



THE LOWER ZAMBEZI REDD+ PROJECT



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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The Lower Zambezi REDD+ Project (Project) is a reducing emissions from deforestation and degradation (REDD+) project on 40,126 ha of privately-owned land in Rufunsa District, Zambia. The Project Area is known as 'Rufunsa Conservancy', and is owned by a Zambian company named Sable Transport Limited. The Conservancy is one of the last intact areas of forest within Lusaka Province (named after the nearby capital city), and provides a 60-kilometer buffer to Lower Zambezi National Park (NP), a strategic protected area in Zambia in a globally significant trans-frontier conservation area. Lower Zambezi NP is adjacent to Mana Pools National Park in Zimbabwe which is a United Nations Educational, Scientific and Cultural Organization (UNESCO) designated World Heritage Site. The population of the Project Zone as of the 2012 baseline evaluation was approximately 8,933 people living in 28 villages spread within 4 community zones.

The Project Proponent is BioCarbon Partners, which is responsible for certifying the Project and for early-stage Project finance.

The core project climate activities undertaken include forest carbon inventorying, modeling cumulative deforestation patterns, and soil carbon assessments. Core community project activities include up to eighteen different types of community-based deforestation mitigation initiatives designed to create sustainable, scalable alternatives to deforestation, and strategic, meaningful incentives that comprise part of pay for performance programs that support forest conservation. Core biodiversity project activities include forest conservation systems, biodiversity monitoring and management, and fire management. Project area boundaries were marked at project start date and since then, aerial and ground patrols are conducted weekly to monitor compliance. Every monitoring period, 20 % of accounting and proxy area biomass plots and 100 % of leakage area monitoring plots are inventoried. Remote sensing imagery is used to monitor disturbance and fires while wildlife and other biodiversity indicators are monitored in bi-annual fixed transects surveys as well as random ground patrols. Ongoing and new community benefit projects are monitored by the Impact Monitoring division and their statuses are described in Table 2.

The project was developed to conform to the Climate, Community and Biodiversity Standard (CCBS, Second Edition) and the Verified Carbon Standard (VCS, Version 3.3). Furthermore, the Project is aligned with the Government of the Republic of Zambia's (GRZ) National REDD+ Program, implemented through the Forestry Department.

The project start and implementation date is 1 October 2009 and will be operational until 1 October 2039. The estimated emissions reduction for the 30-year project span is 5,673,505 tCO₂e at an average of 189,117 tCO₂e/yr. The emissions reduction for the current monitoring period (January 1st, 2019 to Dec. 31st, 2019) is 232,341 tCO₂e.

1.2 Sectoral Scope and Project Type

VCS Sectoral Scope 14 – Agriculture, Forestry, and Other Land Uses (AFOLU), project activities Reduced Emissions from Deforestation and Degradation (REDD), using Methodology for Avoided Ecosystem Conversion, VM0009, v3.0 and qualifies as baseline type F-U3, unplanned mosaic or frontier deforestation. This is not a grouped project.

1.3 Project Proponent

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1.4 Other Entities Involved in the Project

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1.5 Project Start Date

MR.2

1 October 2009

1.6 Project Crediting Period

MR.3

The project crediting period starts on the project start date – 1 October 2009 and ends on 1 October 2039 and runs for a total of 30 years with the option to renew.

1.7 Project Location

The Lower Zambezi REDD+ project is located approximately 120 km southeast of Lusaka and falls within the miombo eco-region which is host to a plethora of endemic species. It falls within the recently declared Rufunsa district and borders the Lower Zambezi National Park to the east and south, Chiawa Game Management Area (GMA) to the west and the Soli Shamifwi Royal Establishment (Chief Unda Unda's Chieftdom) to the north (Figure 1). The project area is accessible by road via the small towns of Chinyunyu and Sinjela on all-weather dirt roads. The project area is the Rufunsa Conservancy, privately owned by Sable Transport Ltd, a local Zambian company.

The project area consists primarily of intact, primary miombo woodland that has never been logged with some open grassland and deep ravines with dense Acacia woodlands. The project area is 40,126 ha in size. A portion of Rufunsa Conservancy has been encroached by illegal charcoal producers and this area has been excluded from the project area (labelled Encroachment, Figure 1). Figure 2 shows the land cover and topography of the Lower Zambezi REDD+ project area.

There are an estimated 8,933 people living in the project zone which falls in the Rufunsa district which is further divided into four zones and 28 villages. The project zone is bound between -15° 16' 57.72"S – 28° 58' 25.68"E (NW Corner) -15° 16' 57.72"S – 29° 23' 43.4394"E (NE Corner), -15° 35' 51.3594"S – 29° 23' 43.4394"E (SE Corner), and -15° 35' 51.3594"S – 28° 58' 25.68"E (SW corner).

MR.6

The project accounting area is the boundary of Farm 10800, known as Rufunsa Conservancy, as shown in Figure 1. Sable Transport Limited, a Zambian registered and 100 percent Zambian citizen owned company, privately owns Rufunsa Conservancy under a leasehold from the Government of the Republic of Zambia. This area was originally registered as a game ranch for wildlife tourism operations. Due to a lack of resources and wildlife poaching pressure, the area has not been used or promoted for eco-tourism or hunting and has been operated as a conservancy.

The accounting area was calculated by firstly excluding non-forested portions of the project area (bare earth and grassland). Then, all steeply sloped lands (greater than 20 degrees slope) which are inaccessible to agents of deforestation were also excluded. The slope of 20 degrees was selected based on the assessment of the maximum slope of fields in the reference area. Figure 3 shows the topography and slope of the Lower Zambezi REDD+ project area.

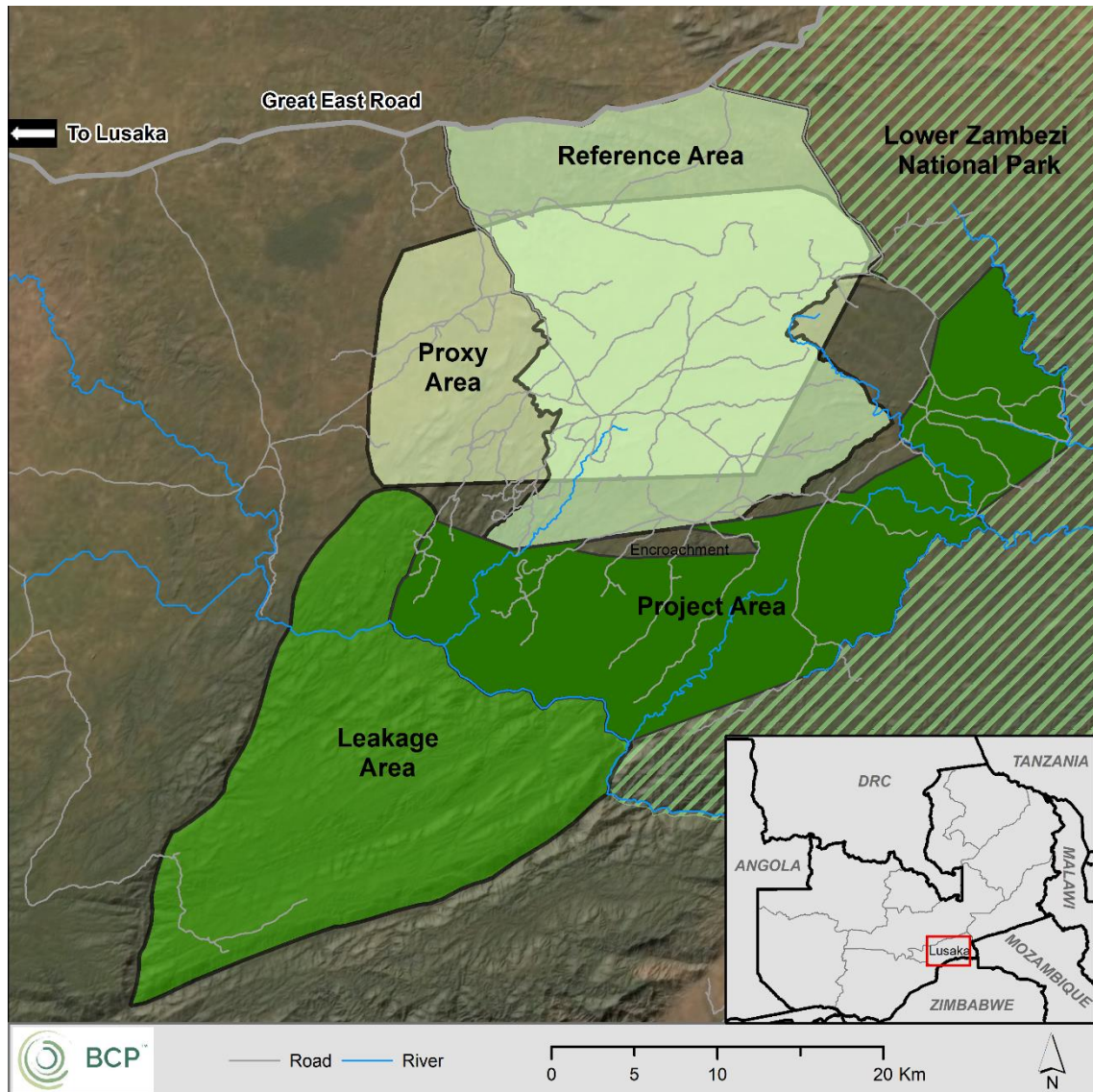


Figure 1. Location map of the Lower Zambezi REDD+ Project. (MR.1)

For clarity, steep slopes were excluded only if the size of the polygon to be excluded is greater than 0.4 ha, in which case a 15 m buffer was created around these polygons. The accounting area comprises 33,338 ha of the total project area of 40,126 ha. A 30 m Digital Elevation Model (ASTER Global Digital Elevation Model Version 2) was used in the slope calculation.

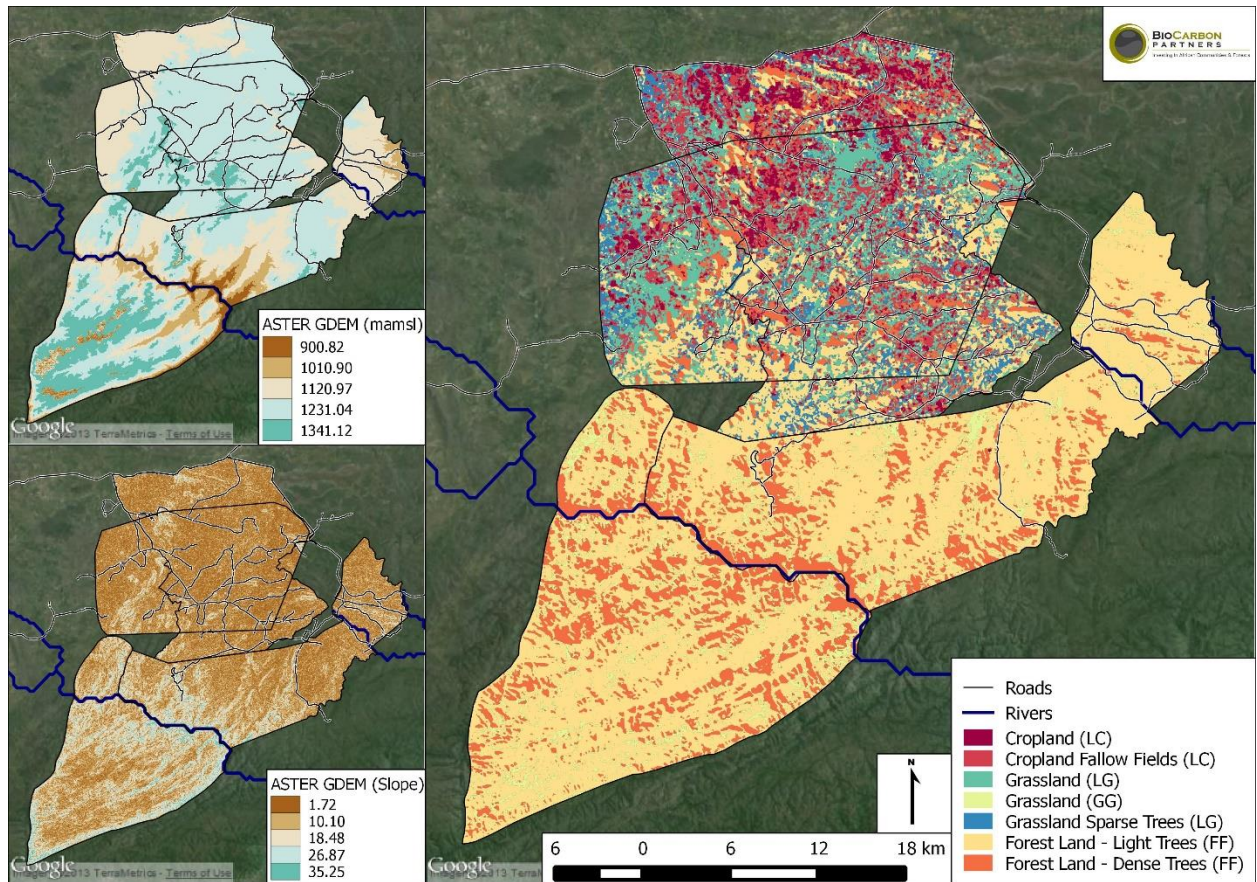


Figure 2. Land cover and topography of the Lower Zambezi REDD+ Project.

For the project accounting area boundaries, it is important to note that while the title deed outlines the boundaries of the conservancy, the reader will see that a portion of this area has been removed along the northern boundary (Figure 1). This excluded area has been removed as this portion of the property has been encroached by illegal squatters currently undertaking charcoaling and subsistence agriculture activities. This illegal squatting resulted from confusion as to the exact location of the Northern boundary of the property. As a result of this confusion, a small number of households (approximately 19) had settled on private property within the boundaries of the Project Area. An additional 24 households live on communal land on or near to the boundary of the property. It is possible that some of these illegal squatters arrived prior to the project start date, but there certainly has been new occupation after the project start date. It has now been brought under control.

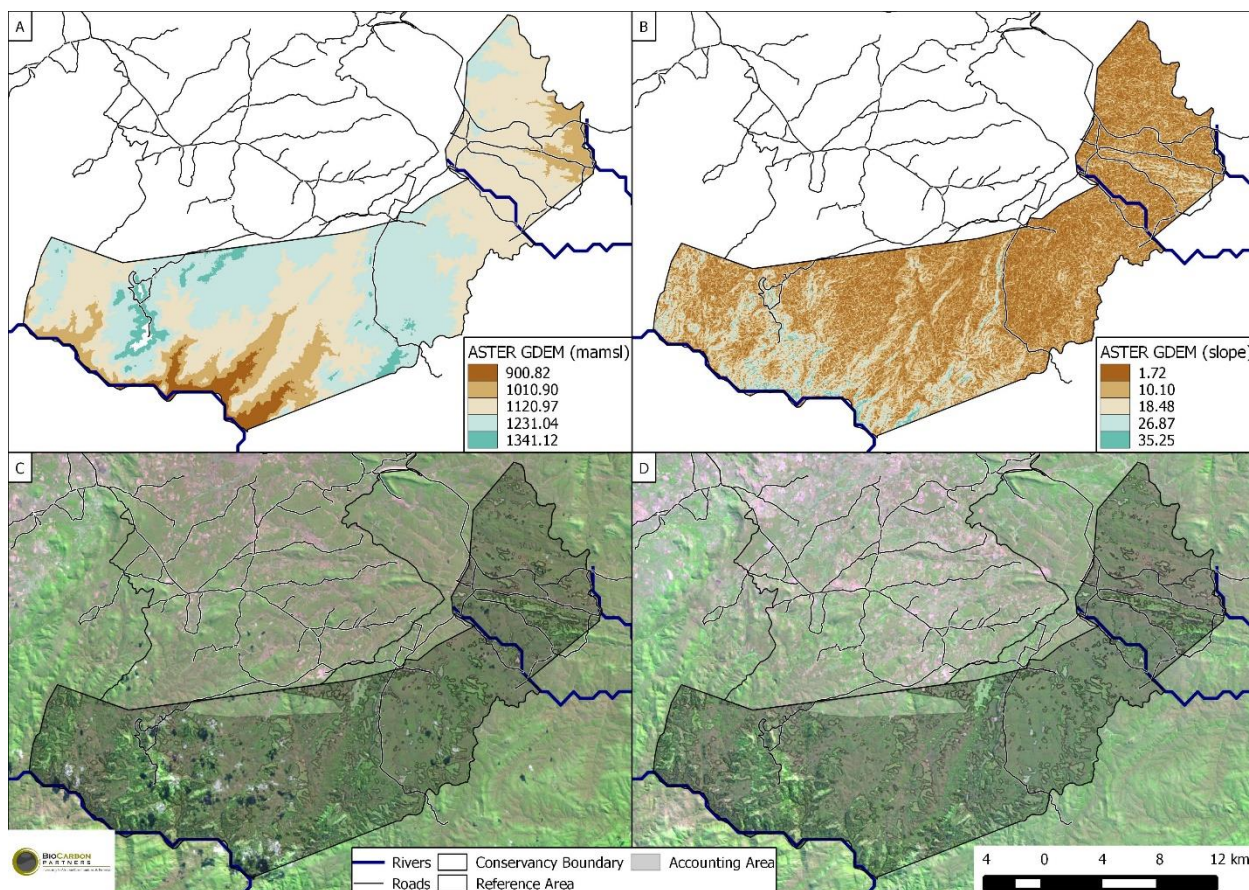


Figure 3. Topography (A), Slope (B), Accounting Area and forest cover in 1989 (C) and 2009 (D).

Due to the sensitive nature of land tenure in Zambia it was decided not to evict these people, but rather exclude this encroached area from the accounting area. It has been decided that the best option is to exclude the encroached area from carbon accounting as including it will most likely make it necessary to relocate the occupants which could lead to unnecessary conflict. It is a conservative exclusion; the area has not been included in emissions reductions accounting.

The boundaries of the exclusion area are based on a survey undertaken by BioCarbon Partners. Each illegal squatting household was surveyed with additional location data also collected using a hand held Global Positioning System (GPS) unit. A convex hull was then generated around these points and used to adjust the boundaries of the conservancy.

There will be no BCP eco-charcoal production in the Project Area (Rufunsa Conservancy-boundaries as per title deed) or the accounting area or the excluded encroached area. All eco-charcoal production is taking place in a degraded patch of forest in the proxy area several kilometers from the project area.

1.8 Title and Reference of Methodology

VM0009 – Methodology for Avoided Ecosystem Conversion, v3.0. Other tools include AFOLU Non-Permanence Risk Tool v4 and VT0001 Tool for the Demonstration and Assessment of Additionality in VCS AFOLU Project Activities, v3.0.

1.9 Participation under other GHG Programs

The project has not applied to any other GHG programs.

1.10 Other Forms of Credit

The Lower Zambezi REDD+ Project is not subject to binding emissions limits or emissions trading programmes.

The project was validated under the Climate, Community and Biodiversity (CCB) standards (Second Edition – Gold Level) in 2013 and CCB Triple Gold verified in 2018:

<https://registry.verra.org/app/projectDetail/CCB/1202>

1.11 Sustainable Development

Zambia subscribes to the UN Sustainable Development Goals, the contribution of the LZRP to the 17 goals is listed below. There is no requirement for any formal monitoring and reporting of activities that pertain to these goals.

No Poverty - End poverty in all its forms everywhere

Local communities benefit from a range of employment and income generating projects ranging from jobs as scouts to honey and eco-charcoal production.

Zero Hunger - End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Sustainable farming and honey production projects contribute to this goal.

Good Health and Well-being - Ensure healthy lives and promote well-being for all at all ages

BCP has supported the upgrading of a clinic.

Quality Education - Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

The LZRP supports an environmental education programme as well as the employment of additional teachers in schools.

Gender Equality - Achieve gender equality and empower all women and girls

All LZRP projects and activities are specifically aimed at marginalized groups such as women and girls. Records illustrating this are kept by BCP.

Clean Water and Sanitation - Ensure availability and sustainable management of water and sanitation for all

Several boreholes have been refurbished and new ones installed, both within the neighbouring community and within Rufunsa conservancy.

Affordable and Clean Energy - Ensure access to affordable, reliable, sustainable and modern energy for all

In partnership with a solar company, LZRP has provided solar lighting for several households and schools. The eco-charcoal project is a prime example of a sustainable, green energy project.

Decent Work and Economic Growth - Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

The LZRP has created and will continue to create jobs and improve economic conditions within the surrounding community through activities such as honey production, conservation farming and ecocharcoal.

Industry, Innovation and Infrastructure - Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Not applicable, this is not an industrial initiative.

Reduced Inequalities - Reduce income inequality within and among countries

One of the main aims of the project is the equal distribution of benefits as prescribed by the CCB Standard.

Sustainable Cities and Communities - Make cities and human settlements inclusive, safe, resilient and sustainable

Conservation Farming and Eco-Charcoal production contribute to this goal.

Responsible Consumption and Production - Ensure sustainable consumption and production patterns

Conservation Farming and Eco-Charcoal production contribute to this goal.

Climate Action - Take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy

This is a greenhouse gas mitigation project avoiding approximately 200,000 tCO₂e emissions annually.

Life Below Water - Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Not applicable. This is a terrestrial-only project.

Life on Land - Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

The project protects 40,000 ha of intact Miombo woodland while ensuring sustainable charcoal production and conservation farming on several hundreds of hectares.

Peace, Justice and Strong Institutions - Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Not applicable. this project focuses on conservation practices.

Partnerships for the Goals - Strengthen the means of implementation and revitalize the global partnership for sustainable development

Not applicable, this is a local level project.

2 SAFEGUARDS

2.1 No Net Harm

The project has been Gold Level Validated for positive community impacts under the CCB Standard. The positive impacts and any perceived negative community impacts has been described in the PDD available on the CCB website, please see <https://registry.verra.org/app/projectDetail/CCB/1202>.

The project was also successfully verified against the CCB standard at the Gold Level in 2018 for the period from 2013-2017.

2.2 Local Stakeholder Consultation

BCP's Community Engagement Strategy is a comprehensive set of policies and procedures that have been designed to ensure that BCP's REDD+ projects bring maximum positive impacts to local community stakeholder livelihoods and meaningfully reduce deforestation. BCP's Community Engagement Strategy is designed to ensure compliance with relevant international standards, including the CCBA Standards (<http://www.vcsprojectdatabase.org/#/ccb-all->

project-details/1202). There are five main components in BCP's Community Engagement Strategy (for more detail):

Community Stakeholder Identification, Mapping and Census Process

Community Sensitization and Consultation

Community Projects: Design and Implementation Processes

Documenting Compliance with International Standards, such as FPIC

On-going Social Monitoring Program

BCP has thus far consulted over 86% of community stakeholders, and benefit from a 96% project approval rating among stakeholders surveyed at community meetings.

All stakeholder communication is documented and minutes of meetings stored. Table 1 below is a summary of all the consultations and meetings held during 2019. Local communities give direct input into development and deforestation mitigation projects hosted by BCP through the officially recognized Cooperative structures, following the five steps above. All projects are either proposed directly by the local community or in partnership with BCP and then tailor-made according to local needs.

The expansion of the eco-charcoal project is an example of the consultative process. Local community members have voluntarily put forward areas of communal forest for charcoal production.

Our community engagement team lives within the local community and interact formally and informally with community members on a daily basis. The SOP in Appendix B outlines the procedure for project identification and alteration. Sensitization meetings are an ongoing process, as explained in Table 2. Every meeting conducted with community groups, representatives and other stakeholders is used as an opportunity to share information and updates of the project, including how to spend project revenues. As an example, in two of the villages, the community recommended that 2016, 2017, and 2018 revenue shared be used towards payment of teachers' arrears and rehabilitating boreholes. The carbon accounting team will be visiting the communities in March 2020 to communicate the upcoming verification audits.

The Zambian laws and regulations covering workers' rights have not changed since the last monitoring period (M6).

Table 1. List of consent and consultation meetings held with local stakeholders for LZRP in 2019.

Date	District	Site	Chiefdom	Main Activity	Specific Activity	Lead Facilitator	M	F
27/03	Rufunsa	Liyoyelo Cooperative (Kantyantya)	Bunda-Bunda	Meeting with cooperative members	LZRP Verification communication	Brighton Chama	4	0
23/04	Rufunsa	Chilimba (Mwalilanda)	Bunda-Bunda	Meeting	Sensitization on REDD+ and update on conservation fees to Cooperative and headmen	Brighton Chama	10	0
25/04	Rufunsa	Liyoyelo Cooperative (Kantyantya)	Bunda-Bunda	Meeting with the headmen and cooperative	Conservation fee update for 2019	Brighton Chama	16	1
15/05	Rufunsa	Mweshang'ombe	Bunda-Bunda	Meeting	Conservation fees update and teachers house handover plans	Brighton Chama	13	5
24/05	Rufunsa	Chinyunyu Site Office	Bunda-Bunda	Meeting	Independent Review Meeting	Brighton Chama	10	1
06/07	Rufunsa	Mweshang'ombe and Namanongo	Bunda-Bunda	Meeting	Grievance resolution meeting	Brighton Chama/ Darlington Chipita	13	3

Date	District	Site	Chiefdom	Main Activity	Specific Activity	Lead Facilitator	M	F
13/08	Rufunsa	Ndubulula (Kantiantya)	Bunda-Bunda	Meeting with the Charpreneurs	Effective management of Eco-charcoal forest	Clement Banda	9	2
15/08	Rufunsa	Ndubulula (Mwankomesh a)	Bunda-Bunda	Community meeting	Sensitization on REDD+ and conservation fees/needs assessment	Brighton Chama	21	20
12/09	Rufunsa	Mweshang'ombe	Bunda-bunda	Meeting with headmen	Conservation of the Mweshang'ombe forest and the buffer zone	Darlington Chipita	7	1
13/09	Rufunsa	Ndubulula (Mutonka)	Bunda-Bunda	Community meeting	Sensitization on REDD+ and conservation fees/needs assessment	Brighton Chama	29	18
26/09	Rufunsa	Ndubulula (Lumwengo)	Bunda-bunda	Community meeting	Sensitization on REDD+ and conservation fees/needs assessment	Brighton Chama	9	6
14/10	Rufunsa	Ndubulula (Chipungu)	Bunda-bunda	Community meeting	Sensitization on REDD+ and conservation fees/needs assessment	Brighton Chama	21	8
21/10	Rufunsa	Ndubulula	Bunda-bunda	Meeting	Desk appraisal of community projects	Brighton Chama	16	0

Date	District	Site	Chiefdom	Main Activity	Specific Activity	Lead Facilitator	M	F
22/10	Rufunsa	Chilimba (Mwalilanda)	Bunda-bunda	Community meeting	Sensitization on REDD+ and conservation fees/needs assessment	Brighton Chama	18	6
22/10	Rufunsa	Mweshang'ombe	Bunda-bunda	Community meeting	Sensitization on REDD+ and conservation fees/needs assessment	Brighton Chama	32	25
15/11	Rufunsa	Chilimba	Bunda-bunda	Meeting	Desk appraisal of projects	Brighton Chama	15	0
04/12	Rufunsa	Namanongo (Musanshika)	Bunda-bunda	Meeting	Village level engagement plan with headmen and cooperative	Brighton Chama	8	1
TOT							251	97

2.3 AFOLU-Specific Safeguards

BCP works closely with local representatives and traditional community leaders to identify local causes and drivers of deforestation, and to design projects that are anticipated to meaningfully and sustainably address them (See Table 2, item 1.1). To mitigate risks to local stakeholders due to project implementation, alternative livelihood projects i.e., honey and eco-charcoal production, conservation farming interventions, training of lead farmers, education support, and fire management trainings were implemented.

Trained security teams comprised of local community members patrol and secure the project area, reporting any acts of deforestation or wildlife poaching that take place. Particular emphasis is placed on protecting the perimeter of the property, especially the boundary adjacent to community lands, with an aim to preventing further encroachment of the project area. Security activities are undertaken through close collaboration with the Forestry Department, Zambian Police and the Zambia Wildlife Agency (ZAWA). Security teams are

trained in effective conflict resolution practices, for example, effective communication styles for pursuing non-confrontational discussions with local community stakeholders. BCP's Forest Monitors are also engaged in on-going comprehensive biodiversity monitoring programs, which are designed to track the ongoing impacts of BCP's REDD+ activities on local wildlife. See details of trainings and monitoring in section 3.1 below.

In October 2012, BCP undertook a "boundary demarcation" activity along the Northern boundary of the property, which separates the project area from community lands. The purpose of this activity was to ensure local community stakeholder awareness and acceptance of project area boundaries, in the interest of reducing the potential of conflict stemming from confusion about the boundary location (see Table 2, item 3.2).

There haven't been any issues in relation to property and land use right of local stakeholders being negatively impacted. During the current monitoring period (*M7*), The community raised a grievance against BCP scouts, citing harassment of community members. This was communicated through the established grievance mechanisms mainly through written correspondence followed by community meetings to redress and closeout grievances. Meetings were held with the headmen, cooperative leaders and community members and the minutes of the proceedings were documented and signed as per standard procedure explained in Table 2.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The LZRP has developed a wide range of deforestation mitigation and benefit sharing activities with local stakeholders. These activities fit broadly into three different categories namely a) Community Sensitization, Education and Consultation, b) Community-Based Deforestation Mitigation Projects, and c) Protection, Enforcement and Monitoring.

Activity Area 1: Community Sensitization, Education and Consultation

Stakeholders understand and support the objectives of BCP's project activities, and are meaningfully involved in decision-making processes so as to ensure local legitimacy and buy-in to the project.

Community Sensitization

BCP works closely with local representatives and traditional community leaders to identify local causes and drivers of deforestation, and to design projects that are anticipated to meaningfully and sustainably address them. BCP's community-based approach allows project activities to benefit from local knowledge, legitimacy and support. Since February 2012, BCP representatives have engaged with local communities through a robust and extensive "community consultation and sensitization" process, which adheres to the principles of obtaining Free, Prior and Informed Consent (FPIC) from local stakeholder communities. We have thus far consulted over 86% of community stakeholders, and benefit from a 96% approval rating among stakeholders surveyed at community meetings.

Since 2012, BCP has undertaken an extensive sensitization and consultation process with community stakeholders living adjacent to Rufunsa Conservancy, the project area for the Lower Zambezi REDD+ Project, in line with the principles of ensuring Free, Prior and Informed Consent (FPIC). Since 2012, BCP has facilitated over 156 Formal Sensitization Meetings across the 28 villages within the LZRP project zone. A total of 2,163 names are listed on attendance sheets accompanying these FPIC meeting minutes. To enhance community engagement, BCP in 2015, invested in new office and accommodation facilities in Chinyunyu in Ndubulula Zone. While this location increased project costs, it increased the ability of the Community Engagement team to be more accessible, and mobile within the communities than from the prior base in Rufunsa Conservancy.

This is an ongoing project activity that started in February 2012. Every meeting conducted with community groups, representatives and other stakeholders is used as an opportunity to share

information and updates of the project. Quarterly Meetings in all 4 zones include Redd+ sensitization and awareness.

School Environmental Education Program (EEP)

BCP aims to reach out to youths to raise awareness about forests and the environment. By teaching youths about the dangers of deforestation, and raising awareness about alternative activities, BCP hopes to change attitudes and actions, and to promote “better practices” and improved awareness among future generations.

In 2014, the EEP was being piloted and implemented in two schools in the project zone; Ndubulula and Namanongo Primary and Basic schools. In 2015, two community schools Chilimba and Mweeshang’ombe community schools were also included. A total of 118 students and 64 teachers were participating in the program.

At the end of the school year in 2014, BCP staff together with 4 Environmental Education Teachers (EET’s) and 2 new EET’s from the community schools re-evaluated the program and revised materials based on “lessons learned” and feedback from the initial pilot in the two government schools. The revised program consists of 25 short Lessons which have been divided into three Modules that is; Module 1 – Land and Plant Conservation, Module 2- Animal Conservation and Module 3- Community-Led Conservation. It also consists of Special Environmental Education Days (SEEDs) – these are three special days/events that BCP assists in facilitating, ideas for SEED include: Sports Day, Tree Planting Day, Environmental Movie Day, Environmental Protection in Action Day, and Environmental Awareness Days (EADs).

In 2015, two SEEDs were held in the first and third terms by all the four schools.

This project activity started in February 2013 in Ndubulula, Mweshang’ombe , and Chilimba but was put on hold in 2018 as the teachers who had the capacity to lead it had moved. Qualified teachers are now available and the project is being re-evaluated for a possible resumption in 2020.

Forest Football: Youth Football and Environmental Education Program

The Eco-Kick program specifically targets youth for involvement in environmentally conscious activities, as well as promoting a healthy lifestyle that emphasizes alternatives to engaging in deforestation (as well as other less-desirable activities, that similar programs are generally designed to steer youths away from).

In January 2015, members of the BCP Community Engagement Team (CET) conducted a “Community conservation football” event which targeted all the youth in the Project Zone. This event was used as a platform for massive REDD+ sensitization and BCP community interventions to the youth and other community members. BCP also took that opportunity to

recognize hard working community members that participated in all USAID VIGOR grant funded projects implemented in the project zone in 2013/14.

A full kit football jersey and a football was given to the winners, a football to the runner-ups while caps and T-shirts branded with BCP and USAID VIGOR grant logos were given to others that participated in the event as well as those recognized as BCP USAID VIGOR Stars.

This project activity started in January 2015 but was temporarily stopped following completion of the USAID VIGOR Grant and will resume when alternative funds are available.

Governance: Institutional Building

BCP has worked with local communities to develop and support 'hybridized' community decision-making institutions, called Zone Development Committees (ZDCs). ZDCs address (avoid) problems of elite capture by combining local, democratically elected representatives from each village with local traditional leaders, to allow decisions about project activities to simultaneously benefit from local knowledge and support, as well as legitimacy maintained through the inclusion of traditional leaders. BCP meets regularly with ZDCs in each of the 4 community zones for the Lower Zambezi REDD+ Project, to promote local sensitization and understanding of project activities, solicit feedback, and discuss upcoming project activities (including: project identification, project design, and project implementation).

Working with local governance structures in the project zone is the most important engagement strategy BCP uses to reach out to the community. These structures are used as a platform to sensitize on BCP work in the project zone, the REDD+ Project taking place in Rufunsa Conservancy, consult as well as engage with the local leaders and community representatives on community development projects that address the major drivers of deforestation and directly provide a sustainable source of income that assists to reducing poverty

In 2013, BCP facilitated the development of "Zone Development Committees" (ZDCs), which are hybridized institutions that combine traditional authority and democratically elected representatives from villages within each zone. The ZDCs are designed to promote local ownership of projects and to support locally appropriate decisions made through transparent decision-making structures.

In 2015 members of the BCP CET aimed identifying local existing governance structures in the project zone which the CET can work with for project implementation in the area. This was done by conducting an assessment with targeted people in the project zone and these include area or ward councillors, former and current members of ADC/WDC's, other respected community members. The goal of this assessment was to assess whether local governance structures such as Area Development Committees (ADC's) and Ward Development Committees (WDC's) could be supported in the Bunda-Bunda chiefdom and if these structures also need strengthening so as to build their capacity so that they self-reliant and take ownership of community

development projects and decisions made on behalf of or by the community. Results of the assessment showed that ADC's or WDC's are not present in Rufunsa District as a whole as well as within the LZRP project zone since the year 2011. In addition, there hasn't been any existing ADC or WDC in Chilimba zone. Additionally, the Bunda Bunda CRB has not been in existence while the LZRP was implemented.

Hence, BCP CET members further assessed the local existing cooperatives in the project zone if they had the capacity to work as governance structures in their respective zones i.e. Chilimba, Namanongo, Mweshang'ombe and Ndubulula. Cooperatives are a government recognized structure under the Department of Cooperatives in the Ministry of Commerce, Trade and Industry. Agricultural cooperatives existed in some zones prior to LZRP. Rather than creating a new institution, it was pragmatic to work through existing Government recognized structures which have district-level Government officer support. BCP signed REDD+ Conservation Fee Sharing Agreements (RCFSA) with 3 of the zones to clearly explain the roles of both parties' roles and the "rules" of benefit sharing from REDD+.

This project activity started in January 2013. BCP participated in District level planning and coordination through the District Development Coordinating Committee. However, formation of sub-district structures – Ward Development Committees was frozen by the Ministry of Local Government in 2017. Existing ones were disbanded in 2018 by the Ministry.

In 2019, cooperatives were supported to register as corporate entities under Ministry of Commerce and Trade through Ministry of Agriculture. Meetings have been conducted with cooperatives on the management of income generating projects for financial management (e.g. Hammer Mills).

Activity Area 2: Community-Based Deforestation Mitigation Projects:

This activity area addresses (reduce) local drivers of deforestation by improving local livelihoods and by providing meaningful alternatives to deforestation-dependent livelihood activities.

Agroforestry

Agroforestry promotes tree-planting and reforestation projects, particularly those with a commercial or food security improvement aspect (such as fruit tree planting activities in combination with vegetable gardens or conservation farming plots).

There is an agro-forestry component in the Conservation Farming Training Program (CFTP). In 2012, as part of an initial pilot, BCP partnered with Zambia's Conservation Farming Unit (CFU) and Musika to provide initial agro-forestry trainings to ten households as part of the CFTP. In 2015, BCP focused on the expansion of the CFTP from 197 to 500 new households. This implementation was done in partnership with Community Markets for Conservation (COMACO).

Four treadle pumps and Gliricidia nurseries were established in each zone at a lead farmer's farm for distribution to CFTP farmers

Agroforestry projects started in November 2012 and since then BCP has supported Forestry Department with nurseries of different tree species to support farmers in agro- forestry and smart agriculture practices through conservation farming. In 2019 BCP supported the drilling of a borehole at the Chinyunyu District Forest Station to support tree seedling production at the Forestry Department's nursery.

Conservation Farming

BCP's Conservation Farming Training Program (CFTP) was originally led in partnership with the Zambian Conservation Farming Unit (CFU) and Musika Development Initiatives. The CFTP is designed to teach farmers how to become more efficient and productive on their farms, with an aim to improve local food security and reduce two of the strongest local drivers of deforestation: clearing for agricultural expansion, and clearing for charcoal production (to earn income to supplement incomes from agriculture). There are six main 'interventions' promoted by the CFTP:

1. Early Planting – helps farmers to take advantage of “natural fertilizer” from first rains
2. No burning of crop residue – improves soil health, reduces emissions
3. Minimum-tillage basins – allows farmers to plant without needing animals to plough (less labour, less expensive, and allows for early planting that allows for “natural fertilizer” from first rains)
4. Precision farming – higher efficiency; maximum yields from minimum inputs
5. Agro-forestry – helps to minimize inputs (fertilizer) over time; *Faidherbia albida* trees provide natural fertilizer
6. Inter-cropping, crop rotation, diversification – help farmers to remain productive on the same area of field/farm over time (reduces need to clear new areas of fields)

In November 2012, BCP launched an initial pilot Conservation Farming Training Program (CFTP) with 10 households, through support and collaboration with CFU and Musika.

In 2013/2014 farming season, BCP expanded participation in the CFTP to include 197 households, with 4 individuals trained as “Senior Lead Farmers” and 41 trained as “Lead Farmers.” Trainings were provided through a combination of CFU, Musika and BCP trainers, with SLFs and LFs playing an important role in disseminating information and providing training to Contact Farmers in their villages.

In 2015, in partnership with COMACO, 500 farmers were recruited and trained from the project zone in conservation farming, a significant proportion of the area's estimated 1,200 households. Sixteen (16) Lead Farmers from all four zones were trained in conservation farming on September 17th – 18th at Kaunga Agriculture Training Centre (KATC). The purpose of the training was to introduce the farmers to the conservation farming model intervention and associated value chain.

In 2015/6, a single season partnership with New Rotations Zambia (NRZ) was experimented with to help link farmers to market. NRZ provided certain seed types and then guaranteed an offtake market. This was discontinued due to high cost after a year.

BCP has since partnered with the Ministry of Agriculture via District Agricultural Coordinators (DACOs) to provide Conservation Farming training to households. This is more cost effective and a more pragmatic partnership with Government.

Conservation farming projects started in November 2012 and in 2019, BCP trained 13 lead farmers who recruited 177 follower farmers.

Improved Small Livestock Production

Throughout BCP's extensive first round of the community "Project Identification and Design Process," which was designed to solicit detailed community feedback concerning priority project activities, Small Livestock Projects were consistently and frequently identified as a top-priority project activity. BCP's small livestock projects are designed to simultaneously improve local food security and help participants to develop small-scale community-owned livestock businesses that can generate income for participants. Participation in livestock project activities is linked to deforestation mitigation through the use of Community Covenants, which restrict participation to those members who agree not to engage in deforestation or poaching activities inside the project area of Rufunsa Conservancy.

In February 2013, BCP launched a "pilot" round of 23 Village Chicken projects taking place throughout the Project Zone. Ongoing "success and compliance" monitoring activities are taking place, and there is much reported enthusiasm for the project. By October 2013, the project is anticipated to "intensify" through the provision of improved-genetics chickens to project groups. In 2014, groups will begin to receive focused "small business development" training.

The VCP aimed to provide an alternative to deforestation by supporting the development of successful community-owned village chicken businesses that channel benefits in terms of improved income and food security to households. Following the initial pilot project launch in 2013, in 2014, BCP has focused on providing intensive training on Improved Village Chicken Care and Production, and small-business development.

In 2014, through a VIGOR grant from USAID, BCPT facilitated the donation of "improved" village chickens to 266 participating households in 22 pilot groups.

Also in 2014, BCP collected feedback from participants in these initial pilot projects and incorporated “lessons learned” into a new project design that promotes a more “individualized” model, that provides support at a household level, instead of group level.

In 2015, the village chicken support was implemented with eight households identified at the end of 2014 as pilot households to receive 10 village chickens each to add to their own chickens so as to develop successful community-owned village chicken businesses that channel benefits in terms of income and food security to households so that the project addresses the major drivers of deforestation by providing a sustainable source of income and reduces poverty.

Each participant received chicken wire to build chicken houses, 5 litre Feeders and drinkers as start-up materials for the project. In addition, all participants received business skills training so as to empower the participants with business development skills that they can apply in this project.

This project activity started in February 2013 and ran through 2018. In 2019 it was not supported following the exhaustion of the VIGOR Grant.

Social Services (i.e.: school, borehole, clinic)

BCP’s social service projects are intended to improve quality of life for residents within the project zone, and to ensure that our project activities are designed to target and involve the “poorest of the poor”—defined, for example, as those who cannot otherwise access decent educational facilities, medical care or clean water supplies.

- In October 2012, BCP refurbished the borehole for central Ndubulula Zone (Kantyantya village).
- In February 2013, BCP collaborated with Forestry Department to assist with the planting of 2 School Fruit Orchards, in Mweshang’ombe and Chilimba Zones.
- In April 2013, BCP provided solar lighting to the Namanongo Clinic.
- In June and August 2013, BCP provided support (locks, desks) to classrooms at Chilimba School

Additional project activities are planned, and will continue to be scheduled according to newly prioritized needs.

In 2014, through the School Support Program, BCP supported 3 teacher salaries at two community schools (Chilimba and Mweshang’ombe).

In August 2014, BCP— through a partnership with Water282, an implementing partner— helped to facilitate Water, Sanitation and Hygiene training programs for 4 local villages.

In 2015, the School support program continued with BCP and the community increasing the amount of money paid to community teachers from K400 shared by BCP and the community (i.e. K200 each) to K721 (i.e. K360.50 from BCP and the community). Further, the number of supported teachers under this program increased from 3 to 5 (2 Mweshang'ombe and 3 Chilimba).

Furthermore, BCP through Community Forests Program (CFP) funding drilled one new borehole at Chilimba school and fixed one old borehole at the school during a training done by Water 282 through BCP were 21 people were trained as pump minders.

In 2019 a total number of 7 community teachers (2 Mweshang'ombe and 5 Chilimba) were supported with salaries through BCP's Conservation Fees. The total amount spent was K24 000. In 2019 BCP continued with rehabilitation of total number of 17 Boreholes, 2 in Ndubulula, 4 in Namanongo, 5 in Mweshang'ombe, and 6 in Chilimba. A total of K 200,000 was allocated for this since 2018. The operation includes flushing of broken boreholes, and the construction of aprons.

Construction of Hammer Mill Houses using Conservation Fees in Ndubulula costing K74,692 and K37,346 in Namanongo is still ongoing. Oil expellers were procured and await installation. Conservation Fee Funds of K25,987.58 were allocated for this project.

Sustainable Honey Production

BCP aims to promote honey production as an alternative source of food and income among rural stakeholders. Since honey production is reliant on the protection of forest areas, the project will also create an incentive for participants and beneficiaries from the project to protect areas of forest where the production is taking place. BCP will help to connect participants to markets for locally produced honey. We have already formed a strategic partnership with a large-scale honey seller in Zambia.

Three honey project pilots were initiated in Ndubulula, Namanongo and Mweshang'ombe zones. BCP through the Chinyunyu Forest Department trained 8 participants; 3 from Mweshang'ombe and 5 from Ndubulula in honey production and bee-keeping. The five from Ndubulula were picked from a group that was formed and previously trained by the Forestry Department and the remaining three are households from the Biodiversity Banking project. An additional 16 participants have been trained by Luano Honey.

A total of 230 top-bar Kenyan hives, 50 swarm boxes, 20 gloves, 20 veils, 3 bee-keeping manuals and 5 smokers were procured to assist in the success of this pilot in the project zone. So far, 131 top-bar Kenyan hives have been hang in the project zone; 3 Forest department, 36 Ndubulula, 6 Mweshang'ombe and 86 Namanongo. All participants were trained on the baiting and monitoring of the placed hives.

The program has now been expanded in partnership with BeeSweet to 5,000 hives in the 4 Zones of the LZRP Project Zone, which is generating honey and funds.

In 2019, Communities earned the following from beekeeping (See Appendix J):

- Ndubulula: 543.9 Kg = K5, 439
- Namanongo: 1333.59 Kg = K13, 335.9
- Mweshangomba: 495.15 Kg = K4, 951.5
- Chilimba: 364.5 Kg = K3, 645
- Total: 2737.14 Kg = K27, 371.4

Sustainable Eco-Charcoal Production

BCP's pilot Sustainable Eco-Charcoal project combines sustainable harvesting practices taking place on protected areas of (degraded) community forest, improved higher-efficiency kiln technologies, and critical value chain interventions (such as access to transportation "at cost" for sustainably produced products), with the aim of creating strong incentives for rural producers to switch from current unsustainable charcoal production practices to sustainable charcoal production practices. The project is designed to replace unsustainable harvesting practices with sustainable practices that allow for the regeneration of forests, promote community-based forest protection, and improve rural producer livelihoods through the development of a commercially viable sustainably harvested charcoal product.

In 2015 Eco-Charcoal expansion consultative meetings continued with different villages in the project zone. Following these consultations, in Shimaluba village of Mweshang'ombe zone, a new Charpreneur started production in his eco-charcoal forest on his private farm-land. Further, in Mweshang'ombe village, the headman allocated a forest for two Charpreneurs to work in, which has already been demarcated into strips and production has started. In Musanshika village of Namanongo Zone one Charpreneur also started production in his private farm land. Total hectareage with these new production areas grew to 182 ha under sustainable charcoal production. There are now a total of 4 project sites involved in this project, across 3 community zones. The other sites were not feasible as they could not meet the minimum size for a sustainable harvesting system.

Four new Charpreneurs, three in Mweshang'ombe and one in Namanongo started production in the last half of 2015. This brought the total number of Eco-charcoal producers to 9 from 5.

During the year 2015 two trainings on sustainable charcoal production were undertaken. One took place in the first half of the year and was attended by 24 aspiring eco charcoal producers of whom 3 started production one in august and the other two in November. In the second half of the year 7 new Charpreneurs were trained in Sustainable charcoal production.

A total of 119.48 tonnes of Eco-charcoal were produced in 2019 (See Appendix J).

Tree Planting (woodlots), Tree Nurseries, Orchards

BCP's tree planting and afforestation projects are the result of a strong partnership and collaboration with the Zambian Forestry Department. In February and March 2013, over 500 trees were planted in 2 School Fruit Orchards, as part of a community 'nursery' project, as well as a forest rehabilitation project connected to the Sustainable Eco-Charcoal Project. Tree planting will be promoted as a means of afforestation and improved forest management, which can additionally support the health of forest-compatible projects that promote the sustainable management of forest resources, as well as commercial opportunities for communities that wish to develop and manage local nurseries.

In 2014, BCP facilitated 40 fruit trees to be planted at Namanongo and Ndubulula Schools as part of the Environmental Education Programme Special Environmental Education Day in the first quarter of the year.

In 2014, BCP also facilitated an afforestation program taking place in the harvested "strip" areas within the Ndubulula Eco-Charcoal forest, in partnership with the local Forestry Department officer. Through this program, 100 indigenous trees were planted.

In 2015, BCP facilitated 40 trees to the 4 schools participating in the EEP with each school getting 10 each i.e. Guava, Avocado, Lemon, Pawpaw, Water berries and Gliricidia trees to add to their school orchards.

In 2018 BCP supported the drilling of a new borehole to provide water to the nursery at the DFO's office. The office was supplied with fruit seeds in 2016 that they managed to raise into seedlings. Distribution of the seedlings reached till 2018 as the department had challenges in logistics.

The total number of seeds that were bought by BCP are 360 Mangoes (*Mangifera indica*), 729 Lemons (*Citrus limon*), and 579 Avocados (*Persea americana*) bringing the total to 1,668. From 2016 the total number of all the distributed seedlings is 1,551. This is broken down as 320 mangoes, 689 lemons and 542 Avocados.

Currently the department is still raising 40 lemons, 40 Mangoes and 37 avocados from what BCP supplied to them.

The department remains positive that with the provision of the borehole by BCP, the raising of the seedlings will be much effective.

Crop Diversification

As a key element to the Conservation Farming Training Program (CFTP), crop diversification will be promoted through BCP's strategic partnership with Musika Development Initiatives—an organization committed to connecting rural producers to urban markets. Crop diversification will promote long-term field health, increase yields, and improve household resilience in the face of climactic changes or other unexpected phenomena, reducing the likelihood of total poverty or livelihood destruction—especially among the 'poorest of the poor'—as a result of such unfortunate events.

The Crop Diversification program was implemented through Musika, a partner organization, and it is linked closely to the CFTP supported by BCP. As such, 197 participating households had access to this program.

This activity was discontinued in 2017 due to limited funding

Employment

BCP views meaningful job creation as one of the strongest and most sustainable ways of providing an alternative livelihood opportunity to local stakeholders. By providing community stakeholders with regular alternative sources of income, BCP hopes to drastically reduce the pressures they otherwise face to engage in deforestation-dependent activities, such as charcoal production, to earn income.

BCP has created multiple employment opportunities in local communities, including:

- **Forest Inventory Team:** Members of local communities trained in forest carbon measurement and reporting techniques, including data collection using Android phone technology. In 2014 there have been 3 members of the team, with 5 members from the local community trained in plot sampling and MRV techniques. In 2015 BCP aims to hire 1-2 more individuals to support this team.
- **Village Scouts:** In 2014, BCP collaborated with ZAWA to undertake a selection-process to identify 12 new scouts who are being sent for formal training through ZAWA, who will then form a Security Team at Rufunsa Conservancy.
- **Tourism Support / Domestic Workers:** Throughout 2013-14, BCP has employed 1-2 "Domestic Workers" who assist with campsite maintenance as part of a tourism development initiative at the Rufunsa Conservancy, and who assist with basic camp maintenance at the Rufunsa Conservancy headquarters.
- **Land Management / Construction:** Employment opportunities have been created through construction (infrastructure improvement) and land management activities (such as roads maintenance, erosion control) at Rufunsa Conservancy.

In 2014/2015, BCP through Musika linked 5 community members from the project zone to the Zambian Seed (ZamSeed) Company to their seed agents.

In collaboration with the Department of National Parks and Wildlife (DNPW) recruitment and training of 12 new community scouts commenced in November 2018. The graduates included 4 women whom it is hoped will encourage further women to be part of the community scout programme. The additional 12 scouts are employed by the local Community Resource Board.

Activity Area 3: Protection, Enforcement and Monitoring

Project boundaries are known and respected by all parties, and ongoing carbon stock monitoring activities take place with full corporation from all parties involved.

Forest Monitors and Scouts

Trained security teams comprised of local community members patrol and secure the project area, reporting any acts of deforestation or wildlife poaching that take place. Particular emphasis is placed on protecting the perimeter of the property, especially the boundary adjacent to community lands, with an aim to preventing further encroachment of the project area. Security activities will be undertaken through close collaboration with the Forestry Department, Zambian Police and the (Department of National Parks and Wildlife) DNPW. Security teams will also be trained in effective conflict resolution practices, for example, effective communication styles for pursuing non-confrontational discussions with local community stakeholders. BCP's Forest Monitors are also engaged in ongoing comprehensive biodiversity monitoring programs, which are designed to track the ongoing impacts of BCP's REDD+ activities on local wildlife.

Four Community members mandated by the (Department of National Parks and Wildlife) DNPW as Village Scouts have been patrolling strategic zones within the project area. Several trespassers attempting to extract timber were arrested on the property with the assistance of the Zambia Police. Several dozen snares have been collected, mostly along the boundaries of the project area. Collaboration between BCP, DNPW resulted in the successful arrest of several timber harvesters inside Lower Zambezi National Park, within a few km of the boundary of the project zone.

Two of the currently-employed scouts are in the process of obtaining their licenses to ride motorcycles. Once licensed they will begin mobile patrols, thereby covering a wide area.

During October to December 2014 twelve new recruits received intensive paramilitary and conservation-oriented training at a ZAWA training facility at Chunga, Zambia. They graduated from their course at the end of December are deployed as fully certified village scouts. There are currently 18 scouts that operate in three teams.

There is currently a team of 25 scouts employed by the local Community Resource Board and all have received additional training.

BCP Forest Monitors have received refresher training in biodiversity data collection and plot sampling.

Boundary Demarcation

In October 2012, BCP undertook a “boundary demarcation” activity along the Northern boundary of the property, which separates the project area from community lands. The purpose of this activity was to ensure local community stakeholder awareness and acceptance of project area boundaries, in the interest of reducing the potential of conflict stemming from confusion about the boundary location. This activity was undertaken in cooperation with the Principal Surveyor from the GRZ Ministry of Lands, to ensure correctness and legitimacy of the demarcation in the eyes of all stakeholders, including local government authorities. In the demarcation process, local traditional leaders, BCP representatives, and the GRZ Surveyor walked along the demarcated boundary, following the GPS points listed on the original Title Deed and beacons that had been placed on the ground to mark the boundary. BCP representatives painted trees along the boundary, to provide a more visual demarcation than the beacons had originally provided.

The boundary clearing and demarcation has been completed and it is maintained annually.

Community-Based Forest Biomass and Carbon Stock Monitoring

The Forest Inventory Team comprised of local community members, has pioneered the use of innovative digital biomass data collection systems, using smartphone devices, in order to collect important data concerning forest carbon stocks in Rufunsa Conservancy. Members of BCP’s community-based Plot Teams have received intensive training in tree and soil sampling, and the use of smartphone technology to collect data used for carbon accounting. The FMT serves an important dual-function of promoting community involvement and ownership of local forest resources, and ensuring high quality data collection for the purposes of our carbon accounting.

The forest inventory data was last updated for all plots in 2016 and has since been gathered annually for 20% of plots. Leakage monitoring and biodiversity monitoring are undertaken annually.

Social Monitoring Program

The robust Social Monitoring Team Standard Operating Procedure (SOP) calls for the ongoing monitoring and evaluation of the impacts of project activities on local stakeholder livelihoods. This will allow BCP to ensure that it’s project activities are effectively designed (and re-

designed, as necessary) to achieve their aims of positively impacting local communities and effectively addressing (reducing) local drivers of deforestation.

In 2012, BCP completed a robust and representative Baseline Survey of community stakeholders living within the project zone for the Lower Zambezi REDD+ Project. Throughout 2013, as BCP has continued to implement a variety of project activities, BCP representatives have collected data through project-specific surveys that are specially designed to track the impacts of each project.

BCP's Social Monitoring Program has been ongoing, with recent efforts in 2014 to improve our data collection and tracking capacity. In 2014, a database of community project participants has been created, with the aim of allowing for more centralized reporting on overall project impacts, and reducing the risk of double-counting, as many community stakeholders are by now engaged in multiple BCP activities. In 2014, BCP has also hired a full-time Monitoring and Evaluation Specialist, who will further assist with the formalization and strengthening of BCP's data collection and monitoring techniques, and who can assist with data analysis and reporting.

In the fourth quarter of 2017, social monitoring follow-up surveys were undertaken among a representative sample of 100 community stakeholders living within the project zone for the LZRP. These surveys follow the initial socio-economic baseline study undertaken in 2012.

Key highlights of the social monitoring follow-up survey include:

- 95% of respondents reported that the LZRP benefits their community.
- 91% reported receiving direct benefits to their household from the project.
- 75% reported active participation in the LZRP by a member of their household.
- 79% reported understanding that the LZRP is a long-term project.
- 91% reported understanding that the LZRP is taking place on the privately-titled Rufunsa Conservancy.
- 86% reported understanding that the LZRP is performance-based.
- 96% say BCP/CFP is welcome in the community.

Community Covenants

BCP has pioneered the use of innovative "Community Covenants," which are written contracts between BCP and project participants that explicitly link participation in BCP-supported projects to achievable forest protection aims. For example, all BCP employees from local communities are required to sign a Community Covenant, written into their employment contract, which specifies the conditionality of their ongoing employment on their agreement to stop any deforestation activities taking place in the project zone. The purpose of the Community Covenants is two-fold: first, Community Covenants provide a direct and explicit link between BCP's activities and reductions in deforestation activities taking place within the project zone. Second, Community Covenants prevent/reduce the risk of adverse effects from project

activities or benefits—for example, BCP does not want community stakeholders to use their incomes from employment with BCP in order to fund charcoal production or poaching activities that threaten the project.

Community Covenants are Ongoing agreements used as an innovative tool for linking community development / livelihoods “benefits” to biodiversity and forest protection aims of the project. In some cases, we have transitioned from the title of “Community Covenant” and have begun to use the language of a Memorandum of Understanding (MoU), in which the forest protection terms of the project are clearly outlined. In 2014, MoUs linking participation in community projects to forest protection were signed as part of the Eco-Charcoal Project expansion into Namanongo and Mweshang’ombe Zones (nine new project sites identified) and the “Bio Bank” project that is implementing forest protection activities on 990.4 hectares of community forest in Mweshang’ombe Zone, adjacent to the Rufunsa Conservancy. These MoUs explicitly document participants’ agreement to implement improved/sustainable forest management techniques on demarcated areas of community forest, in exchange for access to services / “benefits” through these projects.

Additionally, all of BCP’s employment contracts contain an enforceable “Community Covenant” clause, that documents that employment is contingent upon respect for BCP’s Ongoing deforestation mitigation activities, and violation of this covenant is a terminable offence.

In 2015, community covenants were signed between BCP and community members participating in various projects such as School support program, Village chicken and Honey projects.

All community projects were covered under an Agreement with the community, headmen signed in 2016. Community covenants were signed for individual projects in each zone

Structured Biodiversity Monitoring

Thirty-seven (37) line transects have been distributed across the conservancy and are being monitored by trained teams of scouts and forest monitors. The distance sampling method is used to monitor large ungulates and other species of conservation importance. These surveys are done at the beginning and end of the dry season

Southern Groundhornbill monitoring

A system has been developed to identify different family groups of this high conservation value, territorial bird species. Observers are posted on high points in the conservancy from where they can locate and map family groups. The surveys were skipped in 2019 due to the Forest Monitoring team’s commitments in assisting inventories in other REDD+ areas. The surveys are now scheduled to resume in July 2020.

Aerial Security Surveys

BCP has teamed up with Conservation Lower Zambezi to improve security through aerial patrols. In this agreement, Conservation Lower Zambezi flies two aerial patrols for BCP every month over pre-determined parts of the conservancy to look for encroachment, illegal logging, poachers, carcasses and wildlife. BCP's Airwing department also periodically flies over the conservancy and collect data on wildlife observations and illegal activities using the BackCountry Navigator and CyberTracker applications.

Fire Impact Monitoring

BCP uses a Belt transect monitoring system to monitor the impact of fire on tree population. Forty belt transects of 100x2m have been setup and get regularly enumerated. All live trees are tagged and will be monitored over time. However, this was not monitored in 2019 but is resuming in 2020.

3.2 Deviations

3.2.1 Methodology Deviations

MR.97

As in *M6*, there was a minor deviation of the visual approach for leakage monitoring (Appendix B, VM0009). Instead of Forest Inventory Team members estimating degradation, they were required to geo-reference every felled tree in the permanent plots and the total number of felled trees were compared against the average density of trees/ha in the project accounting area, again avoiding biased estimations/erroneous counting of trees in 1 ha plots. This value was then placed in a degradation category as per VM0009. This approach removed all potential bias and greatly improves the robustness and repeatability of degradation monitoring. This deviation does not affect the conservativeness of any emissions reductions as it is in fact an improvement of the prescribed procedure and removes observer bias that could result in degradation in the leakage area being underestimated.

There was also a minor variation with regards the monitoring of disturbances. VM0009 requires that disturbances in the project area must be monitored in plots. The very low density of disturbances experienced in the LZRP are not captured by plots. Therefore, when disturbances are detected by other means, their size is directly measured using ground surveys.

Using this approach, a small area of disturbance was detected and measured during this monitoring period (Figure 8, Appendix H). By comparing 2018 and 2019 Sentinel-2 Imagery, a small clearing was detected in the Northern corner of the project area. It did not overlap any monitoring plots. A team was deployed to assess and confirm the clearing. A shapefile of the

cleared area was then created using a heads-up digitization in GIS software. The total area calculated in a GIS was only 1.96 Ha and the associated emissions were calculated and accounted for in this monitoring period.

This methodology deviation does not affect the conservativeness of emissions reductions. It is an improvement as a minor disturbance would have unlikely been captured during routine monitoring with plots and the manner in which the disturbance was quantified is much more accurate than what could be achieved with fixed plots.

Neither of these deviations relate to any other part of the methodology except for monitoring and measuring of activity shifting leakage and disturbances in the project area.

The allometric equation used to estimate above ground biomass in this monitoring period and all previous monitoring periods was not tested on trees larger than 55 cm. However, the project inventory data includes a few trees larger than this. The methodology requires that the directly measured biomass of the largest tree in the representative sample of destructively harvested trees be greater than the biomass predicted by the equation, and that the value of the first order derivative of the largest tree in the representative sample and inventory not differ by more than 10 %. The selected allometric equation does under predict the biomass of the largest tree in the representative sample, but the difference of the first order derivative values was greater than 10 %. Therefore, for all trees in the inventory greater than 55 cm DBH, the calculated biomass was set equal to a 55 cm DBH tree. This is a very conservative assumption and erases the possibility of the equation over predicting biomass of trees outside the size classes for which it was tested. This deviation only relates to how biomass is measured for monitoring purposes and doesn't affect any other part of the methodology. It results in a more conservative estimate of biomass and emissions savings. Therefore, it meets the criteria for an acceptable methodological deviation.

3.2.2 Project Description Deviations

A new Project Description Document was developed at the current baseline reevaluation. There were no Project Description deviations during this monitoring period.

3.3 Grouped Projects

This is not a grouped project.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	α
Data unit	Unitless
Description	Combined effects of β and θ at the start of the historic reference period, updated every 10 years after project start date, see appendix I
Source of data	Reference area and historic reference period
Value applied	1.484
Justification of choice of data or description of measurement methods and procedures applied	Time and place in which the logistic model is fit. BioCarbon Partners Carbon Accounting department. Analysis undertaken in 2020
Purpose of Data	Calculation of baseline emissions
Comments	Is one of the results of applying the cumulative deforestation model but is not used in baseline type U3 as it is replaced with ru

Data / Parameter	β
Data unit	unitless
Description	Effect of time on the cumulative proportion of deforestation over time, updated every 10 years after project start date, see appendix I
Source of data	Reference area and historic reference period
Value applied:	0.000371
Justification of choice of data or description of measurement methods and procedures applied	Time and place in which the logistic model is fit. BioCarbon Partners Carbon Accounting department. Analysis undertaken in 2020
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	γ
Data unit	Days
Description	Time shift from beginning of historic reference period to project start date
Source of data	Historic reference period
Value applied:	10, 957
Justification of choice of data or description of measurement methods and procedures applied	Time and place in which the logistic model is fit. BioCarbon Partners Carbon Accounting department. Analysis undertaken in 2013
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	λ_{soc}
Data unit	proportion (unitless)
Description	Exponential soil carbon decay parameter
Source of data	VCS AFOLU default for tropical regions
Value applied:	0.2
Justification of choice of data or description of measurement methods and procedures applied	Conservative default based on IPCC value.
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	$\hat{\sigma}_{EM}$
Data unit	standard deviation (unitless)
Description	The estimated standard deviation of the state observations used to fit the logistic function
Source of data	Remote sensing image interpretation
Value applied:	0.4978
Justification of choice of data or description of measurement methods and procedures applied	Time and place in which the logistic model is fit. BioCarbon Partners Carbon Accounting department. Analysis undertaken in 2020.
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	B
Data unit	Set
Description	The set of all selected carbon pools in biomass. Is a subset of C
Source of data	PDD
Value applied:	2
Justification of choice of data or description of measurement methods and procedures applied	The project accounts for AGOT and BGOT. All other biomass pools are conservatively excluded and were found to be insignificant. AGMT and BGMT pools are not applicable to the project as there are no commercially valuable timber trees that occur in the accounting area.
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	C
Data unit	Set
Description	The set of all selected carbon pools
Source of data	Monitoring records
Value applied:	3
Justification of choice of data or description of measurement methods and procedures applied	The project accounts for AGOT, BGOT and SOC. All other pools are optional, were found to be insignificant and have been conservatively excluded.
Purpose of Data	Calculation of baseline emissions

Data / Parameter	J
Data unit	Set
Description	The set of all observations of conversion. When superscripted with a monitoring period, the conversion observations are taken for leakage analysis.
Source of data	Remote sensing image interpretation or field observations in the reference area.
Value applied:	28, 582
Justification of choice of data or description of measurement methods and procedures applied	VM0009, v3.0 section 6.6 onwards. The number of observations of forest state in the reference area were originally quantified as 3120 but some points were removed due to complications with forest state interpretation or non-forest at start of historic reference period.
Purpose of Data	Calculation of baseline emissions
Comments	Value was 15, 600 in the initial baseline evaluation, and updated to 28, 582 at the 10 years baseline reevaluation (Appendix I)

Data / Parameter	M
Data unit	Set
Description	The set of all monitoring periods
Source of data	Monitoring records
Value applied:	27
Justification of choice of data or description of measurement methods and procedures applied	There will be 27 monitoring events over the project crediting period of 30 years. The project proponent has decided on annual monitoring
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	A_{PAA}
Data unit	ha
Description	Area of Project Accounting Area
Source of data	GIS analysis prior to sampling
Value applied:	33, 338
Justification of choice of data or description of measurement methods and procedures applied	See GIS data in Appendix H. BioCarbon Partners, Carbon Accounting Department. Data used to generate this value include the title deed, GIS layers, several tiles from the ASTER Global Digital Elevation Model, Land cover classification undertaken using Landsat imagery - 2013 - Appendix H
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	A_{PX}
Data unit	ha
Description	Area of proxy area
Source of data	GIS analysis and participatory rural appraisal prior to sampling
Value applied:	42, 794
Justification of choice of data or description of measurement methods and procedures applied	GIS layers and expert knowledge - BioCarbon Partners Carbon Accounting department - 2013 - Appendix H
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	A_{AS}
Data unit	ha
Description	Area of activity-shifting leakage area
Source of data	GIS analysis
Value applied:	27, 805
Justification of choice of data or description of measurement methods and procedures applied	GIS layers and expert knowledge - BioCarbon Partners Carbon Accounting department - 2013 - Appendix H. Fulfils criteria stipulated in VM0009.
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	n_d
Data unit	Set
Description	Number of spatial points in the reference area
Source of data	Remote sensing image interpretation
Value applied:	2588
Justification of choice of data or description of measurement methods and procedures applied	Number of points defined as per the methodology VM0009 to adequately quantify forest state in the reference area - BioCarbon Partners Carbon Accounting department - 2019 - Appendix H
Purpose of Data	Calculation of baseline emissions
Comments	The points were 2600 in 2013 but 18 were eliminated during the 2019 baseline reevaluation (Appendix I) due to cloud cover.

Data / Parameter	o_i
Data unit	Binary
Description	State observation for the sample point in the reference area
Source of data	Cumulative Deforestation Model - BioCarbon Partners Carbon Accounting Department - 2019 - Appendix H
Value applied:	0 or 1
Justification of choice of data or description of measurement methods and procedures applied	Data collected as per the methodology.
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	p_{LME}
Data unit	Proportion (unitless)
Description	Portion of leakage related to market effects
Source of data	Leakage monitoring data - See Appendix C and Appendix F
Value applied:	0
Justification of choice of data or description of measurement methods and procedures applied	Market effect and activity shifting leakage are the same as the same agents are clearing forest for commodities and for agricultural purposes. They are not separate entities as is often the case in planned deforestation scenarios.
Purpose of Data	Calculation of leakage
Comments	

Data / Parameter	q
Data unit	Days
Description	Lag between start of degradation and deforestation
Source of data	Consultation with local agents of deforestation – 28 farmers were questioned to determine how long they usually wait after clearing an area before ploughing it.
Value applied:	620
Justification of choice of data or description of measurement methods and procedures applied	Based on observations in the reference area, hence applicable to the project area.
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	r_{RS}
Data unit	Unitless
Description	Expansion factor for above-ground biomass to below-ground biomass (root/shoot ratio)
Source of data	Chidumayo, E. N. 2013. Forest degradation and recovery in a miombo woodland landscape in Zambia: 22 years of observations on permanent sample plots. Forest Ecology and Management 291:154-161.
Value applied:	0.54
Justification of choice of data or description of measurement methods and procedures applied	The root-shoot ratio was determined within a study site that overlaps the project reference area
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	τ_U
Data unit	Unitless
Description	Onset proportion of deforestation immediately adjacent to project area
Source of data	GIS analysis and image interpretation
Value applied:	0.126
Justification of choice of data or description of measurement methods and procedures applied	Positions the baseline emissions models relative to the instantaneous rate of deforestation. Measurement was undertaken using GIS analyses described elsewhere in the document. BCP Carbon Accounting Department - 2013 - Appendix H
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	t
Data unit	Days
Description	Time since project start date
Source of data	Calendar
Value applied:	3744
Justification of choice of data or description of measurement methods and procedures applied	Project start date is 1 October 2009 and the current monitoring period ended 31 December 2019.
Purpose of Data	Calculation of project emissions
Comments	

Data / Parameter	t_i
Data unit	Days
Description	The point in time of the observation made at point i
Source of data	Remote sensing image interpretation
Value applied:	1 – 12,698
Justification of choice of data or description of measurement methods and procedures applied	The initial historic reference period stretched from 1984 to 2009, the reference period was then extend to 2019 during the 10 years baseline reevaluation (Appendix I), thus dates of the first and last images are now 1984-06-29 and 2019-04-05, the time span is thus 12, 698 days in total.
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	t_{PL}
Data unit	Days
Description	Length of project crediting period
Source of data	PDD
Value applied:	10, 957
Justification of choice of data or description of measurement methods and procedures applied	The project crediting period stretches from 1 October 2009 to 1 October 2039. This complies with the minimum project lifespan of AFOLU projects as stipulated by the VCS.
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	w_i
Data unit	Unitless
Description	weight applied to the sample point in the reference area
Source of data	Remote sensing image interpretation based on 11 time steps in the historic reference period which is related to availability of suitable imagery.
Value applied:	0.000034965
Justification of choice of data or description of measurement methods and procedures applied	GIS layers and expert knowledge - BioCarbon Partners Carbon Accounting department - Appendix H. Calculated as specified in VM0009.
Purpose of Data	Calculation of baseline emissions
Comments	Initially 6 time steps, increased to 11 at the 10 years baseline reevaluation

4.2 Data and Parameters Monitored

MR.85-87

Data / Parameter	$A_{P1}^{[m=0]}$
Data unit	ha
Description	Area of project accounting area stratum 1 prior to first verification event
Source of data	GIS analysis prior to sampling
Description of measurement methods and procedures to be applied	Supervised land cover classification employing the Support Vector Machine algorithm (Landsat 5 TM Image). Classification accuracy was 76.84% with a kappa value of 0.745
Frequency of monitoring/recording	First monitoring period / 10 years
Value monitored	27, 322
Monitoring equipment	Landsat TM satellite
QA/QC procedures to be applied	Classification accuracy using training and validation data. Classification error matrix
Purpose of the data	Calculation of baseline emissions
Calculation method	GIS area calculation
Comments	

Data / Parameter	$A_{P2}^{[m=0]}$
Data unit	ha
Description	Area of project accounting area stratum 2 prior to first verification event
Source of data	GIS analysis prior to sampling
Description of measurement methods and procedures to be applied	Supervised land cover classification employing the Support Vector Machine algorithm (Landsat 5 TM Image). Classification accuracy was 76.84% with a kappa value of 0.745
Frequency of monitoring/recording	First monitoring period / 10 years
Value monitored	6.016
Monitoring equipment	Landsat TM satellite
QA/QC procedures to be applied	Classification accuracy using training and validation data. Classification error matrix
Purpose of the data	Calculation of baseline emissions
Calculation method	GIS area calculation
Comments	

Data / Parameter	$C_B^{[m]}$
Data unit	tCO ₂ e/ha
Description	Baseline carbon stocks at the end of the current monitoring period
Source of data	Proxy area sampling
Description of measurement methods and procedures to be applied	Proxy area sampling as per the protocol Appendix E.
Frequency of monitoring/recording	20% of plots measured annually.
Value monitored	6.7
Monitoring equipment	See Appendix E. Standard vegetation quantification equipment.
QA/QC procedures to be applied	See Appendix E and description in monitoring report.
Purpose of the data	Calculation of baseline emissions
Calculation method	Using standard vegetation ecology plot sampling techniques and subsequent quantification of biomass using allometric equations.
Comments	

Data / Parameter	$C_{B\ BGB}^{[m]}$
Data unit	tCO ₂ e
Description	Carbon not decayed in BGB at the end of the current monitoring period
Source of data	Proxy area sampling
Description of measurement methods and procedures to be applied	Ongoing forest monitoring as per Appendix E
Frequency of monitoring/recording	Every monitoring period
Value monitored	25
Monitoring equipment	See Appendix E
QA/QC procedures to be applied	See Appendix E
Purpose of the data	Calculation of baseline emissions
Calculation method	Applied equation F.29 in VM0009, v3.0
Comments	

Data / Parameter	$C_{B SOC}^{[m]}$
Data unit	tCO2e
Description	Carbon not decayed in SOC at the end of the current monitoring period
Source of data	Proxy area sampling
Description of measurement methods and procedures to be applied	Proxy area sampling as per the protocol in Appendix E and application of equation F.32, VM0009, v3.0
Frequency of monitoring/recording	Fixed once off sampling, monitored every monitoring period
Value monitored	313,997
Monitoring equipment	See Appendix E standard soil sampling procedures and equipment.
QA/QC procedures to be applied	See Appendix E. The soils were analysed at a reputable laboratory – The Institute of Soil, Water and Climate in South Africa.
Purpose of the data	Calculation of baseline emissions
Calculation method	Application of equation F.32 VM0009, v3.0 using SOC values from the project accounting area.
Comments	

Data / Parameter	$C_{Bb}^{[m]}$
Data unit	tCO ₂ e / ha
Description	Baseline scenario average carbon stock in selected carbon pools
Source of data	Proxy area sampling
Description of measurement methods and procedures to be applied	Proxy area sampling as per the protocol in Appendix E
Frequency of monitoring/recording	Every time measured (≤ 5 yrs)
Value monitored	6.7
Monitoring equipment	See Appendix E
QA/QC procedures to be applied	Review of monitoring records and re-sampling of 20% of plots
Purpose of the data	Calculation of baseline emissions
Calculation method	Using standard vegetation ecology plot sampling techniques and subsequent quantification of biomass using allometric equations.
Comments	

Data / Parameter	$C_{BBM}^{[m]}$
Data unit	tCO ₂ e / ha
Description	Baseline carbon stocks in biomass at the end of the current monitoring period
Source of data	Proxy area sampling
Description of measurement methods and procedures to be applied	Proxy area sampling as per the protocol in Appendix E
Frequency of monitoring/recording	At first verification and baseline revision
Value monitored	6.7
Monitoring equipment	See Appendix E
QA/QC procedures to be applied	Review of monitoring records as described in Appendix E and re-sampling of 20% of plots
Purpose of the data	Calculation of baseline emissions
Calculation method	Using standard vegetation ecology plot sampling techniques and subsequent quantification of biomass using allometric equations. Averages calculated as per equation B.9 VM0009, v3.0
Comments	

Data / Parameter	$C_{B\text{SOC}}^{[m]}$
Data unit	tCO ₂ e / ha
Description	Baseline soil carbon stocks at the end of the current monitoring period
Source of data	Proxy area sampling
Description of measurement methods and procedures to be applied	Proxy area sampling as per the protocol in Appendix E
Frequency of monitoring/recording	Once off measurement as per VM0009, v3.0
Value monitored	131.7
Monitoring equipment	See Appendix E, standard soil sampling equipment
QA/QC procedures to be applied	Review of monitoring records at next baseline re-evaluation
Purpose of the data	Calculation of baseline emissions
Calculation method	Quantification of SOC done according to Annex B, VM0009, v3.0
Comments	

Data / Parameter	$C_P^{[m]}$
Data unit	tCO ₂ e / ha
Description	Project carbon stocks at the end of the current monitoring period
Source of data	Project accounting area sampling
Description of measurement methods and procedures to be applied	Appendix E describes the plot based monitoring procedure.
Frequency of monitoring/recording	20% of plots monitored annually. Inventory revised during this monitoring period.
Value monitored	180.1 Dense Tree Stratum, 166.7 Light Tree Stratum
Monitoring equipment	See Appendix E, standard vegetation sampling equipment
QA/QC procedures to be applied	Review of monitoring records, see Appendix C.
Purpose of the data	Calculation of baseline emissions
Calculation method	Standard plot sampling techniques to quantify vegetation and application of allometric equations. Averages calculated using equation B.9 VM0009, v3.0
Comments	

Data / Parameter	$C_P^{[m-1]}$
Data unit	tCO ₂ e / ha
Description	Project carbon stocks at the beginning of the current monitoring period
Source of data	Project accounting area sampling
Description of measurement methods and procedures to be applied	See Appendix E, standard vegetation sampling equipment.
Frequency of monitoring/recording	Prior monitoring period
Value monitored	180.1 Dense Tree Stratum, 166.7 Light Tree Stratum
Monitoring equipment	Review of monitoring records, see Appendix C.
QA/QC procedures to be applied	Review of monitoring records, re-sampling of 20% of plots
Purpose of the data	Calculation of baseline emissions
Calculation method	Standard plot sampling techniques to quantify vegetation and application of allometric equations. Averages calculated using equation B.9 VM0009, v3.0
Comments	

Data / Parameter	$C_P^{[m=0]}$
Data unit	tCO ₂ e / ha
Description	Project carbon stocks prior to first verification event
Source of data	Project accounting area sampling
Description of measurement methods and procedures to be applied	Appendix E describes the plot based monitoring procedure.
Frequency of monitoring/recording	First monitoring period
Value monitored	233.8 Dense Tree Stratum, 225.0 Light Tree Stratum
Monitoring equipment	See Appendix E, standard vegetation sampling equipment
QA/QC procedures to be applied	Review of monitoring records, see Appendix C.
Purpose of the data	Calculation of baseline emissions
Calculation method	Standard plot sampling techniques to quantify vegetation and application of allometric equations. Averages calculated using equation B.9 VM0009, v3.0
Comments	

Data / Parameter	$C_{P1BM}^{[m=0]}$
Data unit	tCO ₂ e / ha
Description	Project carbon stocks in stratum 1 prior to first verification event
Source of data	Project accounting area sampling
Description of measurement methods and procedures to be applied	Appendix E describes the plot based monitoring procedure.
Frequency of monitoring/recording	First monitoring period
Value monitored	225
Monitoring equipment	See Appendix E, standard vegetation sampling equipment
QA/QC procedures to be applied	Review of monitoring records, see Appendix C.
Purpose of the data	Calculation of baseline emissions
Calculation method	Standard plot sampling techniques to quantify vegetation and application of allometric equations. Averages calculated using equation B.9 VM0009, v3.0
Comments	

Data / Parameter	$C_{P2BM}^{[m=0]}$
Data unit	tCO ₂ e / ha
Description	Project carbon stocks in stratum 2 prior to first verification event
Source of data	Project accounting area sampling
Description of measurement methods and procedures to be applied	Appendix E describes the plot based monitoring procedure.
Frequency of monitoring/recording	First monitoring period
Value monitored	233.8
Monitoring equipment	See Appendix E, standard vegetation sampling equipment
QA/QC procedures to be applied	Review of monitoring records, see Appendix C.
Purpose of the data	Calculation of baseline emissions
Calculation method	Standard plot sampling techniques to quantify vegetation and application of allometric equations. Averages calculated using equation B.9 VM0009, v3.0
Comments	

Data / Parameter	$C_{PBM}^{[m=0]}$
Data unit	tCO2e
Description	Project carbon stocks in biomass prior to first verification event
Source of data	Project accounting area sampling
Description of measurement methods and procedures to be applied	Appendix E describes the plot based monitoring procedure.
Frequency of monitoring/recording	First monitoring period
Value monitored	7,554,258
Monitoring equipment	See Appendix E, standard vegetation sampling equipment
QA/QC procedures to be applied	Review of monitoring records, see Appendix C
Purpose of the data	Calculation of baseline emissions
Calculation method	Standard plot sampling techniques to quantify vegetation and application of allometric equations. Averages calculated using equation B.9 VM0009, v3.0.
Comments	

Data / Parameter	$C_{Pb}^{[m]}$
Data unit	tCO ₂ e / ha
Description	Average carbon in biomass in the project accounting area
Source of data	Project accounting area sampling
Description of measurement methods and procedures to be applied	Appendix E describes the plot based monitoring procedure.
Frequency of monitoring/recording	20% of all plots sampled annually, revised in 3rd monitoring period
Value monitored	5,639,153
Monitoring equipment	See Appendix E, standard vegetation sampling equipment
QA/QC procedures to be applied	Review of monitoring records, see Appendix C and Appendix E
Purpose of the data	Calculation of baseline emissions
Calculation method	Standard plot sampling techniques to quantify vegetation and application of allometric equations. Averages calculated using equation B.9 VM0009, v3.0 multiplied by area of each stratum.
Comments	

Data / Parameter	$C_{P\text{SOC}}^{[m=0]}$
Data unit	tCO ₂ e / ha
Description	Project soil carbon stocks prior to first verification event
Source of data	Project accounting area sampling
Description of measurement methods and procedures to be applied	See Appendix E
Frequency of monitoring/recording	First monitoring period
Value monitored	192.6
Monitoring equipment	See Appendix E, standard soil sampling equipment
QA/QC procedures to be applied	Soil analysed at a reputable laboratory – Institute for Soil, Water and Climate in South Africa.
Purpose of the data	Calculation of baseline emissions.
Calculation method	Standard soil sampling techniques. Averages calculated using equation B.9 VM0009, v3.0
Comments	

Data / Parameter	$E_{\Delta GER}^{[m]}$
Data unit	tCO2e
Description	GERs for the current monitoring period
Source of data	Area measurements
Description of measurement methods and procedures to be applied	See Appendix E
Frequency of monitoring/recording	Every monitoring period
Value monitored	232,341
Monitoring equipment	See Appendix E, standard plot sampling equipment
QA/QC procedures to be applied	Review of GER calculations
Purpose of the data	Calculation of project emissions
Calculation method	Calculated with equation F.53 as per section 8.4.1 of VM0009, v3.0.
Comments	

Data / Parameter	$E_{\Delta GER}^{[i]}$
Data unit	tCO2e
Description	GERs for monitoring period ⁱ
Source of data	Area measurements
Description of measurement methods and procedures to be applied	Accounting area plots monitoring as per Appendix E.
Frequency of monitoring/recording	Every monitoring period
Value monitored	5,673,505
Monitoring equipment	See Appendix E, standard plot sampling equipment
QA/QC procedures to be applied	Review of GER calculations
Purpose of the data	Calculation of baseline emissions
Calculation method	Calculated with equation F.53 as per section 8.4.1 of VM0009, v3.0.
Comments	

Data / Parameter	$E_{\Delta NER}^{(i)}$
Data unit	tCO2e
Description	NERs for monitoring period ⁱ
Source of data	Area measurements
Description of measurement methods and procedures to be applied	Accounting area plots monitoring as per Appendix E
Frequency of monitoring/recording	Every monitoring period
Value monitored	5,079,481
Monitoring equipment	See Appendix E, standard plot sampling equipment
QA/QC procedures to be applied	Review of NER calculations and non-permanence risk assessment
Purpose of the data	Calculation of baseline emissions
Calculation method	Calculated with VCS AFOLU Non-Permanence Risk Tool and equation F.55 as per section 8.4.3 of VM0009, v3.0
Comments	

Data / Parameter	$E_B^{[m]}$
Data unit	tCO2e
Description	Cumulative baseline emissions at the end of the current monitoring period
Source of data	Proxy area measurements
Description of measurement methods and procedures to be applied	Proxy area plots monitoring as per Appendix E and equation F.16
Frequency of monitoring/recording	Every monitoring period - annually
Value monitored	1,520,453
Monitoring equipment	Standard vegetation and soil sampling equipment, see Appendix E
QA/QC procedures to be applied	Annual monitoring of proxy area, see Appendix E for error correction procedures.
Purpose of the data	Calculation of baseline emissions
Calculation method	Equation F.16 from VM0009, v3.0
Comments	

Data / Parameter	$E_B^{[m-1]}$
Data unit	tCO2e
Description	Cumulative baseline emissions at the beginning of the current monitoring period
Source of data	Proxy area measurements
Description of measurement methods and procedures to be applied	Proxy area plots monitoring as per Appendix E and equation F.16
Frequency of monitoring/recording	Prior monitoring period
Value monitored	1,287,653
Monitoring equipment	Standard vegetation and soil sampling equipment, see Appendix E
QA/QC procedures to be applied	Annual monitoring of proxy area, see Appendix E for error correction procedures.
Purpose of the data	Calculation of baseline emissions
Calculation method	Equation F.16 from VM0009, v3.0
Comments	

Data / Parameter	$E_{B\Delta}^{[m]}$
Data unit	tCO2e
Description	Change in baseline emissions
Source of data	Proxy area measurements
Description of measurement methods and procedures to be applied	Proxy area plots monitoring as per Appendix E and equation F.15
Frequency of monitoring/recording	Every monitoring period - annually
Value monitored	232,800
Monitoring equipment	Standard vegetation and soil sampling equipment, see Appendix E
QA/QC procedures to be applied	Annual monitoring of proxy area, see Appendix E for error correction procedures.
Purpose of the data	Calculation of baseline emissions
Calculation method	Equation F.15 from VM0009, v3.0
Comments	

Data / Parameter	$E_{B\Delta BGB}^{[i]}$
Data unit	tCO2e
Description	Change in baseline emissions from below-ground biomass during monitoring period i
Source of data	Monitoring the proxy area
Description of measurement methods and procedures to be applied	See Appendix E
Frequency of monitoring/recording	Every monitoring period
Value monitored	1,623,923
Monitoring equipment	See Appendix E
QA/QC procedures to be applied	See Appendix E
Purpose of the data	Calculation of baseline emissions
Calculation method	Calculation of above ground biomass using standard vegetation sampling techniques and application of an acceptable root:shoot ratio and application of equation F.29 of VM0009, v3.0, the decay emissions model
Comments	

Data / Parameter	$E_{B\Delta SOC}^{(m)}$
Data unit	tCO ₂ e
Description	Baseline change in emissions from soil carbon
Source of data	Measurement in the project area
Description of measurement methods and procedures to be applied	See Appendix E
Frequency of monitoring/recording	Once off measurement
Value monitored	73,282
Monitoring equipment	See Appendix E
QA/QC procedures to be applied	See Appendix E
Purpose of the data	Calculation of baseline emissions
Calculation method	Calculation of SOC using standard soil sampling techniques and application of equation F.26 of VM0009, v3.0, the SOC decay emissions model
Comments	

Data / Parameter	$E_{B\Delta SOC}^{[i]}$
Data unit	tCO2e
Description	Baseline emissions from soil carbon in monitoring period i
Source of data	Measurement in the project area
Description of measurement methods and procedures to be applied	See Appendix E
Frequency of monitoring/recording	Once off measurement
Value monitored	1,730,828
Monitoring equipment	See Appendix E
QA/QC procedures to be applied	See Appendix E
Purpose of the data	Calculation of baseline emissions
Calculation method	Calculation of SOC using standard soil sampling techniques and application of equation F26 of VM0009, v3.0, the SOC decay emissions model
Comments	

Data / Parameter	$E_{BBGB}^{[m]}$
Data unit	tCO2e
Description	Cumulative baseline emissions from below-ground biomass at the end of the current monitoring period
Source of data	Measurement in the proxy area
Description of measurement methods and procedures to be applied	Standard vegetation sampling techniques to quantify above ground biomass, application of a root-shoot ratio and a decay emissions model.
Frequency of monitoring/recording	Every monitoring period
Value monitored	474,236
Monitoring equipment	See Appendix E
QA/QC procedures to be applied	See Appendix E
Purpose of the data	Calculation of baseline emissions
Calculation method	Calculation of above ground biomass using standard vegetation sampling techniques and application of an acceptable root:shoot ratio and application of equation F.29 of VM0009, v3.0, the decay emissions model
Comments	

Data / Parameter	$E_{BBGB}^{[m-1]}$
Data unit	tCO2e
Description	Cumulative baseline emissions from below-ground biomass at the beginning of the current monitoring period
Source of data	Measurements in the proxy area
Description of measurement methods and procedures to be applied	Standard vegetation sampling techniques to quantify above ground biomass, application of a root-shoot ratio and a decay emissions model.
Frequency of monitoring/recording	Prior monitoring period
Value monitored	402,646
Monitoring equipment	See Appendix E
QA/QC procedures to be applied	See Appendix E
Purpose of the data	Calculation of baseline emissions
Calculation method	Calculation of above ground biomass using standard vegetation sampling techniques and application of an acceptable root:shoot ratio and application of equation F.29 of VM0009, v3.0, the decay emissions model
Comments	

Data / Parameter	$E_{BBM}^{[m]}$
Data unit	tCO2e
Description	Cumulative baseline emissions from biomass at the end of the current monitoring period
Source of data	Measurements in the proxy area
Description of measurement methods and procedures to be applied	See Appendix E
Frequency of monitoring/recording	Every monitoring period
Value monitored	1,352,497
Monitoring equipment	See Appendix E
QA/QC procedures to be applied	See Appendix E
Purpose of the data	Calculation of baseline emissions
Calculation method	Standard vegetation sampling techniques, quantification of deforestation in the reference area and application of equation F.4 and F.21, VM0009, v3.0
Comments	

Data / Parameter	$E_{BSOC}^{[m]}$
Data unit	tCO ₂ e
Description	Cumulative baseline emissions from soil carbon at the end of the current monitoring period
Source of data	Measurements in the proxy area
Description of measurement methods and procedures to be applied	Standard soil sampling techniques in the proxy area, laboratory analysis and application of the soil decay model.
Frequency of monitoring/recording	Soil carbon is only quantified once at the first verification event as per VM0009.
Value monitored	481,954
Monitoring equipment	Standard soil sampling equipment, see Appendix E
QA/QC procedures to be applied	Soil analysed at a reputable laboratory – Institute of Soil, Climate and Water in South Africa.
Purpose of the data	Calculation of baseline emissions
Calculation method	Quantification of soil carbon and application of equation F.7 and F.28, VM0009, v3.0
Comments	

Data / Parameter	$E_{BSOC}^{[m-1]}$
Data unit	tCO ₂ e
Description	Cumulative baseline emissions from soil carbon at the beginning of the current monitoring period
Source of data	Measurements in the proxy area
Description of measurement methods and procedures to be applied	Standard soil sampling techniques in the proxy area, laboratory analysis and application of the soil decay model.
Frequency of monitoring/recording	Soil carbon is only quantified once at the first verification event as per VM0009.
Value monitored	408,671
Monitoring equipment	Standard soil sampling equipment, see Appendix E
QA/QC procedures to be applied	Soil analysed at a reputable laboratory – Institute of Soil, Climate and Water in South Africa.
Purpose of the data	Calculation of baseline emissions
Calculation method	Quantification of soil carbon and application of equation F.7 and F.28, VM0009, v3.0
Comments	

Data / Parameter	$E_{BA}^{[m]}$
Data unit	tCO2e
Description	Cumulative emissions allocated to the buffer account at the end of the current monitoring period
Source of data	VCS Non-Permanence Risk Report, See Appendix G
Description of measurement methods and procedures to be applied	See Appendix G – standard VCS procedure used
Frequency of monitoring/recording	Non-permanence risk revised at every baseline re-assessment.
Value monitored	176,891
Monitoring equipment	None
QA/QC procedures to be applied	Annual review of risk criteria and disturbance monitoring
Purpose of the data	Calculation of emissions submitted to VCS buffer account
Calculation method	Procedure followed in VCS non-permanence risk tool and emissions allocated to buffer account subtracted from GERs.
Comments	

Data / Parameter	$E_L^{[m]}$
Data unit	tCO2e
Description	Cumulative emissions from leakage at the end of the current monitoring period
Source of data	Measurements in the leakage area(s)
Description of measurement methods and procedures to be applied	Plot based sampling of leakage area and estimation of degradation.
Frequency of monitoring/recording	Every monitoring period
Value monitored	0
Monitoring equipment	See Appendix F, standard vegetation sampling equipment
QA/QC procedures to be applied	See Appendix F, all evidence of tree-felling by humans are geo-referenced and plots photographed
Purpose of the data	Calculation of activity shifting leakage
Calculation method	Application of equation F.44 and F.45 to field data collected.
Comments	Leakage in this monitoring period is considered insignificant. No significant deforestation has taken place in the leakage area, only minor degradation.

Data / Parameter	$E_L^{[m-1]}$
Data unit	tCO2e
Description	Cumulative emissions from leakage at the beginning of the current monitoring period
Source of data	Measurements in the leakage area(s)
Description of measurement methods and procedures to be applied	Plot based sampling of leakage area and estimation of degradation.
Frequency of monitoring/recording	Every monitoring period
Value monitored	0
Monitoring equipment	See Appendix F, standard vegetation sampling equipment
QA/QC procedures to be applied	See Appendix F, all evidence of tree-felling by humans are geo-referenced and plots photographed
Purpose of the data	Calculation of project emissions
Calculation method	Application of equation F.44 and F.45 to field data collected.
Comments	Leakage in this monitoring period is considered insignificant. No significant deforestation has taken place in the leakage area, only minor degradation.

Data / Parameter	$E_{L\Delta}^{[m]}$
Data unit	tCO2e
Description	Change in emissions due to leakage
Source of data	See Appendix F
Description of measurement methods and procedures to be applied	Plot based sampling of leakage area and estimation of degradation.
Frequency of monitoring/recording	Every monitoring period
Value monitored	0
Monitoring equipment	See Appendix F, standard vegetation sampling equipment
QA/QC procedures to be applied	See Appendix F, all evidence of tree-felling by humans are geo-referenced and plots photographed
Purpose of the data	Calculation of leakage
Calculation method	Application of equation F.44 and F.45 to field data collected.
Comments	Leakage in this monitoring period is considered insignificant. No significant deforestation has taken place in the leakage area, only minor degradation.

Data / Parameter	$E_{LASF}^{[m]}$
Data unit	tCO2e
Description	Cumulative emissions from activity-shifting leakage in forested strata at the end of the current monitoring period
Source of data	Measurements in the activity-shifting leakage area
Description of measurement methods and procedures to be applied	Plot based sampling of leakage area and estimation of degradation.
Frequency of monitoring/recording	Every monitoring period
Value monitored	0
Monitoring equipment	See Appendix F, standard vegetation sampling equipment
QA/QC procedures to be applied	See Appendix F, all evidence of tree-felling by humans are geo-referenced and plots photographed
Purpose of the data	Calculation of leakage
Calculation method	Application of equation F.44 and F.45 to field data collected.
Comments	Leakage in this monitoring period is considered insignificant. No significant deforestation has taken place in the leakage area, only minor degradation.

Data / Parameter	$E_{LME}^{[m]}$
Data unit	tCO2e
Description	Cumulative emissions from market effects leakage at the end of the current monitoring period
Source of data	Measurements in the market-effects leakage area
Description of measurement methods and procedures to be applied	Market and activity shifting leakage are the same for the LZRP
Frequency of monitoring/recording	Every monitoring period
Value monitored	0
Monitoring equipment	See Appendix F
QA/QC procedures to be applied	See Appendix F
Purpose of the data	Calculation of leakage
Calculation method	See calculations for activity-shifting leakage above
Comments	

Data / Parameter	$E_{P\Delta}^{[m]}$
Data unit	tCO2e
Description	Change in project emissions
Source of data	Monitoring records for Forest Fire, Burning, logging, wood products, and natural disturbance events
Description of measurement methods and procedures to be applied	Standard vegetation sampling techniques and remote sensing to determine the extent of fires.
Frequency of monitoring/recording	Every monitoring period
Value monitored	459
Monitoring equipment	Standard vegetation sampling equipment and satellite imagery.
QA/QC procedures to be applied	Remote sensing, patrols and field measurements
Purpose of the data	Calculation of project emissions
Calculation method	Monitoring of burnt wood in the project accounting area and equation F.41 VM0009, v3.0.
Comments	

Data / Parameter	$E_{P\Delta BRN}^{[m]}$
Data unit	tCO2e
Description	Cumulative project emissions due to burning at the end of the current monitoring period
Source of data	Monitoring plots in the project accounting area
Description of measurement methods and procedures to be applied	Standard vegetation sampling techniques and remote sensing to determine the extent of fires.
Frequency of monitoring/recording	Every monitoring period
Value monitored	0
Monitoring equipment	Standard vegetation sampling equipment and satellite imagery.
QA/QC procedures to be applied	Review of monitoring records
Purpose of the data	Calculation of baseline emissions
Calculation method	Calculation of project emissions
Comments	

Data / Parameter	$E_U^{[m]}$
Data unit	tCO2e
Description	Cumulative confidence deduction at the end of the current monitoring period
Source of data	Biomass and soil carbon inventory data, Appendix C
Description of measurement methods and procedures to be applied	Calculation of the standard error of the total of the baseline emissions model, proxy area carbon stocks and accounting area carbon stocks
Frequency of monitoring/recording	Every monitoring period
Value monitored	0
Monitoring equipment	See Appendix C
QA/QC procedures to be applied	See Appendix C
Purpose of the data	Calculation of baseline emissions Calculation of project emissions Calculation of leakage
Calculation method	Equation F.57 from VM0009. v3.0
Comments	There were no confidence deductions as the uncertainty was insignificant.

Data / Parameter	$P_{L\text{ DEG}}^{[m]}$
Data unit	Proportion (unitless)
Description	Portion of leakage due to degradation at the end of the current monitoring period
Source of data	Monitoring in the leakage area
Description of measurement methods and procedures to be applied	Plot based sampling of leakage area and estimation of degradation.
Frequency of monitoring/recording	Every monitoring period
Value monitored	0.11
Monitoring equipment	See Appendix F, standard vegetation sampling equipment
QA/QC procedures to be applied	See Appendix F, all evidence of tree-felling by humans are geo-referenced and plots photographed
Purpose of the data	Calculation of leakage
Calculation method	Calculated using equation B.9, VM0009, v3.0. Minimum sample size determined using equation B.31, VM0009, v3.0
Comments	Leakage in this monitoring period is considered insignificant. No significant deforestation has taken place in the leakage area, only minor degradation.

Data / Parameter	$P_{L\ DEG}^{[m=0]}$
Data unit	Proportion (unitless)
Description	Portion of leakage due to degradation prior to first verification event
Source of data	Monitoring in the leakage area
Description of measurement methods and procedures to be applied	Plot based sampling of leakage area and estimation of degradation.
Frequency of monitoring/recording	First monitoring period
Value monitored	0.087
Monitoring equipment	See Appendix F, standard vegetation sampling equipment
QA/QC procedures to be applied	See Appendix F, all evidence of tree-felling by humans are geo-referenced and plots photographed
Purpose of the data	Calculation of leakage
Calculation method	Calculated using equation B.9, VM0009, v3.0. Minimum sample size determined using equation B.31, VM0009, v3.0
Comments	

Data / Parameter	$t^{[i-1]}$
Data unit	Days
Description	Time from the project start date to beginning of monitoring period i
Source of data	Monitoring records
Description of measurement methods and procedures to be applied	NA
Frequency of monitoring/recording	NA
Value monitored	3379
Monitoring equipment	NA
QA/QC procedures to be applied	NA
Purpose of the data	Calculation of baseline emissions
Calculation method	Count of days in project crediting period
Comments	

Data / Parameter	$t^{[m]}$
Data unit	Days
Description	Time from project start date to end of current monitoring period
Source of data	Monitoring records
Description of measurement methods and procedures to be applied	NA
Frequency of monitoring/recording	Every monitoring period
Value monitored	3,744
Monitoring equipment	NA
QA/QC procedures to be applied	Monitoring records
Purpose of the data	Calculation of baseline emissions
Calculation method	Deduct project start date from end of date of current monitoring period.
Comments	

Data / Parameter	$t^{[m-1]}$
Data unit	Days
Description	Time from project start date to beginning of current monitoring period
Source of data	Monitoring records
Description of measurement methods and procedures to be applied	NA
Frequency of monitoring/recording	Prior monitoring period
Value monitored	11,752
Monitoring equipment	NA
QA/QC procedures to be applied	Monitoring records, Appendix C
Purpose of the data	Calculation of baseline emissions and compliance with VM0009, v3.0 minimum monitoring intervals.
Calculation method	NA
Comments	

Data / Parameter	$U_B^{[m]}$
Data unit	tCO2e
Description	Total uncertainty in proxy area carbon stock estimate
Source of data	Biomass and soil carbon inventory data
Description of measurement methods and procedures to be applied	Calculation of the standard error of the total of the baseline emissions model, proxy area carbon stocks and accounting area carbon stocks
Frequency of monitoring/recording	Every monitoring period
Value monitored	60, 520
Monitoring equipment	NA
QA/QC procedures to be applied	NA
Purpose of the data	Calculation of baseline emissions
Calculation method	Equation B.10, VM0009, v3.0.
Comments	

Data / Parameter	$U_{EM}^{[M]}$
Data unit	tCO2e
Description	Total uncertainty in Baseline Emissions Models
Source of data	Forest State Interpretation
Description of measurement methods and procedures to be applied	Calculation of the standard error of the total of the baseline emissions model, proxy area carbon stocks and accounting area carbon stocks
Frequency of monitoring/recording	Every baseline revision
Value monitored	5, 542
Monitoring equipment	Appendix H
QA/QC procedures to be applied	Appendix H
Purpose of the data	Calculation of baseline emissions
Calculation method	Equation B.14, VM0009, 3.0
Comments	

Data / Parameter	$U_p^{[m]}$
Data unit	tCO2e
Description	Total uncertainty in project accounting area carbon stock estimate
Source of data	Forest State Interpretation
Description of measurement methods and procedures to be applied	Calculation of the standard error of the total of the baseline emissions model, proxy area carbon stocks and accounting area carbon stocks
Frequency of monitoring/recording	Every monitoring period
Value monitored	873,002
Monitoring equipment	Appendix E
QA/QC procedures to be applied	Appendix E
Purpose of the data	Calculation of baseline emissions
Calculation method	Equation B.10, VM0009, v3.0
Comments	

4.3 Monitoring Plan

Table 3. Summary of monitoring activities.

Monitoring Activity	Timing	Methods
Conservancy trespassing and boundary transgressions	Monthly patrols	Scouts patrol the conservancy on an ongoing basis, it is their core duty
Leakage monitoring	Annually	Forest Inventory team following VM0009
Plot measurements	Annually	Forest Inventory Team following VM0009, re-sample 20% of plots in project accounting.
Disturbance monitoring	Monthly in the fire season and otherwise as BCP becomes aware of disturbances.	Remote sensing (MODIS Burned Area Product (University of Maryland)) followed by ground based inspections, bi-monthly aerial surveys.
Charcoal production	Monthly	Charcoal operations managers records all charcoal production on an ongoing basis.

PDR.122

The principle means of monitoring project emissions is with inventory plots in project accounting areas where above ground biomass is measured by recording tree dbh. Allometric equations are used to convert the measures to above and below ground biomass. Soil samples are also collected during the first monitoring period to establish the soil carbon stocks for the project accounting area. VM0009 requires that all such plots must be measured during the first monitoring period and then 20% measured during each subsequent monitoring period.

MR.91

The monitoring strategy for the LZRP followed a stratified random approach for the accounting area. The vegetation in the project accounting area is fairly homogenous Miombo woodland, but two different strata, namely light and dense tree cover were distinguished using remote sensing techniques (Figure 2)

A total of 186 circular, permanent inventory plots are located in Rufunsa Conservancy, and soil was sampled at 59 of these plots during *M1*. 26 plots fell within the dense tree stratum, the remainder were in the light tree stratum which incidentally covers the majority of the accounting area.

Twenty percent of plots are re-measured every year. Two of the 160 plots in the light tree stratum could not be located due to a GPS waypoint transcription error during the first inventory and they were thus not re-sampled and excluded from calculations.

MR.92

GPS coordinates for all of the accounting area, proxy, and leakage plots can be found in Appendix H.

MR.93

Biomass monitoring is conducted according to the BCP field sampling manual (copy provided to VVB, Appendix E). Optimum plot size and minimum tree diameter were determined during a trial sampling run in February 2012. Circular plots (12m radius) were used due to their simplicity, ease of layout and reduced measurement error. A randomly generated plot location was navigated-to using a handheld GPS unit or Android Smart Phone. When the plot location was reached, the centre was permanently marked with a steel rebar driven into the ground. If, for some reason, a plot could not be reached due to terrain, the location was moved following a predetermined deviation that lead to the location of another plot. Very few plots could not be reached. The plots layout is shown in Figure 4.

Trees were identified to species level as far as possible, noting that there are several miombo species (some common) that require taxonomic revision (M. Bingham. Pers Comm¹). The use of a generic allometric equation to calculate AGOT mass fortunately negated mistakes or uncertainties with tree species identification.

As explained above, plots are re-measured on a rotating basis, with 20% re-measured per year, however stock estimates are only updated every 5 years when all plots would have been re-measured.

¹ Mike Bingham, Zambian Miombo Ecosystem Authority.

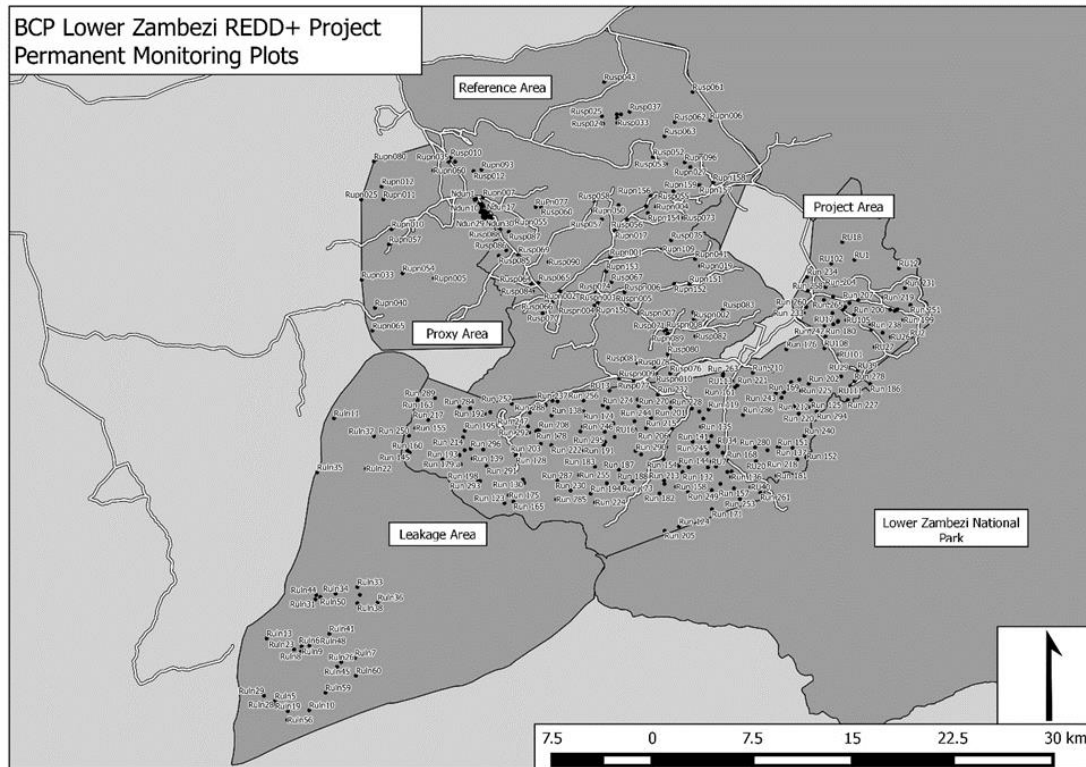


Figure 4. Permanent carbon stock monitoring plots for the Lower Zambezi REDD+ Project.

PDR.123

Proxy plots are used to estimate residual biomass after conversion and the end point for soil carbon decay. For estimating residual biomass, after mapping the proxy areas as described in the project design document, the project generated a random sample of 46 points within the proxy areas.

Since proxy soil carbon is only measured once, it is important to select samples from areas that represent the end point of conversion. Soil data was collected from 16 soil in the proxy area. The same biomass and soil sampling protocols used for accounting areas (Appendix E) were used for proxy areas as well.

PDR.124

Leakage plots in the leakage area are used to estimate activity-shifting leakage from the project accounting areas. The project generated a random sample of 30 points within the leakage area where 1 ha leakage plots could be established. Equation B.31 as per VM0009, suggested the minimum number of plots required was 23. The leakage plot protocol is described in Appendix F.

MR.98

All accounting area, proxy, and leakage plots were measured during monitoring period 1. The project verifies on an annual basis therefore measures all leakage plots each year and 20 % of accounting area and proxy plots each year.

Organizational Structure, responsibilities and competencies

BioCarbon Partners has a team of experts responsible for the carbon inventory and standards compliance. There is a dedicated carbon accounting department that oversees all inventory data collection, processing, storage, GIS and remote sensing and electronic data capture systems (Figure 5)

Both the carbon accounting manager and remote sensing and GIS specialist have post graduate degrees with a strong focus on ecology and collectively have more than 20 years' experience in biological inventories, remote sensing and GIS.

A field team consisting of local residents from neighbouring communities have been trained in forest monitoring (see below) in line with BCP's policy of local capacity building and investment. The team has intimate knowledge of local flora and fauna and their knowledge of the area enables them to locate inventory plots with limited difficulty.

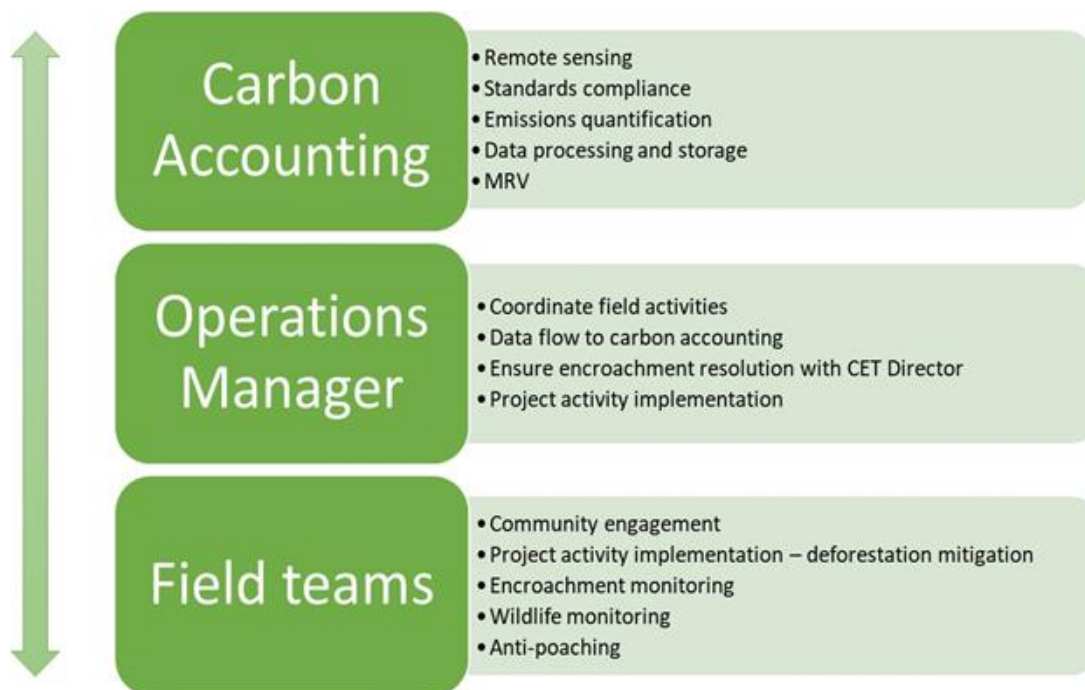


Figure 5. BioCarbon Partners carbon monitoring organisational structure.

The inventory team's day-to-day activities are monitored by the Rufunsa Conservancy Operations Manager who is based on site at the conservation centre. The operations manager sees to the logistical needs of the plot team, ensures that deadlines are adhered to, assists with any equipment failures and transferring data to the carbon accounting department.

Data Management

The initial inventory data for the project accounting area was collected using pen and paper, transferred to BCP HQ for copying, storage and entry. The data was entered by an experienced data capturer with specific experience in collating and capturing ecological data. Data was captured in spreadsheets and original data sheets are kept in a safe place at the BCP HQ. The data was then error checked by the carbon accounting manager to identify any obvious errors. Following this process, an intensive error checking was conducted with the data capturer and two of the senior inventory team members.

Subsequently, BCP developed a digital data capturing system using Android Smartphones. The advantage of this system is that it dramatically reduces errors and adds a significant element of quality control to data collection as start and end times plus location are recorded for all plots. Furthermore, the digital system allows for restrictions in data collection by using drop down menus and upper and lower bounds for figures. It also guides the data collector through the process with a series of text prompts and diagrams.

The process followed for data collection is outlined in Figure 6 and a spot error check SOP can be found in Appendix E. It is a feedback system that relies heavily on training, review and good communication. All training is followed by trial runs of the sampling procedure and then actual data collection under supervision. Data is continuously submitted from the field to the carbon accounting department, and feedback is provided if any corrective actions are required. Furthermore, plots are visited in the field periodically and subjected to an internal audit process.

Once data has been error checked and cleaned it is safely stored online using Google Drive and then transferred to an online relational database that is currently being developed.

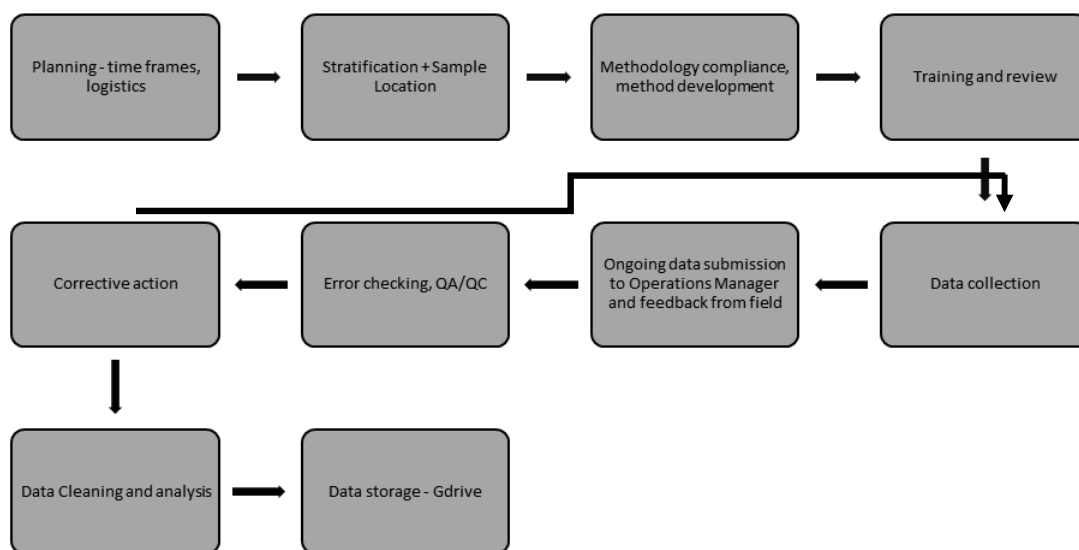


Figure 6. BioCarbon Partners data collection, QA/QC and storage process.

MR.90

Quality Assurance and Quality Control

A set of Standard Operating Procedures and Field Manuals have been developed for all the various aspects of the carbon inventory. As indicated above, BCP has strong systems in place to ensure all carbon related data is collected according to the required quality standards. Quality Control is embedded in the organizational structure of the Carbon Accounting department (Figure 6).

Continuous feedback from the field, coupled with field visits from senior staff, ensure that errors are identified in a timely fashion and corrected (Figure 6). Spot checks and internal audits are conducted to make sure all data collected is of the highest standard. The new digital data capture system furthermore ensures that errors are identified and rectified immediately, unlike paper based systems where data often takes weeks to enter and error-check. Spot errors are dealt with as per Appendix E. During the current monitoring period a senior person was on site for the enumeration of all plots re-sampled. Corrections were done in field.

With regards to GIS and RS, similar procedures are followed although this role resides mainly within the senior management's responsibility. The Remote Sensing aspect of the Cumulative Deforestation Model was undertaken independently by two associates from a South African tertiary institution. The CDM point interpretation was then submitted to a rigorous third party audit by BCP staff.

MR.88

Local capacity building and employment creation is one of the core focus points of BioCarbon Partners and this is clearly reflected in our approach to field based carbon accounting practices. Table 4 is a summary of all forest inventory training undertaken for the first monitoring period. BCP initially trained a group of 19 local residents consisting of neighbouring villagers, officials from the Department of Forestry and local post graduate ecology students in basic forest enumeration techniques followed by hands-on sampling and data collection according to our carbon stock assessment field manual (Appendix E).

Table 4. Summary of field based carbon accounting training for the LZRP.

Date	Training course	Number of trainees	Duration of training (days)	Venue	Trainers
Feb 2012	Biomass Inventory	19	8	Rufunsa Conservancy	L. Theron & H. Sachedina
Sep 2012	Biomass Inventory Advanced Training	5	4	Rufunsa Conservancy	L. Theron, W. Roberts & M. Bingham
Dec 2012	Biomass Inventory refresher course including use of improved bulk density corer	4	2	Rufunsa Conservancy	L. Theron
Jan 2013	Charcoal Inventory and Soil Proxy Sampling and electronic data capture	4	4	LRZP Eco-Charcoal Forest	L. Theron, W. Roberts, E. Chidumayo
Apr 2013	Tree allometry equation development	3	1 and 5 sampling under supervision	LRZP Eco-Charcoal Forest	L. Theron, W. Roberts

Date	Training course	Number of trainees	Duration of training (days)	Venue	Trainers
Jun 2013	NT and DW allometry development, Residual Biomass Sampling, Leakage Monitoring	4	3 and 4 sampling	Rufunsa Conservancy and Leakage Area	L. Theron
June 2014	Biomass Inventory refresher course	5	2	Rufunsa Conservancy	L. Theron
May 2016	Biomass Inventory refresher course	6	2	Rufunsa Conservancy	L. Theron
June 2016	Biodiversity Monitoring Course	15	6	Rufunsa Conservancy	A. Cotterill and L. McDonald

Following the viability phase of the project, five people were selected from the 19 originally trained, to undertake the required monitoring in preparation for the verification under the VCS of the project and one additional member selected from a local village. The forest inventory team members were:

Pythias Sebente

Collins Jere Kaoma

Andrew Tembo

Christopher Wanga

Elvin Muchimba

The inventory team then underwent refresher and advanced training during September 2012 (Figure 7). The training particularly focused on correct data capture and measurement techniques, use of clinometers, GPS use and advanced tree identification presented by local Zambian expert Mike Bingham. Plots were then enumerated under supervision until a satisfactory level of proficiency was achieved.

Pythias Sebente resigned in November 2013 due to the physical nature of the work and was replaced as team leader by Andrew Tembo. The team were by that time well versed in the sampling method and did not need five people to complete the inventory.

BCP in the interim developed an electronic data capture system using Android smartphones and the Open Data Kit (ODK) software. This software allows for the design of custom data capture forms, capturing geographic data and images. It allows for the introduction of stringent data quality control features. A trial version was developed and in January 2013 the team was trained on it and it was piloted in the eco-charcoal forest to quantify the biomass available for charcoal. Since then all new data has been captured using this system.

The soil sampling procedure was also revised during this time; it included training in collecting metadata required for collecting data on residual soil carbon stocks and soil decay rates.

A refresher training course was again held in June 2014. It included a review of the upcoming leakage monitoring and planning for leakage monitoring.



Figure 7. Copy of certificate issued to Forest Monitoring Team members after completion of the advanced training course.

The current Forest Monitoring Team comprise Elvin Muchimba (Team Leader), Lawrence Msoni, Liason Chiyakamba, and Nchimunya Simwendengwe

MR.89

During the *M5* monitoring period biomass available for charcoal production was estimated following the BCP carbon stock assessment field manual in the eco-charcoal forest located to the North of the project accounting area, the Ndubalula eco-charcoal forest. The Ndubalula eco-charcoal area is approximately 93 ha in size and would have been deforested in the baseline scenario. The area was identified by local community leaders and charcoal producers who agreed to harvest it in a sustainable manner. Biomass was enumerated in 30 plots. There is currently 484 ha under eco-charcoal management. Charcoal is harvested using a coup & shelter belt system (eco-charcoal harvesting and production system documents have been made available to the VVB), on a rotational basis, returning to the first strip after approximately 18 years. Charcoal production and sales are carefully monitored by BCP staff and project participants. Charcoal production figures per month for the year 2019 are listed in Table 5 below.

Table 5. Summary of Eco-charcoal production for the LZRP during 2019

Month	Total (t)
January	0
February	0
March	0
April	0
May	0
June	29.78
July	0
August	16.35
September	20.78
October	21.98
November	30.60
December	0
TOTAL	119.49

MR.99

A generic miombo equation developed by Chidumayo (2013) at a study site very close to the reference area was used:

$$\text{Wood Biomass (kg)} = 0.0446 \times \text{DBH}^{2.765}$$

The Diameter at Breast Height (DBH) range for the model was 2-39cm and it was developed from a sample size of 113 destructively sampled trees covering 19 species, including the common species in this project.

BCP has the original data from the author and have made it available to the VVB. BCP destructively sampled another seven trees of various species to extend the diameter range of the equation to 55cm (Table 6). The procedures followed for destructive harvesting are described in Annex F and was developed under the guidance of Professor Chidumayo.

Table 6. Results of allometry validation and diameter range expansion.

Species	DBH (cm)	Total dry mass (kg)	Mass Predicted by equation (kg) (Chidumayo 2013)	Latitude	Longitude
<i>Brachystegia boehmii</i>	49	2750	2143	-15.3672	29.08735
<i>Brachystegia boehmii</i>	48	2838	1957	-15.3654	29.08534
<i>Brachystegia boehmii</i>	42	1236	1346	-15.3627	29.08307
<i>Brachystegia spiciformis</i>	41	1141	1318	-15.3678	29.08696
<i>Brachystegia utilis</i>	43	2212	1462	-15.3627	29.08266
<i>Brachystegia utilis</i>	48	2006	2030	-15.3635	29.08613
<i>Parinari curatellifolia</i>	55	3823	2950	-15.3654	29.08537
Total Mass		16006	13206		

MR.100

The equation is generic and predicts biomass at a stand level. It is applied to all the species in the inventory and predicts 100% of the biomass.

MR.101

The equation was applied to the first monitoring event for which physical measurements spanned 2012-2013.

MR.102

The cumulative biomass of all felled trees both in the original data set of Chidumayo and sampled by BCP are 10% greater than that predicted by the equation (Table 6). The equation is thus conservative. In addition, the equation was capped at 55cm DBH, although there were very few trees in the inventory that had a DBH greater than 55cm.

MR.103

Chidumayo (2013) developed the equation through destructive harvesting of study plots located between latitudes 15.2167° and 15.2833°S and longitudes 29.1500° and 29.2333°E, which was miombo woodland in Lusaka province. The sample consisted of 113 trees spanning 19 species, all of which occur in the project and proxy areas.

The seven additional specimens harvested to expand the diameter range were located in the proxy area in the Eco-Charcoal forest (Table 6).

MR.104

See MR.99 above.

MR.105

The location of the 7 trees destructively sampled to expand the range is listed in Table 6 and they were located in the proxy area in the Eco-Charcoal forest.

MR.106

The field protocol was made available to the VVB when the equations were validated in the *M1* monitoring period. See the *M1* monitoring report on the Verra projects website.

MR.107

The field protocol was based on the methods used by Chidumayo (2013) to develop the original equation. It is a methodical and robust approach that is conservative. The same wet-dry mass ratio as used by Chidumayo (2013) was applied.

MR.108

The results of actual vs. predicted mass are summarized in Table 6 and the data from the 113 original trees and seven additional trees harvested to develop the equation was provided to the VVB at the M1 verification.

Disturbance Monitoring

In addition to the inventory plots, human and natural disturbances in the project accounting area are mapped using visual interpretation of Sentinel-2 and if needed Landsat data. This is done once a year using the most cloud free imagery from April-May. This represents the end of the raining season and beginning of the dry season. This is generally the best time of year for mapping woodlands in Zambia as there is less cloud cover, trees generally still have leaves, and the under story grass has started to dry out providing better contrast between grassy and wooded areas. The woodlands in the project area are fire adapted and fires generally don't cause massive disturbance. April-May imagery helps avoid mistakenly mapping fire scars as disturbance, when the fire likely only burned the under story grass. With April-May imagery, only permanently damaging fires will be mapped as disturbance.

When significant disturbances are detected in an area not covered by an inventory plot, a polygon is drawn around the area and the per hectare emissions factors determined from the plot inventory work will be applied to the area to calculate project emissions.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

MR.95

Table 7. Estimated carbon stock, standard error of the total for each stock, and the sample size for each stratum in the areas selected.

Parameter	Project Accounting Area			Proxy Area	
	Dense Tree OT	Light Tree OT	Soil (Dense + Light)	Proxy Area OT	Proxy Area Soil
Plots (P)	26	158	48	46	16
Total Possible plots ($N_{p,k}$)	132,986	603,954	736,941	945,964	945,964
C	1,083,490	4,555,663	6,420,888	286,069	5,634,230
U (B.10) per stratum	208,511	208,511	841,589	84,055	283,500

MR.10

Baseline emissions ($E_{(B\Delta)}^{[m]}$) for the current monitoring period (January 1st, 2019 to December 31st, 2019) are summarized in Table 8. Equation F.15 was used to calculate these baseline emissions. Cumulative baseline emissions were calculated using a logistic deforestation model, based upon a point interpretation of forest state in the reference area applying equation F.16 from VM0009, v3.0.

Table 8. Baseline emissions summary for the seventh monitoring period (see Appendix D for calculations).

Monitoring Period	Carbon Pool	Baseline Emissions (tCO ₂ e)
M7	AGOT	132,508
M7	BGOT	71,590
M7	SOC	28,702
Total		232,800

MR.11

Cumulative baseline emissions $E_{B\Delta}^{[m-1]}$ from prior monitoring periods were calculated using equation F.16 of VM0009, v3. 0. Refer to Appendix D for calculations.

1,287,653 tCO₂e

MR.12

Cumulative baseline emissions for each selected pool ($E_{B\Delta}^{[m]}$ and $E_{B\Delta}^{[m]}$) and undecayed carbon ($C_{B\Delta}^{[m]}$, $C_{B\Delta}^{[m]}$) as of the current monitoring period are summarized below.

See Appendix D for calculations.

$$E_{B\Delta}^{[m]} = 1,520,453 \text{ tCO}_2\text{e}$$

$$E_{B\Delta}^{[m]} = 481,954 \text{ tCO}_2\text{e}$$

$$C_{B\Delta}^{[m]} = -25 \text{ tCO}_2\text{e}$$

$$C_{B\Delta}^{[m]} = -313,997 \text{ tCO}_2\text{e}$$

MR.15-17

Baseline emissions from biomass for the current monitoring period are based on the average per hectare carbon stocks in selected carbon pools from AGOT, BGOT given by equation F.17 for the accounting area and F.18 for the proxy area. The light tree carbon stratum has a carbon stock of 166.7 tCO₂e while the dense tree stratum has a stock of 169.1 tCO₂e. The proxy area (baseline scenario) carbon stocks are 6.7 tCO₂e.

Cumulative baseline emissions from biomass $E_{B\Delta}^{[m]}$ for the current monitoring period were 1,352,497 tCO₂e

See Appendix D for calculations.

Current baseline emissions from SOC ($E_{(B\Delta SOC)}^{[m]}$) as of the current monitoring period were 73,282 tCO₂e

See Appendix D for calculations.

Cumulative baseline emissions from SOC ($E_{(B\ SOC)}^{[m]}$) for the current monitoring period were 481,954 tCO₂e

See Appendix D for calculations

Cumulative baseline emissions from biomass $E_{B\ BM}^{[m]}$ for prior monitoring periods were 1,148,399 tCO₂e

See Appendix D for calculations.

MR.26

Carbon stored in non-decayed BGB ($C_{B\ BGB}^{[m]}$) for the current monitoring period was 36 tCO₂e

See Appendix D for calculations

MR.27

Cumulative baseline emissions from BGB for the current monitoring period ($E_{B\ BGB}^{[m]}$) were 474,236 tCO₂e

See Appendix D for calculations.

MR.28

Cumulative baseline emissions from BGB ($E_{B\ BGB}^{[m]}$) for all prior monitoring periods were 402,646 tCO₂e

See Appendix D for calculations.

MR.29

Carbon stored in non-decayed SOC for the current monitoring period ($C_{B\ SOC}^{[m]}$) was - 44,581 tCO₂e

See Appendix D for calculations.

5.2 Project Emissions

MR.32-33

There was a minor clearing in the Northern part of the project (Figurer 8). The clearing was to build a kiln and was halted as soon as it was discovered. The total area disturbed was 1.96 ha. It was conservatively assumed that the entire area disturbed was forested before the clearing. It was also conservatively assumed that all of the cleared land was the dense tree class. Therefore, the emissions were assumed to be $1.96 * 234$ (a combined disturbance-emissions factor for ABG+BGB+soil for the LZRP) = 459 tCO₂e.

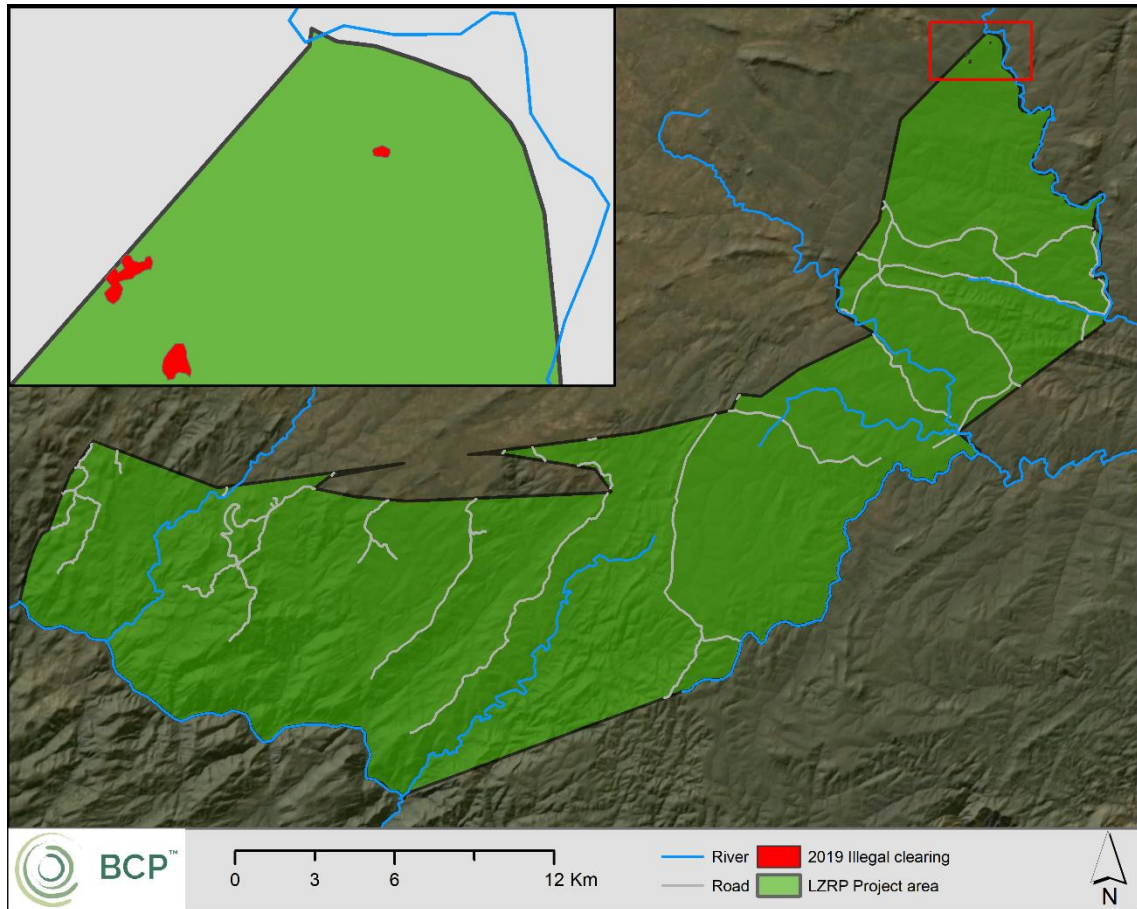


Figure 8. Illegal clearing area detected and mapped in 2019

5.3 Leakage

MR.44

The primary leakage mitigation strategies of the project are improving agricultural techniques with conservation farming and agroforestry, and promoting alternative livelihoods that don't

depend on forest clearing such as beekeeping. See section 3.1 of this report for a detailed description of the leakage mitigation activities employed by this project. The leakage monitoring results for the current monitoring period are presented in Table 9. Due to problems accessing the leakage area, the data could not be collected during 2019 but was instead collected in March 2020 when accessibility improved.

See Table 2 for a summary of project leakage mitigation activities and a detailed description of how these projects will achieve leakage mitigation can be found in the Project Design Document.

During the seventh monitoring period, a total of 30 plots were sampled using a predefined leakage monitoring strategy. Observed degradation was calculated from these plots as being 0.11 using equation B.9 VM0009, v3.0 (see Appendix C for calculations). This value is slightly higher than what was recorded for the sixth monitoring period.

Table 9. Monitoring results for the activity shifting leakage area for the seventh monitoring period.

Plot no	Stump count	Leakage score	Degradation Factor
RuIn11	3	0.51%	0.2
RuIn13	1	0.17%	0.2
RuIn22	5	0.86%	0.2
RuIn23	1	0.17%	0.2
RuIn26	0	0.00%	0
RuIn31	0	0.00%	0
RuIn35	3	0.51%	0.2
RuIn48	20	3.43%	0.2
RuIn60	0	0.00%	0
RuIn9	2	0.34%	0.2
RuIn8	2	0.34%	0.2
RuIn6	1	0.17%	0.2
RuIn41	2	0.34%	0.2
RuIn12	1	0.17%	0.2
RuIn33	1	0.17%	0.2
RuIn36	0	0.00%	0
RuIn38	0	0.00%	0
RuIn34	1	0.17%	0.2
RuIn50	1	0.17%	0.2
RuIn44	0	0.00%	0
RuIn7	0	0.00%	0
RuIn45	0	0.00%	0
RuIn59	1	0.17%	0.2
RuIn10	0	0.00%	0

Plot no	Stump count	Leakage score	Degradation Factor
RuIn56	0	0.00%	0
RuIn19	0	0.00%	0
RuIn28	0	0.00%	0
RuIn5	0	0.00%	0
RuIn29	0	0.00%	0
RuIn32	1	0.17%	0.2
Pldeg		0.51%	0.11

MR.48

Under VM0009, v3.0, for the first monitoring period, cumulative emissions from activity-shifting leakage ($E_{(LASF)}^{[m]}$) are 0.

MR.49

Cumulative emissions from activity-shifting ($E_{(LAS)}^{[m]}$) for the prior monitoring period (M6) are 0.

MR.56

The parameter ($p_{(L\ DEG)}^{[m]}$) for the current monitoring period (M7) was estimated using equation B.9. The calculations can be found in Appendix C.

$$p_{(L\ DEG)}^{[m]} = 0.11$$

MR.57

For the first monitoring period, $p_{(L\ DEG)}^{[m=0]} = 0.087$

MR.63

BCP doesn't own any land but is a project proponent representing the private land-owner in this project. The management plans and land-use of land in that REDD+ project have not changed as a result of this project.

5.4 Net GHG Emission Reductions and Removals

MR.65

GERs (Net GHG emissions or removals in Table 10) were calculated with equation F.53 as per section 8.4.1 of VM0009, v3.0 (see Appendix D).

MR.66

GERs (Net GHG emissions or removals) for the prior monitoring period were calculated with equation F.53 as per section 8.4.1 of VM0009, v3.0 (see Appendix D).

188,016 tCO₂e

MR.67

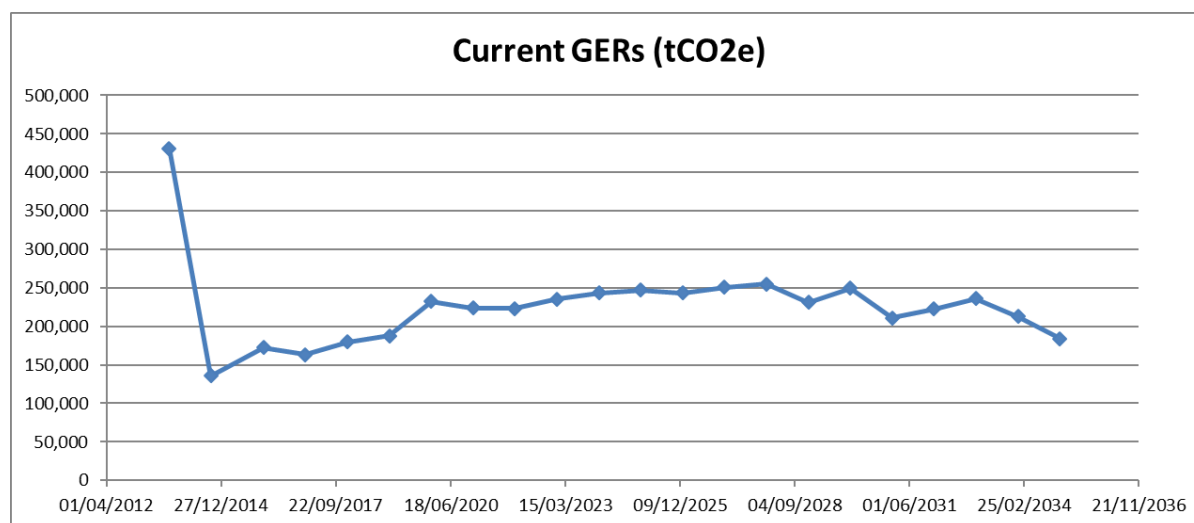


Figure 9. Current GERs by monitoring period for the LZRP.

Table 10: Net GHG emissions reductions or removals for current monitoring period

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)	Buffer pool allocation	VCUs eligible for issuance
2019	232,800	-459	0	232,341	-23,234	209,106
Total	232,800	-459	0	232,341	-23,234	209,106

MR.68

$U_B^{[m]}$ – Total uncertainty in proxy area carbon stock estimate = 60,520 tCO₂e

$U_{EM}^{[m]}$ – Total uncertainty in Baseline Emissions Models = 5,542 tCO₂e

$U_P^{[m]}$ – Total uncertainty in project accounting area carbon stock estimate = 873,002 tCO₂e

E_u – Total uncertainty = -41,216 tCO₂e = 0

There were no confidence deductions as the uncertainty was insignificant

MR.69

$U_B^{[m]}$ was calculated with equation B.10 VM0009, v3.0

$U_{EM}^{[m]}$ was calculated with equation F.14 VM0009, v3.0

$U_P^{[m]}$ was calculated with equation B.10 VM0009, v3.0

$E_u^{[m]}$ was calculated with equation F.57 VM0009, v3.0

Please see Appendix C for calculations.

MR.74

NERs (VCUs as per VCS) generated for the current monitoring period were calculated with equation F.55 from VM0009, v3.0 and are reported in Table 10. For calculations please see Appendix D.

MR.75

NERs for the M6 monitoring period are 169,214 tCO₂e (Appendix D).

MR.76

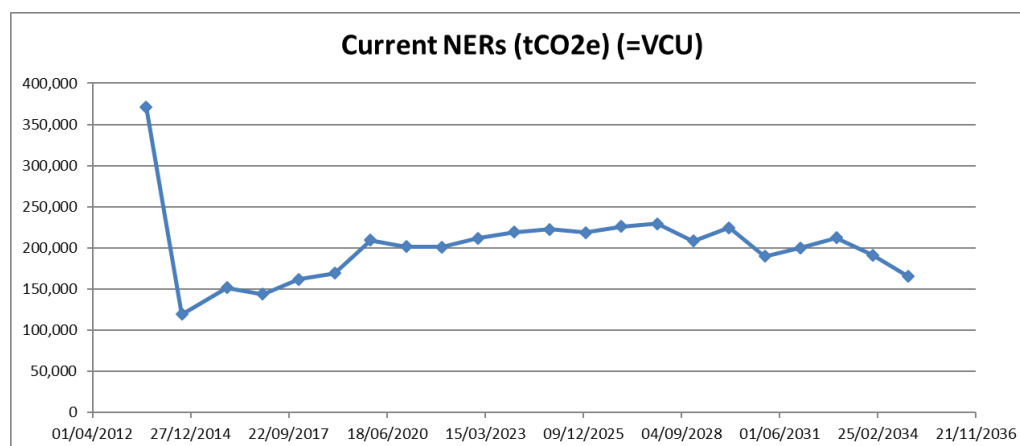


Figure 10. Graph of NERs by monitoring period for the LZRP.

MR.77

VCS Non-Permanence Risk Assessment Tool V4.0 (Appendix G) was used to calculate buffer account allocation, calculated as GERS x Non Permanence Risk score (10%) = -23,234 tCO₂e.

MR.78

Please see Appendix G for non-permanence risk calculations using the VCS Non-Permanence Risk Assessment Tool V4.0.

MR.82

See Table 10 for quantified NERs by vintage year for the current monitoring period. See Appendix D for calculations.

MR.83

Because of the baseline re-evaluation in the current monitoring period the ex-ante estimated NERs are equal to the ex-post NERs of 232,341 tCO₂e

MR.84

There is no difference between ex-ante and ex-post NERs for this monitoring period (see MR.83 above).

6 REFERENCES

Chidumayo, E. N. 2013. Forest degradation and recovery in a miombo woodland landscape in Zambia: 22 years of observations on permanent sample plots. *Forest Ecology and Management* 291:154-161.

Verplanke, E. and Zahabu, E. (2009) 'A field guide for assessing and monitoring reduced forest degradation and carbon sequestration by local communities', Kyoto: Think Global, Act Local Project report, Enschede, The Netherlands. Available at [Http://www.communitycarbonforestry.org](http://www.communitycarbonforestry.org).

7 APPENDICES

Appendix A Environmental Management Plan. Confidential

Appendix B BCP Community Engagement SOPs and Monitoring Systems. Confidential

Appendix C Carbon Inventory. Confidential

Appendix D Emissions Reductions Calculations. Confidential

Appendix E Biomass and soil monitoring protocol. Confidential

Appendix F Leakage monitoring protocol. Confidential

Appendix G VCS Non-permanence risk assessment. Public

Appendix H Spatial Data. Confidential

Appendix I Baseline Reevaluation. Confidential

8 ANNEX 1: LIST OF MONITORING REQUIREMENTS APPLICABLE TO F-U3 BASELINE TYPE (VM0009, V3.0)

MR#	Category	Applicable to Project
MR.1	Spatial Project Boundaries	Yes
MR.2	Temporal Project Boundaries	Yes
MR.3	Temporal Project Boundaries	Yes
MR.4	Grouped Projects	No. This is not a grouped project
MR.5	Grouped Projects	No. This is not a grouped project
MR.6	Project Accounting Areas	Yes
MR.7	Determining t_{PAI}	No. This is not a grouped project
MR.8	Determining t_{PAI}	No. This is not a grouped project
MR.9	Determining x_{PAI}	No. This is not a grouped project
MR.10	Baseline Emissions	Yes
MR.11	Baseline Emissions	Yes
MR.12	Baseline Emissions	Yes
MR.15	Applying the Spatial Algorithm	Yes
MR.16	Applying the Spatial Algorithm	Yes
MR.17	Applying the Spatial Algorithm	Yes
MR.21	Carbon Not Decayed in DW	No. All biomass is burned in baseline scenarios
MR.22	Carbon Not Decayed in DW	No. All biomass is burned in baseline scenarios

MR.23	Carbon Not Decayed in DW	No. All biomass is burned in baseline scenarios
MR.24	Carbon Not Decayed in DW	No. All biomass is burned in baseline scenarios
MR.25	Carbon Not Decayed in DW	No. All biomass is burned in baseline scenarios
MR.26	Carbon Not Decayed in BGB	Yes
MR.27	Carbon Not Decayed in BGB	Yes
MR.28	Carbon Not Decayed in BGB	Yes
MR.29	Carbon Not Decayed in SOC	Yes
MR.30	Carbon Stored in Wood Products	No. No timber harvesting in baseline
MR.31	Carbon Stored in Wood Products	No. No timber harvesting in baseline
MR.32	Emissions Events in Project Area	Yes
MR.33	Emissions Events in Project Area	Yes
MR.34	Emissions from Burning from Project Activities	No. No biomass burning in project activities
MR.35	Carbon Stored in Wood Products from Project Activities	No. Timber harvesting is not a project activity
MR.36	Carbon Stored in Wood Products from Project Activities	No. Timber harvesting is not a project activity
MR.37	Carbon Stored in Wood Products from Project Activities	No. Timber harvesting is not a project activity
MR.38	Livestock Grazed in the Project Area	No. Livestock grazing is not permitted in the project area and unpermitted grazing was determined to be de minimus.
MR.39	Livestock Grazed in the Project Area	No. Livestock grazing is not permitted in the project area and unpermitted grazing was determined to be de minimus.

MR.40	Livestock Grazed in the Project Area	No. Livestock grazing is not permitted in the project area and unpermitted grazing was determined to be insignificant.
MR.41	Synthetic Fertilizer in the Project Area	No. Project activities do not include the use of synthetic fertilizers.
MR.42	Synthetic Fertilizer in the Project Area	No. Project activities do not include the use of synthetic fertilizers.
MR.43	Synthetic Fertilizer in the Project Area	No. Project activities do not include the use of synthetic fertilizers.
MR.44	Leakage Mitigation Strategies	Yes
MR.45	Commodity Production for Leakage Mitigation	No. The baseline scenario is subsistence
MR.46	Commodity Production for Leakage Mitigation	No. The baseline scenario is subsistence
MR.47	Commodity Production for Leakage Mitigation	No. The baseline scenario is subsistence
MR.48	Estimating Emissions from Activity-Shifting Leakage	Yes
MR.49	Estimating Emissions from Activity-Shifting Leakage	Yes
MR.50	Change to the Activity-Shifting Leakage Area	No. No change to activity-shifting leakage area
MR.51	Change to the Activity-Shifting Leakage Area	No. No change to activity-shifting leakage area
MR.52	Change to the Activity-Shifting Leakage Area	No. No change to activity-shifting leakage area
MR.53	Change to the Activity-Shifting Leakage Area	No. No change to activity-shifting leakage area
MR.54	Change to the Activity-Shifting Leakage Area	No. No change to activity-shifting leakage area
MR.55	Change to the Activity-Shifting Leakage Area	No. No change to activity-shifting leakage area

MR.56	Estimating $p_{L\text{DEG}}$	Yes
MR.57	Estimating $p_{L\text{DEG}}$	Yes
MR.58	Estimating $p_{L\text{CONG}}$	No. No grassland in project area
MR.59	Estimating $p_{L\text{CONG}}$	No. No grassland in project area
MR.60	Determining Emissions from Market Leakage	No. The baseline scenario is subsistence
MR.61	Determining Emissions from Market Leakage	No. The baseline scenario is subsistence
MR.62	Determining Emissions from Market Leakage	No. The baseline scenario is subsistence
MR.63	Ensuring No Leakage Within Project Proponent's Ownership	Yes
MR.65	Quantification of GERs	Yes
MR.66	Quantification of GERs	Yes
MR.67	Quantification of GERs	Yes
MR.68	Confidence Deduction	Yes
MR.69	Confidence Deduction	Yes
MR.70	Quantification of GERs	No. A linear model was not used in this project
MR.71	Quantification of GERs	No. A linear model was not used in this project
MR.72	Reversal Event	No. No reversal occurred
MR.73	Reversal Event as a Result of Baseline Reevaluation	No. No baseline reevaluation occurred
MR.74	Quantification of NERs for a PAA	Yes

MR.75	Quantification of NERs for a PAA	Yes
MR.76	Quantification of NERs for a PAA	Yes
MR.77	Buffer Account	Yes
MR.78	Buffer Account	Yes
MR.79	Quantification of NERs across PAAs	No. There is currently only 1 PAA
MR.80	Quantification of NERs across PAAs	No. There is currently only 1 PAA
MR.81	Quantification of NERs across PAAs	No. There is currently only 1 PAA
MR.82	Vintages	Yes
MR.83	Evaluating Project Performance	Yes
MR.84	Evaluating Project Performance	Yes
MR.85	Data and Parameters Monitored	Yes
MR.86	Data and Parameters Monitored	Yes
MR.87	Data and Parameters Monitored	Yes
MR.88	Description of the Monitoring Plan	Yes
MR.89	Description of the Monitoring Plan	Yes
MR.90	Description of the Monitoring Plan	Yes
MR.91	Description of the Monitoring Plan	Yes
MR.92	Description of the Monitoring Plan	Yes
MR.93	Description of the Monitoring Plan	Yes
MR.94	Description of the Monitoring Plan	No. No new equations were developed
MR.95	Description of the Monitoring Plan	Yes

MR.96	Description of the Monitoring Plan	No. Timber harvesting is not a project activity
MR.97	Description of the Monitoring Plan	Yes
MR.98	Description of the Monitoring Plan	Yes
MR.99	Sources of Allometry	Yes
MR.100	Sources of Allometry	Yes
MR.101	Sources of Allometry	Yes
MR.102	Sources of Allometry	Yes
MR.103	Sources of Allometry	Yes
MR.104	Validating Previously Developed Allometry	Yes
MR.105	Validating Previously Developed Allometry	Yes
MR.106	Validating Previously Developed Allometry	Yes
MR.107	Validating Previously Developed Allometry	Yes
MR.108	Validating Previously Developed Allometry	Yes
MR.109	Validating Newly Developed Allometry	No. No new allometric equations were developed.
MR.110	Validating Newly Developed Allometry	No. No new allometric equations were developed.
MR.111	Validating Newly Developed Allometry	No. No new allometric equations were developed.
MR.112	Validating Newly Developed Allometry	No. No new allometric equations were developed.
MR.113	Validating Newly Developed Allometry	No. No new allometric equations were developed.