the Government of Sierra Leone's budget to manage 48 Forest Reserves and National Parks covering over 300,000 hectares of forest. It is therefore highly unlikely that *t*he Government would have proclaimed the area as a National Park, had the finances from a REDD project not been highlighted as the future source of funding (Eco-securities 2008) for the Park management (per comm.. Sheku Mansaray, McClanahan 2011).

The designation of the area as a National Park with committed financial resources cannot therefore be considered as a viable alternative scenario but would be the scenario which serves as a with-project activity performed without being registered as a VCS AFOLU project.

As a result of the above analysis, the credible land use scenarios are therefore;

1. Continuation of the Forest Reserve designation and issuance and implementation of selective logging concessions

2. Continuation of the Forest Reserve designation lacking operation budget resulting in an influx of small scale logging activities

3. Continuation of Forest Reserve and issuance and implementation of industrial mining concession and operations

4. Continuation of the Forest Reserve designation lacking operation budget resulting in an influx of artisanal miners

5. Continuation of Forest Reserve designation lacking operation budget resulting in influx of small holder agriculture

6. Continuation of Forest Reserve designation lacking operation budget resulting in influx of Plantation agriculture

Step 1b. – Consistency of land use with mandatory laws and regulations

The principal laws that legislate the Forest Reserves and protected areas of Sierra Leone are the Forestry Act 1988, the Forest Regulations 1990 and the Wildlife Act 1992.

1. Continuation of Forest Reserve designation and issuance and implementation of selective logging concessions

Without the project, the forests would be controlled by Forestry Act No.7 of 1988 and administered under the Forestry Regulations published as part of the Act in December 1990. The forests would be managed by the Forestry Division of the Ministry of Agriculture, Forestry and Food Security (MAFFS). Commercial logging would be consistent with the mandatory laws and regulations from the 1988 Forestry Act which grant the Forestry Division the power to issue commercial timber licences and concessions in Forest Reserves (Fofanah 2012). Even as a National Park, concessions can be authorized by the Chief Conservator of Forests (Fofanah 2012). Provided the company has a license or concession, this land use would be consistent with laws and regulations for either a Forest Reserve or a National Park.

2. Continuation of the Forest Reserve designation lacking operation budget resulting in an influx of small scale logging activities

Although small scale logging is illegal unless licenses are granted (Fofanah 2012), there is currently little or no enforcement of the existing laws and legislation in other Forest Reserves, nor would there be in the project area without the project (Showers 2012). A reserve without active management due to low capacity and lack of finances within the Forestry Division (Showers 2012) is therefore readily subject to degradation by small scale logging activities. Degradation resulting from small scale logging activities is widely reported as a land use occurring in other Forest Reserves in Sierra Leone (Cuni-Sanchez 2012b, Showers 2012). Although it's not consistent with legislation unless loggers have a licence, it is common practice and therefore an alternative land use scenario.

3. Continuation of Forest Reserve and issuance and implementation of industrial mining concession and operations

Without the project the forests would be controlled by Forestry Act No.7 of 1988 and administered under the Forestry Regulations published as part of the Act in December 1990. According to section 3(a) and (b) of the Forestry Act, the Chief Conservator, under the direction of the Minister of MAFFS, is responsible for the efficient management and rational utilisation of the country's forest resources and their preservation. According to Section 28 (1) of the Forestry Act, no prospecting, exploration or mining may be carried out in national or community forest. Section 9 of the Forestry Act also states that in a national or community forest no one can "cut, burn, uproot, destroy…clear any land, remove any timber… take any earth, clay, sand, gravel or stone except pursuant to a concession agreement or licence confirmed usage right or other authority under this act" (Forestry Act 1988:5, 20, 8). Furthermore, Section 21 of the 1994 Mines and Mineral Decree, which was in force when the licenses outlined in step 1a were allocated, states that where an act is prohibited in another law, nothing in the Mines Decree will be interpreted as authorising that action (Global Witness 2010).

However, the fact that mining licences have been allocated over several Forest Reserves (Witkowski 2012) and are currently operational, as is the case in Kangari Hills Forest Reserve (Cluff Gold report 2010: 8) and in Farangbaia where a railway to extract mineral ore has divided the Forest Reserve in two (Showers 2012), demonstrates that legislation is not the only factor that should be considered in assessing alternative scenarios. Political will, development opportunities and finance must also be considered. Even as a National Park, a provision currently exists in the legislation allowing the President or the Chief Conservator of Forests to permit prohibited activities within National Parks if they are within national interests (Fofanah 2012). Commercial mining could be granted within a Forest Reserve or within a National Park in Sierra Leone if approved by the Chief Conservator or by the President. This land use would therefore be consistent with laws and regulations.

4. Continuation of the Forest Reserve designation lacking operation budget resulting in an influx of artisanal miners

Although as described above, artisanal mining is illegal unless licenses are granted, there is currently little enforcement of the existing laws and legislation due to the Ministry of Mine's lack of human and financial resources (Fofanah 2012). The price obtained for gold and diamonds offers an attractive incentive for artisanal activities. In a country where unemployment, especially amongst male youths, is high (Peters et al 2010:6,7), other Forest Reserves in Sierra Leone are experiencing degradation as a result of artisanal mining activities (Showers 2012 and Cuni-Sanchez 2012b). Although not necessarily consistent with legislation, artisanal mining has become common practice in reserves with no active management.

5. Continuation of Forest Reserve designation lacking operation budget resulting in influx of small holder agriculture

Whilst farming activities inside Forest Reserves would be considered illegal without any formal permission, farming inside other Forest Reserves where management is minimal or non-existent has become common practice, (Cuni-Sanchez 2012b, Showers 2012, Netzer and Walker 2013). Without additional external funding the Government of Sierra Leone does not have the resources to protect its forest estates, and protection is not seen as a strategic priority when there are many other more pressing development issues on the agenda (Showers 2012). Farming inside the project area occurred before conservation management and law enforcement began in 2004 (Witkowski 2012). Encroachment by local communities for farming is therefore a commonplace activity inside Forest Reserves in Sierra Leone and consequently an alternative land use scenario that is consistent with common practice.

6. Continuation of Forest Reserve designation lacking operation budget resulting in influx of plantation agriculture

As with the issuance of logging and mining concessions described above, the Chief Conservator has the authority to issue a licence or a concession for a plantation within a Forest Reserve or a National Park, making this land use consistent with legislation.

Plausible alternative land use scenarios:

1. Continuation of Production Forest designation and issuance and implementation of selective logging concessions

2. Continuation of the Forest Reserve designation lacking operation budget resulting in an influx of small scale logging activities

3. Continuation of Forest Reserve and issuance and implementation of industrial mining concession and operations

4. Continuation of the forest reserve designation lacking operation budget resulting in an influx of artisanal miners

5. Continuation of Forest Reserve designation lacking operation budget resulting in influx of small holder agriculture

6. Continuation of Forest Reserve designation lacking operation budget resulting in influx of Plantation agriculture

Step 1c. Selection of the baseline scenario

The REDD project activity is identified using the following decision tree, as delineated in VM0007. The result of this decision tree demonstrates that the REDD project activity is Avoided Unplanned Deforestation. Thus it is concluded that the baseline scenario is avoided unplanned deforestation.

<table>
<tr><td colspan="4">Is the Forest land expected to be converted to non-forest in the baseline case?</td></tr>
<tr><td colspan="2">Yes</td><td colspan="2">No</td></tr>
<tr><td colspan="2">Is the land legally authorized and documented to be converted to non-forest?</td><td colspan="2">Is the forest expected to degrade by fuelwood extraction or charcoal production, in the baseline case</td></tr>
<tr><td>Yes</td><td>No</td><td>Yes</td><td>No</td></tr>
<tr><td>Avoided planned deforestation</td><td>Avoided unplanned deforestation</td><td>Avoided forest degradation</td><td>Proposed project is not VCS REDD activity currently covered by the module framework</td></tr>
</table>

The below potential land uses are deemed not the most likely land use due to the following characteristics:

1. Planned deforestation due to selective logging concessions

Selective logging concessions are **not** considered a land use in the baseline scenario for the project area as despite being consistent with legislation for a forest reserve, no concession licenses have been granted within the project area in the last 30 years and are therefore an unlikely alternative land use.

2. Unplanned degradation due to small scale logging activities

Small scale logging activities result in localised degradation as typically only a few trees are removed from an area (Witkowski 2012). Commercial activities in the 1960s to the 1980's removed the most valuable and accessible timber (Illes et al 1993: 10, 29), but small scale activities involving local gangs and people to transport the wood are likely to feature in a baseline scenario as occurred pre conservation activities (Illes et al 1993: 34, Witkowski 2012). Degradation from small scale logging activities is **not**

included in the baseline scenario as it would not result in deforestation, it will be however be monitored through the projects lifetime.

3. Planned deforestation due to Industrial mining concessions

Although industrial mining concessions for exploration have been issued within the project area in the last 10 years, no mining activities have ever been initiated and most of the companies that purportedly own the licenses no longer operate. The only possible threat for industrial mining to occur is in the southern block of the project area where there is a commercially viable deposit of iron ore in the Bagla Hills. It is a potential threat as several claims have recently been made by individuals and companies interested in mining there (Daily Mail 2012). However, the Government has repeatedly stated that mining will not be allowed to occur in the GRNP (e.g. State House Communications Unit 2011) and therefore planned deforestation from mining concessions is not an alternative baseline scenario.

4. Unplanned degradation due to artisanal mining

Artisanal mining results in forest degradation and small areas of deforestation as mining pits are made with rudimentary tools and are small and shallow (Witkowski 2012). Artisanal mining was seen as an activity to supplement agricultural incomes by Forest Edge Communities and not the primary livelihood activity (90% of communities in the project zone reported that agriculture was the main livelihood activity (Bulte et al. 2013). Although artisanal mining is expected to take place in some small areas within the project area without the presence of forest rangers, it is not the dominant driver of deforestation and is therefore **not** considered in the baseline scenario. It will be monitored throughout the lifetime of the project.

5. Unplanned deforestation: degradation and deforestation resulting in land use change from smallholder agriculture

Historical trends regarding land use in Sierra Leone in and around Forest Reserves indicate that the primary driver of deforestation in Forest Reserves which are not actively managed is from encroachment by small holder agriculturalists converting forests into the bush fallow cycle. This is the most widespread driver of deforestation in Sierra Leone and would result in a mosaic landscape containing fields at various stages along the crop-fallow cycle, from active cropland to fallow areas (Netzer and Walker 2013).

6. Planned deforestation due to commercial plantations

Planned deforestation due to commercial plantations is not considered a likely alternative land use as currently there is no evidence of agriculture concessions being granted within the boundaries of the project area or other Forest Reserves in Sierra Leone.

As a result of step 1c, the most plausible land use scenario is:

Unplanned deforestation due to smallholder agriculture practices.

Step 2 – INVESTMENT ANALYSIS

Here we apply a simple cost analysis to demonstrate the costs associated with the project and that the Gola project generates no financial benefit other than VCS related income**.**

Sub-step 2b

Detailed accounts of the costs incurred by the GRNP forest program to develop and operate the conservation management during the pilot phase of activities have been kept since 2008. The average yearly costs from the 4 years of activities plus the costs of implementing new activities in the Forest Edge Communities around the project area to mitigate leakage and provide net positive benefits have been summarized in the table below (more detailed records will be made available to the auditor upon request).

Table 9 Annual costs for the REDD project; averaged into a yearly amount calculated over a 5 year period (2013-2018)

Budget Item	TOTAL
Management	**80,902**
Research & Monitoring	**58,298**
Administration & Finance & HR services	**134,957**
Park Operations	**232,622**
Travel & Transport	**9,548**
Equipment, Consumables & Running costs	**169,965**
Other services & fees (incl communication, finances & verification event)	**43,845**
Visibility & Outreach	**28,693**
Community Benefit Sharing Development & Implementation	**268,965**
Infrastructure (maintenance & development)	**28,432**
Total GRNP Core Operations Annual Budget (£)	**1,056,226**
Core Ops Annual Budget USD (@1,59)	**1,686,117**

The only income over this period has been from visitors to the park, the revenue from which is summarized in the table below:

Table 10 Income from ecotourism activities

Year	Total Revenue	Revenue for Forestry Division	Revenue for Communities
2009	$357	$233	$124
2010	$1999	$1258	$741
2011	$1427	$757	$670
2012	$2791	$1640	$1151

The income generated by project tourism activities is given to the Forestry Division and to local communities involved in the tourism activities and is not kept by the project. The project activities therefore do not generate any income to offset the costs of the project.

Budget available from the Government of Sierra Leone

The strategic priorities of the Government of Sierra Leone revolve around consolidating peace and rebuilding the economy after the debilitating civil conflict (Poverty Reduction Strategy Paper II, 2008.), conservation is a low priority for the allocation of funds.

The protection of Forest Reserves in Sierra Leone is not part of the Forestry Division's strategic plan (Forestry Division strategic Plan 2012-2014, Showers 2012), and therefore no budget is available from the Central Government for activities relating to the management or protection of Forest Reserves in Sierra Leone. Instead, the Forestry Division's strategy focuses on reforestation, the promotion of commercial activities and the legislative framework for forestry. The staff required in the districts to fulfil the requirements of the Forestry Divisions strategic plan are paid directly by the Central Human Resources Department. In the 2012-2014 budget, a total of Le272,638 ($63) was available per month for 3 FD staff in Pujehun District, Le1,311924 ($305) was available per month for 16 staff in the Kenema District and Le79241 ($18) per month for 1 staff in the Kailahun District. This amounts to an average of $22 per person per month (below the widely accepted $1 per day international poverty line). These 3 districts are responsible for 13 Forest Reserves, not just the project area (GRNP). Without the project, it is assumed that these amounts would still be available to pay Forestry Division staff in the 3 districts where the project is located[9]. However, there would be no budget available for them to implement any forest management or protection activities.

The project activities and budget available from Central Government clearly do not generate any significant income to offset the necessary conservation management costs. The project is therefore entirely reliant on VCS income to create financial benefit.

Having demonstrated that the project does not generate any financial benefits other than VCS related income, the project is then required to show that the project activities are not common practice. In the interest of transparency and best practice, the project, in addition to common practice analysis, also presents a barrier analysis to highlight some of the difficulties in implementing conservation projects in Sierra Leone

[9] The Gola REDD project employs 168 staff to manage the protected area and work with the local communities so even if all 20 FD staff were employed to work solely in protecting the GRNP without the project, management of the area would be severely understaffed.

STEP 3 - BARRIER ANALYSIS

Step 3a. Identify barriers that would prevent the implementation of a type of the proposed activity:

Investment barriers

Creating and implementing conservation projects and protected areas in developing countries is costly; in a post-conflict country such as Sierra Leone which lacks basic infrastructure and has multiple development needs, protecting forest resources is not seen as a priority area for expenditure especially when resources are so limited. The Forestry Division's strategic plan 2012-2014 does not include the protection of any Forest Reserves beyond the Western Area Peninsular Forest (FD strategic plan) and so no budget to implement any management actions on the ground is available from central sources beyond what the government allocates to salaries, which is part of its core costs (see sub-step 2b).

Finances to manage the conservation of the project area since 2004 have been raised from several donors:

Year	Donor Source	Total Amount
2003	GCF	$25,000
2004-2006	GCF grant and Darwin grant	$450,000 and £100,000
2007-2012	EU and FFEM	Euro 4.2 million

The RSPB, a member of Gola Rainforest Conservation LG, (the project proponent) took the lead in sourcing donor financing for the Gola Forest Programme and as reported by the lead fundraiser, Alex Hipkiss, (Hipkiss 2012) the potential to find donor funding for the project dried up; without REDD funding, the project will fall into the traditional boom and bust project cycle that has been experienced by many conservation projects around the world (IUCN 2006). The problem for accessing donor funds is that the focus for the funds is constantly changing as the priorities of governments and international development shift (IUCN 2006). Typical donor funding is available for 3-5 year periods which makes it extremely difficult for a project to develop long term programs and management strategies. This difficulty was identified very early during the early development of the Gola Forest Program and after a review of funding options in 2006 (Davies 2006), carbon markets were identified as a potential source of funding for the project and a feasibility study was undertaken by the Eco-Securities consultancy to investigate this possibility in 2008 (Eco-Securities report 2008). Once confirmed as a potential source of funding for the then Gola Forest Reserve, fundraising was initiated to develop the necessary documents to create carbon project documentation (ARTP 2010). Donor funds from the EU ended in July 2012 and despite extensive investigation and proposals the GRNP team has been unable to secure further funding via donor routes (Hipkiss 2012). For example the partners failed to secure funding from the German International Climate Initiative in 2011; funds from other large donors do not prioritize Sierra Leone; and those from smaller grant-making bodies would be insufficient to protect the project area (Hipkiss 2012).

Institutional barriers

Within the Government of Sierra Leone the most significant institutional barrier to implementing forest conservation projects is the lack of capacity within the Forestry Division, which is directly related to issues of under-funding and causes a multitude of subsidiary effects. The Forestry Division is significantly understaffed; no new staff have been recruited into the FD in the last 10 years and capacity is very low; only 10% of staff have a university degree or equivalent (FAO 2010).

Understaffing and low capacity result in a lack of coordination with District Councils[10], leading to District Forestry Staff lacking credibility at the local level (Sierra Leone Forest Policy draft 2010). There have also been reports of ground staff actively deviating from their stated duties. Recent investigations in the 7 Gola chiefdoms found that forest officers, police officers, and other government officials have, rather than enforcing existing laws, been granting authorisations to logging operators to extract timber, despite no clear authority to do so (EC 2010) or had been selling confiscated timber for personal profit. For example, in 2011 the District Forest Officer for Kenema, one of the districts in the project area, was indefinitely suspended for selling illegally cut timber (Sheku Mansaray, Acting Director of the Forestry Division pers. comm.). Furthermore there is a severe lack of coordination and conflicting mandates between the Forestry Division and other Ministries within the Government of Sierra Leone. For example, the Ministry of Mines and Mineral Resources is responsible for issuing licences for prospecting and mining, yet no formal procedures are in place for consultation with the Forestry Division before a license is issued in a Forestry Reserve (Draft Forest Policy 2010). As a result between 2005 and 2007, the Ministry of Mines issued two licenses for prospecting diamonds and iron ore in the project area, then a Forest Reserve (Global Witness 2010, Witkowski 2012).

Such institutional barriers contribute to the on going problem of deforestation in Sierra Leone and demonstrate that low capacity within Government offices is a significant barrier to the implementation of effective forest conservation activities. Significant external support is therefore currently a pre-requisite to the successful implementation of forest projects.

Step 3b. Show that the identified barriers would not prevent the implementation of at least one of the alternative land use scenarios (except the proposed project activity).

The identified barriers do not affect the alternative land use scenario (deforestation for smallholder agriculture) negatively; in fact they aid its occurrence. If the Forestry Division had adequate funding and capacity and were able to manage the country's Forest Reserves then smallholders would not have the opportunity to practice agriculture within the reserves. It is due to the barriers facing the project scenario that the alternative scenario is able to occur. Investment and institutional barriers to conservation aid the conversion of forest to farm land, as the Forestry Division does not have the capacity or funding to implement the laws governing Forest Reserves and few alternatives to agriculture exist for local communities to earn a living.

[10] District Councils meet monthly and address a number of devolved functions from central government including the mobilization of finances and resources

Step 4 – COMMON PRACTICE ANALYSIS

The Sierra Leonean Government is highly dependent on external financing. Since 2005 between 19 and 46% of Sierra Leones yearly revenue has come from foreign aid (EU report 2007;9, DFID 2012). As demonstrated in Step 2, the Government does not have internal funding to manage the country's Forest Reserves. In 2003 the National Biodiversity Strategy and Action Plan (NBSAP) reported a 95% dependency of the forestry sector on donor funding (NBSAP 2003). Financial dependency on short term and insecure donor funding sources creates a cycle of short term projects and does not allow for long term strategic planning and management or secure sharing of benefits with local stakeholders (IUCN 2006 Chapter 2 and 3). This is demonstrated in the only other National Park gazetted in 1995; Outamba-Kilimi, in the far north of the country. A 5-year World Bank project, the Biodiversity Conservation Project began in 2010 to improve the management of 3 protected areas in Sierra Leone, one of which is the Outamba-Kilimi National Park. In a METT analysis (Management Effectiveness Tracking Tool) carried out by the Biodiversity Conservation Project team in 2011 on Outamba-Kilimi National Park, one of the principal issues identified was that no current budget was available for the protected area and that management was wholly reliant on outside or year by year funding (Koker 2011). This has resulted in a lack of effective management of the National Park and associated problems of encroachment, deforestation and hunting (Koker 2011). There is no strategy to secure funds for Outamba-Kilimi National Park beyond the lifetime of the Biodiversity Conservation Project which ends in 2015. The possibility of future funding from REDD or PES schemes is mentioned as a possible future finance mechanism in project documents but there is no project funding to develop the necessary documents to secure this finance (BCP project proposal 2009). As demonstrated, it is common practice for outside donors to periodically finance short-term conservation work in Sierra Leone but this does not secure the long term finances necessary to reduce deforestation.

The Forest Reserve closest to the capital city – the Western Area Peninsular Forest Reserve which in 2013 was upgraded to a National Park, is another Park experiencing high levels of deforestation. As the Government does not have the finances or capacity to manage this Park, an international NGO (WHH – Welthungerhilfe) is working with the Forestry Division to investigate alternative financing mechanisms including PES and REDD (e.g. OBf WAPFOR REDD scoping study 2011). Again, since the Government does not have the finances to stop deforestation within Forest Reserves and Parks, other NGOs are therefore beginning to investigate new sources of financing to reduce deforestation, but this is far from common practice. The Western Area Peninsular National Park and the Gola project are separate projects in different geographical areas with very different alternative land-use scenarios.

Within the project area, the RSPB took the lead in sourcing funding from donors for the initiation of conservation management activities in the GRNP, but as can be seen from the 'Review of Gola Funding Potential' (Hipkiss 2012), securing financing from a limited pool of donors results in a boom and bust project cycle as reported above. The GRNP team failed to secure funding from donor sources beyond July 2012, despite extensive research and investment into proposals (Hipkiss 2012). It has therefore been common practice since 2004 for the project area to be protected using short-term donor funding, but donor funding is no longer available as explained Step 3a (investment barriers) and without funding, the project area will become like any other Forest Reserve or National Park in Sierra Leone and suffer from significant deforestation and degradation.

Clearly it is not common practice in Sierra Leone for the State to be able to fund the management of its forest estates. Requests to donors have been the only alternative tried in Sierra Leone to fund the

management of Forest Reserves, but these funding streams are subject to the priorities of external governments and donor objectives, and therefore do not enable effective long term management. Developing REDD projects in Sierra Leone is not currently common practice. The Government clearly stated that it intends to seek financing via REDD to provide the income to manage the State's forests (NSADP 2009, NPAA Act 2012) and it is intended that the long term nature of such revenues will overcome the boom and bust project cycle commonly found in other Forest Reserves in Sierra Leone financed by donors and thus result in a significant reduction to deforestation in the project area.

Step 5 – IMPACT OF VCS REGISTRATION

A resource-strapped Government would not have upgraded a Production Forest Reserve with the potential for revenues from timber or other sources such as minerals into a National Park without the expectation of receiving financing from other sources (pers comm. Sheku Mansaray, Acting Director of the Forestry Division). In Sierra Leone, upgrading reserves to National Parks has proved an ineffective option to protecting reserves e.g. the upgrading of Outamba-Kilimi National Park – See step 4. Since the sustainable financing report (Davies 2006) and the first carbon feasibility report carried out in 2008 for the Gola Forest Reserves, the expectation has been for emerging markets such as the carbon market to fund the management and benefit sharing mechanisms that were set up in the initial stages of conservation work. With this in mind the RSPB together with Birdlife International applied for funding from the EU to develop carbon projects, amongst other objectives, for work in the Gola Forest Reserves in Sierra Leone and Liberia (ARTP 2010). Some of the funding to develop a REDD project for the GRNP has therefore come from this project, other funding has come from the Critical Ecosystem Partnership Fund and from the RSPB.

5 MONITORING DATA AND PARAMETERS

5.1 Description of the Monitoring Plan (CL3, CM3 & B3)

1. Overview (CL3, CM3 & B3)

The project activities make up the Management Plan for the project. The Management Plan will be reviewed and where appropriate revised every 5 years. The implementation of the activities occurs through the development of Annual Operating Plans. Each activity is devolved to the relevant sub-department and the superintendents of each sub-department are responsible for developing, implementing and monitoring the work plans for members of staff to carry out the activities. The work is supported by the technical advisors for each sub-department. For example, the activities of the rangers are overseen by the Superintendent of Park Operations and supported by the technical advisor for Park Operations. The Park Operations team uses the software SMART (Management Information System), which is a database management system designed for conservation management needs, to collate information gathered by rangers on which areas of the project area they visited, which dates and what threats were encountered etc. This ensures effective and efficient monitoring of Park Operations and activities.

Furthermore, the Community Development team is responsible for implementing all of the activities that involve local stakeholders. A Community Monitoring Plan was developed to monitor all relevant indicators

of this component of the project (Henman 2013) and includes both surveys and standard operating procedures to gather information to ascertain progress and impact of the project throughout its lifetime.

The third area of activities surrounds the research work that is carried out for measuring and enhancing biodiversity in and around the project area. A Monitoring Plan was developed (Hillers and Tatum-Hume 2013) and the methodologies and protocols to collect the required data are available to the auditor for review through a series of Standard Operating Protocols (SOP).

2. Organisational structure, responsibilities, and competencies

Please see Table 3 for the detailed roles, responsibilities and competencies following the organisational structure below.

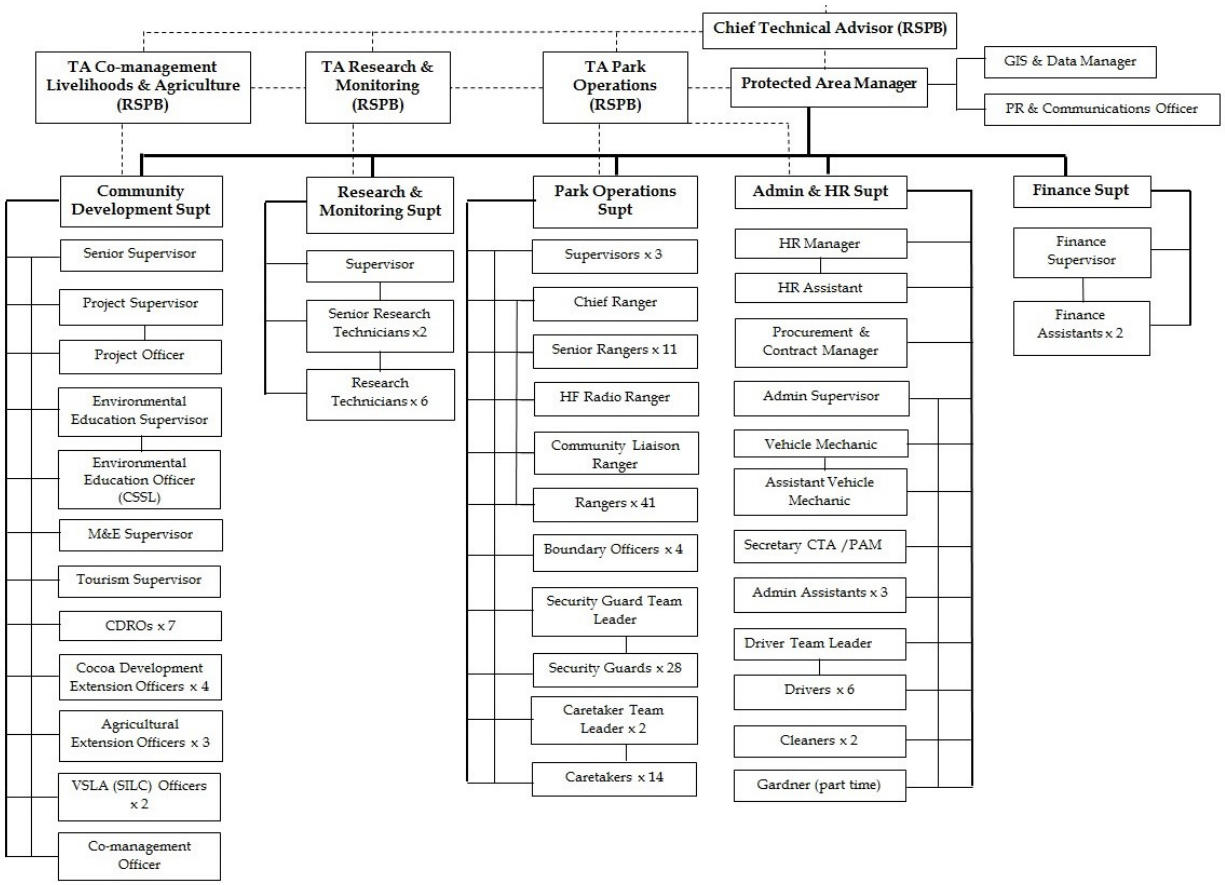


Figure 12 Organisational structure of the Gola Rainforest National Park Management Department of the Gola Rainforest Conservation LG.

3. Data generation, storage, and reporting

Generation, recording, storing, aggregating, collating and reporting of data is conducted by the team responsible for each aspect of the monitoring activities as described above. All data that is gathered is stored into the relevant files on a central database in the project office in Kenema. The database is backed up every week on to external hard drives. The database is shared and stored in the UK offices of the RSPB (who provides technical support to the management team) as a backup. It is the Superintendents and the Technical Advisors of each sub-department who are responsible for ensuring that their teams' data is correctly entered and stored in the database and that reports are produced at

the required time intervals. Field data and survey responses are also stored as paper versions in the Kenema office and where appropriate are electronically scanned and stored on the central database.

Additionally, the team relies on a 'cloud storage' platform (Dropbox) for the compilation of reports and and data analysis to ensure effectiveness between the team sitting in the project office in Kenema and the one in the UK offices of the RSPB.

Data Generation	**Storage**	**Archiving and reporting**
Park Ops Forest Rangers & Technical Advisor	Field data - Surveys and GPS - SMART database at project office	Monthly progress reports to management, bi-annual synthesis reports
Social monitoring CD team & Technical Advisor	Field data - Activity and longitudinal surveys, activity data - Excel databases at project office	Monthly progress reports to management, bi-annual synthesis reports
Biodiversity monitoring Research team & technical Advisor	Field data - Surveys - Excel databases at project office	Monthly progress reports to management, bi-annual synthesis reports
GIS information RSPB and field support From research team & Data management staff	- Geo-databases Analysis of imagery etc - Arc view, MODIS etc databases held by RSPB and shared with office	Annual reports

END USES AND USERS OF INFORMATION

Information will be compiled into different formats for reporting to;
- GRCLG Directors and Members
- Local stakeholders (dissemination to local communities, regional and local Government, NGO forums, research groups)
- For verification reports
- For Forestry Division/MAFFS/NPAA
- External Publications

Figure 13 Data generation, storage and reporting

5.2 Climate monitoring plan (CL3)

Description of the monitoring plan & Revision of the Baseline (CL3.1)

The Baseline will be reassessed every ten years (when the project baseline must be revisited) or every five years where conditions trigger[11] more frequent baseline renewal based on the methods written in the Methodology Module VMD0007:

Calculate the area of each land cover category (i.e. forest and non-forest) within the project area and, where required, the leakage belt.

- Update the Forest Cover Benchmark Maps for the reference region, project area and leakage belt.
- Estimate the total area deforested during the historical reference period in the reference region for rate - *RRD* ($A_{RRD,unplanned,hrp}$).

Monitoring greenhouse gas emissions and removals (CL3.1)

In order to calculate the net greenhouse gas emissions in the project case in the project area and the leakage belt a 3 step procedure was applied (as per M-MON). The Monitoring plan is also documented in Appendix (M-MON, 2013)

STEP 1. Selection and analyses of sources of land-use and land-cover (LU/LC) change data

Monitoring of the Project Area and Leakage Belt was conducted using the same methods and sensors as was used in the development of the baseline to create land cover maps with forest non-forest classification ≥90% accuracy (See BL-UP Part 2 and Mitchard 2012). This includes Landsat (or most similar dataset to Landsat) and ALOS PALSAR. It is carried out by the RSPB's Data Management team which includes a GIS analyst. If for any reason the sensors used for the baseline are not available the most similar sensor type is used to replace it.

For the calculation of each category of land use change:

- The area of each category within the project area is calculated in the project area and leakage belt
- The forest cover maps of reference for the project area and leakage belt is updated
- The remaining forest area within the project zone is updated

Following M-MON the data is collected for the entire reference region and no more or less than 1 year from the data of baseline renewal. The entire Project Area and Leakage Belt is available for the year that monitoring and verification occurs.

Processing LU/LC Change Data

All remote sensed data is prepared for analysis using geometric correction and geo-referencing and cloud and shadow detection and removal that are scientifically approved methods (i.e. following guidance from GOLFC-GOLD). Processing follows the same methods used in the development of the baseline (Mitchard 2012).

[11] This trigger will be based on changes in conditions on the ground that are considered potentially significant to forest carbon stocks. Such as major changes in policy that relate to the project area, major natural disturbance, a new influx of immigrants due to unforeseen events like refugees.

Post-processing and accuracy assessment

Post processing follows M-MON guidance and strict scientifically approved methods. This includes mapping areas of change and calculating the area of each category in both the Project Area and Leakage Belt following the same methods used to establish the baseline (See Mitchard 2012). This enables the updating of the forest cover benchmark maps and updating of the remaining area of forest in the RRL.

To avoid issues of cloud cover obscuring the image, we use multi-date images for the remote sensing analysis to ensure less than 10% cloud cover as was done in the initial analysis (See Mitchard 2012).

To reduce small isolated areas from being classified as deforested a 5x5 majority rule filter will be applied to the final land cover map (See Mitchard 2012).

A detailed accuracy assessment is conducted and all efforts made to achieve the required 90% accuracy of the overall classification.

Change detection

To assess land cover change a "combined" (i.e. cross-tabulation) was used to create a single map where each pixel represents a unique combination of class over the entire period. The maps that are combined are classified into 3 classes - forest, non-forest and water. All pixels that are classified as "water" at any of the time points are reclassified into a single water class to avoid accounting for deforestation as the conversion of forest to water.

Step 2 Interpretation and Analysis

Monitoring deforestation

Monitoring of emission resulting from deforestation that occurs in the Project Area and Leakage Belt is conducted following common good practice in the remote sensing field, and every effort is made to follow the same methods as were used in the baseline (See BL-UP Part 4 and Mitchard 2012). Following from Step 1 "Selection and analyses of sources of land-use and land-cover (LU/LC) change data" produces an estimate of the emissions resulting from any deforestation that occurs within the project area and leakage belt ($\Delta CP,Def,i,t$).

The calculation of net carbon stock change as a result of deforestation follows M-MON and any other referenced VM0007 Modules (e.g. CP-W).

Monitoring degradation

Monitoring Degradation through felling of trees for illegal timber, fuelwood and charcoal

Emissions due to extraction of trees is monitored and emissions estimated. Due to the anticipated high deforestation rate in the leakage belt modules BF-DFW and LK-DFW may need to be used in the future once the baseline is reassessed. A Participatory Rural Appraisal (PRA) will be conducted in order to determine whether degradation occurs. In this sense, these steps will be followed:

- A PRA is conducted every 2 years (one due in end 2015) by the Community Development team. If the results indicate that the project area has no pressure from this type of degradation, then it will be assumed that: $\Delta Cp,Deg,i,t = 0$.

- If the results of the PRA indicate that there is potential for degradation, then the team will:
- Obtain a "penetration distance" in the PRA (distance that the degradation agents can enter from the nearest access points).
- Identify the most important access points to the vulnerable area.
- From said points, draw the distances and create a Buffer Area with a width equal to length.
- Establish transects to evaluate the buffer zone. The assessed area should not be lesser than 1% of the buffer area.
- If stumps are not found (harvested trees), then it is assumed that $\Delta Cp,Deg,i,t = 0$ and the assessment is repeated every 2 years.
- If stumps are found, then a systematic assessment will be carried out. For this, plots are distributed systematically, being the area to assess ≥ 3% of the buffer area.
- Take into account the diameter of the stumps, which will be assumed as their DBH. If they were very large (e.g. due to buttresses), then the species of the stump is identified and standing trees of the same species are located. Afterwards, their DBH and stump diameter are measured and a ratio between DBH/stump diameter is calculated. With this ratio, the DBH from the stump diameter of the cleared individuals that were found is estimated.
- With the DBH data, the carbon stock of the harvested trees is calculated, using the allometric equation that was employed for the estimation of the tree carbon stocks in the baseline (Chavé Equation).
- It will be assumed that all stock will be lost to the atmosphere.
- This assessment must be repeated every 5 years.

Monitoring degradation due to selective logging

Selective logging is not expected to occur in the project area. However, if such activities are initiated, methods delineated in M-MON will be followed.

Monitoring areas undergoing natural disturbance

Disturbance in the project area, such as tectonic activity (earthquake, landslide, volcano), extreme weather (hurricane), pest, drought, or fire is monitored on an annual basis, using a variety of remote sensing data types and on the ground knowledge. Tectonic activity and landslides are rare in the Project Area, but it is monitored on an annual basis through the United States Geologic Society (USGS) and Incorporated Research Institute for Seismology (IRIS) Seismic Monitor[12]. Any earthquakes are also monitored through reports on the ground. All the data is downloaded and written-up on an annual basis and stored with all other documentation collected for monitoring. If an event has occurred that could have affected carbon stocks in the Project Area or Leakage Belt the project investigates the extent of the

[12] http://www.iris.edu/dms/seismon.htm

damage though satellite imagery. Landsat satellite imagery is be downloaded and every effort to accurately delineate and forest loss is implemented. If Landsat is not available or sufficient, other remote sensing data are investigated. Any event is also investigated on the ground by field crews. Field crews assess the extent and carbon loss on the ground through field measurements. The quantification of carbon stock changes follows M-MON.

Landslides are not a major natural risk in the project area[13]. However, monitoring of these events is done annually through visual interpretation of Landsat imagery and information obtained on the ground from field crews during the frequent patrols of the project area. All the data is downloaded and written-up on an annual basis and stored with all other documentation collected for monitoring.

Extreme weather and drought, is monitored on an annual basis through National Oceanic and Atmospheric Administration (NOAA) National Climate Data Center, International Best Track Archive for Climate Stewardship (IBTrACS)[14]. Any extreme weather events and drought are monitored through reports on the ground. All the data is downloaded and written-up on an annual basis and stored with all other documentation collected for monitoring. If an event occurs that could have affected carbon stocks in the Project Area or Leakage Belt the project investigates the extent of the damage though satellite imagery. Landsat satellite imagery will be downloaded and every effort to accurately delineate and forest loss is implemented. If Landsat is not available or sufficient, other remote sensing data is investigated. Any event is also investigated on the ground by field crews. Field crews assess the extent and carbon loss on the ground through field measurements. The quantification of carbon stock changes follows M-MON.

Pests, are unknown to cause major forest die-back in the Project Area, however every effort is made to monitor it. There are no current monitoring methods in Sierra Leone for pests. The GRNP project staff makes every effort to monitor this on the ground. If an event occurs that could have affected carbon stocks in the Project Area or Leakage Belt the project investigates the extent of the damage though satellite imagery. Landsat satellite imagery is downloaded and every effort to accurately delineate and forest loss is implemented. If Landsat is not available or sufficient, other remote sensing data is investigated. Any event is also investigated on the ground by field crews. Field crews assess the extent and carbon loss on the ground through field measurements. The quantification of carbon stock changes follows M-MON.

Fire is monitored on an annual basis through assessments of MODIS Active Fire and Burned Area Product[15]. Because the MODIS data can be very sensitive to even small controlled burns from slash and burn agriculture this data is cross referenced with visual inspection of burned areas in Landsat imagery for every year. Fire is also monitored through reports on the ground. All the data is downloaded and written-up on an annual basis and stored with all other documentation collected for monitoring. If an event occurs that could have affected carbon stocks in the Project Area or Leakage Belt the project investigates the extent of the damage though satellite imagery. Landsat satellite imagery is used to accurately

[13] Columbia University Center for International Earth Science Information Network (CIESIN). http://sedac.ciesin.columbia.edu/theme/hazards/data/sets/browse

[14] http://www.ncdc.noaa.gov/oa/ibtracs/index.php?name=ibtracs-data

delineate the area of forest loss. If Landsat is not available or sufficient, other remote sensing data is investigated. Any event is also investigated on the ground by field crews. Field crews assess the extent and carbon loss on the ground through field measurements. The quantification of carbon stock changes follows M-MON.

Monitoring areas undergoing carbon stock enhancement

The Gola REDD Project monitors forest carbon stock enhancement in the stratum Gola South.

It is not anticipated that any of Gola South will be subject to degradation. However PRA is to be conducted to ensure this is not occurring (See Monitoring Degradation).

Carbon stock enhancements are measured based on permanent plots established in 2006 and was revisited in 2012 (Tatum-Hume et al 2013b). Enhancements are monitored following M-MON. All the plots will be re-measured following Standard Operating Procedures for Carbon Stock Enhancement (See Appendices folder).

Monitoring project emissions

Emissions from non-CO_2 due to biomass burning are conservatively expected to occur in all areas of deforestation during the project's life. These non-CO_2 emissions have also been accounted for in the baseline.

Emissions from N_2O as a result of nitrogen application is not expected to occur in the project case as fertilizers will not be used as part of the agricultural project activities (increases in production focus on cultivation and post-production techniques). No monitoring will therefore be required. If any N_2O is applied in the project case these are accounted and monitored.

Emission from fossil fuel combustion is not accounted for in the baseline and therefore is not required to be accounted for in the project case. Also emission from fossil fuel combustion, a result of using project vehicles for project activities, is not significant as it results in less than 5% of net anthropogenic removals by sinks, whichever is lower.

Step 3 - Documentation

A consistent time-series analysis of land-use change and the associated emission is monitored following M-MON steps 1-2. The procedures for steps 1-2 include:

a. Data sources and pre-processing: Type, resolution, source and acquisition date of the remotely sensed data (and other data) used; geometric, radiometric and other corrections performed, if any; spectral bands and indexes used (such as NDVI); projection and parameters used to geo-reference the images; error estimate of the geometric correction; software and software version used to perform tasks; etc.

b. Data classification: Definition of the classes and categories; classification approach and classification algorithms; coordinates and description of the ground-truth data collected for training purposes; ancillary data used in the classification, if any; software and software version used to perform the classification; additional spatial data and analysis used for post-classification analysis, including class subdivisions using non-spectral criteria, if any; etc.

c. Classification accuracy assessment: Accuracy assessment technique used; coordinates and description of the ground-truth data collected for classification accuracy assessment; and final classification accuracy assessment.

d. Changes in Data sources and pre-processing / Data classification: If in subsequent periods changes will be made to the original data or use of data:
   - Each change and its justification must be explained and recorded; and
   - When data from new satellites are used documentation must follow a) to c) above

Monitoring leakage

As per step 4 of Module LK-ASU "Estimation of unplanned deforestation displaced from the project area to outside the Leakage Belt" the area deforested in the leakage belt is monitored in each monitoring period (*ADefLB,i,t*). The same methods for monitoring deforestation in the project area are used for the leakage belt.

The leakage belt is monitored each time the project area is monitored (*ADefPA,i,t*), which is at least every 5 years or if verification occurs on a frequency of less than every 5 years examination occurs prior to any verification event.

Development of a comprehensive monitoring plan

A full monitoring plan was developed. The results of monitoring and verification are made publically available on the project website and disseminated to communities and stakeholders through radio shows, meetings and notice boards, amongst other methods.

5.3 Community impact monitoring (CM3)

Preliminary community monitoring plan

The monitoring plan was developed following guidance from the CCBA Social and Biodiversity Impact Assessment Manual for REDD+ Projects (Richards & Panfil, 2011), which recommends the *theory of change* approach (Figure 14) as an appropriate and cost-effective impact assessment approach for community monitoring of REDD+ projects. For the detailed community monitoring plan see CCB social monitoring plan (Henman 2013).

The theory of change approach allows project developers to identify causal chains from project activities, to short-term outputs, from outputs to outcomes, and from outcomes to impacts through applying anticipated cause-and-effect sequences. Such an approach is not only cost-effective and a useful framework for developing a logical project design, but is useful to help projects overcome the challenge of substantiating impacts which will be achieved in the long term. This can be achieved through the monitoring of tangible outcomes to demonstrate that the casual chain is being followed, which in turn can provide confidence that the impacts will be achieved.

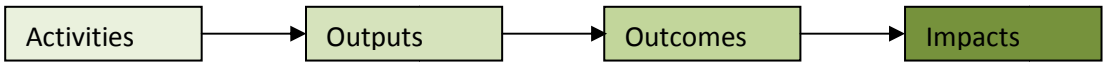


Figure 14 Causal chains underlying the theory of change

The Gola REDD project started in August 2012 and is therefore at an early stage of implementation. The emphasis of the community monitoring plan is therefore on the project level short and medium term output and outcomes of the casual chain. Medium and long-term impact monitoring may be revised for later verifications taking into account changes in project implementation and other factors outside of the project that could be contributing to the impacts identified through the theory of change process.

The Gola REDD Project Monitoring Plan is a "living" document in the sense that it is adjusted over time in response to feedback and adaptive management to ensure continual improvement and relevance. If it is found that there are unanticipated issues in collecting identified indicators, a more appropriate indicator will be identified and incorporated in to the monitoring plan. Similarly if new activities are incorporated or unanticipated effects of the project are observed new monitoring protocols are developed to address them.

The plan has drawn on the 'Synthesis Report on the social impact assessment for the Gola REDD project' (See Appendice Reports folder). The 10 areas which are monitored include the five community development activities that focus on the Forest Edge Communities, any negative impacts to Forest Edge Communities due to wildlife, offsite communities, worker rights, the grievance mechanism and governance (see Table 11).

Table11 Areas of activity to be monitored

Category Number	Areas to be monitored	Focal Issue being addressed/issue
1	Crop intensification and increased production activity	Poverty Reduction
2	Improved cocoa production and post-production	Poverty Reduction
3	Saving and internal lending communities (SILC)	Poverty Reduction
4	Co-management of community use zones in the GRNP and land use mapping and planning in the leakage belt	Poverty Reduction Improved Governance
5	Education	Poverty Reduction Improved Governance
6	Crop Raiding by Wildlife	Monitoring identified possible negative impact
7	Chiefdom development fund	Poverty Reduction
8	Workers' Rights and Employment Scheme	Worker rights
9	Communication and grievance procedures	Improved governance
10	Government capacity building	Improved governance

The theory of change, an analysis of anticipated cause and effect sequences from project activities through to outcomes and eventual long-term impacts, was applied to the project's different community related activities and served as a guide to develop appropriate indicators and monitoring requirements in line with the CCB. All selected indicators are found in the monitoring plan along with the theory of change to justify their selection, a small selection of indicators is found in Table12.

Whilst the monitoring plan was designed around the activities themselves some of the outcome and impact indicators overlap as they are targeted at the same overall impact, for example increasing farmer incomes, which in turn should help to reduce poverty. Short term output indicators are being measured as the activities are being implemented and have therefore been reported on to management since January 2014. The majority of medium term outcome indicators are measured at the end of the implementation of an activity (i.e. at year 2 after implementation), through an activity survey. The first such results will therefore be available from 2016. The impact indicators are measured through longitudinal surveys carried out every 5 years (the baseline longitudinal survey was undertaken in January and February 2014, the subsequent survey will therefore be carried out in January and February 2019).

Table12 A sub-selection of indicators for community monitoring (please see Annexes 1 and 2 for full details)

Area of activity	Output indicator	Outcome indicator	Impact indicator
Crop intensification and increased production activity	Number of Farmer Field Schools implemented Number of trained Master Farmers Number of farmers trained by Master Farmers	Number of hectares of intensified crops planted Yield of harvested crop	Farmers better able to meet basic food needs with reduced hunger gap
Improved cocoa production and post-production	Number of Master Farmer field schools established and meetings held No. of participants at farmer field schools No. of fermentation boxes supplied	Cocoa yield per ha Improved quality of cocoa harvested	Farmers increased ability to meet basic needs from increased income
Improved cocoa production and post-production	Number of Master Farmer field schools established and meetings held No. of participants at farmer field schools No. of fermentation boxes supplied	Cocoa yield per ha Improved quality of cocoa harvested	Farmers increased ability to meet basic needs from increased income
Saving and internal lending communities (SILC)	No. of SILCs established, size and location Value of the savings	Number and value of loans taken Number of new groups set up by PSPs	Reduced short term crises as a result of support from social fund of SILC group
Co-management of	Number of Community Use	New by-laws drafted and	Improved participatory

Area of activity	Output indicator	Outcome indicator	Impact indicator
community use zones in the GRNP and land use mapping and planning in the leakage belt	Zones mapped Number of Land use plans under development	adopted Active Forest Edge Community engagement in protection of project zone	governance structure for the decision making and management of the GRNP
Education	Number of secondary school scholarships provided to Forest Edge Communities Number of people attending roadshows	Number of years of secondary school education completed by FEC children Improved education on natural resource management by Forest Edge Communities	Communities supporting the protection of the Park
Crop Raiding by Wildlife	Source and scale of crop raiding evaluated Farmers trained in mitigation measures	Less cropland is damaged by wildlife Farmers adopt mitigation measures	Farmer perception of wildlife conflict Change in species composition in project zone
Chiefdom development fund	Number of project proposals implemented Number of communities directly benefitting from CDF projects Money distributed	Improvement in core areas of development selected in activity plans	Increased income, health, food security
Workers' Rights and Employment Scheme	Number of resignations Number of women employed	Low staff accident level/ improved safety record in the workplace Job satisfaction	Example of good employment and workers' rights model in Sierra Leone
Communication and grievance procedures	Register of grievances recorded Report on how grievances have been handled	Grievances resolved by community management	Good relations between communities and project
Communication and grievance procedures	Register of grievances recorded Report on how grievances have been handled	Grievances resolved by community management	Good relations between communities and project
Government capacity building	Government staff on secondment with the project Contribution to national level policies, law review processes, strategies, PAM guidelines	Government implementing best practices learnt from working with project in other protected areas	Government has capacity and resources to manage GRNP with minimal international support

High Conservation Values monitoring plan

HCV 5

As previously established, the project area is not fundamental to meeting the basic needs of local communities. It is understood that the project area serves as an additional source for meeting basic needs rather than a fundamental source. The project was designed to involve Forest Edge Communities in the development of co-management zones in the project area (GRNP) and therefore have access to areas to sustainably extract NTFPs and fish to meet any additional requirements for basic needs as they have likely done in the past. The establishment of co-management zones is monitored through those indicators presented in Activity 4.

HCV 6

As previously established, the project zone does comprise areas which meet HCV 6. This is because they provide for two critical traditional cultural activities:

Secret societies (Sande and Poro)

Secret societies are a central part of the Mende culture. As part of the initiation process, children are required to spend time in a special part of the bush isolated from members of the opposite sex (Leach 1996); the locations of these areas are only known to members of the societies and not to outsiders but they are understood to be largely within the bush areas of the leakage belt in the project zone rather than in the project area (Personal communication, GRNP Community Development staff and Green Africa staff).

Burial grounds

Burial grounds and graves are considered sacred areas and there are strict rules about respecting such areas (Bulte et al. 2013; 24). Such sites have been encountered within the project area but these are found as biodiversity survey work is carried out rather than as a result of a deliberate effort to identify such areas. Burial grounds are also present in the leakage belt.

Monitoring HCV 6

Secret Societies: given the areas used by secret societies are secret it is not possible to map or preserve and particular areas for this activity. However, given the overall objective of the project is to preserve forest, it seems the project activities would be well aligned to meeting the needs of secret societies for forested lands to carry out their meetings.

Burial grounds and graves: these areas are not currently mapped but the location of sites will become clearer as the project develops Co-Management within the project area. Monitoring of these activities is covered in Activity 4 and its indicators.

Development of comprehensive community monitoring plan

Please see the CCB social monitoring plan (Henman 2013) for details of the full monitoring plan, the protocols and surveys required to implement the plan are available to the auditor upon request. These documents are made available on the Gola projects website and the plans as well as the results as they are established through the project reports are communicated to stakeholders via the appropriate mechanisms identified for each group.

5.4 Biodiversity impact monitoring (B3)

Biodiversity monitoring plan

The biodiversity goals of the project are focused around maintaining and where possible improving forest cover and condition throughout the project zone in order to maintain or increase habitat availability and connectivity for all species but in particular high conservation value forest dependent species. The project zone meets 3 of the criteria for high biodiversity conservation value at the species, ecosystem and landscape scales[16]. For detailed Biodiversity monitoring plan see Hillers and Tatum-Hume 2013

The biodiversity monitoring plan therefore has been devised to monitor the progress of the project in maintaining and improving the conservation value of the project zone at the species, ecosystem and landscape scale and project activities are designed to create positive biodiversity impacts against the without project scenario. The impacts are measured at two levels; the species level and the ecosystem and landscape level.

The selection of indicators for monitoring the outputs-outcomes and impacts of the project followed a theory of change approach, using a causal model to predict the changes attributable to the project and thereby the most relevant indicators for monitoring progress (see Hillers and Tatum-Hume 2013). Given the species richness of the area, for some aspects of monitoring certain species were chosen as indicators of overall biodiversity wellbeing, the indicators were selected as they reflect the overall health of the habitat or area of monitoring interest based on many years of prior conservation assessment (e.g. Klop et al 2008, Hillers 2013), see Table13 for biodiversity indicators.

The overall impact of the project on biodiversity is intricately linked to the management and community livelihood activities of the project. The activities that result in impacts on biodiversity are management and community related activities from the operational work of the forest rangers to the implementation of the community livelihoods programme (see Hillers and Tatum-Hume 2013).

Ecosystem and Landscape scale

The project monitors changes in forest cover and condition as a result of project activities throughout the project zone through the interpretation of satellite imagery and through ground work that monitors degradation and threats to biodiversity. A two-pronged approach is used as remote sensing methods alone may not pick up on the finer spatial scale activities caused by degradation. Forest cover changes are monitored through the interpretation of satellite imagery. The project follows VCS methodologies and the approach is outlined in the VCS PD and in the VCS emissions monitoring plan (M-MON, 2013). Threats to the condition of the forest are monitored through the analysis of threat surveys that are completed by the forest rangers as they carry out their patrolling activities. The threat surveys collect data on a range of variables from visible signs of forest degradation such as tree stumps to freshly cut trails, encounters of gun cartridges, snares or mining pits. The work for monitoring species is also used as an indicator of the health of the forest at the ecosystem scale.

[16] The monitoring of HCV 5 and 6 can be found in PDD CM3.2 and in the social monitoring plan for the CCB

Species scale

Species have long been used as indicators of the health of a habitat. Species that are particularly susceptible to environmental or human disturbance, are present in the area at the beginning of the project activities and are relatively easy to encounter are those that make the most suitable indicators to monitor project attributable changes. The taxa, species and methodologies selected to monitor changes in the different habitats of the project reflect nearly 25 years of conservation research in the area carried out by the past conservation work. A diversity of species and taxa were chosen in order to provide a broad understanding of the impact of the project on biodiversity. For example as different species will manifest changes at different rates, some species may change in distribution and abundance faster than others and may act as indicators of the beginnings of an uphill or downhill trend, this is especially true of the large bushmeat species such as Chimpanzees and pygmy hippos or those that are sensitive to disturbance such as the White necked Picathartes. Other species occupy different habitats within the forest and so by choosing a range of species we can monitor the impacts across the wider landscape e.g. pygmy hippos tend to be found along the forested margins of streams and rivers whilst Chimpanzees are found in undisturbed areas of near primary forest. As it is vital for the project management team to understand whether the operational and livelihood activities being implemented are having the desired biodiversity impacts, monitoring a wide range of species that provide indications of impact for different forest habitats or timescales are very useful and enable management to adapt actions as appropriate (see Table13).

Methodologies to measure longitudinal change in population status and range throughout the project zone are based on best scientific practice and follow standardised protocols for data collection and analysis. Methodologies include bird surveys and point counts, camera trap surveys, mammal transects and nest surveys and are detailed in the methodology section. All surveys include a habitat quality component with varying detail and relevant to the surveyed species groups, as outlined in the Standard Operating Procedures (See Appendice Reports folder). Additionally, a general habitat quality measurement is part of the chimpanzee survey that covers the whole project area and selected parts of the leakage belt. This general habitat measurement serves to define the general habitat type and its level of degradation based on the number of trees in different DBH classes at a survey site and the level of canopy cover. It can generally be assumed that old, healthy forest will have a higher number of trees in higher DBH classes and a more closed canopy compared to disturbed forest.

Table13 Species indicators and justification for their inclusion

Species	Group	Justification	Methodology
All terrestrial bird and mammal species, in particular HCV species including: Western Chimpanzee, Sooty Mangabey, Jentinks Duiker, Zebra Duiker, Pygmy hippo, Forest elephant, White breasted Guineafowl	Birds and Mammal	These species are all HCV species and are all forest dependent species. The presence/absence and abundance of these species will provide a measure of the pressure that biodiversity is under, the health of the forest and monitor the success of protection efforts	Camera traps through out the project zone following a grid based methodology

Species	Group	Justification	Methodology
Western red Colobus, Western pied Colobus, Diana monkey	Primates	These monkeys are not only indicators for the status of the forest habitat and for the pressure from hunting. They are also very important seed dispersers thus playing an important role in forest ecology. Furthermore, they are a diverse group with some species being dependent on relatively undisturbed forest, making them valuable indicators of forest conditions.	Primate surveys in the project area following line transect methodologies
Western Chimpanzee	Primate	This is an endangered species (HCV) under pressure from hunting and requiring large areas of suitable habitat. It is a good indicator of forest quality and disturbance	Line transect Nest surveys through out the project zone
Pygmy Hippo	Mammal	This is an endangered species under threat from habitat loss and hunting. It is an indicator of disturbance and hunting pressure	Surveys, camera traps and dung sampling through out project zone and in offsite zone
White-necked Picathartes	Bird	Endemic and vulnerable species (HCV). Indicator of disturbance and changes to habitat.	Nest surveys in the project zone and offsite zone
Tai toad and other species	Amphibian	Amphibians are widely recognized as excellent indicators of the health status of a forest habitat and the Tai toad is an HCV species and therefore important to monitor	Plot sampling through out the project zone

High Conservation Values monitoring plan

As the project zone, and the project area in particular is a biodiversity hotspot and meets HCV1-3, indicators to monitor the effectiveness of measures to maintain or enhance HCV biodiversity are a central component of the biodiversity monitoring plan (see Table14).

Table14 Monitoring summary for HCV components of the Gola REDD project

HCV criteria	Parameter to be measured	Variable	Monitoring activities and measurement frequency	Indicators	Target
HCV 1 Globally, regionally or nationally significant concentrations of biodiversity values - threatened and endemic species	1. Species composition	1. Diversity of forest dependent bird community	Bird point counts (every 4-5 years)	Abundance and diversity of species encountered	Stable or increasing populations, stable or increasing species distribution, decreasing threat encounter rate
	2. Population structure of species	2. a. Distribution of key species 2.b Abundance of key species	Camera traps, transect and plots surveys, nest surveys (every 1-5 years)	Abundance and diversity of species encountered	
	3. Species threat	3. Threat encounters	Threat encounter surveys (ongoing, monitored by the Operations team)	Number of cartridges and snares found in project area	
HCV 2 Globally, regionally, nationally significant large landscape –level areas where viable populations of natural populations occur in natural distribution and abundance	Ecosystem condition	Diversity and distribution of forest dependent bids and mammals	Camera traps, bird point counts, primate surveys (every 2-5 years)	Abundance and distribution of species encountered (reflecting the health of the forest)	Stable or increasing populations, stable or increasing distribution of species

HCV criteria	Parameter to be measured	Variable	Monitoring activities and measurement frequency	Indicators	Target
HCV 3 Threatened or rare ecosystems	Ecosystem integrity	1. Forest cover 2. Forest enhancement	1. Interpretation of satellite images (before every verification event) 2. Vegetation surveys (before every verification event)	Change in forest cover and connectivity between forest blocks of the project area Changes in above ground biomass	Forest cover maintained or increases within and between blocks of the project area and trees are growing to full potential

Development of comprehensive biodiversity monitoring plan

A full biodiversity monitoring plan was developed (Hillers and Tatum-Hume 2013) and Standard Operating Procedures (SOPs) are available upon request of the auditing team. The finalized plan and the monitoring results as they are gathered are placed on the projects website (www.golarainforest.org) and disseminated to stakeholder groups via relevant meetings and forums. The Community Development Relations Officers are responsible for disseminating the monitoring plan to FECs (especially highlighting when and why monitoring is carried out within the leakage belt) and the results of the field monitoring as it develops (see the Communication strategy for CDROs with FECs in the FEC communications folder in the appendices of Tatum-Hume et al 2013). The monitoring plan was finalised in December 2014, disseminated early 2015 and the results of monitoring have been communicated to stakeholders. This will keep being so throughout the lifetime of the project.

5.5 Data and Parameters Available at Validation (CL3)

Data / Parameter	Regional Forest Cover / Non-Forest Cover Benchmark Map
Data unit	NA
Description	Map that shows the location of forest and non-forest areas in the Reference Region RRD at the beginning of the accreditation.
Source of data	Landsat satellite imagery
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied	The Landsat images have an adequate resolution (30m) and they are available to all public. Three maps over the last 10 years are available 2001, 2007 and 2011. Cloud cover over the project boundaries was reduced to 0%. All land cover maps are >90% accurate. For more information see Mitchard 2012.
Purpose of Data	The Landsat imagery was used for all the purposed listed below: • Determination of baseline scenario • Calculation of baseline emissions • Calculation of project emissions • Calculation of leakage
Comments	All forest areas are considered the same forest type, a mix of tropical evergreen to moist semi-deciduous. Stratification of the project area is based on management history and not forest type. Non-forest areas are predominantly crop fallow. Because the cop fallow has the highest biomass of any non-forest area in the region it is conservative to assume all non-forest is crop fallow.

Data / Parameter	Project Forest Cover Benchmark Map
Data unit	NA
Description	Map showing the location of forest within the project area at the beginning of each monitoring period. The benchmark map will show the deforested areas at each monitoring event
Source of data	Landsat satellite imagery
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied	The Landsat images have an adequate resolution and they are an available tool to all public. All land cover maps are >90% accurate. Maps will be created at minimum ten years prior to baseline renewal. For more information see Mitchard 2012.
Purpose of Data	The project area forest benchmark map for 2011 is used to: • Determine baseline scenario (AFOLU projects only) • Calculate baseline emissions • Calculate project emissions
Comments	All forest areas are considered the same forest type, a mix of tropical evergreen to moist semi-deciduous. Stratification of the project area is based on management history and not forest type. Non-forest area are predominantly crop fallow. Because the cop fallow has the highest biomass of any non-forest area in the region it is conservative to assume all non-forest is crop fallow.

Data / Parameter	Leakage Belt Forest Cover Benchmark Map
Data unit	NA
Description	Map showing the location of forest within the leakage belt at the beginning of each monitoring period. The benchmark map will show the deforested areas at each monitoring event
Source of data	Landsat satellite imagery
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied	The Landsat images have an adequate resolution and they are an available tool to all public. All land cover maps are >90% accurate. Maps will be created at minimum ten years prior to baseline renewal. For more information see Mitchard 2012.
Purpose of Data	The leakage belt forest cover bench mark map is used to: • Calculate project emissions • Calculate leakage
Comments	All forest areas are considered the same forest type, a mix of tropical evergreen to moist semi-deciduous. Stratification of the project area is based on management history and not forest type. Non-forest area are predominantly crop fallow. Because the cop fallow has the highest biomass of any non-forest area in the region it is conservative to assume all non-forest is crop fallow.

Data / Parameter	Ai
Data unit	ha
Description	Area of stratum i
Source of data	Landsat satellite imagery & forest inventory in 2006
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied	The area of stratum was decided based on Landsat imagery and historic harvest intensity. The Landsat images were used to map forest and non-forest. For more information see Mitchard 2012. The harvest intensity was based on historic logging concession areas and the forest inventory in 2006. The forest inventory found significantly lower (and growing) stocks in Goal South compared to Golan North/Central. This was the basis for stratification.
Purpose of Data	The forest strata was used to: • Determine baseline scenario (AFOLU projects only) • Calculate baseline emissions • Calculate project emissions
Comments	Ex-ante it is assumed that strata area will remain constant.

Data / Parameter	ARRD,unplanned,hrp
Data unit	ha
Description	Total area deforested during the historical reference period in the RRD
Source of data	Landsat satellite imagery
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied	Landsat imagery was used to determine the total area deforested during the historic reference period 2001-2011. The Landsat images have the adequate resolution and they are a free and available tool to all public. For more information see Mitchard 2012. Frequency at a minimum every 10 years prior to baseline renewal.
Purpose of Data	The total area deforested during the historic reference period was used to: • Determine baseline scenario (AFOLU projects only) • Calculate baseline emissions
Comments	Monitored for the purpose of baseline revisions

Data / Parameter	CF
Data unit	t C t-1 d.m.
Description	Carbon fraction of dry matter
Source of data	Value taken from IPCC 2006 INV GLs AFOLU Chapter 4 Table 4.3
Value applied:	0.47 t C t-1 d.m
Justification of choice of data or description of measurement methods and procedures applied	Default value 0.47 t C t-1 d.m. can be used, or species specific values from the literature (e.g. IPCC 2006 INV GLs AFOLU Chapter 4 Table 4.3)
Purpose of Data	The Carbon fraction for dry wood was used to: • Calculate baseline emissions • Calculate project emissions • Calculate leakage
Comments	NA

Data / Parameter	CFj
Data unit	t C t-1 d.m.
Description	Carbon fraction of biomass for tree species j
Source of data	Species- or family-specific values from the literature (e.g. IPCC 2006 INV GLs AFOLU Chapter 4 Table 4.3) shall be used if available, otherwise default value of 0.47 t C t-1 d.m. can be used.
Value applied:	0.47 t C t-1 d.m
Justification of choice of data or description of measurement methods and procedures applied	Default value 0.47 t C t-1 d.m. can be used, or species specific values from the literature (e.g. IPCC 2006 INV GLs AFOLU Chapter 4 Table 4.3)
Purpose of Data	The Carbon fraction for dry wood was used to: • Calculate baseline emissions • Calculate project emissions • Calculate leakage
Comments	Where new species are encountered in the course of monitoring, new carbon fraction values must be sourced from the literature or otherwise use the default value.

Data / Parameter	Dj
Data unit	t d.m. m-3 .
Description	Basic wood density in t d.m. m-3 for species *j*.
Source of data	Wood density data were gathered from published databases (Chave et al. 2009; Zanne et al. 2009; Henry et al. 2010). For 30 species, no species- or genus-specific data were available. The mean wood density of all recorded species was 0.59 g cm^{-3}.

Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied	Wood density data were gathered from published databases (Chave et al. 2009; Zanne et al. 2009; Henry et al. 2010) and were available for 59.4 % of recorded tree species (65.2 % of trees). If species-specific data were not available we used, in order of priority, the genus mean (26.1% of trees), the mean of all other known species in the same plot (8.5% of trees), the mean of all other known genera in the same plot if no species were identified (0.01%) or the family mean (0.005%). For 30 species, no species- or genus-specific data were available. The mean wood density of all recorded species was 0.59 g cm^{-3}.
Purpose of Data	• The basic wood density was used to:Calculate baseline emissions • Calculate project emissions • Calculate leakage
Comments	

Data / Parameter	Dmn
Data unit	t d.m.m-3
Description	Mean wood density of commercially harvested species
Source of data	NA (for all wood densities see parameter Dj)
Value applied:	NA
Justification of choice of data or description of measurement methods and procedures applied	NA
Purpose of Data	NA
Comments	

Data / Parameter	fj (X,Y)
Data unit	t d.m. tree-1
Description	Allometric equation for species j linking measured tree variable(s) to aboveground biomass of living trees, expressed as t d.m. tree-1
Source of data	Formulas have been taken from: - Chave, J, et. al. 2005. Tree allometry and improved estimation of carbon stocks and balance in tropical forests. Oecología 145: 87-99. The final model selected for above-ground biomass is the model for moist forest found in Chave et al. (2005) based on DBH, height and wood density. $Exp(-2.977 + \ln(\rho D^2 H))$ $\exp(-1.576 + 2.179 \ln(D) + 0.198$

Value applied:	Exp(-2.977 + ln(ρ D^2 H)) exp(-1.576 + 2.179 ln(D) + 0.198
Justification of choice of data or description of measurement methods and procedures applied	The applicability of the selected model from Chave et al. (2005) was tested using a 'limited measurements' approach (see VMD0001). The data used for the limited measurements analysis consist of a random sample of 100 trees (with DBH>20cm) taken from the survey data of 2005 – 2007. Stem volume and biomass were calculated following VMD0001. Out of the sample of 100 measurements, 60 of the trees have a greater biomass when using the Chave et al. (2005) equation than the volume*BEF approach. This is within the limits set in VMD0001, confirming the validity of the model for Gola Forest.
Purpose of Data	The allometric equation for tree biomass was used to: • Calculate baseline emissions • Calculate project emissions • Calculate leakage
Comments	

5.6 Data and Parameters Monitored

Data / Parameter	Project Forest Cover Monitoring Map
Data unit	ha
Description	Map showing the location of forest land within the project area at the beginning of each monitoring period. If within the Project Area some forest land is cleared, the benchmark map must show the deforested areas at each monitoring event
Source of data	Landsat imagery or other similar Satellite images and field verification of deforested areas if any (GPS).
Description of measurement methods and procedures to be applied	By using satellite images and remote sensing to map forest and non-forest covering the Project Area it would be determined if there are any variations in the forest in the project area. All maps will be >90% accurate.
Frequency of monitoring/recording	Every 5 years (or less) with images. Verification of deforested areas will be continually monitored in field by the project staff.
Value applied:	NA
Monitoring equipment	Landsat imagery or other similar. Remote sensing software (e.g. ENVI)
QA/QC procedures to be applied	Field based accuracy assessment including accuracy assessment from high resolution imagery (<10m).
Purpose of data	Indicate one of the following: • Calculation of project emissions
Calculation method	NA
Comments	

Data / Parameter	Leakage Belt Forest Cover Monitoring Map
Data unit	ha
Description	Map showing the location of forest land within the leakage belt at the beginning of each monitoring period. If within the Project Area some forest land is cleared, the benchmark map must show the deforested areas at each monitoring event
Source of data	Landsat imagery or other similar Satellite images and field verification of deforested areas if any (GPS).
Description of measurement methods and procedures to be applied	By using satellite images and remote sensing to map forest and non-forest covering the Project Area it would be determined if there are any variations in the forest in the project area. All maps will be >90% accurate.
Frequency of monitoring/recording	Every 5 years (or less) with images. Verification of deforested areas will be continually monitored in field by the project staff.
Value applied:	NA
Monitoring equipment	Landsat imagery or other similar. Remote sensing software (e.g. ENVI)
QA/QC procedures to be applied	Field based accuracy assessment including accuracy assessment from high resolution imagery (<10m).
Purpose of data	Indicate one of the following: • Calculation of leakage
Calculation method	NA
Comments	

Data / Parameter	Degradation PRA Results
Data unit	NA
Description	The PRA will be executed from interviews and/or surveys to local actors with the purpose of identifying the existence of degradation potential within the area of the project due to: - Extraction of firewood. - Illegal logging If ≥ 10% of the surveys indicate that there is a risk of degradation then the procedures to verify and estimate the degradation should be executed. An additional result of the PRA would be the penetration distance that should be applied to calculate the area with degradation potential (buffer area).
Source of data	PRA
Description of measurement methods and procedures to be applied	The PRA will be conducted every 2 years. If the results indicate that the project area has no pressure from this type of degradation, then it will be assumed that: $\Delta C_{p,Deg,i,t} = 0$.

	If the results of the PRA indicate that there is potential for degradation, then it must: - Obtain a "penetration distance" in the PRA (distance that the degradation agents can enter from the nearest access points). - Identify the most important access points to the vulnerable area. - From said points, draw the distances and create a Buffer Area with a width equal to length. - Transects will be established to evaluate the buffer zone. The assessed area should not be lesser than 1% of the buffer area. - If stumps are not found (harvested trees), then it is assumed that $\Delta Cp,Deg,i,t = 0$ and the assessment is repeated every 2 years. - If stumps are found, then a systematic assessment is carried out. For this, plots are distributed systematically, being the area to assess ≥ 3% of the buffer area. - Take into account the diameter of the stumps, which will be assumed as their DBH. If they were very large (e.g. due to buttresses), then the species of the stump is identified and standing trees of the same species are located. Afterwards, their DBH and stump diameter are measured and a ratio between DBH/stump diameter is calculated. With this ratio, the DBH from the stump diameter of the cleared individuals that were found is estimated. With the DBH data, the carbon stock of the harvested trees is calculated, using the allometric equation that was employed for the estimation of the tree carbon stocks in the baseline (Chavé 2005 Equation -- $Exp(-2.977 + \ln(\rho D^2 H))$ $\exp(-1.576 + 2.179 \ln(D) + 0.198)$. - It will be assumed that all stock will be lost to the atmosphere.
Frequency of monitoring/recording	This assessment will be repeated every 5 years.
Value applied:	NA
Monitoring equipment	NA
QA/QC procedures to be applied	NA
Purpose of data	Indicate one of the following: • Calculation of project emissions
Calculation method	
Comments	

Data / Parameter	Result of Limited Degradation Survey
Data unit	
Description	This will be sampled by surveying several transects of known length and width across the access-buffer area (equal in area to at least 1% of ADeg,i) to check whether new tree stumps are evident or not.
Source of data	PRA

Description of measurement methods and procedures to be applied	NA
Frequency of monitoring/recording	Will be repeated each time the PRA indicates a potential for degradation
Value applied:	NA
Monitoring equipment	GPS Measuring tape DBH tape Camera Data collection sheets Other required equipment
QA/QC procedures to be applied	Blind checks will be conducted by field team leads. Hot checks will be conducted by other field staff on a regular basis.
Purpose of data	Indicate one of the following: • Calculation of project emissions
Calculation method	NA
Comments	

Data / Parameter	ADefPA,i,u,t
Data unit	ha
Description	Area of recorded deforestation in the project area in stratum i converted to land use u at time t
Source of data	Landsat satellite images.
Description of measurement methods and procedures to be applied	The images used will be compatible with the ones already used in the estimations ex-ante in order to be compared.
Frequency of monitoring/recording	The data will be assesses at least every 5 years or if verification occurs
Value applied:	NA
Monitoring equipment	Landsat imagery or other similar. Remote sensing software (e.g. ENVI)
QA/QC procedures to be applied	Field based accuracy assessment including accuracy assessment from high resolution imagery (<10m).
Purpose of data	Indicate one of the following: • Calculation of project emissions
Calculation method	NA
Comments	According to what has been observed on each monitoring, it has been considered to be zero for project scenario.

Data / Parameter	ADefLB,i,u,t
Data unit	ha
Description	Area of recorded deforestation in the leakage belt in stratum i converted to land use u at time t
Source of data	Landsat satellite images.
Description of measurement methods and procedures to be applied	The images used will be compatible with the ones already used in the estimations ex-ante in order to be compared.
Frequency of monitoring/recording	The data will be assesses at least every 5 years or if verification occurs
Value applied:	NA
Monitoring equipment	Landsat imagery or other similar. Remote sensing software (e.g. ENVI)
QA/QC procedures to be applied	Field based accuracy assessment including accuracy assessment from high resolution imagery (<10m).
Purpose of data	Indicate one of the following: • Calculation of leakage
Calculation method	NA
Comments	

Data / Parameter	ADECKS,I,t
Data unit	ha
Description	Area of logging decks in stratum i at time t
Source of data	Landsat satellite images.
Description of measurement methods and procedures to be applied	NA
Frequency of monitoring/recording	NA
Value applied:	NA
Monitoring equipment	NA
QA/QC procedures to be applied	NA
Purpose of data	NA
Calculation method	NA
Comments	

Data / Parameter	ADegW,i
Data unit	ha
Description	Area potentially impacted by degradation processes in stratum i
Source of data	PRA
Description of measurement methods and procedures to be applied	The PRA will be executed from interviews and/or surveys to local actors with the purpose of identifying the existence of degradation potential within the area of the project due to: - Extraction of firewood. - Illegal logging If ≥ 10% of the surveys indicate that there is a risk of degradation then the procedures to verify and estimate the degradation should be executed. An additional result of the PRA would be the penetration distance that should be applied to calculate the area with degradation potential (buffer area).
Frequency of monitoring/recording	Every 2 years
Value applied:	NA
Monitoring equipment	NA
QA/QC procedures to be applied	NA
Purpose of data	• Indicate one of the following: Calculation of project emissions
Calculation method	The PRA will be conducted every 2 years. If the results indicate that the project area has no pressure from this type of degradation, then it will be assumed that: $\Delta C_{p,Deg,i,t} = 0$. If the results of the PRA indicate that there is potential for degradation, then it must: - Obtain a "penetration distance" in the PRA (distance that the degradation agents can enter from the nearest access points). - Identify the most important access points to the vulnerable area. - From said points, draw the distances and create a Buffer Area with a width equal to length. - Transects will be established to evaluate the buffer zone. The assessed area should not be lesser than 1% of the buffer area. - If stumps are not found (harvested trees), then it is assumed that $\Delta C_{p,Deg,i,t} = 0$ and the assessment is repeated every 2 years. - If stumps are found, then a systematic assessment is carried out. For this, plots are distributed systematically, being the area to assess ≥ 3% of the buffer area. - Take into account the diameter of the stumps, which will be assumed as their DBH. If they were very large (e.g. due to buttresses), then the species of the stump is identified and standing trees of the same species are located. Afterwards,

	their DBH and stump diameter are measured and a ratio between DBH/stump diameter is calculated. With this ratio, the DBH from the stump diameter of the cleared individuals that were found is estimated. With the DBH data, the carbon stock of the harvested trees is calculated, using the allometric equation that was employed for the estimation of the tree carbon stocks in the baseline (Chavé 2005 Equation -- $Exp(-2.977 + \ln(\rho D^2 H))$ $\exp(-1.576 + 2.179 \ln(D) + 0.198)$. - It will be assumed that all stock will be lost to the atmosphere.
Comments	

Data / Parameter	ADistPA,q,i,t
Data unit	Ha
Description	Area impacted by natural disturbance in the project stratum *i* converted to natural disturbance stratum *q* at time *t*; ha
Source of data	Satellite images, field monitoring and: - United States Geologic Society (USGS) and Incorporated Research Institute for Seismology (IRIS) Seismic Monitor[17]. - National Oceanic and Atmospheric Administration (NOAA) National Climate Data Center, International Best Track Archive for Climate Stewardship (IBTrACS)[18]. - MODIS Active Fire and Burned Area Product[19].
Description of measurement methods and procedures to be applied	Any disturbance detected will be evaluated with Landsat imagery and ground verification using a GPS.
Frequency of monitoring/recording	This will be monitored on an annual basis.
Value applied:	NA
Monitoring equipment	United States Geologic Society (USGS) and Incorporated Research Institute for Seismology (IRIS) Seismic Monitor[20]. - National Oceanic and Atmospheric Administration (NOAA) National Climate Data Center, International Best Track Archive for Climate Stewardship (IBTrACS)[21]. MODIS Active Fire and Burned Area Product[22].
QA/QC procedures to be applied	NA

[17] http://www.iris.edu/dms/seismon.htm

[18] http://www.ncdc.noaa.gov/oa/ibtracs/index.php?name=ibtracs-data

[19] http://modis-fire.umd.edu/index.html

[20] http://www.iris.edu/dms/seismon.htm

[21] http://www.ncdc.noaa.gov/oa/ibtracs/index.php?name=ibtracs-data

[22] http://modis-fire.umd.edu/index.html

Purpose of data	Indicate one of the following: • Calculation of leakage
Calculation method	NA.
Comments	Ex-anti estimation of disturbance have been assessed based on the historic incidence

Data / Parameter	AROAD,i,t
Data unit	Ha
Description	Area of roads in stratum i at time t
Source of data	Field measurements or reported measurements such as post-harvest assessment reports and post-harvest maps that are based on field measurements
Description of measurement methods and procedures to be applied	No logging NA
Frequency of monitoring/recording	NA
Value applied:	NA
Monitoring equipment	NA
QA/QC procedures to be applied	NA
Purpose of data	NA
Calculation method	NA
Comments	NA

Data / Parameter	ARRL,forest,t
Data unit	Ha
Description	Remaining area of forest in RRL at time t
Source of data	Landsat satellite imagery
Description of measurement methods and procedures to be applied	Landsat imagery or other similar. Remote sensing software (e.g. ENVI)
Frequency of monitoring/recording	Remaining forest area will be updated at least every 5 years or at verification.
Value applied:	NA
Monitoring equipment	- Landsat imagery or other similar. - Remote sensing software (e.g. ENVI)
QA/QC procedures to be applied	Field based accuracy assessment including accuracy assessment from high resolution imagery (<10m)

Purpose of data	• Indicate one of the following: Calculation of project emissions • Calculation of leakage
Calculation method	NA
Comments	Ex-anti estimation has been made of deforestation in the project case following BL-UP

Data / Parameter	*APi*
Data unit	Ha
Description	Total area of degradation sample plots in stratum i
Source of data	Ground measurement
Description of measurement methods and procedures to be applied	See parameter PRA
Frequency of monitoring/recording	Every 2 years
Value applied:	NA
Monitoring equipment	NA
QA/QC procedures to be applied	NA
Purpose of data	Indicate one of the following: • Calculation of project emissions
Calculation method	NA
Comments	

Data / Parameter	CDegW,i,t
Data unit	t CO2-e
Description	Biomass carbon of trees cut and removed through illegal logging and fuelwood and charcoal extraction degradation process from plots measured in stratum i at time t
Source of data	Field measurement
Description of measurement methods and procedures to be applied	The diameter of all tree stumps is the designated plots will be measured and conservatively assumed to be the same as the DBH. If the stump is a large buttress, several individuals of the same species nearby will be identified and a ratio of the diameter at DBH to the diameter of buttress at the same height above ground as the measured stumps will be determined. This ratio will be applied to the measured stumps to estimate the likely DBH of the cut tree. The above and below ground carbon stock of each harvested tree will be estimated using the same allometric regression equation and root to shoot ratio used in the module for estimating the carbon pool in trees (CP-AB) in the baseline scenario.

Frequency of monitoring/recording	Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Value applied:	NA
Monitoring equipment	GPS Measuring tape DBH tape Camera Data collection sheets Other required equipment
QA/QC procedures to be applied	Blind check will be conducted by field team leads. Hot checks will be conducted by other field staff on a regular basis.
Purpose of data	• Indicate one of the following: Calculation of project emissions
Calculation method	NA
Comments	This will only occur if the Degradation PRA Results indicate logging is occurring

5.7 Data and Parameters Monitored (CL3, CM3 & B3)

Since validation and verification are taking place almost simultaenously, there is no data nor parameters being monitored subsequent to validation. The same point is to be made for anticipated and actual impacts on comunities. Therefore, please see section 5.5 above instead.

6 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS (CLIMATE)

6.1 Baseline Emissions (G2)

The quantification of baseline emissions followed the VM0007 methodology modules BL-UP (part 4 estimation of carbon stock changes and GHG emissions), X-STR, C-AB, E-BB. Following the module BL-UP the baseline deforestation rate was calculated from the Reference Region for Deforestation (RRD). The rate of deforestation was applied to the Project Area and Leakage Belt using spatial modelling. **The population driver approach was not used**. The following section is a summary of the analysis and equations. The complete baseline report following BL-UP is found in Netzer and Walker (2013), found in the appendix folder of the PD.

Following BL-UP the annual area of unplanned deforestation is determined from the RRD and then applied to the Reference Region for Location (RRL) which includes the Project Area and Leakage Belt.

Following the methodology deviation, presented in Section 2.6 of the PD and approved during validation, two deforestation rates were used: 1) within forest reserves (FR-RRD) applied to the PA,

and 2) buffer area around forest reserves (BUFF-RRD) applied to the LB. All other methodology requirements were followed.

To calculate the annual area of deforestation in the RRD (both the FR-RRD and BUFF-RRD) ($A_{BSL,RRD,unplanned,t}$) the methodology provides three approaches: 1) historic average, 2) linear regression and 3) non-linear regression that can be used if there are more than 5 points in time. If the regression is significant ($p \leq 0.05$, $r^2 \geq 0.75$, and demonstrated free from bias based on selection of fit with the lowest residuals) than it must be used.

A significant regression was not able to be established and therefore a historic average was taken and the following equations were applied to estimate the projected annual area of unplanned baseline deforestation:

$$A_{BSL,FR-RRD,unplanned,t} = {}^{A_{FR-RRD,unplanned,hrp}}\Big/_{T_{hrp}}$$

$$A_{BSL,BUFF-RRD,unplanned,t} = {}^{A_{FR-BUFF-RRD,unplanned,hrp}}\Big/_{T_{hrp}}$$

Where:

$A_{BSL,FR-RRD,unplanned,t}$	Projected area of unplanned baseline deforestation in the Forest Reserve *RRD* in year t; ha
$A_{FR-RRD,unplanned,t}$	Total area deforestated during the historical reference period in the Forest Reserve RRD; ha
$A_{BSL,BUF-RRD,unplanned,t}$	Projected area of unplanned baseline deforestation in the buffer area *RRD* in year t; ha
$A_{BUFF-RRD,unplanned,t}$	Total area deforestated during the historical reference period in the buffer area RRD; ha
T_{hrp}	Duration of the historical reference period in years; yr
t	1,23, …t* years elapsed since the projected start of the REDD project activity

Table15 Deforestation during the historic reference period in the RRD

	Total area deforested during the historical reference period in the RRD	Duration of the historical reference period	Annual deforestation during the historic period in the RRD
	$Area_{RRD,unplanned,t}$	T_{hrp}	$Area_{BSL,RRD,unplanned,t}$
	Hectares	Years	Hectares
Total RRD area	31,150	10	3,115
FR-RRD	14,244	10	1,424
BUFF-RRD	16,907	10	1,691

Estimation of annual areas of unplanned baseline deforestation in the RRL (BL-UP step 2.3)

Following the methodological guidelines and the Methodology deviation the projected unplanned deforestation in the FR-RRD and BUFF-RRD is described below. Where P_{rrl} is the proportion of forest area in the RRL's LB and PA at the start of the baseline period (2011) to the total area of the RRD's forest reserves and buffer areas, and **A**bsl,RR,unplanned,t is the area of unplanned baseline deforestation in the RRD in year t in the forest reserves and buffer areas. The projected area of unplanned deforestation is estimated using the following equation:

$$A_{BSL,RR,unplanned,t} = A_{BSL,RRD,unplanned,t} * P_{RRL}$$

Where:

$A_{BSL,RR,unplanned,t}$	Projected area of unplanned baseline deforestation in the reference region for location (*RRL*) in year *t;* ha
$A_{BSL,RRD,unplanned,t}$	Projected area of unplanned baseline deforestation in *RRD* in year *t*; ha
P_{RRL}	Ratio of forest area in the *RRL* at the start of the baseline period to the total area of the *RRD*; dimensionless
t	1, 2, 3, … t^* years elapsed since the projected start of the REDD project activity

Table16 Estimation of annual areas of unplanned baseline deforestation in the RRL

	Annual deforestation during the historic period **RRD (from Table15)**	Ratio of forest area in the RRL at the start of the baseline period to the total area of the RRD	Projected area of unplanned baseline deforestation in the reference region for location **RRL (Project Area & Leakage Belt)**
	$Area_{BSL,RRD,unplanned,t}$	P_{RRL}	ABSL,RR,unplanned,t
	Hectares	%	Hectares
Total RR* area	3,115	0.81	2,517
FR-RR*	1,424	0.73	1,041
BUFF-RR*	1,692	0.91	1,544

* represents both RRD and RRL as specified in the top row of the table.

Table16 shows the projected area of unplanned baseline deforestation in the Gola Project Area (FR-RRL) and Leakage Belt (BUFF-RRL).

This method of estimating the annual area of unplanned baseline deforestation was used because spatial modelling was applied. Because the Gola REDD project is using a simple historic approach there is no analysis of any of the "alternate population driver" approach.

As per VMD0007, the Gola REDD project is identified as having a "Frontier Configuration" and therefore location analysis is required (i.e. modelling). Frontier deforestation is forest destruction that occurs along a discernible frontier, such as a new road cut into a forest. Mosaic deforestation, in contrast, occurs in patches across a forested area. The land surrounding the Gola REDD Project is a frontier configuration because, although patchy, deforestation is slowly progressing towards the frontier of the National Park.

The software used to model the location of deforestation in the RRL was IDRISI Selva[23]. Within IDRISI there are 2 models that are appropriate under VM0007 BL-UP for projecting deforestation, Land Change Modeller (LCM) and GEOMOD. Both of these models have similar setup and dataset requirements and therefore can be used interchangeably. Both of these models met all of the requirements set out in BL-UP (Netzer and Walker 2013). The modelling was run from 2011 to 2041. The number of hectares per year deforestation in the Project Area (*FR-ABSL,RR,unplanned,t*) and the Leakage Belt (*BUFF- ABSL,RR,unplanned,t*) was projected into the future at a linear rate. The location of deforested in the Project Area and Leakage Belt was determined by the risk map created in the modeling process (Netzer and Walker 2013).

Therefore the baseline annual deforestation in the Project Area is 1,041ha^{-1} y^{-1} and the baseline deforestation in the Leakage Belt is 1,544ha^{-1} y^{-1}

[23] http://www.clarklabs.org/products/idrisi.cfm

Estimation of Carbon stock changes and greenhouse gas emissions Stratification (Step 4.1 in BL-UP)

Pre-deforestation strata (forest strata)

Stratification for carbon stocks consists of grouping forest areas in homogeneous groups in terms of carbon stocks, using stratification factors (such as type of forest/vegetation, type of soil/geology, management). The project area and Leakage belt were stratified using VM0007 Module X-STR.

Prior to the development of this REDD project extensive ground measurements had established the forest carbon stock for the project area. The data was collected in 2006 and 2007 from 609 permanent plots (Klop 2012). The results of this extensive survey work showed that the forests across the project area were relatively homogenous in species composition (same forest type), however there were significant differences in carbon stocks between Gola South, and Central/North. It was hypothesized that the difference between the stocks in the 2 areas was due to past management histories, the southern block having been more extensively logged than the central or northern blocks, thus resulting in a forest with lower carbon stocks but with potential for significant re-growth (Lindsell and Klop 2012). Because of the potential for re-growth enhancement of carbon in Gola South will be measured throughout the projects lifetime (Tatum-Hume 2013b).

Based on these results the Project Area was stratified into:

1) Gola Central & North, and

2) Gola South (where enhancements (forest growth) will be monitored). However, in this first monitoring period (2015) enhancements are not being measured because the last measurement was less than two years prior, and it is thought that no substantial enhancements will have occurred in that time.

Table17 Area of Gola REDD project strata in 2011.

Stratum	area (ha)
Gola Central/North	43,059
Gola South	25,455
Total	68,515

The Leakage Belt is the same forest type as the GRNP. Due to limited information on carbon stocks in the Leakage Belt forests it is conservatively assumed that the leakage belt forests have the same carbon stocks as Gola Central/North. This is conservative because Gola Central/North has the highest carbon stocks and is undoubtedly the least disturbed forest in the Reference Region.

Table18 Area of Leakage belt in 2011

Block	area (ha)
Leakage belt	62,932

Post deforestation strata (non-forest strata)

Farming is the primary livelihood activity for the vast majority of communities in the region around the project area (Witkowski et al 2012a, Bulte et al 2013). These communities engage in shifting cultivation converting natural forests in the farm-fallow cycle (Witkowski et al 2012a, Bulte et al 2013). Every person interviewed described using similar farming techniques. The farming process begins with brushing early in the year. Then the trees are felled, and the land is burned in March or April. (Witkowski et al 2012a, Bulte et al 2013). Traditional practices involve the clearing of forests to make way for 1-2 years of crop plantations followed by an average of 7.5 years fallow time in the reference region (Cuni-Sanchez 2012b), in the Leakage Belt the fallow period is also on average is 7 years (Witkowski et al. 2012a). Therefore the post deforestation strata is considered crop-fallow.

Carbon stocks and carbon stock changes per stratum (BL-UP step 4.2)

Pre deforestation carbon stocks (forest strata)

Carbon stocks were estimated in the forest areas following VM0007 Modules CP-AB and CP-S.

Non-tree, litter and deadwood were excluded (Tatum-Hume et al 2013b). Above and below ground tree biomass and soil organic carbon was calculated for both forest strata (Table19). Carbon stocks were estimated for Strata 1 (GRNP Central/North) and Strata 2 (GRNP South). Uncertainty was calculated as a percentage of the mean at 95% confidence intervals following X-UNC.

Table19 Pre deforestation carbon stocks

Carbon Pool	Strata 1 (GRNP Central/North)				Strata 2 (GRNP South)			
	No of Plots	Mean Stock	95% CI	95% CI as % of mean	No of Plots	Mean Stock	95% CI	95% CI as % of mean
		t CO_2 ha^{-1}				t CO_2 ha^{-1}		
$C_{AB\_Tree,i}$	353	629	48.4	6.6%	49	578	76.6	13.0%
$C_{BB\_Tree,i}$		151.0	10.0	6.6%		138.7	18.0	13.0%
$C_{AB\_nontree,i}$								
$C_{BB\_nontree,i}$								
$C_{LI,i}$								
$C_{SOC,i}$	18	253.9	30.6	12.1%	29	192.3	24.4	12.7%
C_{BSL}		1,034.26	30.5	8.4%		909.05	49.1	12.9%

Post deforestation carbon stocks

Post-deforestation field measurements are the long term average carbon stocks of agricultural land from 0-10 years. This included the 1-2 year of planted crops through the 10 year fallow. As delineated in VMD0007, Section 4.2.2, Option 1- Simple approach was chosen and a time-weighted average was used to estimate the above ground biomass of post-deforestation carbon stocks (Tatum-Hume et al 2013b) (Table20).

Modules CP-AB and CP-S were used to estimate carbon stocks (Tatum-Hume et al 2013b). Non-tree, litter and deadwood were excluded because they are less than 5% of the net carbon stocks

and are therefore considered insignificant[24] following T-SIG (Tatum-Hume et al 2013b). Total post-deforestation carbon stocks in all pools are hence calculated using Equation 17 of VMD0007 based on the above and below ground tree biomass and soil organic carbon (Tatum-Hume et al 2013b) (Table20).

Table20 Post-deforestation carbon stocks

Carbon Pool	Post Deforestation			
	Number of Plots	Mean Stock	95% CI $t\ CO_2\ ha^{-1}$	95% CI as % of mean
$C_{AB\_TreePost,i}$ $C_{BB\_TreePost,i}$ $C_{SOCPost,i}$	99	127.0 34.3 172.7	19.8	12.8%
$C_{BSL,post,i}$		334.0	19.8	12.8%

Estimation of carbon stocks in wood products per stratum

Wood products were calculated following CP-WP. Based on surveys around the project area 7% of respondents indicated they would do nothing with the wood as it was too far away from the village to carry, and 73% would burn and/or use the wood for charcoal. The remaining 20% of people reported using felled wood for construction (Witkowski et al 2012a). Based on these surveys the amount of wood products extracted during deforestation was estimated to be 20% (representing 20% of the farmers) and conservatively estimated that those farmers harvest 50% of the total above ground biomass. This resulted in a mean stock extraction shown in Table21.

Table21 Wood products extracted during deforestation

	Strata 1: GRNP North	Strata 2: GRNP South
AG Biomass	654.7	582.5
mean stock of extracted biomass carbon (CXB,i)	50.36	44.81

Following CP-WP, the remaining long lived wood products from the total biomass extracted is shown in Table22.

Table22 Carbon stocks entering the wood products pool

	Description	Strata 1: GRNP North	Strata 2: GRNP South
		t CO2e ha-1	t CO2e ha-1
CWP,i	Carbon stock entering the wood products pool from stratum i	5.47	4.86
CWP100,i	Carbon stock entering the wood products pool at the time of deforestation that is expected to be emitted over 100-years from stratum i	0.04	0.03

[24] http://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-04-v1.pdf

$$C_{XB,ty,i} = \frac{1}{A_i} * \sum_{j=1}^{S} (V_{ex,ty,j,i} * D_j * CF_j * \frac{44}{12}) \quad (1)$$

Where:

$C_{XB,ty,i}$	Mean stock of extracted biomass carbon by class of wood product *ty* from stratum *i*; t CO_2-e ha^{-1}
A_i	Total area of stratum *i*; ha
$V_{ex,ty,j}$	Volume of timber extracted from within stratum *i* (does not include slash left onsite) by species *j* and wood product class *ty*; m^3
D_j	Mean wood density of species *j*; t d.m.m^{-3}
CF_j	Carbon fraction of biomass for tree species *j*; t C t^{-1} d.m.
j	*1, 2, 3, … S* tree species
ty	Wood product class – defined here as sawnwood (s), wood-based panels (w), other industrial roundwood (oir), paper and paper board (p), and other (o)
44/12	Ratio of molecular weight of CO_2 to carbon, t CO_2-e t C^{-1}

$$C_{WP,i} = \sum_{ty=s,w,oir,p,o} C_{XB,ty,i} * (1 - WW_{ty}) * (1 - SLF_{ty}) * (1 - OF_{ty}) \quad (2)$$

Where:

$C_{WP,i}$	Carbon stock in wood products pool (stock remaining in wood products after 100 years) from stratum *i*; t CO_2-e ha^{-1}
$C_{XB,ty,i}$	Mean stock of extracted biomass carbon by class of wood product *ty* from stratum *i*; t CO_2-e ha^{-1}
WW_{ty}	Wood waste. The fraction immediately emitted through mill inefficiency by class of wood product *ty*; dimensionless
SLF_{ty}	Fraction of wood products that will be emitted to the atmosphere within 5 years of timber harvest by class of wood product *ty*; dimensionless
OF_{ty}	Fraction of wood products that will be emitted to the atmosphere between 5 and 100 years of timber harvest by class of wood product *ty*; dimensionless
ty	Wood product class – defined here as sawnwood (s), wood-based panels (w), other industrial roundwood (oir), paper and paper board (p), and other (o)
i	*1, 2, 3, … M* strata

Estimation of carbon stock changes per stratum (BL-UP step 4.3)

As delineated in Section 4.2.3 of VMD0007 and equations 16-22, stock changes in each pool are calculated by subtracting post-deforestation carbon stocks from forest carbon stocks (Table23). Non-tree, litter and deadwood were excluded because they are less than 5% of the net carbon stocks and are therefore considered insignificant[25] following T-SIG (Tatum-Hume et al 2013b).

Table23 Carbon stock changes per stratum

Carbon Pool	Strata 1	Strata 2	Post deforestation	Wood product CWP, strata1	Wood product CWP, strata2	ΔC,Strata 1	ΔC,Strata 2
	Mean Stock t CO2e ha-1						
$C_{AB\ Tree,i}$	629.3	578.0	127.0	5.3	4.8	497.1	446.2
$C_{BB\_Tree,i}$	151.0	138.7	34.3			116.7	104.4
$C_{AB\ nontree,i}$	x	x	x			x	x
$C_{BB\_nontree,i}$	x	x	x			x	x
$C_{LI,i}$	x	x	x			x	x
$C_{SOC,i}$	253.9	172.7	172.7			81.2	19.6
C_{BSL}	1034.3	334.0	334.0			695.0	570.2

Forest strata:

$$C_{BSL,i} = C_{AB\_tree,i} + C_{BB\_tree,i} + C_{AB\_non-tree,i} + C_{BB\_non-tree,i} + C_{DW,i} + C_{LI,i} + C_{SOC,i} \quad (11)$$

Where:

$C_{BSL,i}$ Carbon stock in all carbon pools in forest stratum *i*; t CO_2-e ha^{-1}

$C_{AB\_tree,i}$ Carbon stock in aboveground tree biomass in stratum *i*; t CO_2-e ha^{-1}

$C_{BB\_tree,i}$ Carbon stock in belowground tree biomass in stratum *i*; t CO_2-e ha^{-1}

$C_{AB\_non-tree,\ i}$ Carbon stock in aboveground non-tree biomass in stratum *i*; t CO_2-e ha^{-1}

$C_{BB\_nontree,I}$ Carbon stock in belowground non-tree biomass in stratum *i*; t CO_2-e ha^{-1}

$C_{DW,i}$ Carbon stock in dead wood in stratum *i*; t CO_2-e ha^{-1}

$C_{LI,i}$ Carbon stock in litter in the forest stratum *i*; t CO_2-e ha^{-1}

$C_{SOC,i}$ Carbon stock in soil organic carbon in the forest stratum *i*; t CO_2-e ha^{-1}

i 1, 2, 3, … *M* strata

[25] http://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-04-v1.pdf

Estimation of the sum of baseline greenhouse gas emissions (BL-UP step 4.4)

See Table25 for the sum of baseline GHG emission.

Emissions of CO_2 by combustion of fossil fuel

Fossil fuel combustion in all situations is an optional emission source. The Methodology Module E-FFC, states that project proponents may elect to include fossil fuel combustion if emissions are higher in the baseline than in the project case thus generating emission reductions through project activities. Where emissions from fossil fuel combustion are estimated in the baseline, monitoring and estimation must also occur in the with-project scenario.

As an option emission the Gola REDD project has elected **not** to estimate emissions from fossil fuel combustion.

Emissions of N_2O due to nitrogen application

The estimation of emission from nitrous oxide is required if leakage prevention activities include the increases in the use of fertilizers (See Module REDD-MF).

The Gola REDD Project will not use fertilizers as a leakage prevention activity, and therefore emissions from nitrous oxide are excluded

Emissions of other GHG by biomass burning

Subsistence crop-fallow farming is the vast majority of the reason for deforestation in the project area (Witkowski et al 2012a). Crop-fallow involves clearing and burning the vegetation (Witkowski 2012; USAID 2007b; Nasi et al. 2006). Therefore GHG emissions from biomass burning is expected to occur on all land deforested during site preparation. Biomass assumed to be extracted for wood products is excluded from the estimation of biomass emission estimation. The emission from biomass burning was estimated following Module E-BB (Table24).

Table24 Non-CO2 emissions from biomass burning (for equations see Netzer and Walker 2013)

	Strata 1: GRNP North	Strata 2: GRNP South	Description
AG Biomass	654.7	582.5	Ave aboveground biomass stock before deforestation t d.m./ha
$B_{i,t}$	604.3	537.7	Ave aboveground biomass stock, after logs removed, before burning, t d.m./ha
Emissions per hectare, CH4	39	35	CH4 Emission from biomass burning per hectare, t CO2e/ha
Emissions per hectare, N2O	17	15	N2O Emission from biomass burning per hectare, t CO2e/ha

Calculation of net emissions (BL-UP Step 4.5)

Stock changes in above ground biomass were emitted at the time of deforestation. Emissions from below ground biomass were emitted at a rate of 1/10 the stock for 10 years. Emissions from soil were emitted at 1/20 the stock for 20 years.

The sum of baseline carbon stock changes is estimated as follows:

$$\Delta C_{TOT} = C_{BSL} - C_{post} - C_{wp} \quad (13)$$

$$C_{BSL} = \sum_{t=1}^{t^*} \sum_{i=1}^{M} ((C_{BSL,i}) * A_{unplanned,i,t}) \quad (14)$$

$$C_{post} = \sum_{t=1}^{t} \sum_{i=1}^{M} (C_{post,i} * A_{unplanned,i,t}) \quad (15)$$

$$C_{wp} = \sum_{t=1}^{t} \sum_{i=1}^{M} (C_{WP,i} * A_{unplanned,i,t}) \quad (16)$$

Where:

ΔC_{TOT}	Sum of the baseline carbon stock change in all pools up to time t^*; t CO_2-e (calculated separately for the project area [PA] and the leakage belt [LB]
C_{BSL}	Total forest carbon stock in areas deforested; t CO_2-e
C_{post}	Total post-deforestation carbon stock in areas deforested; t CO_2-e
C_{wp}	Total carbon stock in harvested wood products; t CO_2-e
$C_{BSL,i}$	Carbon stock in all carbon pools in the forest stratum i; t CO_2-e ha^{-1}
$A_{unplanned,i,t}$	Area of unplanned deforestation in forest stratum i at time t; ha
$C_{post,i}$	Carbon stock in all carbon pools in the post-deforestation stratum i; t CO_2-e ha^{-1}
$A_{unplanned,i,t}$	Area of unplanned deforestation in post deforestation stratum i at time t; ha
$C_{WP,i}$	Mean carbon stock in wood products pool (stock remaining in wood products after 100 years) from stratum i; t CO_2-e ha^{-1}
t	1, 2, 3, … t years elapsed since the projected start of the REDD project activity
i	1, 2, 3, … M strata

For calculation of carbon stock sequestered in wood products, see CP-W.

Total GHG emission were estimated for biomass burring. Nitrous oxide and emissions from fossil fuel combustion were excluded.

The GHG emissions in the baseline within the project boundary can be estimated as:

$$GHG_{BSL,E} = \sum_{t=1}^{t^*} \sum_{i=1}^{M} \left(E_{FC,i,t} + E_{BiomassBurn,i,t} + N_2O_{direct-N,i,t} \right) \quad (17)$$

Where:

$GHG_{BSL,E}$	Greenhouse gas emissions as a result of deforestation activities within the project boundary in the baseline; t CO_2-e
$E_{FC,i,t}$	CO_2 emission from fossil fuel combustion in stratum *i* in year *t*; t CO_2-e
$E_{BiomassBurn,i,t}$	Non-CO_2 emissions due to biomass burning as part of deforestation activities in stratum *i* in year *t*; t CO_2-e
$N_2O_{direct-N,i,t}$	Direct N_2O emission as a result of nitrogen application on the alternative land use within the project boundary in stratum *i* in year *t*; t CO_2-e
t	1, 2, 3, …t^* years elapsed since the projected start of the REDD project activity

For detailed information regarding the calculation of $E_{FC,i,t}$, $E_{BiomassBurn,i,t}$ and $N_2O_{direct-N,i,t}$ see E-FFC, E-BB and E-NA.

GHG emission sources excluded from the project can be neglected, i.e. accounted as zero. For the determination which sources of emissions must be included in the calculations as a minimum use Table 1 in REDD-MF and tool T-SIG

Following BL-UP net emissions were calculated for each strata in the project area and leakage belt (Table25).

Table25 Ex-Ante calculation of net emissions

		AreaBSLunplanned - Strata 1			AreaBSLunplanned - Strata 2			AreaBSLunplanned - Leakage belt			ΔCBSL,PA	ΔCBSL,LB
t	y	ha	t CO2	t non-CO2e (EBiomassBurn,i,t)	ha	t CO2	t non-CO2e (EBiomassBurn,i,t)	ha	t CO2	t non-CO2e (EBiomassBurn,i,t)	t CO2e (cumulative)	t CO2e (cumulative)
1	2012	337	172,744	18,035	704	322,179	34,620	1,544	791,586	82,643	547,578	874,229
2	2013	413	216,950	22,097	628	295,545	30,894	1,544	815,873	82,643	1,113,063	1,772,745
3	2014	353	192,799	18,897	688	330,026	33,828	1,544	840,207	82,648	1,688,614	2,695,600
4	2015	446	245,888	23,860	595	295,507	29,274	1,544	864,449	82,643	2,283,143	3,642,692
5	2016	435	247,408	23,287	606	307,167	29,796	1,544	888,737	82,643	2,890,802	4,614,072
6	2017	487	281,158	26,096	554	290,120	27,221	1,544	913,024	82,643	3,515,397	5,609,740
7	2018	518	304,749	27,758	522	282,194	25,690	1,544	937,358	82,648	4,155,789	6,629,746
8	2019	534	320,799	28,582	507	281,161	24,937	1,544	961,600	82,643	4,811,268	7,673,989
9	2020	543	333,998	29,083	498	282,630	24,473	1,544	985,888	82,643	5,481,452	8,742,520
10	2021	552	346,930	29,541	489	284,444	24,057	1,544	1,010,175	82,643	6,166,423	9,835,338

6.2 Project Emissions

The Green House Gas (GHG) emission results from the ex post monitoring of the Gola REDD project in Sierra Leone for the period 2011 to 2015 following the monitoring plan (M-MON) from VCS Methodology VM0007, and the Gola REDD project Monitoring Plan (M-MON, 2013).

The following activities resulting in emissions and removals have been monitored:

1) The area of forest land converted to non-forest land and associated changes in carbon stocks;
2) The area of forest land undergoing loss in carbon stock from degradation activities and associated changes in carbon stocks;
3) The area of forest land undergoing gain in carbon stock from enhancement activities and associated changes in carbon stocks.
4) The greenhouse gas emissions associated with project implementation.
5) The area of forest land undergoing loss in carbon stocks resulting from natural disturbances and associated changes in carbon stocks.

Selective logging of forest management areas possessing a FSC certificate is not taking place in the project area.

The baseline does not need to be reassessed in this monitoring period because it has only been four years since the baseline was established and there have been no events that would trigger a renewal of the baseline (see Section 6.2 Step 2 “Risk” for justification on no trigger). As described in M-MON the baseline will be reassessed every ten years or every five when conditions trigger a renewed baseline.

Changes in forest cover were assessed in the Reference Region for Location (RRL) which equates to the Project Area and Leakage Belt (M-REDD pp39). Methods for mapping forest cover changes followed those specified in BL-UP and GOFC-GOLD Good Practice Guidance[26].

Step 1 Selection and analyses of sources of land-use and land-cover (LU/LC) change data

A consistent time-series analysis of land-use change and the associated emission have been monitored following M-MON steps 1-2.

As with the 2011 classification produced for the initial VCS and CCB Project Documents, a combination of optical and Synthetic Aperture Radar data were used. In 2011 the precise satellites and sensors used were Landsat 5’s Thematic Mapper (TM) and the Advanced Land Observing Satellite (ALOS)’s Phased Array L-band Synthetic Aperture Radar (PALSAR). Both of these satellites have since failed, but successor mission data were available from Landsat 8’s Operational Land Imager (OLI) and ALOS-2’s PALSAR-2 sensor. Both OLI and PALSAR-2 produce similar data to TM and PALSAR-1, but with greater radiometric accuracy and, in the case of OLI, more bands, with slightly different wavelength. It was not thought likely that differences in the sensor characteristics would change the results.

[26] http://www.gofcgold.wur.nl/redd/

Processing LU/LC Change Data

The Gola Rainforest National Park is located across the boundary of two different Landsat scenes, Path 200 Row 55, and Path 201 row 55 (WRS-2). Fortunately cloud free Landsat 8 scenes were found for both scenes for January 2015 (Figure15, Table26).

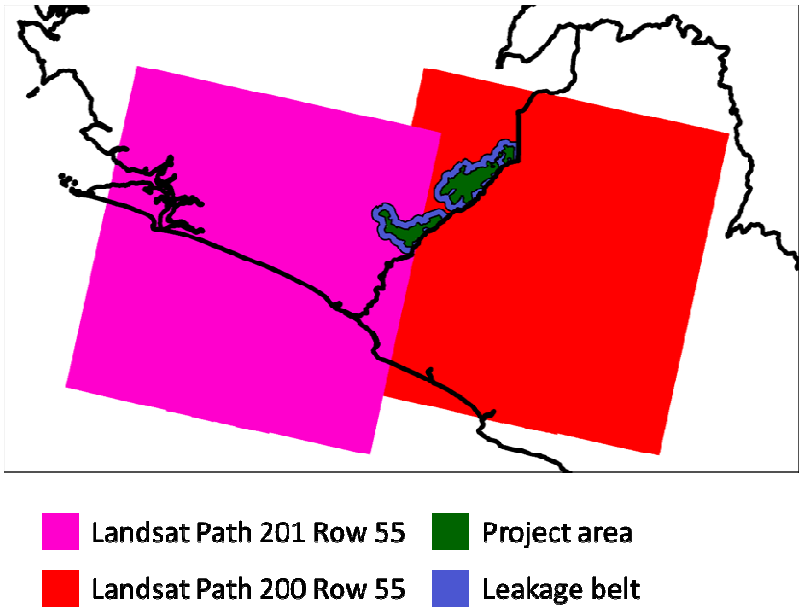


Figure15 Landsat scene boundaries

The situation for PALSAR-2 is more complicated, as a complete dataset of Strip-map (~10 m resolution) scenes has not yet been collected. Therefore a combination of two Strip-map scenes covering 80 % of the study area, and one ScanSAR scene (100 m resolution) scene covering the rest, were used (Figure15, Table26).

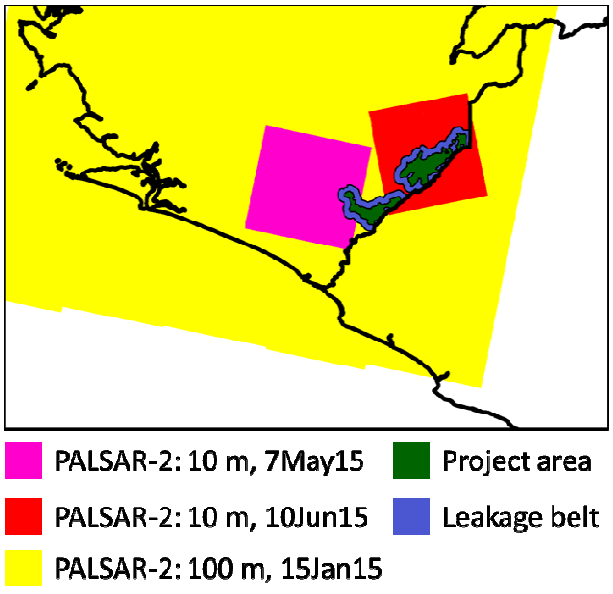


Figure16 PALSAR-2 scene boundaries

Table26 Metadata for all scenes used

Sensors	Scene ID	Mode & nominal resolution	Date
Landsat 8	LC82010552015028LGN00	OLI, 30 m	28th January 2015
Landsat 8	LC82000552015005LGN00	OLI, 30 m	5th January 2015
ALOS-2 PALSAR-2	ALOS2034953450-150115	ScanSAR, 100 m	15th January 2015
ALOS-2 PALSAR-2	ALOS2056470138-150610	Strip map, 10 m	10th June 2015
ALOS-2 PALSAR-2	ALOS2051513464-150507	Strip map, 10 m	7th May 2015

Data preparation

The Landsat scenes were converted from digital number to calibrated surface reflectances using the build in atmospheric correction and calibration tools in ENVI 5.0 (used for all further data manipulation and analysis). Scene LC82010552015028LGN00 was provided in UTM Zone 28N, whereas LC82010552015028LGN00 and other shapefiles and analysis in this project is done in UTM Zone 29N, so it was converted to 29N using a Rigorous transformation in ENVI. Subsequently the Landsat scenes were mosaicked together, with colour balancing applied to LC82010552015028LGN00, and cropped to cover the area of the chieftain boundaries involved in the Gola Forest, with a 300 m buffer to ensure the mapping covered the whole area of interest even given mapping errors. A 3 colour composite (using bands 6, 5, and 7) of the Landsat mosaic overlaid on the area of interest is shown in Figure17.

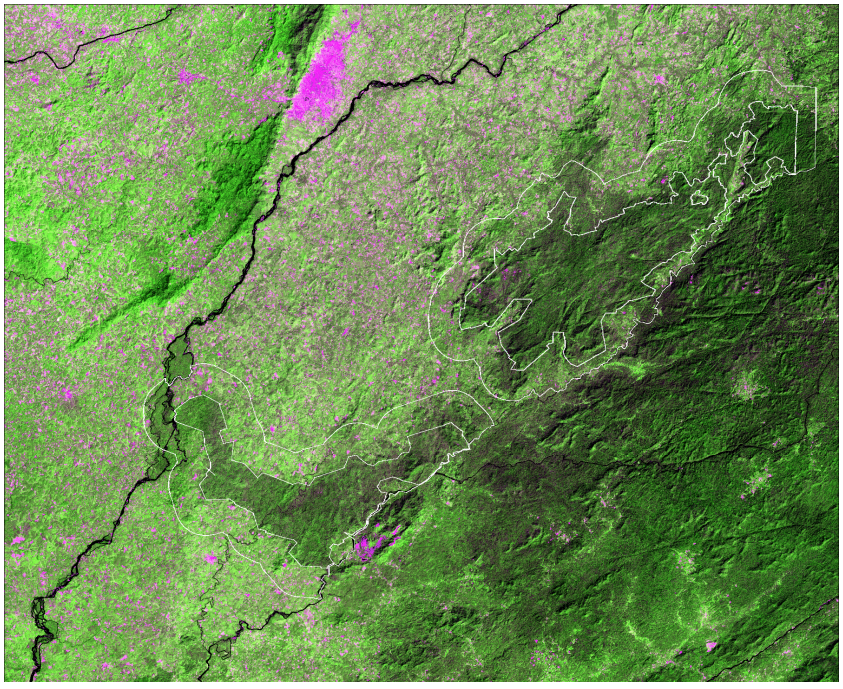
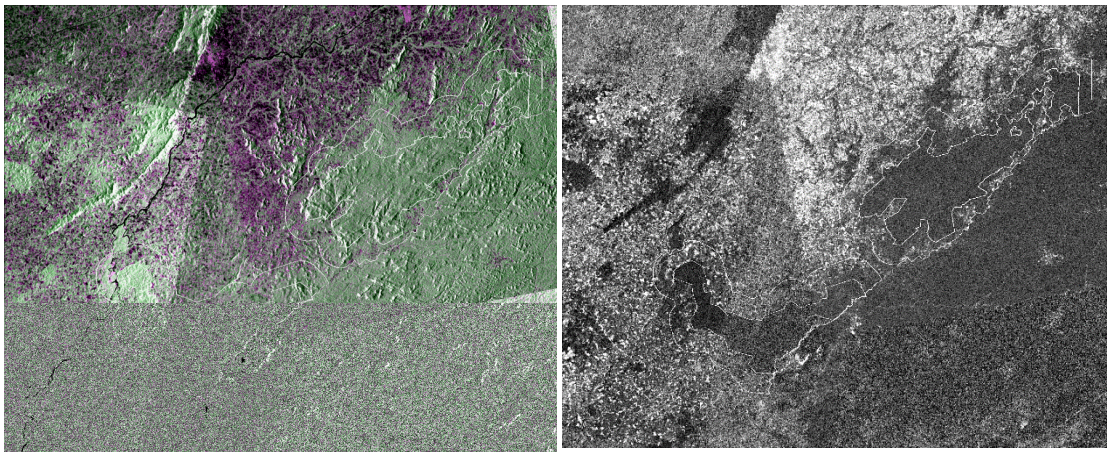


Figure17 Landsat mosaic over Gola Forest study area

The PALSAR-2 scenes were provided at level 2.1, and were thus already terrain corrected using SRTM data. The PALSAR scenes were converted from digital number to sigma0 using the default parameters. All were then resampled to 30 m using a cubic convolution kernel. Subsequently a 5 by 5 Enhanced Lee Filter was applied to remove speckle.

Despite significant effort in terms of cross calibration, the different orbits and products used meant a well calibrated backscatter product could not be produced. The best possible is shown in Figure18a, with seams between scenes clearly visible. A decision was therefore taken to use the Radar Forest Degradation Index, RFDI (Mitchard et al. 2012). This is the normalised difference of the two SAR bands provided, HH and HV, and gives a useful estimate of the canopy openness, with high values for open areas and low values for dense forest, taking advantage of their differential scattering mechanisms on cross-polarised and same-polarised data. RFDI represents a useful analysis technique on its own, but was especially chosen here as the ratio of the two bands is much less sensitive to calibration difficulties, and thus the seams between scenes seen in Figure18a are not visible in Figure18b. The RFDI was the only radar product used in the final classification.



a **b**

Figure18 PALSAR mosaics, HH & HV (a) and RFDI (b).

The RFDI was then added to the cropped Landsat 7-band image using the Layer Stacking procedure in ENVI. The image was inspected at a pixel level resolution around sharp features such as rivers, forest boundaries and roads, and no geometric offset was found.

Classification

A 'ground truth' dataset was prepared using areas of hyperspatial imagery on Google Earth, and based on the experience of the remote sensing technician, Edward Mitchard, who performed the analysis, performed the original set of classifications based on ground data collection for the Gola REDD Project. In all a dataset of 8000 pixels for each of the 'forest' and 'non-forest' classes were collected, and 1000 pixels for the 'water' class. A test dataset of about 5000 pixels per class (500 for water, as rarer class) was subsequently collected for validation purposes.

A variety of different classification methods were tested. In the end the optimal methodology involved transforming the 8-band input file using a forward Principal Components rotation, producing 8 orthogonal bands containing independent information. The first three bands, which contained between them 90 % of the total information (estimated using their Eigenvectors), were used for the classification procedure, leaving the remaining 5 bands which contained mostly information relating to instrument noise, haze and other unhelpful characteristics. A Support Vector Machine classification using a radial basis function was then performed to produce the final 3-class image.

As with the original 2011 classification, a post-processing step of a 5 by 5 majority filter was applied to the final classification, to remove isolated pixels that were in all likelihood mis-classified. This filtered classification was compared to the 2011 3-class classification to produce estimates of deforestation and regrowth in the Project Area and Leakage Belt.

Post-processing and accuracy assessment

The classification produced had a high accuracy when compared to the independent test dataset, with an overall accuracy of 98.8 %, kappa coefficient of 0.97, and omission and commission errors below 2.5 % for all classes (Table27). Additionally it looked reasonable when compared directly to the classification from 2011 (Figure19).

Table27 validation dataset

Class	Commission (pixels)	Omission (pixels)	Commission (%)	Omission (%)
Forest	22/5204	94/5276	0.42	1.78
Non-forest	94/4199	22/4127	2.24	0.53
Water	0.00	0.00	0/500	0/500

Table28 confusion matrix

		Independent test data			
Classification		Forest	Non-forest	Water	Total
	Forest	5182	22	0	5204
	Non-forest	94	4105	0	4199
	Water	0	0	500	500
	Total	5276	4127	500	9903

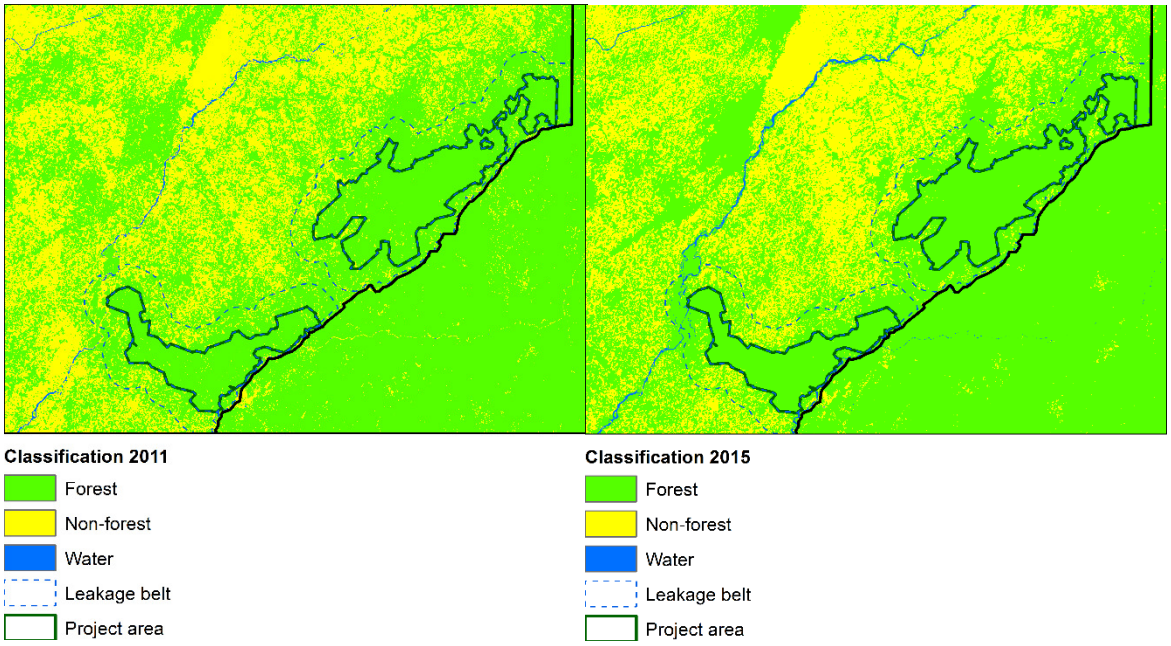


Figure19 Classification 2011 and 2015

As would be expected given the swidden agricultural practices of Sierra Leone, there is plentiful deforestation and regrowth throughout the region. In general there is more deforestation than regrowth noticeable outside the project area, suggesting a long-term deforestation trend, but the changes are relatively balanced.

It should be noted that the Gola REDD Project Area and Leakage Belt are determined by the area of forest within the Project Area and Leakage Belt at the start of the REDD project (t=0). Therefore, at t=0 the Project Area and Leakage Belt are 100% forest. This is important to note because the Gola National Park boundary (the area protected by the Gola REDD project) is a mix of forest, non-forest and water, and the two should not be confused.

To be accurate to the actual time period that the land cover maps and therefore deforestation are representative of the difference in imagery acquisition time was calculated in months (Baseline land cover at t=0 and Monitoring land cover t=4). Due to cloud cover and availability of LandSat imagery, the Baseline land cover map was from Feb. 2010 to Jan 2011, and AOLS PALSAR data from Jan and Feb 2011 (Mitchard 2012). Using the average between these dates the actual land cover map is estimated to be representative of August 2010. This is acceptable under the VM0007 Methodologies which states that land cover map must be within 2 years of the project start date. The Monitoring land cover map (developed for this monitoring event) is from imagery in Jan 2015 and ScanSAR data Jan 2015. **Therefore the period of time between the two land cover maps is set at 4.5 years.**

As mentioned above, the area of forest in the Project Area and Leakage Belt in 2011/10 (t=0), was 68,515ha and 63,932ha respectively. The results from the 2015 land cover mapping shows the area of forest in the Project Area and Leakage Belt dropping to 68,455ha and 55,578ha respectively (*ARRL,forest,t*). This is a loss of forest in the Project area of 60ha, and 7,356ha in the Leakage Belt over four and a half years, amounting to an annual deforestation rate of 13ha in the Project Area, and 1,635ha in the Leakage belt.

Table29 Forest area and deforestation for the first Monitoring event (2011 to 2015)

ARRL,forest,t	Forest area 2011/10 (t=0)	Forest area 2015 (t=4)	Total deforestation	Annual deforestation
	ha			
Project Area	**68,515**	**68,455**	**60**	**13**
Gola South	25,456	25,414	41	9
Gola North	43,059	43,040	19	4
Leakage Belt	**62,934**	**55,578**	**7,356**	**1,635**

The updated forest cover benchmark map for the Gola REDD project is now 68,455ha for 2015.

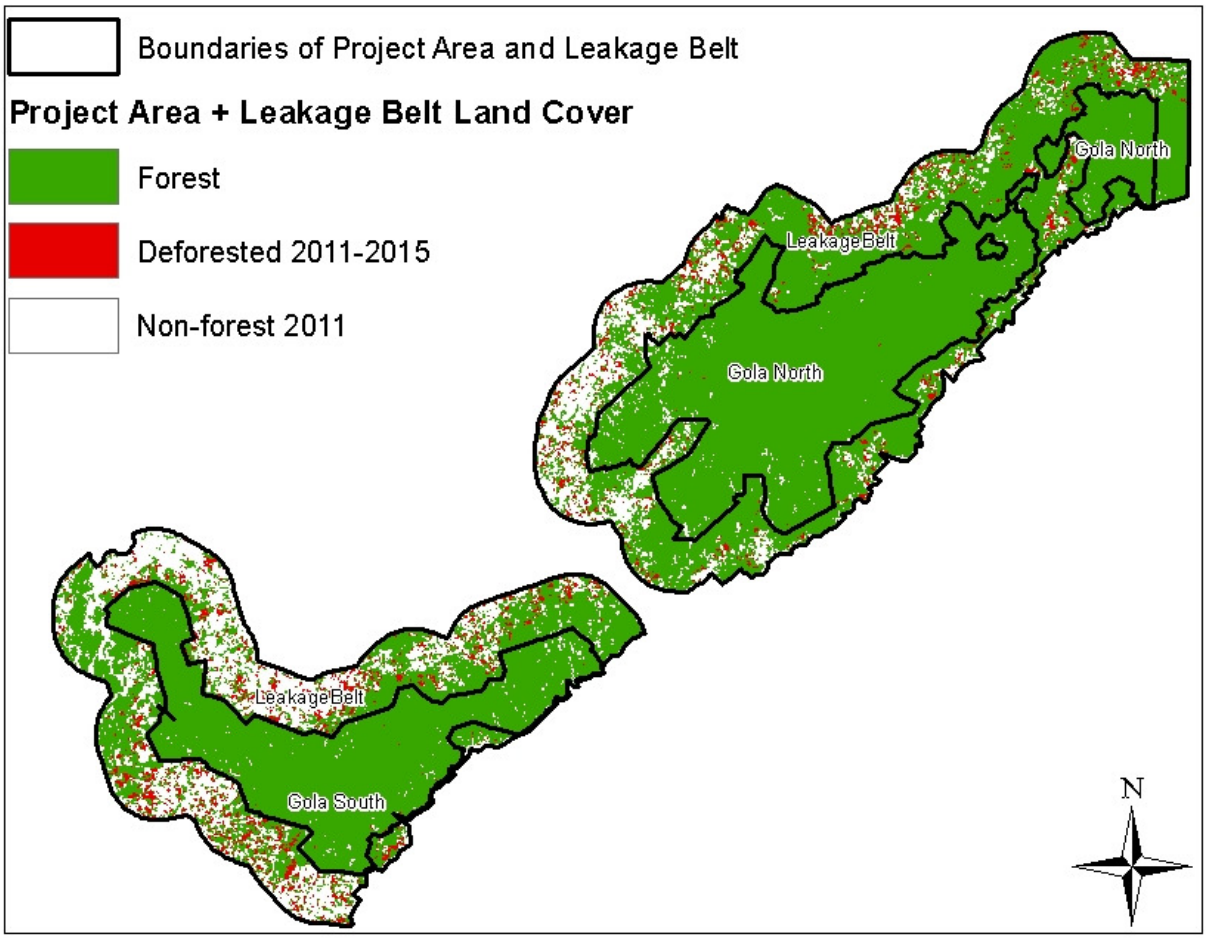


Figure20 Forest cover and deforestation (2011-2015) in the RLL.

Step 2 Interpretation and analysis

Monitoring deforestation

This step will produce an estimate of the emissions resulting from any deforestation that occurs within the project area and leakage belt (ΔCP,Def,i,t & ΔCLB,Def,i,t).

The net carbon stock change as a result of deforestation is equal to the area deforested multiplied by the emission per unit area.

The area deforested in each stratum of the Project Area (Gola South and Gola North/Central) and the Leakage belt are shown in Tabel30.

Table30 The area deforested in the Project Area and Leakage Belt ex-post Aug2010/2011 to Jan2015 $A_{DefPA,u,i,t}$ & $A_{DefLB,u,i,t}$

	Total deforestation	Annual deforestation
	ha	
Project Area $A_{DefPA,u,i,t}$	**60**	**13**
Goal South (Strata 2)	41	9
Goal North (Strata 1)	19	4
Leakage Belt $A_{DefLB,u,i,t}$	**7,356**	**1,635**

The net carbon stock changes as a result of deforestation in the project area are reported in Section 6.1 Baseline Emissions, and repeated again in Table31. Strata 1 being Gola North, Strata 2 Gola South, and the Leakage Belt using the same ΔC as Strata 1.

Table31 (repeat from Table30) Carbon stock changes per stratum $\Delta C_{pools,Def,u,i,t}$

Carbon Pool	Strata 1	Strata 2	Post deforestation	Wood product CWP, strata1	Wood product CWP, strata2	ΔC,Strata 1	ΔC,Strata 2
	Mean Stock t CO_2e. ha-1						
$C_{AB\_Tree,i}$	629.3	578.0	127.0	5.3	4.8	497.1	446.2
$C_{BB\_Tree,i}$	151.0	138.7	34.3			116.7	104.4
$C_{AB\_nontree,i}$	X	x	x			x	x
$C_{BB\_nontree,i}$	X	x	x			x	x
$C_{LI,i}$	X	x	x			x	x
$C_{SOC,i}$	253.9	172.7	172.7			81.2	19.6
C_{BSL}	1034.3	334.0	334.0			695.0	570.2

$$\Delta C_{P,DefPA,i,t} = \sum_{u=1}^{U} \left(A_{DefPA,u,i,t} * \Delta C_{pools,P,Def,u,i,t} \right) \quad (3)$$

$$\Delta C_{P,DefLB,i,t} = \sum_{u=1}^{U} \left(A_{DefLB,u,i,t} * \Delta C_{pools,P,Def,u,i,t} \right) \quad (4)$$

Where:

$\Delta C_{P,DefPA,i,t}$	Net carbon stock change as a result of deforestation in the project case in the project area in stratum *i* at time *t*; t CO_2-e
$\Delta C_{P,DefLB,i,t}$	Net carbon stock change as a result of deforestation in the project case in the leakage belt in stratum *i* at time *t*; t CO2-e
$A_{DefPA,u,i,t}$	Area of recorded deforestation in the project area stratum *i* converted to land use *u* at time *t*; ha
$A_{DefLB,u,i,t}$	Area of recorded deforestation in the leakage belt stratum *i* converted to land use *u* at time *t*; ha
$\Delta C_{pools,Def,u,i,t}$	Net carbon stock changes in all pools in the project case in land use u in stratum i at time t; t CO2-e ha-1
u	*1,2,3,…U* post-deforestation land uses
i	*1, 2, 3 …M* strata
t	*1, 2, 3, … t** years elapsed since the start of the REDD project activity

The emission per unit area is equal to the difference between the stocks before and after deforestation minus any wood products created from timber extraction in the process of deforestation:

$$\Delta C_{pools,Def,i,t} = C_{BSL,i} - C_{P,post,i} - C_{wp,i} \quad (5)$$

Where:

$\Delta C_{pools,Def,u,i,t}$	Net carbon stock changes in all pools as a result of deforestation in the project case in land use u in stratum i at time t; t CO2-e ha-1
$C_{BSL,i}$	Carbon stock in all pools in the baseline case in stratum *i;* t CO2-e ha-1
$C_{P,post,u,i}$	Carbon stock in all pools in post-deforestation land use *u* in stratum *i*; t CO2-e ha-1
$C_{WP,i}$	Carbon stock sequestered in wood products from harvests in stratum i; t CO2-e ha-1
u	*1,2,3,…U* post-deforestation land uses
i	*1, 2, 3 …M* strata

t *1, 2, 3, … t** years elapsed since the start of the REDD project activity

See Section Monitoring Project Emissions (below) for the results from these equation.

Monitoring degradation

Degradation is not accounted for in this project. There is no selective logging in the project area.

However, the GRNP project implement active protection of the Project Area and any wood extracted due to illegal logging or fuel wood collection will be measured and discounted from the projects avoided emissions.

As per the Monitoring Report (M-MON 2013), the Participatory Rural Appraisal (PRA) will be conducted every 2 years in order to determine whether degradation occurs. However, it has not yet been two years so the PRA will only be conducted in 2015.

Risk. Monitoring areas undergoing natural disturbance and political or socially driven disturbance

This section outlines the monitoring of any natural social or political disturbance that could have resulted in an increase in GHG emission during the monitoring period that would trigger a reassessment of the baseline.

Natural Disturbance

Disturbance in the project area, such as tectonic activity (earthquake, landslide, volcano), extreme weather (hurricane), pest, drought, or fire have been monitored over the last 5 years using a variety of remote sensing data types and in on the ground knowledge.

Tectonic activity and landslides are rare in the Project Area, but are monitored on an annual basis through the United States Geologic Society (USGS) and Incorporated Research Institute for Seismology (IRIS) Seismic Monitor[27]. Figure21 indicates that no earthquakes have occurred in or near the project area in recent time. This correlates with reports on the ground from GFC staff.

[27] http://www.iris.edu/dms/seismon.htm

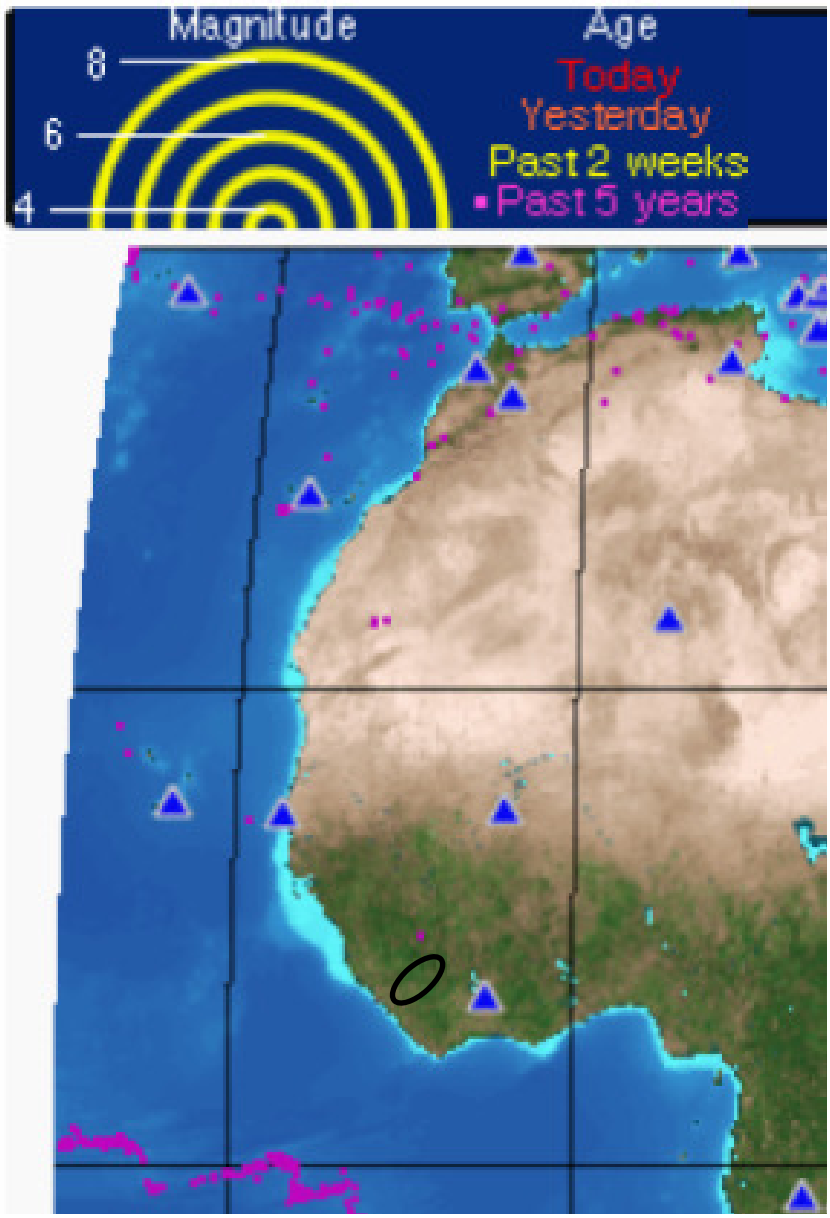


Figure21 Seismic Monitor for North West Africa for the past 5 years.

Landslides. Landslides were monitored through visual inspection of Landsat imagery, checked with the land cover mapping analysis, and based on field report from GFC staff. Through this monitoring no major landslides were detected.

Extreme weather and drought are monitored on an annual basis through National Oceanic and Atmospheric Administration (NOAA) National Climate Data Center, International Best Track Archive for Climate Stewardship (IBTrACS)[28]. Figure21 shows that no major storm tracks were reported anywhere near the project area. Annual rainfall and precipitation have remained consistent with historic averages from 1960.

[28] http://www.ncdc.noaa.gov/oa/ibtracs/index.php?name=ibtracs-data

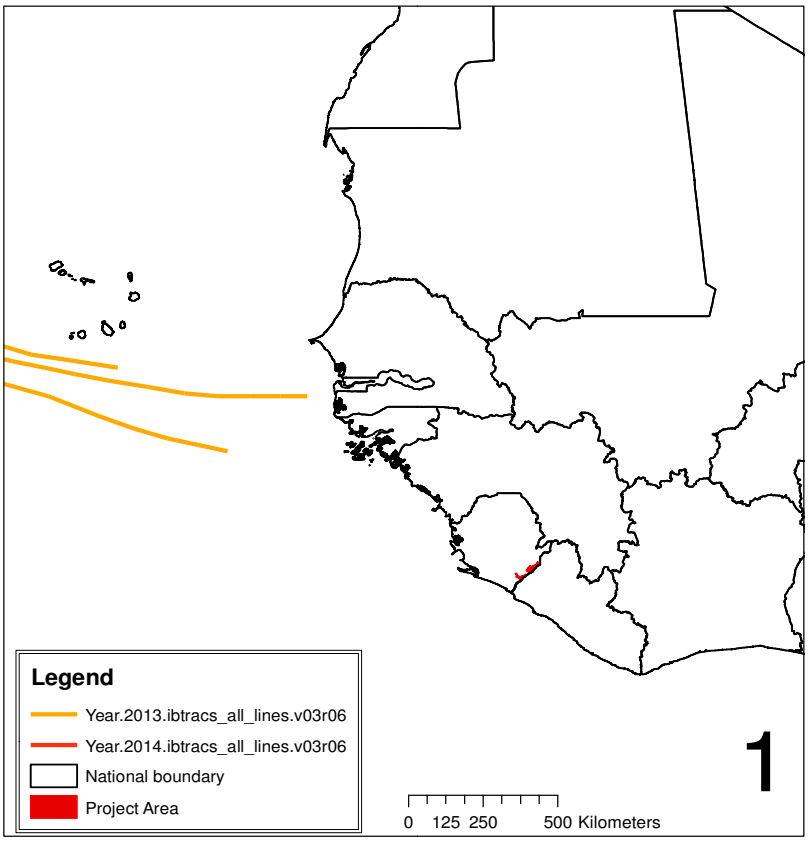


Figure22 Storm tracks from International Best Track Archive for Climate Stewardship

Pests, are unknown to cause major forest die-back in the Project Area, however every effort hasbe made to monitor it. There are no current monitoring methods in Sierra Leone for pests. Therefore, the GRNP project staff have monitored any die-backs. There were no major pest outbreaks reported, and land cover mapping in the Project Area have shown no sign of pest, with forest cover actually increasing in the Gola Rainforest National Park.

Fire, has been monitored on an annual basis through assessments of MODIS Active Fire and Burned Area Product[29]. A summary product is shown in Figure23 showing areas (100x100km) where at least on burn has been detected over the last 5 years. Because the MODIS data can be very sensitive to even small controlled burns from slash and burn agriculture this data has been cross referenced with visual inspection of burned areas in Landsat imagery. Based on detailed land cover mapping there were no largescale burns in the Project Area. No large burns were reported by GRNP staff during patrols.

[29] http://modis-fire.umd.edu/index.html

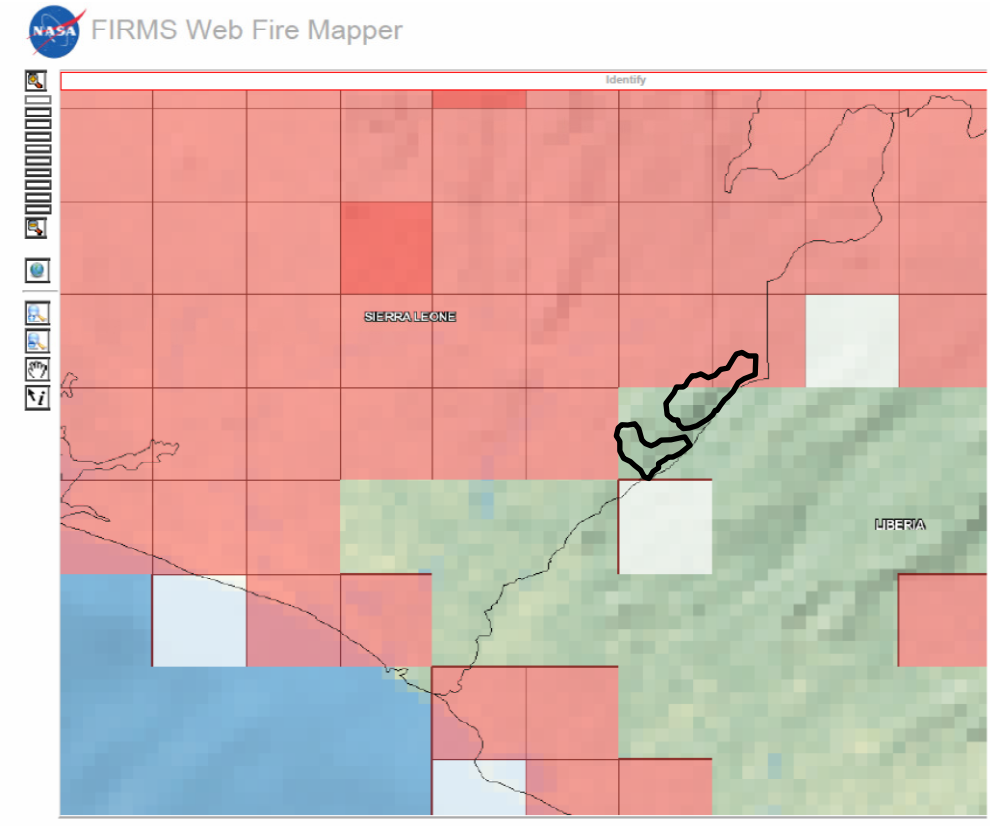


Figure23 MODIS Active Fire and Burned Area Product for 2011 to 2015.

MODIS does not produce location data for historic period greater than 72h. Instead they produce the image below that shows 100x100km blocks with light red (low fire frequency) to dark red (high fire frequency). The image below show the Project Area to have no fires or low fire frequency

Political or Social

There have been no political or social changes that would trigger a reassessment of the baseline. The Ebola outbreak in mid-2014 had a considerable impact on communities in the Gola region, however these impacts did not result in any perceivable change in deforestation or forest degradation.

Monitoring areas undergoing carbon stock enhancement

The GRNP Project intends to monitor forest carbon stock enhancement in Gola South. This area was stratified from Goal Central/North following X-STR. However, enhancements will not be included in the 2015 monitoring as carbon stock are not thought to have increased substantially from the last measurement event.

Monitoring project emissions

Where significant, non-CO_2 greenhouse gas emissions occurring within the project boundary must be evaluated. The tool T-SIG was used to determine which emission sources must be included in the emission calculation.

As an optional emission the Gola REDD project has elected **not** to estimate emissions from fossil fuel combustion.

The Gola REDD Project will not use fertilizers as a leakage prevention activity, and therefore emissions from nitrous oxide are excluded.

Based on the risk assessment there have been no significant natural disturbances that require inclusion in the emission calculations.

Enhancements are not being calculated in this Monitoring event.

GHG emissions from biomass burning are expected to occur on all land deforested during site preparation. Biomass assumed to be extracted for wood products is excluded from the estimation of biomass emission estimation. The emission from biomass burning is estimated following Module E-BB.

The emission reduction for the Gola Project (Strata 1 and 2) are shown in Table32 and 33. In Table32 and 33 emissions are denoted as positive numbers, and emission reductions as negative numbers. The period that the Gola Project is accounting for are from August 1st 2012 through 2014 (i.e. Jan 2015 the date of the land cover map for the first Monitoring event). Therefore, the project accounts for 33% of 2012, and 100% 2013 and 2014. Table32 and 33 $\Delta C_{P,Def,PA,1,t}$ for 2012 is at 33%.

Table32 Emission reduction for Gola North (Strata 1), baseline minus with project, (negative numbers indicate emission reduction & positive numbers emission).

t	y	Baseline Ex-ante			With project Ex-post				
		AreaBSLunplanned-PAStrata 1						ΔCP,Def,PA,1,t	
		ha	t CO2	t CO2e (EBiomassBurn,i,t)	ha	t CO2	t non-CO2e (EBiomassBurn,i,t)	Δt CO2e	Cumulative t ΔCO2e
1	2012	337	172,744	18,035	4	2,154	225	-62,737*	-62,737*
2	2013	413	216,950	22,097	4	2,117	214	-236,715	-299,452
3	2014	353	192,799	18,897	4	2,180	214	-209,302	-508,754

* Emission reduction for 2012 are from August to December therefore are 33% of the annual total.

Table33 Emission reduction for Gola South (Strata 2), baseline minus with project, (negative numbers indicate emission reduction & positive numbers emission)

t	y	Baseline Ex-ante			With project Ex-post				
		AreaBSLunplanned-PAStrata 2						ΔCP,Def,PA,2,t	
		ha	t CO2	t CO2e (EBiomassBurn,i,t)	ha	t CO2	t non-CO2e (EBiomassBurn,i,t)	Δt CO2e	Cumulative t ΔCO2e
1	2012	704	322,179	34,620	9	4,191	490	-117,255	-117,255
2	2013	628	295,545	30,894	9	4,295	490	-321,653	-438,909
3	2014	688	330,026	33,828	9	4,400	490	-358,964	-797,873

* Emission reduction for 2012 are from August to December therefore are 33% of the annual total.

The total emissions for the Gola REDD Project Area (sum of both Stratum) are presented in Table34. This does not include deductions for leakage or the buffer account.

Table34 Total emission reduction for Gola REDD project, not including leakage

ΔCP	
t CO2e	cumulative t CO2
-179,993	-179,993
-558,368	-738,361
-568,266	-1,306,627

6.3 Leakage

For the calculation of leakage ex-post the first two Steps of Module LK-ASU are skipped. Step 3 of LK-ASU befits with the estimation of unplanned deforestation displaced from the Project area to the Leakage belt.

There are no emissions from activity shifting resulting in peat drainage (Step 5 LK-ASU).

There are no leakage prevention activities that result in biomass burning or fertilizer usage (Step 6).

Following LK-ASU, leakage is calculated as two different groups: 1) **Local deforestation agents** that would be conducting their activities inside or near the Project Area (i.e. Leakage Belt), 2) **Immigrant deforestation agents** that could be expected to encroach on the Project Area in future periods, but now are assumed to conduct their activities beyond the confines of the Leakage Belt.

Estimation of unplanned deforestation displaced from the Project Area to the Leakage Belt (Ex post assessment)

Activities that deforestation agents would implement inside the project area in the absence of the REDD project activity could be displaced outside the project boundary as a consequence of the implementation of the REDD project activity.

Based on community PRA there is not unsustainable fuelwood collection occurring within the project boundary.

Leakage prevention activities may lead to the increase in combustion of fossil fuels, however, as per M-REDD, any increase in emissions is considered insignificant. Combustion of fossil fuels was not considered in the baseline case.

There are no leakage prevention activities that use increases in fertilizer.

Ex post leakage will be assessed following Module M-MON and LK-ASU.

$$\Delta C_{LK-ASU-LB} = \Delta C_{P,LB} - \Delta C_{BSL,LK,unplanned} \quad (1)$$

Where:

$\Delta C_{LK-ASU-LB}$	Net CO_2 emissions due to unplanned deforestation displaced from the Project Area to the Leakage Belt; t CO_2-e
$\Delta C_{BSL,LK,unplanned}$	Net CO_2 emissions in the baseline from unplanned deforestation in the leakage belt; t CO_2-e
$\Delta C_{P,LB}$	Net greenhouse gas emissions within the leakage belt in the project case t CO_2-e

If $\Delta C_{LK-ASU-LB}$ as calculated is <0 then $\Delta C_{LK-ASU-LB}$ shall be set equal to 0 (to prevent positive leakage).

Baseline (ex-ante) emission were calculated in the Leakage Belt following BL-UP and LK-ASU. At the first Monitoring event the baseline emissions are compared to the *with project* (ex-post) emission.

Where this displacement of activities increases the rate of deforestation, the related carbon stock changes and non-CO_2 emissions must be estimated and counted as leakage.

The *with project* (ex-post) assessment of leakage by local deforestation agents in the Leakage belt is shown in Table35 (positive numbers are emissions and negative numbers emission reduction from the baseline). Similar to the Project Area, the Leakage Belt emission estimates (ΔCP,Def,LB,1,t) for 2012 are 33% of the annual total due to the project start date being in August. The results show that there has been a small increase in the rate of deforestation from an estimated baseline of 1,544 ha^{-1} y^{-1} to a monitored annual average of 1,635ha^{-1} y^{-1}. This has resulted in an average annual leakage within the Leakage Belt of 41,098t CO_2e y^{-1} (ΔCP,Def,LB,1,t), about 8% of the projects emission reduction (Table35).

Table35 Emission reduction for Leakage Belt, baseline minus with project, (negative numbers indicate emission reduction & positive numbers emission)

t	y	Baseline Ex-ante			With project Ex-post				
		AreaBSLunplanned-LB						ΔCP,Def,LB,1,t	
		ha	t CO2	t CO2e (EBiomassBurn,i,t)	ha	t CO2	t non-CO2e (EBiomassBurn,i,t)	Δt CO2e	Cumulative t ΔCO2e
1	2012	1,544	791,586	82,643	1,635	833,237	87,517	15,493*	15,493*
2	2013	1,544	815,873	82,643	1,635	853,923	87,517	42,924	58,417
3	2014	1,544	840,207	82,648	1,635	874,609	87,517	39,272	97,689

* Emission reduction for 2012 are from August to December therefore are 33% of the annual total.

Table36 shows the Net CO_2 emissions due to unplanned deforestation displaced from the Project Area to the Leakage Belt.

Table36 Leakage displaced to the Leakage Belt

y	Net CO_2 emissions in the baseline from unplanned deforestation in the leakage belt; **Cumulative t CO_2-e** $\Delta C_{BSL,LK,unplanned}$	Net greenhouse gas emissions within the leakage belt in the project case **Cumulative t CO_2-e** $\Delta C_{P,LB}$	Net CO_2 emissions due to unplanned deforestation displaced from the Project Area to the Leakage Belt; **Cumulative t CO_2-e** $\Delta C_{LK\text{-}ASU\text{-}LB}$
2012	291,118*	306,611*	15,493*
2013	1,189,635	1,248,051	58,417
2014	2,112,489	2,210,178	97,689

* Emission reduction for 2012 are from August to December therefore are 33% of the annual total.

Estimation of unplanned deforestation displaced from the project area to outside the Leakage Belt

To assess leakage outside the Leakage Belt the project followed steps a-e in the LK-ASU Module. The amount of leakage displaced outside of the Lekakage Belt to other area in Sierra Leone is estimated once at the start of the project (reported in the PD) following Step 4 in LK-ASU, and is not recalculated at each monitoring event. Table37 shows the results from Gola REDD PD. See the Gola REDD PD for a detailed description of how $_{LB}\Delta CLK\text{-}ASU,OLB$ was calculated.

Table37 Net cumulative CO_2 emissions due to unplanned deforestation displaced outside the Leakage Belt

Net CO2e emissions due to displaced unplanned deforestation outside LB ΔCLK-ASU,OLB	
t CO2e	cumulative t CO2
3,702	3,702
3,823	7,526
3,891	11,417

Estimation of Total Leakage Due to the Displacement of Unplanned Deforestation

The total emission reduction for the Gola REDD project at the 2015 Monitoring event including leakage is shown in Table38.

$$\Delta C_{LK\text{-}AS,unplanned} = \Delta C_{LK\text{-}A\ SU\text{-}LB} + \Delta C_{LK\text{-}ASU\text{-}OLB} + GHG_{LK,E} \quad (13)$$

Where:

$\Delta C_{LK\text{-}AS,unplanned}$ Net greenhouse gas emissions due to activity shifting leakage for projects preventing unplanned deforestation Net CO_2 emissions ; t CO_2-e

$\Delta C_{LK\text{-}ASU\text{-}OLB}$ Net CO_2 emissions due to unplanned deforestation displaced outside the Leakage Belt; t CO_2-e

$\Delta C_{LK\text{-}ASU\text{-}LB}$ Net CO_2 emissions due to unplanned deforestation displaced from the Project Area to the Leakage Belt; t CO_2-e

$GHG_{LK,E}$ Greenhouse gas emissions as a result of leakage of avoided deforestation activities; t CO_2-e

Table38 Net greenhouse gas emissions due to ALL leakage for projects preventing unplanned deforestation

y	Net greenhouse gas emissions due to activity shifting leakage for projects preventing unplanned deforestation ΔCLK-AS,unplanned	
	t CO2e	t CO2e (cumulative)
2012	19,195	19,195
2013	46,747	65,942
2014	43,163	109,106

6.4 Summary of GHG Emission Reductions and Removals (CL1 & CL2)

Net GHG Emission Reductions and Removals

The total net greenhouse gas emissions reductions of the REDD project activity are calculated as follows:

$$C_{REDD,t} = \Delta C_{BSL} - \Delta C_P - \Delta C_{LK} \quad (1)$$

Where:

$C_{REDD,t}$ Total net greenhouse emission reductions at time *t*; t CO_2-e

ΔC_{BSL} Net greenhouse gas emissions under the baseline scenario; t CO_2-e

ΔC_P Net greenhouse gas emissions within the project area under the project scenario; t CO_2-e (from M-MON)

ΔC_{LK} Net greenhouse gas emissions due to leakage; t CO_2-e

The Table39 shows net greenhouse emission reductions as the difference between the baseline (ΔCBSL) and with project (ΔC_P), minus leakage (ΔCLK). Again, 2012 is 33% of total annual emission reduction due to the project start date being in August.

Table39 Total net greenhouse emission reductions $C_{REDD,t}$, not including buffer deductions.

Y	Total net greenhouse emission reductions $C_{REDD,t}$ (tCO_2e) (ΔCBSL - ΔC_P - ΔCLK)	
	t CO2e	t CO2e (cumulative)
2012	-160,798	-160,798
2013	-511,621	-672,418
2014	-525,103	-1,197,521

Table39 (above) shows Gola REDD Project's net GHG emission reduction (not including the 10% buffer account) are 1,197,521t CO_2e between August 1st 2012 and the first Monitoring event at the end of 2014.

Calculation of VCS buffer

The number of credits to be held in a permanent risk buffer is determined as a percentage of the difference between total emission from unplanned deforestation in the baseline (ΔCBSL) and with project scenario (ΔCP). Leakage emissions do not factor into the buffer calculations.

The retention rate is determined according to the risk classification of the project, using the VCS tool for AFOLU of Risk of Non Permanence. According to the calculations, it has a total percentage of 10% buffer (See VCS Risk Report).

To estimate the number of Verified Carbon Units (VCUs) for the monitoring period $T = t2\text{-}t1$, this methodology uses the following equation:

$$Buffer_{UNPLANNED} = \left(\left(\Delta C_{BSL,unplanned} - \sum_{t=1}^{t^*} \sum_{i=1}^{M} \left(E_{FC,i,t} + N_2O_{direct,i,t} \right) \right)_{Baseline\ Unplanned} - \left(\Delta C_{P,(UnplannedDeforestationAreas)} - \sum_{t=1}^{t^*} \sum_{i=1}^{M} \left(E_{FC,i,t} + N_2O_{direct,i,t} \right) \right)_{Project\ Unplanned} \right) * (Buffer\%)$$

Uncertainty Analysis

The analysis of uncertainty of carbon stocks was developed according to the Module X-UNC. The purpose of X-UNC is for calculating ex-ante and ex-post a precision level and any deduction in credits for lack of precision following project implementation and monitoring. The module assesses uncertainty in baseline estimations and in estimations of with-project sequestration, emissions and leakage.

A precision target of a 95% confidence interval equal to or less than 15% of the recorded value shall be targeted.

As per X-UNC, Part 1 – Uncertainty in Baseline Estimate:

Step 1: Assess uncertainty in projection of baseline rate of deforestation or degradation.

In this case the UncertaintyBSL,RATE = 0 where the baseline rate is long term (i.e. historic) average.

Step 2: Assess uncertainty of emissions and removals in project area.

Uncertainty should be expressed as the 95% confidence interval as a percentage of the mean. The uncertainty from dead-wood, litter, non-tree, were not analyzed as they are not included in baseline calculations. Fossil fuel combustion and N2O emissions from nitrogen application, were also not analyzed as they are not included in baseline calculations.

Uncertainty in the emissions from biomass burning is captured in the uncertainty of above ground biomass (CAB_Tree,I $Uncertainty_{BSL,SS,i}$).

Uncertainty in the wood products pool is considered undisputedly conservative and therefore Uncertainty =0.

Uncertainty Ex Post in the REDD Project Scenario

Following X-UNC step 3 "Uncertainty Ex Post," the area of deforestation in the project scenario was assessed using the same methods as the baseline (See Section 6.2 Post Processing and Accuracy Assessment). The accuracy of the land cover map is 98%, therefore Uncertainty =0

As per X-UNC, where no ex post (re-)measurements of carbon pools or GHG sources have been made, uncertainty from these sources is already included in UncertaintyREDD_BSL,t*, and UncertaintyREDD_WPS is set equal to zero.

The allowable uncertainty under this methodology is +/- 15% of CREDD,t at the 95% confidence level. Where this precision level is met then no deduction should result for uncertainty. Therefore no deductions are associated with the GRNP Project, and the Adjusted_CREDD, t = CREDD,t

Calculation of Verified Carbon Units

To estimate the number of Verified Carbon Units (VCUs) for the monitoring period *T = t2-t1*, this methodology uses the following equation:

$$VCU_{t=(Adjusted\_C_{REDD,t_2} - Adjusted\_C_{REDD-t_1})-Buffer_{TOTAL}}$$

Where:

VCU_t	Number of Verified Carbon Units at time $T = t_2 – t_1$; VCU
$Adjusted\_C_{REDD,t2}$	Cumulative total net GHG emissions reductions at time t_2 adjusted to account for uncertainty; t CO_2-e
$Adjusted\_C_{REDD,t1}$	Cumulative total net GHG emissions reductions at time t_1; t CO_2-e
$Buffer_{total}$	Total permanence risk buffer withholding; t CO_2-e

y	Buffer withholding percentage	ΔCBSL	ΔCP	Total permanence risk buffer withholding (BufferTotal)	Estimate the number of Verified Carbon Units (VCUs)	
	Buffer%	t CO2e (cumulative)			VCUt	VCUt (cumulative)
2012	10%	182,343	2,351	17,999	142,798	142,798
2013	10%	747,828	9,468	73,836	437,785	580,583
2014	10%	1,323,379	16,752	130,663	394,440	975,023

The total VCUs that the Gola REDD Project has generated between August 1st 2012 and the first Monitoring event (end of 2014), are 975,023.

6.5 Climate Change Adaptation Benefits (GL1)

Climate Scenarios for Sierra Leone

According to the National Adaptation Plan of Action (NAPA) for Sierra Leone, the most likely climate change scenario for the country is an increase in average temperature of 6-9% by 2100, a reduction in rainfall, changes to rainfall patterns and an increase in extreme weather events including drought, strong winds, thunderstorms, landslides, heat waves, floods, and intense seasonal rainfall, amongst others (NAPA 2007). This is confirmed also in more recent modeling work reported in the second National Communication on Climate Change to the UNFCCC (2012) which used climate data from 1961 to 1990 to construct climate change scenarios for the country based on GCM, HADCM, UKTR, ECHAM modeling.

During discussions with local residents around the GRNP to understand communities perceptions of changes in weather and its impacts on their livelihoods many villages reported that the seasons

have been changing and they are experiencing more rain in the dry season and more erratic weather patterns overall (Witkowski et al 2012b). Unpredictable changes in rainfall patterns and the onset of the rainy season affects a farmers ability to clear land to farm, to predict when the best time is to plant seed and harvest seed as well as the growth of the crop; effects can be both positive and negative but between 2007 and 2009, more negative shocks than positive were reported by surveyed Forest Edge Communities (Bulte et al 2013).

Changes in climate are expected to affect both the quantity and quality of water, land and soil resources. Ecosystem services are critical for Sierra Leone as agriculture is the largest sector of the economy and provides employment for over 65% of the labour force (National Communication on Climate Change 2012). As rice is the staple food crop in Sierra Leone grown by small scale farmers under rain-fed conditions, changes in rainfall patterns, intensity or amount will have significant impacts on agricultural productivity and livelihoods and indeed impacts are already being experienced (National Communication on Climate Change 2012). In addition, changes in the length of the growing season or in the range of pests could prove devastating for crops and negatively impact production stability. If agricultural yields decline, there will be a significant resultant impact on food security, income and health for small holder farmers in Sierra Leone. Resultant fluctuations in food prices and trade will also impact small holder farmers. Combined, these impacts will serve to exacerbate poverty (National Communication on Climate Change 2012; p157).

Despite the abundant water resources, access to safe drinking water is very limited as a result of unavailable or limited functional infrastructure for water supply. Today only about 32% of the rural population has access to a reliable water supply.

Changes in rainfall patterns and intensity will also have an impact on water supply as despite the country having fairly abundant water resources, access to safe drinking water is very limited due to the lack of functional infrastructure; only about 32% of the rural population has access to a reliable water supply (National Communication on Climate Change 2012; p159). Shortages in water availability for consumption as well as productivity are likely resulting in outbreaks of pests and disease whilst heavy rain and strong winds may cause damage to crops and standing forests.

Increases in temperature and a drying climate are also likely to cause shifts in the range and composition of species, which will affect both biodiversity and carbon stocks (Faucet et al 2012).

The anticipated biophysical and socio-economic impacts combined with very low levels of human (information, knowledge, health), physical (technology, infrastructure), social (policies, institutions) and financial capital to mitigate or respond to those impacts make Sierra Leone highly vulnerable to climate change.

Project activities that assist local communities to adapt to climate change

Forests provide a rich source of natural capital for local communities; in essence they provide essential 'life support systems' i.e. ecosystem services, that people depend on. Healthy, fully functioning ecosystems are more resilient to climate change stresses and therefore enhance resilience to climate change impacts (Munang et al 2013). As mentioned, project activities were designed to reduce climate exposure and sensitivity as they protect the natural resources, biodiversity values and ecosystem services that underpin communities' livelihoods ensuring that habitat connectivity is maintained.

Assessment of FEC vulnerability to climate change was through informal discussions with community members to date, activities therefore include a more formal participatory approach and awareness raising to assist communities in understanding future impacts and to encourage the adoption of activities to mitigate those impacts. Activities such as the promotion of Savings and Internal Lending Communities (to increase financial capital within Forest Edge Communities for alternative economic activities), implementation of sustainable and conservation agriculture techniques (to improve food security and soil fertility), environmental awareness building and co-management (to create local resource ownership and resilient institutions), can reduce the sensitivity and/or enhance the adaptive capacity of communities; a summary of how the project activities assist both biodiversity and communities to adapt is found in the Table below:

Anticipated Climate Change	Impact on Climate (CL), Community (CO) and Biodiversity (BD)	Impact of project activities	Result
Changes in micro-climate especially rainfall and temperature	• Disruption of agricultural calendar and lower productivity in staple food crops such as rice (CO) • Negative impact on coffee and cocoa production resulting in reduction in income (CO) • Shifting pattern in the distribution of trees and wildlife populations (BD) • Changes in the range and distribution of agricultural pests and diseases (CO)	• Awareness raising of climate change and adaptive agricultural techniques • Broaden income generating options available to Forest Edge Communities so not dependent solely on sustainable agriculture • Maintenance of corridors between forest blocks to allow species to migrate as climate changes • Improved agricultural techniques and integrated pest management reduce impact of agricultural pests	• Enhanced resilience to effects of climate change • Reduced vulnerability to climate change through increased adaptive capacity, decreased sensitivity, and reduced exposure • Improved adaptation to predicted impacts of climate change
Erosion from increased and heavier rainfall	• Sedimentation of streams and water supply (BD, CO) • Loss of soil fertility (CO)	• Land use planning to avoid the conversion of inappropriate areas for agriculture • Promotion of methods to improve soil fertility (e.g. use of legumes, maintaining canopy to reduce run-off, maintaining root systems to divert and encourage infiltration etc)	
Increased frequency and severity of extreme weather events e.g. storms and droughts	• Increase in disease and deaths (CO) • Increase in economic damage (through crop failures or destruction) (CO)	• Increased incomes enable families to access health care • Improved agricultural techniques and livelihood diversification reduce vulnerability and enhance resilience	
Ecosystem degradation	• Changes in the quantity and quality of land, water and soil resources (CO) • Loss of suitable habitat resulting in biodiversity loss (BD)	• Enhanced agricultural techniques, institutions and knowledge help people maintain quality and compensate for changes in quantity of	

Anticipated Climate Change	Impact on Climate (CL), Community (CO) and Biodiversity (BD)	Impact of project activities	Result
		resources • Maintenance of corridors between forest blocks to allow species to migrate as climate changes • Research and monitoring efforts allow for adaptive management of GRNP	

7 COMMUNITY

7.1 Net Positive Community Impacts (CM1)

Net Positive community impacts

Estimate of impact of project activities on communities

The project uses the methodologies outlined in the Social and Biodiversity Impact Assessment (SBIA) manual for REDD+ projects (Richards and Panfil 2011) to estimate project impacts through the theory of change approach (Tatum-Hume and Witkowski 2013).

A net positive impact is expected for all community groups over the lifetime of the project based on the beneficial impact that the implementation of project activities have on local livelihoods and the resources on which those livelihood activities are based, compared to the without project scenario .

The community groups identified by the stakeholder analysis that are impacted by project activities are; Paramount Chiefs, Landowning families and Forest Edge Communities and are discussed below:

Paramount Chiefs

Positive Impact	Negative Impact
• direct payment received • financial and in-kind benefits support their development objectives for their Chiefdoms	• loss of revenue from commercial logging

Had the project area remained a production Forest Reserve, Paramount Chiefs would have been entitled to receive benefits from any commercial logging activities taking place in the reserves (Witkowski et al 2012c, Forestry Act 1988). Although in practice, the Paramount Chiefs report that this did not occur, the entitlement existed and therefore the project has impacted this potential

without project benefit. By making direct payments to Paramount Chiefs via the Benefit Sharing Agreement[30] (currently set at $1000 per year for each of the 7 Paramount Chiefs), the project aims to ensure that Paramount Chiefs are not be negatively impacted by conservation management actions and thus receive a net positive financial benefit from the project.

Amongst other responsibilities, Paramount Chiefs serve as agents of development and are the custodians of land in their Chiefdoms (Gola project context report Witkowski et al 2012c).

The Chiefdoms of the Gola area were a rebel stronghold during the period of civil conflict; infrastructure, housing and livelihoods were devastated by the impacts of the war and these areas have received very little support from the Government or from development agencies to help communities recover (ibid). Through the financial[31] and in-kind benefits provided to the communities of the Chiefdoms outlined in this section and in CM2 the project provides long term support to these impoverished and neglected Chiefdoms, supporting the Paramount Chief and District Councils in their development objectives.

Landowning families

Positive Impact	Negative Impact
• direct payment received • majority living in Forest Edge Community, therefore benefit from livelihood activities	• loss of revenue from commercial logging

The Chiefdoms surrounding the GRNP are recognized as the owners of the land within the project area, however no register of landowning families was made at the time the reserves were created (a process which began in the 1920's). A report written in 1908 about the Gola Forests, describes the forests to be largely intact with a closed canopy and the presence of three villages in the area (Unwin 1909; 24); it is therefore not known if any families were actually moved off their land at the time the reserves were created. In the provinces of Sierra Leone no formal written title exists for landowners. Rather, as described in the Gola context report (Witkowski et al 2012c), a customary system of land tenure exists in which the Paramount Chief is the ultimate custodian of the land, but family lineages hold certain areas that their ancestors first farmed and members of the family continue to hold these areas today.

The Forestry Act stipulates that like the Paramount Chiefs, land owning families are also under law entitled to receive payments from the profits of commercial logging activities (Gola Project Context report Witkowski et al 2012c, Forestry Act 1988). In reality, whilst the project area was managed as a production Forest Reserve, no payments were ever made despite commercial activities having occurred for over 30 years. When the partners negotiated with the local communities to manage the Gola Forests in 2001-2003 for conservation objectives, part of the agreement was to make

[30] This amount is currently set at $9,500 per year for each of the 7 Paramount Chiefs. The amounts outlined in the Benefit Sharing Agreement are not fixed and may fluctuate in line with the revenues generated from the sale of credits and with re-negotiation of the agreement

[31] This amount is currently set at $9,500 per year for each of the 7 Chiefdoms. The amounts outlined in the Benefit Sharing Agreement are not fixed and may fluctuate in line with the revenues generated from the sale of credits and re-negotiation of the agreement

payments to the heirs of the original landowners in recognition of their rights. The first landowner register was completed in 2008 by the Forestry Division of the Government of Sierra Leone to enable landowners to receive payments via a Benefit Sharing Agreement developed by the Gola Forest Programme. These payments continued under the Gola REDD project and are made in lieu of potential royalties and for complying with the terms of the landowners agreement[32] The register currently contains the names of 1141 landowner families, each family is represented by a principle family head (there are 234 principal family heads) who are the heirs of the areas their ancestors purportedly owned land in Gola before it was made into a Forest Reserve[33].

27% of the principal family heads of the landowning families currently live in Forest Edge Communities and a similar or slightly higher percentage of families are likely to live in Forest Edge Communities; they are therefore also party to the project activities in the Forest Edge Communities described below.

As landowning families were not moved from the project area, have never received any form of benefit from the Gola forest from commercial logging and many (nearly ¾ of principal family heads) live far from the project area and are therefore not likely to have been accessing it for livelihood benefits the project provides a net positive benefit to this stakeholder group. Landowning families that live close to the Park and may have been accessing the Park for livelihood activities are also part of the Forest Edge Community livelihood program described below and the project therefore does not negatively impact these families.

Forest Edge Communities

Positive Impact	Negative Impact
• extensive livelihood programme directly benefitting them • ecosystem services underpinning livelihoods preserved	• no farming, hunting, logging or mining inside the National Park

Negative impacts of the with project scenario

The primary impact of the project on Forest Edge Communities is the continued enforcement of conservation measures to prevent illegal activities in the National Park which have largely been in place since 2004; this prevents Forest Edge Communities from accessing the project area to farm, hunt, log or mine as they have reported doing in the past.

[32] This amount is currently set at $28,000 to be equally divided between the heirs of the original landowners identified in the landowner register. The amounts outlined in the Benefit Sharing Agreement are not fixed and may fluctuate in line with the revenues generated from the sale of credits and re-negotiation of the agreement

[33] It should be noted that it is thought many more families are in the register than ever owned land in Gola, particularly in one of the Chiefdoms, but the register has been publically created and verified by the Section and Paramount Chiefs and so is as accurate as can possibly be made, given the one hundred plus years that have passed since some of the parts of the reserve were created

The project area, (the only part of the project zone from which all illegal activities are now prevented), is not fundamental[34] for meeting local community's basic needs but is nonetheless important as an additional source of resources for livelihood activities.

As is the pattern in the leakage belt, the most important activity occurring in the project area for Forest Edge Communities prior to the implementation of conservation measures in 2004 was farming (Witkowski et al 2012b). Farming was carried out in both upland areas and inland valley swamps and served primarily to supplement food grown in farms near the villages and provide an early harvest before the main harvest was due. When questioned, communities could not say whether farming activities in the project area were carried out by a specific subset of villagers e.g. those with poor access to land within the village, instead they claimed that farming was undertaken by which ever households wanted to or had the resources to do so in a particular year. Hunting, fishing, and gathering were widely reported to have been carried out by some members of all Forest Edge Communities; hunting was carried out by men, fishing was primarily carried out by women and gathering by both men and women. These activities occurred as a supplement to activities in farmbush areas in the leakage belt and occurred in an ad hoc manner. Only a few Forest Edge Communities reported to have been involved in illegal logging and mining activities which were either carried out directly by villagers or by outsiders who provided rent to communities in exchange for access to the reserve (Richards 2012).

As farming forms the main livelihood of 90% of Forest Edge Community members (Bulte et al. 2013), a second impact on Forest Edge Communities is the damage to crops caused by wildlife from the project area. Communities report that wildlife conflict existed in the past but has increased since the war. Although the protection of the project area is widely cited as the cause of the problem, it is far more likely that the ban on fire arms which was put in place in 2002 after the civil war has prevented farmers from scaring (or killing) larger animals away from their crops has had a more significant impact on communities[35]. Communities also acknowledge that human-wildlife conflict was a problem that pre-dated conservation activities, again demonstrating that conservation management is unlikely to be the primary cause of human-wildlife conflict. Communities report that larger species cause damage to crops; Chimpanzees cause problems in cocoa plantations but as a threatened species they are illegal to hunt with or without the Gola REDD project.

A third potential impact is that of increased land conflict within and between villages in the leakage belt and offsite communities as access to farming areas becomes restricted due to increasing populations and land pressures. Currently communities report that land conflicts are not common in the area (Bulte et al. 2013, Witkowski et al 2012a,b, Offsite report, Zombo et al 2012) but this is monitored throughout the project and the land use planning work described below assists communities in planning for their future needs and result in clearer land tenure.

Positive Impacts of the with project scenario

The first goal of the project is to strengthen the protection strategy and effective management of the GRNP. In the absence of the project this would not occur and resources would become depleted through activities that cause deforestation and degradation. The activities carried out under this

[34] Fundamental is defined as an area which is forming or serving as an essential component of local communities basic needs.

[35] The fire arms ban was lifted in 2012 and people are now able to own and use a firearm if they have a licence to do so.

project objective ensure that the ecosystem services are preserved and the forest which acts as a natural resource base to underpin many of the livelihood options of the communities is available for future generations, providing a positive benefit to Forest Edge Communities and communities of the greater Gola area.

The second goal of the project is to create an enabling environment for neighbouring communities to act as committed environmental stewards of the natural resource base through activities that enhance, generate value from and materialize the benefits derived from the project zone's forests and sustainable land use practices'. To accomplish this, the Gola REDD project implements various activities focused on achieving five objectives described below[36]. The sustainable livelihood improvement projects were developed in consultation with Forest Edge Communities and will address the major focal issues as determined by the communities themselves (Tatum-Hume and Witkowski 2013). As the vast majority of villagers living in Forest Edge Communities are subsistence farmers, the key to development was identified both by the SIA work and by other studies (e.g. WFP report 2008) as improving agriculture production, processing and market access. The overall impact of the Gola REDD project to benefit communities is the reduction of poverty and the safeguarding of natural resources in the project zone enabling natural capital to continue to contribute to the livelihoods of nearby villages. The associated theory of change, describing how this impact is achieved is: *If we build capacity to maintain, improve and capitalize on natural resources and agricultural activities then food security and income will increase resulting in a reduction in poverty and an enabling environment for communities to become environmental stewards and actively participate in sustainable land use planning and resource management* (see Tatum-Hume and Witkowski 2013 for more detail on how the project applied the theory of change).

Objectives of the livelihood program:

1. *Establish sustainable farming practices in Forest Edge Communities that improve productivity on existing crop fallow land*

The aim of this objective is to increase the productivity of farms in the Forest Edge Communities in the leakage belt of the project zone through training in improved farm practices and the provision of inputs to encourage more sustainable farming techniques and in the long term, reduce the hunger gap frequently reported by villages. Supporting farmers to intensify farming activities in their farm bush areas reduces pressure to clear new areas of forest within the leakage belt and in the National Park and therefore will reduce leakage. This activity brings both social and biological benefits and therefore fits with the multiple objectives of the Gola REDD project (see Tatum-Hume and Witkowski 2013 for activity results chain). Although the main crop produced on farms is rice as this is the staple food crop of villages, a variety of vegetables for consumption and/or sale are also grown.

Farmer field schools and demonstration fields offer villages improved practices for growing and increasing yields of a variety of crops including upland/lowland rice, vegetables (such as sweet and hot pepper, okra, eggplant and bitter ball), groundnuts and cassava. The activity is principally implemented over a 2 year period. After the initial 2 years, the villages continue to be monitored and reviewed every 2 years to assess whether follow-up training or inputs are required. Whether such additional and tailored training and/or inputs are required depends on the outcome of the monitoring.

[36] Please note that there are 6 objectives to the second goal of the project but the sixth objective is centred around the implementation and monitoring of the benefit sharing agreement and so is not described in this section.

During the first year the activity focused around Farmer Field Schools and is divided into dry and wet season Farmer Field Schools. From December to May the Farmer Field Schools focus on vegetable growing as this is the season it takes place. From June to November the Farmer Field Schools focus on upland/lowland rice, cassava and groundnut growing as this is the season these crops are grown (one wet season crop is chosen by each Forest Edge Community Farmer Field Schools). So over a one year cycle farmers are taught how to improve yields on at least one dry season and one wet season crop.

In the second year Master Farmers are selected from the participants of the first year Farmer Field Schools to receive further training and be focal points of their village to spread the knowledge acquired and enable the improved techniques to continue without the resources of the project.

Welthungerhilfe (WHH) implements this activity with project staff during the first year of the activity. Staff were trained by WHH with a view to continuing the implementation of the activity after the 1 year of training. GRNP staff capacities to implement the project were assessed at the end of year one and the decision was made for this activity to continue to be implemented.

WHH was identified as a project partner as it has been implementing the Food Security and Economic Development (FoSED) project since 2009 in the Bo, Kenema and Pujehun Districts through an EU-funded project and with Sierra Leonean partners. The Food Security and Economic Development project works in 55 village communities, 20 of which are leakage belt communities but the EU funding for the project ends in August 2014. A major part of Food Security and Economic Development project involves the development of sustainable farming systems and a variety of methods have been tried and tested by WHH since 2009. From the lessons learned WHH is further developing farmer field schools as these are proving more successful than other methods. As such WHH is in a good position to assist the Gola REDD project with the best methods for developing Farmer Field Schools with increased crop production in the villages. Four project field officers were trained by one WHH field officer for undertaking Farmer Field Schools trainings and providing the on-going support that farmers, particularly Master Farmers require, through learning by doing (see Tatum-Hume and Witkowski 2013 for further detail and implementation plan).

2. To improve productivity and farmer income from cocoa production and other diversified sustainable income generating activities

During the 10 year period of civil conflict in Sierra Leone, many people left their villages in the Gola area, migrating to temporary refugee camps, towns and cities or even to neighbouring countries. As cocoa is typically shade-grown, and planted in mixed poly-cultures which retain native trees, if a plantation is not managed the natural advantage cocoa has of being grown within a forest canopy (e.g. resistance to drought and improved pollination) is traded as productivity declines with too much shade as less pods are produced and more losses occur through pests and disease. As a result of farmers moving out of their villages during the civil conflict, plantations became overgrown and are unproductive and farmers have struggled to carry out any rehabilitation since their return to their villages after the conflict ended. Farmers are very interested in rehabilitating and improving the management of their cocoa plantations, but do not have adequate know-how to replace trees that are too old or diseased or improve productivity (Witkowski et al 2012b).

Despite cocoa having been an important source of income for farmers in the pre-war period, production and quality throughout Sierra Leone is currently very low. As a result the exported product is realizing a low price on the world market which means that farmers are also receiving a

low price. Redevelopment of the cocoa sector represents an opportunity for the country which the government has recognised and recently prioritised with the development of a National Sustainable Agricultural Development Plan which includes a Smallholder Commercialization Program (NSADP 2009). The Government of Sierra Leone identified the cocoa sector as one of the pillars for growth and is aiming to bring Sierra Leonean cocoa back to the global market. The Sierra Leone Investment and Export Promotion Agency (SLIEPA) was created in 2007, with the goal of facilitating investment. The Government has a target of producing 25,000 tonnes by 2015. The Government is keen to develop the cocoa processing sector to add further value into the supply chain since cocoa from Sierra Leone is currently shipped as beans for processing elsewhere. The Government has given tree crops a "tax holiday for 10 years" (up to 2020).

This project activity therefore not only fits in with the ambitions of cocoa farmers in the leakage belt but also with National agricultural strategies.

The aim is to build on the national momentum for cocoa by re-habilitating shade-grown cocoa plantations to provide farmers with an increase in productivity and therefore an increased, diversified source of income which helps reduce poverty in the villages of the leakage belt. Maintaining shade grown plantations may also help enhance habitat connectivity within the matrix of agriculture and forest landscape that exists between the blocks of the GRNP (the project area) in the leakage belt. Promoting land-use practices that are favourable to both wildlife and people and which maintain carbon stocks is beneficial to the multiple objectives of the Gola project.

In the medium term, the objective of the activity is for leakage belt farmers who wish to achieve certified cocoa standards such as Fairtade and the Rainforest Alliance can do so as these standards have a consumer-facing brand and strong marketing teams in Europe which can help strengthen the price achieved for the villages cocoa.

The activity follows a farmer field school approach with one year dedicated to the training of Master Farmers. Immediately after receiving each training the Master Farmers went back to their villages and trained the rest of the farmer group in the techniques they learnt at the Farmer Field School. In year 2, the progress of the farmers will be monitored by a field officer and refresher and dedicated trainings tailored to the needs of the Farmer Field school groups will be provided by the field officer. During years 3 to 6 the farmers progress will continue to be monitored and refresher training provided as required. Farmers that wish to achieve certification for their farms will be supported during this period to do so – the details of this are currently being developed (see Tatum-Hume and Witkowski 2013 for further details on the activity and implementation plan)

3. To enable Forest Edge Communities to achieve financial independence

Forest Edge Communities frequently identified during PRA exercises that access to cash to develop alternative livelihood activities or support agricultural development was a constraint to development. Households in Forest Edge Communities have scarce financial resources and no means to secure small loans or access to any secure method of saving money. If money is lent to farmers by for example traders who buy the farmers products it is often with high rates of interest usually in the form of a large proportion of the product being produced. During PRA exercises women in particular expressed a need to access micro-credit as they would use it to engage in the petty trade of items that are not available in Forest Edge Communities e.g. salt, seasoning, batteries, clothing etc as well to fund agricultural activities including for example paying for farm labour or for the marketing of produce. Loans can also be useful to enable households to meet their immediate needs without

having to sell their crop when it is still in the field or to middlemen, meaning they can sell their product by weight once it has been harvested and processed, thus achieving a higher price. Villagers reported that any additional income made from these activities would be invested into a number of areas depending on the need of the household from education and improved housing to food and health issues. Supporting Forest Edge Communities in the creation and training of sustainable savings and lending groups therefore provides community members, and in particular women (as this group expressed a greater interest in micro-finance), with the means to access credit and generate their own sources of diversified income.

Investigations into possible mechanisms to support communities to develop internal, self sustaining systems for savings and lending led to the SILC programme run by Catholic Relief Services in Sierra Leone and other parts of Africa. The aim of the 'Savings and Internal Lending Communities' (SILC) scheme is to empower farmers, and often, female headed households to increase their financial assets as well as providing them with the knowledge and skills to better manage their own scarce financial resources. In addition to providing a safe place to save and lend to group members, the SILC methodology also builds cohesive groups that work together to solve individual, group and community problems. Group management skills such as organizing meetings, keeping basic financial records and initiating basic business planning are also strengthened. There is also a special fund, known as the 'social fund' which every member contributes a fixed amount to, to help at special times like illness, death, marriage, etc. SILC groups form an important basis for what is known as 'Integral Human Development' (IHD) as it builds up individual and community financial assets through savings and internal lending; human assets by facilitating skill development in numeracy, bookkeeping and following policies and procedures; social assets through electing a committee and drafting a constitution; solidarity through supporting the poorest members of the community and building group cohesion and self-reliance through the SILC meetings; political assets by their ability to speak up as a community; and physical assets by investing their loans into income generating activities (SILC, a basis for Integral Human Development, CRS Publication, November 2006).

The aim is to enable Forest Edge Communities to achieve financial independence through establishing a secure means of saving money and procuring small loans that can be used for petty trading or for investments into agricultural activities. Savings and the social fund will provide members with a financial safety net should any shocks occur. By creating internal savings and lending groups villagers are either able to generate alternative incomes or invest in their farming activities. The additional income generated from new or expanded income generating activities will in the long term help reduce poverty.

The activity is implemented over a 2 year period, with the SILC groups receiving training and support throughout the 2 years. In the last 6 months of the 2 years, a 'Private Service Provider' is chosen from each group by its members to act as the future supervisor of their group. This person is also trained to support the setting up of new groups within their village (or elsewhere).

4. To improve the well-being and resource governance capacity of Forest Edge Communities whilst maintaining a biodiverse forest

Forest Edge Communities have traditionally accessed areas of the GRNP to extract NTFPs including medicinal plants and to fish; such activities have supplemented the main livelihood activities carried out around their villages. Areas important to secret societies and linked to old burial sites are also thought to exist within the GRNP, although such information is not accessible to

outsiders. Forest Edge Communities are still permitted to enter the GRNP and extract NTFPs but the PRA exercises carried out during Gola REDD project development revealed that many villagers do not understand their rights and believe that the forest rangers will prevent their access to the Park. Weak governance in other Forest Reserves in Sierra Leone has led to encroachment into the reserves of agricultural activities. This would also occur in the baseline scenario for the project area. Forest Edge Communities have stated that they will act as guardians of the forest if they are involved in its management (Witkowski et al 2012b) developing co-management agreements will therefore result in better governance of the National Park through the long term support of the Forest Edge Communities in enforcing regulations.

This activity consults with the Forest Edge Communities to negotiate the development management plans for community use zones in the National Park. The management plans will enable the community use zones to be sustainable, well-managed areas generating products of commercial value which can be used to increase the income generating activities of the Forest Edge Communities. They will also secure the support of the Forest Edge Communities in protecting the National Park from illegal activities. The long term objective is to improve the well-being of people now and in the future while supporting a diverse population of animals and plants.

Outside of the National Park in the Forest Edge Communities, the activity develops land use mapping and planning within each Forest Edge Community to enable communities to plan the sustainable use of their resources for current and future generations. Communities are encouraged to develop by-laws around the use of forest resources, where these do not currently exist. The objective of this activity is to reduce unplanned deforestation in the leakage belt.

The project works with Forest Edge Communities to map areas that were used in the past for resources and cultural activities within the GRNP. The work is led by the community development staff under the guidance of a co-management supervisor. The maps are used to establish community use zones within the National Park that are jointly managed and monitored by the communities. The participatory mapping begins with a rough map drawn in the dirt or on paper with village members outlining where resources are in relation to recognizable geographical features, these areas are then walked and plotted with a GPS to make them identifiable in the GIS map for the community to see. Rules are developed and jointly agreed between Forest Edge Communities and local authorities about who can do what when, how and utilize how much of a resource in the zones to ensure sustainable use of the resources. The agreements also outline the roles and responsibilities of all the parties including monitoring resource collection. The agreements strengthen local resource rights and empower local communities to manage forested areas for improved conservation outcomes.

Forest Edge Community land-use maps are developed for their land outside the park for planning purposes, in the same way as the maps of the community use zones are established. What can be done on this land is different to that inside the Park so different rules may be applied by the community (logging for example is allowed outside the Park if a license is obtained which may form part of a land use plan). The involvement of the local authorities may also be different due to the different rules applying to land-use outside the Park. Different by-laws may also apply between Forest Edge Communities. How planning is undertaken following the (participatory) land-use mapping is assessed on a case by case basis but a current land-use map in itself is an extremely useful tool to see what is being done where and what potential future changes may be needed to ensure the land is sustainably used.

The direct benefits for the Forest Edge Communities include: the sustainable utilisation of NTFPs and fish inside park ensuring resources for future generations; the creation of clear unambiguous rules about who can do what where, when, how and utilise how much (this also regulates what outsiders can do, if anything); organised and reliable support from the local authorities (particularly the District Forestry Office and police) and GRNP to assist communities with enforcement of rules; and shared decision making and accountability for resource use inside the park increasing a sense of ownership in conservation outcomes. It also provides clear land-use maps for current uses outside the Park in the leakage belt which can be used for sustainable use planning purposes in this area.

The development of the co-management approach for the Gola REDD project begins with a pilot with 2 clusters of Forest Edge Communities to test the methodologies and assess the overall approach and villages' willingness and capacity to engage with the process. Once trialed and adapted the activity will be implemented in further Forest Edge Communities (see Tatum-Hume and Witkowski 2013 for further details)

5. To enhance environmental awareness and promote community participation in the management of the GRNP

Increased capacity building and awareness raising efforts are carried out in the Forest Edge Communities focusing on the importance of a healthy environment, its contributions to human well-being and the value of standing forests and natural resource management. Raising awareness on a range of environmental issues from climate change, to endangered species and co-management to sustainable land use planning is part of the process to empower Forest Edge Communities with the knowledge and skills to engage in project activities. Aiding community members to identify and understand the non-financial benefits, ecosystem services, and ways in which the forest and natural resources serve as the foundation for local livelihood strategies facilitates the development of environmental stewards in this generation and the next.

A number of activities aimed at different audiences are implemented in order to achieve this objective. Roadshows have proven to be an effective way of engaging Forest Edge Communities, particularly adults, with environmental concepts and these were continued. In secondary schools nature clubs are promoted by the Government, (The Environmental Protection Agency), to engage pupils with environmental issues and nature clubs are reactivated and supplied with educational materials and ideas by the project. For youths, a volunteer scheme has been developed and promoted through which youths selected by their communities undertake short turns volunteering with the project. They are engaged with activities such as boundary brushing, biodiversity monitoring, trail cutting, tour guiding, and patrolling with the forest rangers. They receive basic training on park management and research, in addition to a small stipend and are encouraged to apply for vacant positions within the project team.

All of the above strategies to achieve net positive impacts for the project's local stakeholder groups have been formalized in a consent based agreement between the project and the 7 Chiefdoms, the 2012 Benefit Sharing Agreement (BSA). The benefit sharing agreement was signed by the 7 Paramount Chiefs and was publicized in open meetings and via radio chat shows and after the sections relevant to specific stakeholder such as landowning families and Forest Edge Communities had been discussed in focal groups and landholder meetings. The effective and transparent implementation of the benefit sharing agreement is a further objective of the project..

With the project, the project zone is a well-managed area, able to provide significant benefits for local communities. Net positive benefits are experienced as the project ensures the maintenance of critical ecosystem services, including provision of freshwater, prevention of erosion, and maintenance of the micro-climate critical for the region's most important economic crops. Secondly, the project enhances the existing primary livelihood activity in the area, farming, as well as providing community members with viable livelihood alternatives to the overuse and unsustainable extraction of natural resources. This aids them in avoiding the illegal activities they sometimes engage in within the park boundaries and decreases logging and mining activities that produce unreliable benefits while degrading the natural resource base. Improved knowledge of sustainable farming practices, inputs and increased access to capital improves productivity of land already integrated within the crop-fallow system and thus increases income and food security. The land use planning and co-management encouraged by the project, coupled with the support leveraged from other development organizations is critical in providing a net positive benefit to communities. Together, these activities help communities avoid the degradation of natural resources, which is critical as if this occurs, those resources will be unable to support the livelihoods of the communities to the extent that they do today, thus communities will increasingly have to rely on cash to buy their basic needs. In order to obtain the necessary funds, they would have to intensify land use, further degrading the land and resources. With the knowledge and tools provided through the Gola REDD project, communities are able to avoid this. The communities will become environmental stewards of the natural resource base that underpins their livelihoods through the project's activities that enhance, generate value from and help ensure that increased benefits from the project zone's forests and sustainable land use practices materialize for the communities.

Impact of project activities on High Conservation Values

Positive Impact	Negative Impact
• significant net-positive impact on endangered species and habitat	• No negative impacts

Areas of HCVs 1 to 4 are located throughout the project zone. Areas falling under HCV 5 that are 'fundamental for meeting the basic needs of local people' were identified as being located primarily in the leakage belt area of the project zone rather than the project area; the project area was used only to supplement livelihood activities occurring in the leakage belt. In order to ensure that HCV 5 is not negatively affected by the project, community management zones will be created in the project area to enable Forest Edge Communities access to NTFPs and fishing areas that have been traditionally accessed in the past. The activities to increase agricultural production in bush fallow areas of the leakage belt will enable Forest Edge Communities to increase yields within their community lands instead of using the project area. As the project aims to support communities in conserving and maintaining access to areas of high conservation value throughout the project zone, and as the project area will be managed for conservation objectives there will be no negative impacts to any HCVs.

7.2 Negative Offsite Stakeholder impacts (CM2)

Offsite stakeholder impacts

Potential negative offsite stakeholders

Offsite villages are defined as those beyond the project zone but within the boundaries of the 7 Chiefdoms of the Greater Gola area. There are approximately 372 communities in this area. From offsite community surveys, there are 2 potential negative impacts on offsite villages that may arise from project activities. The first is due to restrictions on access to the project area for illegal activities such as hunting, logging, mining and farming. As revealed by the survey work (Zombo et al 2012) and confirmed by earlier work carried out by independent social scientists (Bulte et al. 2013), offsite communities did occasionally access Gola to obtain resources to complement those obtained within their community lands but to far lesser extent than Forest Edge Communities (Davies and Richards 1991). If populations continue to increase over the project's lifetime and increase pressure on land availability, a second potential impact may arise from conflicts over land use with Forest Edge Communities in the project zone (Sierra Leone's population growth rate is reported to be 2.3% [UN statistics 2010] but is often lower in the most rural areas.) The species of wildlife that Forest Edge Communities in the project zone report as damaging their crops include primarily large mammal species such as Chimpanzees and buffalo. Such species are forest dependent species that are restricted to areas with large areas of continuous forest tract – as are found in the project area and some parts of the project zone. It is highly unlikely that such species would stray beyond the project zone which stretches 4 km around the project area and into the offsite area. Wildlife conflict from the project area is therefore not considered a negative impact for offsite communities.

Mitigation of negative offsite stakeholder impacts

No pattern emerged over which offsite communities were accessing the project area (e.g. communities closer to the project zone or with less community forest) or over whether there was a sub-set of offsite community members using the reserve more than others e.g. women or landless households (Zombo et al 2012). Communities reported that the people using the reserve varied each year. It is therefore not possible to target communities or individuals with mitigation activities for the loss of access to the project area. Instead, the project provides each of the 7 Chiefdoms with an annual community development fund which is to be used by communities for implementing sustainable development projects; the amount each chiefdom receives is currently set at $9,500, as per the benefit sharing agreement. Potential project ideas are developed by the offsite communities, selected and evaluated by Gola community development committees (GCDCs) consisting of elected offsite community members and implemented by offsite communities where projects are approved (see GRNP 2013). The impacts of these projects will be monitored by the committees. A formal community development fund scheme was trialed by the Gola Forest Program between 2008 and 2012 and the lessons learnt were used to develop the new Community Development Fund mechanism for the Gola REDD project.

If land conflicts arise as a result of project activities they are more likely to occur in the areas where land from the Forest Edge Communities meets the land of offsite villages that lie closest to the project zone. The few land conflicts that were reported in the surveys were on the whole as a result of poor knowledge of boundaries and accidental incursions onto another villages' land. In order to mitigate for this potential impact, land use mapping and planning activities was developed based on

natural clusters of villages and includes offsite villages bordering with the project zone. By mapping family claims to land, tenure is clearer and planning future land uses ensures greater awareness of farming and fallow areas.

In addition to the above activities the project provides other benefits to offsite communities through project activities that raise awareness of environmental protection such as school nature clubs and the Gola road show, through education scholarships, employment to the project as permanent or casual staff and capacity building exercises.

The project monitors for both positive and negative impacts in offsite villages throughout the project lifetime; if negative impacts attributable to the project are found then further activities will be planned to mitigate any effects.

Net impacts on other stakeholder groups

All stakeholder groups were identified and the impacts of the project on these groups evaluated. There are no further groups of stakeholders whose well-being is affected by the project.

7.3 Exceptional Community Benefits (GL2)

Exceptional community benefits

Human Development ranking

The project zone is located in Sierra Leone, which in 2014 was ranked 183 out of 187 countries on the Human Development Index (UNDP 2014).

Project benefits to the poorest 50% of households

The Gola REDD project is not seeking a gold level in community benefits. The project activities are not targeted to the poorest quartile of a community for a number of reasons. Firstly, from the PRA work, it was noted that there is great reluctance amongst community members to rank themselves in terms of well-being, they all consider themselves to be poor and want to be involved in the project activities (and introducing a targeted activity that is not approved by the community was not considered a viable option). Secondly it is considered that poorer households tend to be more risk adverse in their livelihood strategies and would therefore be unwilling to adopt any new techniques introduced by the project activities until they have been tried and tested by other community members. Poorer households, identified as being 'strangers' or female headed households are therefore likely to benefit in the medium term as new farming techniques, training and SILC groups expand and are taken up by the wider community, although some special measures have been incorporated into livelihood activities.

Barriers to project benefits reaching the poorer households

Project activities have taken into account the fact that poorer households tend to be more risk adverse and have time constraints to their involvement in livelihood activities. Special measures have therefore been introduced into the farming activities (crops and cocoa) to include poorer households in the short term (see activity descriptions in Tatum-Hume and Witkowski 2013). As

described above in the medium to longer term it is anticipated that poorer households will uptake activities once they have been tested by other households.

Identification and mitigation of negative impacts from project to poorer households

The poorer households in Forest Edge Communities are more likely to be either stranger-headed households or female-headed households as they have less ability to access good areas of land for farming. PRA did not identify these same households as more frequently accessing the project area to farm. Livelihood activities have been designed to ensure that these poorer households are involved in the livelihood activity, for example in the agricultural activity, through the provision of seed inputs to 2 poorer households from each Forest Edge Community (one female headed and one male headed where possible). An agreement was developed between the landless farmer and the landowner he rents land from to ensure the farmer has access to a piece of land to grow the rice seed. Once the rice has been harvested the landless farmers pass the same amount of seed to another landless farmer within the village with a similar agreement in place. (NB It is not considered appropriate to directly target these households for their involvement in Farmer Field Schools due to the time constraints these families often have).

Effectiveness of community impact monitoring with focus on poorer households and women

The community impact monitoring includes households with both stranger-headed and female-headed households to monitor the long-term impact of the project on these groups.

8 BIODIVERSITY

8.1 Net Positive Biodiversity Impacts (B1)

The project will bring multiple benefits for biodiversity resulting in the following net positive impacts for biodiversity by reducing the following threats.

Habitat loss and fragmentation

As described in previous sections, it is estimated that between 10% and 30% of the Upper Guinea forest cover that existed at the turn of the 19th century remains (Poorter et al. 2004). Reducing deforestation and degradation in the project zone is one of the main goals of the project activities which will reduce habitat loss and fragmentation. Since many of the threatened species in the project zone are forest-dependent, preventing forest loss is of major importance to these species. The impacts of the project activities can be summarized as follows:

- Conversion of forest to agriculture is reduced through leakage prevention activities that increase production in existing farm bush areas of the leakage belt in the project zone, following the theory that land sparing in which high yield farming is combined with protecting natural habitats from conversion to agriculture, have a positive effect on biodiversity (Phalan et al 2011). In the project area forest patrols prevent deforestation and so there is minimal loss of habitat throughout the project zone. This benefits all forest dependent species in the project zone.

- There is reduced deforestation in the project area from agriculture and other illegal activities so the quality and amount of this habitat and the species that are confined to it positively benefit, especially the true primary forest specialists such as Jentink's duiker, Western red colobus and several species of birds and amphibians benefit.
- In the leakage belt of the project zone, project land use planning activities developed with Forest Edge Communities ensure that key corridor areas for wildlife populations are maintained thereby reducing forest fragmentation so species can move between different parts of the forest, enhancing the viability of small populations, especially species with large home ranges (e.g. forest elephant, pygmy hippo) will benefit.

Disturbance

- Small-scale mining and logging activities can result in disturbance and opening up the forest by making trails and access roads. Project activities ensure that no illegal activities take place inside the project area. This benefits many species that are shy or sensitive to disturbance, including forest elephant, chimpanzees,

- Pygmy hippo, ungulates, or nesting birds. Water pollution from mining is minimised which is be of direct benefit to aquatic biodiversity.
- In the leakage belt of the project zone, sustainable resource use is being promoted and key areas of importance for wildlife will be set aside through the development of land use maps and plans, thus reducing disturbance to shy and sensitive species.

Species loss

The project activities are expected to have net positive impacts on biodiversity by minimizing species loss.

- One of the most obvious and direct effects of the project activities is reduced hunting pressure in the project area. Species that are especially targeted by local hunters are the primates and duikers. Among the primates, especially the Vulnerable Sooty Mangabey and colobines are susceptible to hunting. This includes the Endangered Western red colobus, which is reported to be easily affected by hunting, because of their large size, conspicuous habits and relatively slow movements (Davies 1987). Besides primates, duikers are a popular source of bushmeat. They are mostly hunted using snares, and by using spotlights at night to blind them before being shot. The most common species is Maxwell's duiker and this species is also commonly hunted. Terrestrial birds also get caught using snares, including the Vulnerable White-breasted guinea fowl. In the leakage belt of the project zone communities are involved in capacity building and information sharing events about threatened species to reduce the threats to these species from hunting activities.
- Besides the direct effects of hunting, species loss is minimized as a result of the project activities because of reduced levels of disturbance and habitat loss. These factors have been described above.

Loss of connectivity

A net positive impact of the Gola REDD project is to enhance the long-term connectivity of the Upper Guinea forests by maintaining the connections between the three forest blocks and by linking the project area in Sierra Leone with the Gola National Forest of Liberia (see Figure1), through community land use mapping and planning. This will greatly increase the long term viability of this globally important forest area and the threatened species it contains. Such connectivity is particularly important to enable species to maintain genetically viable populations, to facilitate species that have very large home ranges (e.g. forest elephant, leopard), and to allow migration of some species.

As described in G2, without the project there are no positive benefits for biodiversity as the forest would be gradually cut down and as a result forest dependent species (the threatened species in need of protection) would decline in numbers and be hunted. A summary of the impacts of the project activities is given in Table40. Overall, it is clear that the net impacts on biodiversity will be positive.

Table 40 Threats, management actions and the impact of project activities on biodiversity.

Threats	Management actions	Net positive impacts
Habitat loss and fragmentation	• Protecting the project area to reduce deforestation and degradation (goal 1) • Patrols by forest rangers in the project area (goal 1) • Education and awareness campaigns in the project zone and wider Chiefdoms (goal 2) • Sustainable livelihood projects (goal 2) • Land use mapping and planning with Forest Edge Communities (goal 2)	• Maintenance of forest cover • No reduction or possibly even an increase of populations of primary forest specialists
Disturbance	• Patrols by forest rangers in the project area (goal 1) • Education and awareness campaigns in the project zone and wider Chiefdoms (goal 2) • Land use mapping and planning with Forest Edge Communities (goal 2)	• Maintenance or Increase in populations of sensitive species (e.g. White necked Picathartes, Pygmy hippos)
Species loss (hunting)	• Patrols by forest rangers in the project area (goal 1) • Education and awareness campaigns (goal 2)	• Reduced net species loss; increase of populations of sensitive species • Reduction in hunting threats (snares, number of poachers)
Pollution from mining or forest damage from	• Patrols by forest rangers in the project area (goal 1) • Education and awareness campaigns in the project zone and wider Chiefdoms	• Healthy riverine systems • Intact forest canopy and understorey

Threats	Management actions	Net positive impacts
logging	(goal 2) • Land use mapping and planning with Forest Edge Communities (goal 2)	
Loss of connectivity	• Development of sustainable management plans with Forest Edge Communities in key areas between project areas and the Liberian border (goal 2) • Agriculture project to increase productivity in land that is already within the bush-fallow cycle (goal 2) • Rehabilitation of cocoa farms in shade grown plantations to maintain forest cover between blocks (goal 2)	• Connectivity between large forest patches and other areas of conservation interest across the border in Liberia allowing for transnational gene flow and the maintenance of viable populations in the face of climate change

Impact of project activities on High Conservation Values

Since many of the HCVs identified depend on the availability of large areas of contiguous forest, the project activities to maintain and enhance the forests of the Project Zone are expected to have a significant positive impact on HCVs. The conservation of these HCVs along with all forest-dependent biodiversity is one of the main goals of the Gola REDD project.

As significant concentration of biodiversity in the project zone are forest-dependent they benefit from the presence of the project. Several of the threatened and endemic species only occur in pristine lowland rainforest and are susceptible to disturbance such as hunting, forest degradation etc. Examples are the Endangered Jentink's duiker, Gola malimbe and Western red colobus. Project activities such as forest patrols to check for illegal deforestation, hunting etc. are essential to ensure the survival of these species. In addition to the individual HCV species, the entire landscape unit of Gola Forest including threatened or rare ecosystems benefit from these project activities.

No negative impacts on HCVs are expected as a result of the project activities. The project activities do not entail any form of forest degradation or other negative impact on the forest. Some project activities may give minor disturbance, such as forest guard patrols or research activities. However these impacts are temporary and probably negligible, certainly in comparison by the disturbance that would be caused by illegal logging, mining or hunting.

Offsite negative impacts to HCVs are not anticipated as the offsite zone has a low biodiversity value.

Table41 A summary of the HCVs and management actions to ensure their protection

HCV criteria	Relevance to the project	Management actions to protect HCV	Target
HCV 1 Globally, regionally or nationally significant concentrations of biodiversity values	The project zone contains many threatened species in significant concentrations that meet the HCV1 criteria (see Table 13)	Patrols by forest rangers to reduce deforestation and hunting activities in the project area Community environmental awareness raising activities land use mapping and planning in the leakage belt Ecotourism Livelihood activities to increase crop productivity and maintain forest cover	Stable or increasing populations, stable or increasing species distribution, decreasing threat encounter rate
HCV 2 Globally, regionally, nationally significant large landscape –level areas where viable populations of natural populations occur in natural distribution and abundance	The project zone is a globally and nationally significant area and contains viable populations of naturally occurring species many of which are threatened	Patrols by forest rangers to reduce deforestation and hunting activities in the project area Community environmental awareness raising activities land use mapping and planning in the leakage belt to create wildlife corridors between the blocks of the project area	Diversity and distribution of species is maintained, forest ecosystem remains fully functioning, forest cover maintained or increases in the project area, trees showing growth
HCV 3 Threatened or rare ecosystems	The project area is a nationally significant landscape and globally recognized biodiversity hotspot	Patrols by forest rangers land use mapping and planning	Forest cover maintained or increases within and between blocks of the project area and trees are growing to full potential

Project activities and invasive species

The management of the project area tries to counter the spread of any invasive species, such as the shrub *Chromolaena odorata* or grasses such as *Imperata cylindrica* that have been introduced to the region by others. The following management actions with respect to invasive and non-native species are identified for the project area:

- Invasive plants. If any site is identified where there are significant numbers of exotic plant species, a simple monitoring system will be put in place to determine whether the exotic species are extending in area or receding over time. In case the exotics are found to be extending, appropriate control or eradication measures will be undertaken.
- Tree crops. Small plantations of tree crops, including oil palm, cacao and some fruit trees, have been found within the project area. These areas were farmed by local communities before the period of civil conflict but were subsequently abandoned during the war and have overgrown. These trees will be allowed to die out naturally as a result of competition with native vegetation. The situation will be monitored after five years to determine whether any further action is required.

In the leakage belt of the project zone, where livelihood activities are implemented with the Forest Edge Communities, the project does not use any invasive species to improve crop productivity.

Project activities and non-invasive species

The species that are used in the agricultural components of the project activities are both native and non-native species. Any non-native species that is used in the project activities have been tried and tested by our project partner WHH in agricultural projects in Sierra Leone to improve productivity before used in the Forest Edge Communities (Per comm., WHH)

Project activities and GMOs

The Gola REDD project does not use any GMOs in the project activities.

8.2 Negative Offsite Biodiversity Impacts (B2)

Potential negative offsite biodiversity impacts

From analysis of ratios of forest to non-forest at increasing distance from the project area it is apparent that the areas of forest beyond the project zone are restricted to small patches of remnant forest, any other forest having become incorporated into the bush-fallow system (see Figure24).

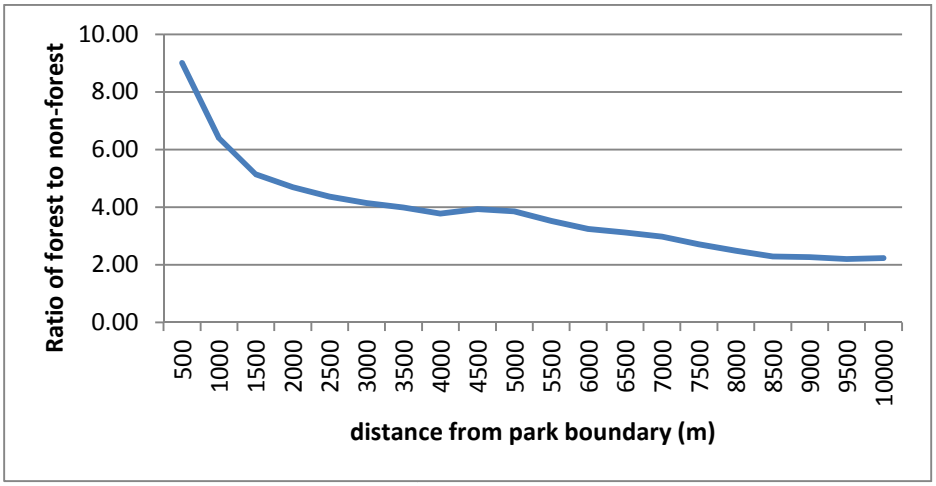


Figure24 Forest to non-forest ratios with distance from the project area

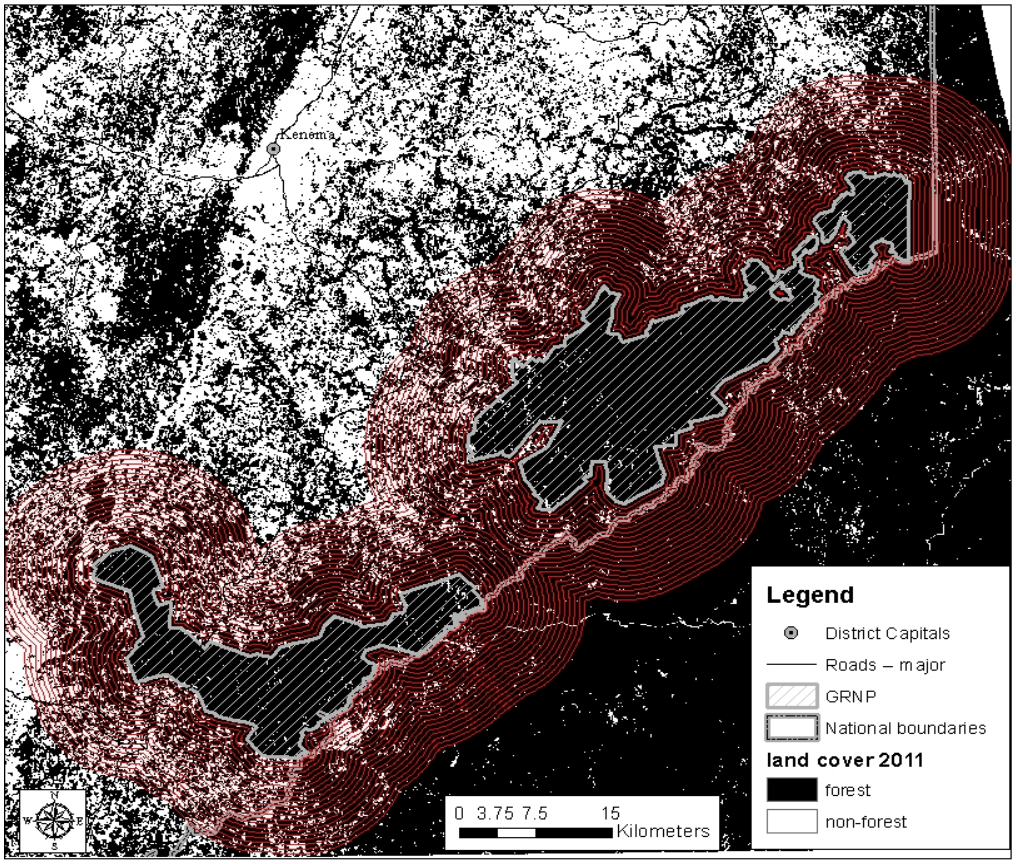


Figure25 Forest cover in the vicinity of the project area (red lines are at 500m intervals)

As explained previously, forest loss and fragmentation has an adverse effect on biodiversity and as a result, biodiversity in the offsite zone is already low; endangered and threatened species having long since been absent from such areas (Ganas 2009), (this is confirmed in a recent study carried out by Hillers and Mauana 2011 which looked at Pygmy hippos; offsite villages where pygmy hippos were reported to have been encountered in the past and where signs of pygmy hippos are found today has dramatically declined).

Potentially negative offsite biodiversity impacts as a result of the project could include a relocation in hunting pressure or activities that result in degradation or deforestation to the offsite zone but as any remaining forest is already significantly degraded, harvestable timber species and larger primates i.e. species with a high biodiversity value having been removed some time ago any impacts are on species that are not threatened.

As very few people living in communities in the offsite zone were using the project area to farm in pre-conservation work (Zombo et al 2012), farming activities are not displaced to the offsite zone.

Mitigation of negative offsite biodiversity impacts

Impacts on biodiversity in the offsite zone are expected to be minimal but in spite of the minimal risk to biodiversity in the offsite zone the project engages with offsite villages for a number of activities that aim to foster support for biodiversity conservation and increase awareness of the importance of forests and biodiversity.

Discussing how the natural resource base underpins many communities' livelihoods with offsite communities via awareness raising campaigns are a first step towards encouraging offsite villages to place a value on the preservation of forest remnants. This is followed by the setting up of nature clubs in schools and a youth volunteer program in the offsite area (and project zone) to ensure that future generations also understand the links between forests and wellbeing.

In order to foster political support for the conservation activities the project also continues to support community selected sustainable development projects via the community development fund that is administered by community elected committees in each of the seven Chiefdoms. Such projects can include reforestation, rehabilitation of plantations, agriculture enhancement projects or other projects that aim to enhance livelihoods in a sustainable manner thus mitigating further impacts on biodiversity.

Demonstration of net positive biodiversity impacts

Even without mitigation activities, offsite biodiversity impacts are expected to be minimal. With mitigation activities, there should not be any negative biodiversity impacts in offsite villages and monitoring over the lifetime of the project reveal if in fact the project is able to improve the biodiversity in the offsite zone. A comparison of potential negative offsite biodiversity impacts in the offsite zone and biodiversity benefits in the project zone was made in Table42 the overall impact on biodiversity is believed to be positive.

Table42 Comparison of offsite biodiversity impacts against biodiversity benefits in the project area

Biodiversity impacts in the offsite zone	Biodiversity benefits in the project area	Net Positive Benefit
Possible relocation of hunting pressure (thought to have a low impact as HCV species are largely absent from the offsite zone)	No reduction and possible increase in numbers of forest specialist species as hunting threat is reduced	There is a net positive benefit to wildlife populations that are typically hunted as such species are protected in the project area
Possible relocation of deforestation and degradation activities to the offsite zone	Maintenance of forest cover in the project area and re-growth in areas that have previously been logged	Maintaining the project area which has high species diversity provides a net positive benefit as it preserves species that no longer exist in the offsite zone
	Maintenance or increase in wildlife populations sensitive to disturbance	The project area is managed to maintain a full complement of species that are naturally found in an Upper Guinean rainforest ecosystem
	Healthy riverine systems	Maintaining forest cover also helps to regulate water flow and quality and thereby the biodiversity found within riverine systems

8.3 Exceptional Biodiversity Benefits (GL3)

Vulnerability

- Critically endangered and endangered species

1 Critically endangered species and 8 endangered species are present within the project site. More than 1 individual of each species are present (Table43).

Table43 Endangered and critically endangered species present in the project site

Gola Malimbe	*Malimbus ballmanni*	Endangered
Hooded Vulture	*Necrosyrtes monachus*	Endangered
Western red colobus	*Procolobus badius*	Endangered
Western chimpanzee	*Pan troglodytes verus*	Endangered
Pygmy hippopotamus	*Choeropsis liberiensis*	Endangered
Jentink's duiker	*Cephalophus jentinki*	Endangered
	Phrynobatrachus annulatus	Endangered
	Hylarana occidentalis	Endangered
Tai toad	*Amietophrynus taiensis*	Critically endangered

- Vulnerable species

The Gola REDD Project believes it can achieve the criteria laid out in the optional criteria GL3 'Exceptional Biodiversity Benefits' to achieve Gold Level status, on the basis of meeting the criteria for "vulnerability" as described. In addition, the criteria for "irreplaceability" are also met. The project zone is home to several threatened species, some of which occur in good numbers. This makes the project zone a key site for the conservation of these species.

- Vulnerability

The project zone is listed as an Important Bird Area (Evans & Fishpool 2001) and is part of the Upper Guinea Forest biodiversity hotspot defined by Conservation International (Myers et al 2000). Based on these criteria, the project zone is classified as a Key Biodiversity Area (KBA) (Langhammer et al. 2007).

Mammals

Over 40 species of large mammal are known to occur in the project zone (Lindsell et al. 2011), of which four species are listed as Endangered and five species as Vulnerable. The three primates that are considered Vulnerable are all widespread and common within Gola. The numbers of Zebra and Jentink's duiker are currently unknown as this is a very furtive species that is difficult to survey, but work using camera traps will help overcome this problem during future monitoring activities. African forest elephant is now very rare in Gola and probably does not meet the threshold of 30 individuals. Approximate numbers of Pygmy hippos are thought to be between 100 and 150 individuals (pers.comm. Annika Hillers). The project therefore meets the vulnerability criteria for endangered and vulnerable mammal species.

Table44 Threatened mammals recorded in the project zone

Based on Lindsell et al. (2011). Status refers to the 2011 IUCN Red List Category, updated from www.iucnredlist.org.

English name	Scientific name	IUCN status	Numbers in PZ
Western pied colobus	*Colobus polykomos*	Vulnerable	5000 – 8000
Western red colobus	*Piliocolobus badius*	Endangered	10,000 – 20,000
Sooty mangabey	*Cercocebus atys*	Vulnerable	2000 – 15,000
Diana monkey	*Cercopithecus diana*	Vulnerable	15,000 – 45,000
Chimpanzee	*Pan troglodytes verus*	Endangered	<500
Pygmy hippopotamus	*Choeropsis liberiensis*	Endangered	Est 100-150
Jentink's duiker	*Cephalophus jentinki*	Endangered	To be confirmed
Zebra duiker	*Cephalophus zebra*	Vulnerable	To be confirmed
African forest elephant	*Loxodonta cyclotis*	Vulnerable	<50

Birds

As described previously the project zone is listed as an Important Bird Area (Evans & Fishpool 2001) and holds a high proportion of the threatened and endemic species of the region. In Table45 all threatened bird species that occur in Gola are listed. One species is listed as Endangered, i.e. Gola malimbe. This species seems to be extremely localized within the Central block of the project area. In addition, six species are listed as Vulnerable. Of these species, White-breasted guineafowl, Rufous fishing-owl, Yellow-bearded greenbul and White-necked picathartes have a wide distribution within the project zone, although not necessarily in high densities. The guineafowl, greenbul and picathartes certainly meet the threshold of 30 individuals or 10 pairs; for the fishing-owl this is also likely but its numbers are difficult to assess. Although the Western wattled cuckoo-shrike and Nimba flycatcher seem to be very rare in Gola and may not meet the abovementioned thresholds, overall the project meets the vulnerability criteria for endangered and vulnerable bird species.

Table45 Threatened birds recorded in Gola Forest.

Status refers to the 2011 IUCN Red List Category; data are from BirdLife International (2011), updated from www.birdlife.org/datazone/species/ index.html. The threshold refers to a threshold of at least 30 individuals or 10 pairs.

English name	Scientific name	IUCN status	Population above threshold?
White-breasted Guineafowl	*Agelastes meleagrides*	Vulnerable	Yes
Rufous Fishing-Owl	*Scotopelia ussheri*	Vulnerable	Yes
Western Wattled Cuckoo-shrike	*Lobotos lobatus*	Vulnerable	No
Yellow-bearded Greenbul	*Criniger olivaceus*	Vulnerable	Yes
Nimba Flycatcher	*Melaenornis annamarulae*	Vulnerable	No
White-necked Picathartes	*Picathartes gymnocephalus*	Vulnerable	Yes
Gola Malimbe	*Malimbus ballmanni*	Endangered	n/a

Amphibians and reptiles

Gola Forest is home to over 40 species of amphibians (Hillers 2009), of which four species are currently considered threatened (Table46). In addition, one reptile (African dwarf crocodile *Osteolaemus tetraspis*) is listed as Vulnerable.

Table46 Threatened amphibians recorded in Gola Forest.

By Hillers (2009). Status refers to the 2011 IUCN Red List Category, updated from www.iucnredlist.org.

Species	IUCN status	Population above threshold?
Amietophrynus taiensis	Critically endangered	n/a
Conraua alleni	Vulnerable	n/a
Phrynobatrachus annulatus	Endangered	n/a
Hylarana occidentalis	Endangered	n/a

9 ADDITIONAL INFORMATION

9.1 Monitoring and Implementation Report Annexes

Gola REDD Project, Project Implementation Report Annex 1: Progress made towards the CCB Social Monitoring Plan (Output, Outcome, & Impact Indicators)

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9.2 REFERENCES

Across the River project. Across the river; a trans-boundary peace park for Sierra Leone and Liberia. Project summary

BCP project. 2009. Project proposal to GEF. Available at http://www.thegef.org/gef/sites/thegef.org/files/repository/Sierra_Leone_Biodiversity_Conservation_Project.pdf Accessed on 17th July 2012 (Pdf)

Bulte E., Kontoleon A., List J., Mokuwa E., Richards P., Turley T. and Voors M. 2013. REDD+ socio-economic descriptive analysis Sierra Leone. Cambridge-Wageningen social science group. (Pdf)

Chave, J., Andalo, C, Brown, S., Cairns, M., Chambers, J., Eamus, H., Fromard, Higuchi, Kira, Lescure, Nelson, Ogawa, Puig, Rie´ra, Yamakura. 2005. Tree allometry and improved estimation. *Ecosystem Ecology*. 145: 87–99.

Chave, J.,Coomes, D.,Jansen, S., Lewis,S., Nathan G. Swenson, Amy E and Zannes. 2009. Towards a worldwide wood economics spectrum. *Ecology Letters.* 12: 351–366

Climate Focus. 2011. Gola Forest REDD project, Analysis of legal issues (Pdf)

Cluff Gold. 2010. A review of the Baomahun gold exploration project, Sierra Leone (Pdf)

Cole, N.H.A. 1993. Floristic Associations in the Gola Rainforests: a proposed biosphere reserve. Journal of Pure and Applied Science. 2:35-50

Daily Mail. 2012. Steve Cosser Interview: Pay-TV tycoon's troubled battle for Africa's mineral riches (Pdf)

Davies, A.G. 1987. The Gola forest reserves, Sierra Leone. Wildlife conservation and forest management. IUCN Tropical Forest Programme. IUCN Gland, Switzerland and Cambridge, UK

Davies, M. 2006. Sustainable Financing for Protected areas in Sierra Leone. RSPB publication for the World Bank GEF project: Wildlife protection and biodiversity conservation in Sierra Leone (Pdf)

Davies, G and Richards, P. 1991. Rainforest in Mende life. A report to ESCOR (Pdf)

DFID (Department for International Development (UK)). 2012. Operational Plan for Sierra Leone 2011-2015. (Pdf)

EC. 2010. Study on the evolution of some deforestation drivers and their potential impacts on the costs of an avoiding deforestation scheme

Eco-securities. 2008. An Assessment of the Carbon Offset Potential of the Gola Forest Conservation Project. (Pdf)

EPA. 2008. Environmental Protection Agency Act. (Pdf)

EU. 2007. Country strategy paper and National Indicative Programme 2008-2013. Available at http://ec.europa.eu/development/icenter/repository/scanned_sl_csp10_en.pdf Accessed on 17th July 2012.

Evans, M.I., and Fishpool, L.D.C. 2001. Important Bird Areas in Africa and Associated Islands: Priority Sites for Conservation. Pisces Publication; Cambridge: Birdlife International. Available at: http://www.birdlife.org/datazone/info/ibasafr

FAO Global Forest Resource Assessment, 2010

Fauset, S., Baker, T.R., Lewis, S.L., Feldpauscj, T.R., Affum-Baffoe K., Foli, E.G., Halmer, K.C. and Swaine, M.D. 2012.drought-induced shifts in the floristic and functional composition of tropical forests in Ghana. Ecology Letters 15:1120-1129

Forestry Act. 1988. Sierra Leone Forestry Act (Pdf)

Forestry Division Strategic Plan. 2012-2014 (Pdf)

Forestry Regulations 1990 (Pdf)

Ganas, J. 2009. Population Status and monitoring of western cimpanzees (*Pan troglodytes verus*) in the Gola Forest Reserve, Sierra Leone. Report to the U.S.Fish and Wildlife Services.

Garnett, K. 2012. Overview of the Forestry Sector presentation (Pdf)

Gibbs, H.K., A.S. Ruesch, F. Achard, M.K. Clayton, P. Holmgren, N. Ramankutty, and J.A. Foley. 2010. Tropical forests were the primary sources of new agricultural land in the 1980s and 1990s. Proceedings of the National Academy of Sciences Vol. 107 p16732-16737.

Gleave, M.B., 1996. The length of the fallow period in tropical fallow farming systems: a discussion with evidence from Sierra Leone. Geographical J. 162 (1), 14–24.

Global Witness. 2010. A near miss? Lessons learnt from the allocation of mining licenses in the Gola Forest Reserve of Sierra Leone. Available at: http://www.globalwitness.org/library/near-miss-lessons-learnt-allocation-mining-licences-gola-forest-reserve-sierra-leone Accessed on 17 July 2011 (Pdf)

Goodman L. 2008. REDD alert in Sierra Leone. Counting the cost of conservation and comparing it to avoided deforestation carbon credits. Unpublished MSc thesis (Pdf)

Government of Sierra Leone. 2010. Millennium Development Goals Progress Report. (Pdf)

Government of Sierra Leone budget 2009-2013. (Pdf)

Green Scenery Report. 2011. The Socofin land deal – Missing out on best practices (Pdf)

Grieg-Gran M. 2008. The cost of avoiding deforestation. Update of the report prepared for the Stern Review of the economics of climate change. Available at: http://pubs.iied.org/pdfs/G02489.pdf Accessed on 17th July 2012.

Hall, J.B. and Swaine, M.D. (1976). Classification and ecology of closed-canopy forest in Ghana. *Journal of Ecology* 64: 913-951.

Henry, M., Besnardd, A., Asantee, W., Eshunf, J., Adu-Bredug, S., Valentinic, R.,Bernouxb, M., Saint-André, L. 2010. Wood density, phytomass variations within and among trees, and allometric equations in a tropical rainforest of Africa. Forest Ecology and Management 260 (2010) 1375–1388

Hipkiss A. 2012. Review of Gola funding potential. RSPB (Pdf)

Ickowitz, A. 2006. Shifting Cultivation and Deforestation in Tropical Africa: Critical Reflections. Development and Change 37(3): 599–626

ICMM (International Council on Mining and Metals). 2012. The role of mining in National economies. (pdf)

Iles M., Savill P. and Koker G. 1993. Gola Forest Reserves, Sierra Leone: Interim management plan. Unpublished manuscript, Forestry Division, Sierra Leone

Internal Displacement Monitoring Center. Website dated 2004 . Available at; http://www.internal-displacement.org/8025708F004CE90B/%28httpCountrySummaries%29/0372C6E093AFEFEB802570C00056B6D0?OpenDocument&count=10000 (Accessed 22nd January 2013) (Pdf)

IUCN. 2006. Sustainable Financing of Protected Areas A global review of challenges and options (Pdf)

Jongkind, C.C.H. 2004. Checklist of Upper Guinea forest species. Pp447-477 in: Poorter, L., Bongers, F., Kouame, F.N. and Hawthorne, W.D. (eds.) Biodiversity of West African forests: an ecological atlas of woody plant species. CABI Publishing, Wallingford.

Kenema District Council. 2012. Kenema District Council Development Plan (Pdf)

Klop, E., Lindsell, J., Siaka, A. 2008. Biodiversity of Gola Forest, Sierra Leone. Gola Forest Program (Pdf)

Koker, G. 2011. Management Effectiveness Tracking Tool for Outamba-Kilimi National Park. BCP project (Pdf)

Koroma E. B. 2009. Statement by President of Sierra Leone for the 2009 UN climate change summit. Available at: http://www.youtube.com/watch?v=jRIQEoMINfE Accessed 17th July 2012 (Pdf)

Koroma E. B. 2011. Statement by President of Sierra Leone for the 2011 official opening of the GRNP (Pdf)

Langhammer, P.F., Bakarr, M.I., Bennun, L.A., Brooks, T.M., Clay, R.P., Darwall, W., De Silva, N., Edgar, G.J., Eken, G., Fishpool, L.D.C.,3 Fonseca, G.A.B. da, Foster, M.N., Knox, D.H., Matiku, P., Radford, E.A., Rodrigues, A.S.L., Salaman, P., Sechrest, W., and Tordoff, A.W. 2007. Identification and Gap Analysis of Key Biodiversity Areas: Targets for Comprehensive Protected Area Systems. Gland, Switzerland: IUCN. Available at https://cmsdata.iucn.org/downloads/pag_015.pdf

Lewis et al. 2009. Supplementary Information. Nature. African Forests Carbon supplement.

Lindsell, J and Klop, K. 2012. Spatial and temporal variation of carbon stocks in a lowland tropical forest in West Africa. Journal of Forest Ecology and Management 289 10–17 (Pdf)

McClanahan, Paige. 2011. Africa Rising: Carbon credits save Sierra Leone's Gola Rainforest**.** Christian Science article. Accessed from; http://www.csmonitor.com/World/Africa/Africa-Monitor/2011/1209/Africa-Rising-Carbon-credits-save-Sierra-Leone-s-Gola-Rainforest 13th July 2013 (Pdf)

MINEO Consortium. 2000. Review of potential environmental and social impact of mining. Available at: http://www2.brgm.fr/mineo/UserNeed/IMPACTS.pdf. Accessed 4 September 2012

Munang, R., Thiaw, I., Alverson, K., Mumba, M., Liu J. and Rivington M., 2013. Climate change and Ecosystem-based Adaptation: a new pragmatic approach to buffering climate change impacts. Current Opinion in Environmental Sustainability, Available at: http://dx.doi.org/10.1016/j.cosust.2012.12.001

Myers, N., R.A. Mittermeier, C.G. Mittermeier, G.A.B. da Fonseca and J. Kent (2000): Biodiversity hotspots for conservation priorities. Nature 403: 853-858. (Pdf)

NAPA. National Adaptation programme of Action. 2007.

National Communication on Climate Change to the UNFCCC. 2012

NBSAP: National Biodiversity Strategy and Action Plan for Sierra Leone. 2003. Available at: http://www.cbd.int/doc/world/sl/sl-nbsap-01-en.pdf (Accessed 18th January 2013)

NPAA. National Protected Area Authority Act. 2012. (Pdf)

National Recovery Strategy. 2002. Report from the Government of Sierra Leone (Pdf)

National Rice Development Strategy. 2009 (Pdf)

National Recovery Strategy. 2002. Report from the Government of Sierra Leone (Pdf)

NSADP. 2009. National Sustainable Agriculture Development Plan 2010-2030 Sierra Leone (Pdf)

Peters, P. et al. 2010. Youth employment in Sierra Leone; Sustainable livelihood opportunities in a post conflict setting. World Bank Report 2009. Available at: http://issuu.com/world.bank.publications/docs/9780821378229 (Accessed 4th September 2012) (Pdf)

Phalan, B., Onial M., Balmford A., Green R.E., 2011. Reconciling Food Production and Biodiversity Conservation: Land Sharing and Land Sparing Compared. Science 333, 1289

PRSP. Poverty Reduction Strategy Paper. 2005. An agenda for change; Republic of Sierra Leone (Pdf)

PRSPII. Poverty Reduction Strategy Paper II. 2008. An Agenda for Change. Republic of Sierra Leone (Pdf)

Richards, M. and Panfil, S.N. 2011. Social and Biodiversity Impact Assessment (SBIA) Manual for REDD+ Projects: Part 1 – Core Guidance for Project Proponents. Climate, Community & Biodiversity Alliance, Forest Trends, Fauna & Flora International, and Rainforest Alliance. Washington, DC. (Pdf)

Sierra Leone draft forest policy. 2010. Government of Sierra Leone. (Pdf)

SLIEPA. Agri Business Sector Presentation. Available at http://www.sliepa.org/downloads/agribusiness-sector-presentation (Accessed 4th September 2012) (Pdf)

Statehouse Communications Unit, GOSL. 2011. Press Release (Pdf)

UNDP. 2011. Human Development Report. Sustainability and Equity: A Better Future for All (Pdf)

Union of Concerned Scientists. 2011. The root of the problem; What's driving tropical deforestation today? Available at http://www.ucsusa.org/assets/documents/global_warming/UCS_RootoftheProblem_DriversofDeforestation_FullReport.pdf (Accessed 5th September 2012) (Pdf)

UNDP. 2007. Sierra Leone Human Development Report 2007. Available at: http://hdr.undp.org/en/reports/national/africa/sierraleone/name,3115,en.html (Accessed 17th July 2012) (Pdf)

UNDP. 2011. Human Development report; Sustainability and Equity. (Pdf)

UNDP. 2012. Human Development Index statistics. Taken from UNDP website; http://hdrstats.undp.org/en/countries/profiles/SLE.html. Accessed 16th April 2013

UNDP, 2014. Assessing the socio-economic impacts of Ebola Virus Disease in Guinea, Liberia and Sierra Leone. Taken from the UNDP website; http://www.africa.undp.org/content/dam/rba/docs/Reports/EVD%20Synthesis%20Report%2023Dec2014.pdf

Unwin, A. H. 1909. Forests and Forestry problems in Sierra Leone. Waterlow & sons limited, London wall, London

USAID. 2007. 118/119 Biodiversity and Tropical Forest Assessment for Sierra Leone. Available at: http://www.encapafrica.org/documents/biofor/Sierra_Leone_118_119_July_2007.pdf (Accessed on 18th January 2013) (Pdf)

White, J A. 1972. Forest Inventory of the Gola Forest Reserves. Report to the Government of Sierra Leone, FAO, Rome

Wilson, N.W. 1965. Geology and mineral resources of part of the Gola forest reserves, Sierra Leone. Bulletin No. 4, Geological Survey of Sierra Leone, Government of Sierra Leone

World Bank. 2010. Sierra Leone at a glance. Available at http://devdata.worldbank.org/AAG/sle_aag.pdf (Accessed on 17th July 2012) (Pdf)

WHH. 2011. REDD Scoping study (Pdf)

WHH, 2014. Ebola in Sierra Leone, the impacts of the Ebola Virus Disease' on the livelihoods of rural communities, agricultural production and food security. Available at: http://www.welthungerhilfe.de/fileadmin/user_upload/Projekte/Sierra_Leone/PDFs/Ebola-sierra-leone-case-study-welthungerhife-09-2014.pdf

Wildlife Conservation Act. 1972. Government of Sierra Leone. (Pdf)

Zanne, A., Lopez-Gonzalez, G., Coomes, D.A., Ilic, J., Jansen, S., Lewis, S.L., Miller, R.B.,Swenson, N.G., Wiemann, M.C. and Chave, J. (2009). Data from: Towards a worldwide wood economics spectrum, Dryad Digital Repository.

9.3 List of Project reports and other files supplied to the auditor as appendices Reports

Climate Focus. 2011. Gola Forest REDD project, Analysis of legal issues.

Cuni-Sanchez, Aida. 2012a. Ground truth survey work in the reference region report

Cuni-Sanchez, Aida. 2012b. Forest Edge Communities of the Reference Region report

Cuni-Sanchez, Aida. 2012c. Soil carbon stock report

Fofanah, Alusine. 2012. Government of Sierra Leone regulations report

Forestry Division 2013. GRNP Landowner registration report

Gola Employee Handbook 2013

GRNP. 2013. Roles, Responsibilities and training for Gola Community Development Committees (GCDCs)

Henman, Jennifer. 2013. CCB Social Monitoring Plan.

Hillers, Annika.2013. Final Report on the Activities of the Research Unit, Across the River, A Transboundary Peace Park for Sierra Leone and Liberia 2010-2013.

Hillers, Annika and Tatum-Hume, Emma. 2013. Biodiversity Monitoring Plan.

Klop, Eric. 2006. Standard Operating Procedures for terrestrial carbon measurement 2006.

Klop, Eric. 2012. Baseline Carbon Stock Report from 2006 data.

Marris, Guy, Sinclair, Frazer, Tamba Vandi and Fofanah, Alusine. 2013. Boundary Demarcation report

M-MON 2013 VCS emissions monitoring plan

Michard, Edward. 2012. Report on Land Cover Mapping Methodologies under VM0007, VMD0007, VMD0015

Michard, Edward, Netzer, Michael, Petrova, Silvia and Walker, Sarah. 2011. Standard Operating Proceedure Manual, Collection of ground data points for calibration and validation of a landcover map.

Netzer, Michael and Walker, Sarah. 2011. Feasibility Assessment of the potential for REDD projects in Gola and the Greater Gola area of Sierra Leone

Netzer, Michael and Walker, Sarah. 2013. Gola REDD baseline report

Showers, Charles. 2012. Land use practices and Forest Reserve management in Sierra Leone report

Tatum-Hume, Emma, Witkowski, Kelly and Lloyd, Richard. 2013a. Stakeholder Engagement report

Tatum-Hume, Emma and Wikowski, Kelly. 2013. SIA synthesis report

Tatum-Hume, Emma, Klop, Eric and Cuni-Sanchez, Aida. 2013b. Carbon baseline synthesis report

VCS Risk Non-Permanence report

Winrock. 2012. Standard Operating Procedures for terrestrial carbon measurement

Winrock. 2013. Carbon monitoring report

Witkowski, Kelly. 2012. Threats report

Witkowki, Kelly, Zombo, Joseph, Zombo, Moses, Mansallay, Musa, Navo, Samuel and Senesie, Peter. 2012a. Household Survey and Key Informant Interview Report

Witkowski, Kelly, Abdulai, Bob, Zombo, Joseph, Zombo, Moses, Navo, Samuel, Katua, Jenkins, Musa, Amara, Senesie, Peter. 2012b. FEC Focal Group Report

Witkowski, Kelly, Kanneh, Fomba, Tatum-Hume, Emma. 2012c. Gola REDD project context report

Zombo, Joseph, Abdulai, Bob, Witkowski, Kelly. 2012. Offsite Village survey report

Other files

Baseline Carbon Calculations – Excel file

GRNP 2013. List of published and unpublished ecological research from the project zone

Project boundaries - KMZ file

Reference region calculations – Excel file

Standard Operating Procedures for measuring carbon enhancement in Gola South

Financial Analysis (confidential file)

Project Agreements (confidential file)

Project HR files (staff handbook, employment policy, templates etc)

9.4. List of Updated Project reports and other files since validation supplied to the auditor as appendices Reports

References and datasheets which these documents rely on will be provided to the auditors in a separate file but are not listed here to avoid confusion.

CDRO (Community Development Relations Officer) communications with FECs

Explanatory notes for Updated post-validation folder

FEC Grievance Mechanism cross-ckeck

Grievance Procedure

Hillers, Annika and Tatum-Hume, Emma. 2013. Biodiversity Monitoring Plan

Output Outcome and Impact Monitoring for the Gola REDD Project

Risk Assessment Forest Working

Risk Assessment Health Hazards

Risk Assessment Offices & Buildings

Risk Assessment Travel & Transport

Social impact monitoring longitudinal protocols and surveys

Tracking file-post validation updates to project documents

Standard Operating Procedures (SOP) Amphibian Monitoring

Standard Operating Procedures (SOP) Bird Pointcounts

Standard Operating Procedures (SOP) Camera Trapping

Standard Operating Procedures (SOP) Carbon Stock Enhancement

Standard Operating Procedures (SOP) Chimpanzee Survey

Standard Operating Procedures (SOP) GRNP Park Protection

Standard Operating Procedures (SOP) Picathartes Monitoring

Standard Operating Procedures (SOP) Primate Survey

Standard Operating Procedures (SOP) Pygmy Hippo Survey