

Lower Zambezi REDD+ Project

Distinctive features

The Lower Zambezi REDD+ project is located approximately 120 km southeast of Lusaka in Rufunsa district, Zambia. The project area is 40,126 ha and is known as 'Rufunsa Conservancy' which is privately owned by a Zambian company "Sable Transport Limited". The Conservancy is one of the last intact areas of forest and provides a 60 km buffer to Lower Zambezi National Park, a strategic protected area in Zambia in a globally significant trans-frontier conservation area.

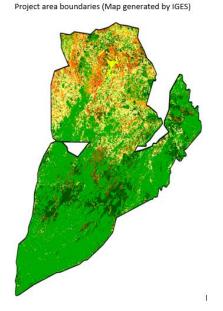
The major agents of deforestation are communities living along the project boundary. They clear forest for unsustainable charcoal production subsistence agriculture and household construction. The



Project Proponent is Bio-Carbon Partners, which is responsible for getting the project certified and early-stage project finance. The Project has been certified triple gold under the Climate,

Community and Biodiversity Standard.

The objectives of the Lower Zambezi REDD+ project are to achieve long-term conservation of the Rufunsa Conservancy and key species; to avoid emissions from land-use change; to ensure protection of ecosystem services; to create employment opportunities for stakeholders; and to alleviate poverty in the project zone. The project activities intended to reduce deforestation include: community sensitization, education and consultation to ensure that stakeholders understand and support the objectives of project activities; community-based deforestation mitigation projects that address local drivers of deforestation by improving local



livelihoods and providing meaningful alternatives to deforestation-dependent livelihood activities; and protection, enforcement and monitoring activities to ensure that project boundaries are known and respected by all parties.

Heading	Explanation
- redding	Locational factors
Location	Rufunsa district, Zambia (120 km southeast of Lusaka Province)
Spatial boundaries	Project area: 40,126 ha Reference area: 42,217 ha (excludes project area) Leakage monitoring area: 27 805.55 ha of intact forest adjacent to project area Leakage management area: [has leakage management activities but size of area not provided in VCS PD]
Land cover	Miombo forest (dominated by trees belonging to the family Caesalpiniaceae) Munga woodland (dominated by Acacia species) Riverine forest Grassy wetlands
Agents and drivers of forest cover change	Agents: Charcoal producers; Local farmers; New/expanding households Underlying drivers: High rate of unsustainable charcoal production is the result of a serious lack of oversight or enforcement capacity from local authorities, including both traditional leaders and local government agencies who are technically responsible for the responsible management and protection of community forests Traditional and historic "rules" concerning the protection of forests have recently been disobeyed or forgotten, as traditional leaders, the historic "protectors" of community forests, find incentives to allocate forest areas, and turn a blind eye to the behaviour of incoming migrants who feel minimal ownership or responsibility towards them Proximate causes: Wood extraction for charcoal production (Access to community forest areas at a small fee ("token") paid to local Headmen.) Household construction/expansion (Local residents and long-term immigrants relocate and/or expand their fields/households with consent from local leaders); Forest clearance for subsistence agriculture (Access to community forest areas granted by local traditional leaders) Note: Uncontrolled, unsustainable commercial charcoal production followed by conversion to agriculture has been identified by both qualitative and quantitative studies as the most significant drivers of deforestation in
	Spatial boundaries Land cover Agents and drivers of forest cover

the baseline

Basic project features



Objectives

- ■The long-term conservation of the Miombo woodlands and enhancement of biodiversity in Rufunsa Conservancy;
- •Manage Rufunsa Conservancy as a buffer zone and wildlife corridor;
- •Manage Rufunsa Conservancy as a potential source pool of threatened populations and expand the habitat of key large mammal HCV species;
- •Watershed management to ensure year round flows of water;
- ■The creation of employment opportunities in industries for people living in the project zone;
- Implementation of an ecologically sound fire management system;
- Support towards the delivery of critical social services;
- Assisting and training rural farmers in conservation farming techniques, gain access to markets and improve agricultural value chains;
- •Piloting the use of "community covenants" as a tool to link community activities to mitigate deforestation and biodiversity threats.

Proponent/s

BioCarbon Partners (registered company comprising a team of technical, social and scientific experts)

Tenure and Carbon rights holder/s

Tenure

Rufunsa Conservancy is privately owned by Zambian registered Sable Transport Limited company under leasehold from the Government of the Republic of Zambia. The area was originally registered as a game ranch for wildlife tourism operations. However, it has not been used or promoted for eco-tourism or hunting due to a lack of resources and wildlife poaching pressure.

Carbon rights

Zambia does not have specific laws dealing with carbon rights. However, the landowner has the rights to above and below ground biomass. The project proponent has full consent from the landowner to implement the project, with clear, uncontested title to the carbon rights. The carbon rights covenant provides the option of renewing the project.

Actors involved in project design and implementation and their roles

- •BioCarbon Partners (BCP) responsible for getting the project certified and early-stage project finance;
- BioCarbon Partners Limited provides employment for the project in Zambia;
- EcoPartners LLC, a US-based forest carbon consultancy firm, provides advisory services with regards to carbon

	accounting and reviewing documents; Musika Development Initiatives Ltd. – specializes in agricultural value chain development and has seconded a full-time agricultural extension officer to BCP; BioCarbon Partners (BCP) Trust – launches and supports community-based deforestation mitigation projects connected to the Lower Zambezi REDD+Project; Conservation Farming Unit – assisting BCP in the development of conservation agriculture projects; Engineers Without Borders Canada – have seconded two engineers to BCP to develop eco-charcoal project.
Upfront financing	BCP Trust, UNDP's African Training and Management Services Project
Start date	1 st October 2009
Crediting period	30 years (Project crediting period is renewable).
	Baseline emissions
Methodology	VM0009, Methodology for Avoided Deforestation, V2.1
Reference data (unplanned deforestation/degra dation)	Reference area: 42,217 ha (excludes project area) Proxy area: 43,433.12 ha; only one proxy area) Reference period: 1984-2009 Imagery: Landsat (5) Thematic Mapper and (7) Enhanced Thematic Mapper data sets (1984, 1992, 1999, 2002 and 2009) were employed to cover the reference area and period. The point data set used to develop the cumulative deforestation model had 100% double coverage.
Reference data (planned deforestation/degra dation)	Not applicable
Stratification of project area	2 strata: •Dense Trees •Light Trees
Deforestation/degr adation rate and location	Historical (unplanned deforestation/degradation) Deforestation exists at some point within 120 meters of the perimeter of the project accounting area (4.221 km), total boundary within 120m of deforestation is 3.362 %. The parameter R _u , (ratio of deforested to threatened perimeter) is 0.126 [Historical deforestation rate is not given]. Projected The deforestation model predicts that the entire accounting area will be deforested within the 30-year project lifespan [3.33% per year].

Likely baseline scenario

Illegal encroachment is likely to continue through logging of woody species for charcoal production and conversion of forest land to cropland for subsistence farming.

Modelling procedure

- ■Landsat 5 TM and Landsat 7 ETM+ imagery for 6 time points across the reference period were used to assess deforestation. A stratified random grid of 2,600 sample points (pixel size 30mX30m) observed and classified over six years of historical imagery was used to accurately estimate deforestation parameters within +/- 15% on average. The resulting logistic function was calculated using a total of 15,600 forest state observations during the historic reference period. No covariates were used as the model had a good fit without them. The final model is $F_{DF} = 1/1 + e^{(0.582+0.0003653*t)}$
- ■To minimise uncertainty, a forest state classification was undertaken by an interpreter familiar with the area for comparing with a 5% sample of each of the forest state interpretations. Systematic errors in the cumulative deforestation model (CDM) were checked and corrected using the CDM tool developed for ArcGIS by Wildlife Works.
- The lag rate for deforestation after the onset of degradation was calculated through a participatory rural appraisal, which checked how long farmers waited to cultivate after clearing the forest. The ratio of deforested perimeter to threatened perimeter of the project area was also calculated.

Carbon pools

- ■Carbon pools included ✓ x
- ■Aboveground tree biomass ✓
- ■Belowground tree biomass ✓
- ■Non-tree woody biomass ×
- ■Litter ×
- ■Dead Wood ×
- ■Soil ✓
- ■Wood products ×

Estimation method

- •A rapid pilot assessment was used to determine plot radius and tree size (circular plots of 12m radius); sample plots were randomly distributed;
- A total of 196 permanent inventory plots were sampled in Rufunsa Conservancy and soil sampled at 59 of these plots (out of which, 10 were located within the encroachment exclusion, 26 fell within the dense tree stratum, the remaining were in light tree stratum which covers the majority of accounting area);

•All trees with a Circumference at Breast Height (CBH) <</p> 15 cm were assessed as aboveground non-tree woody biomass pool; local villagers were trained for inventory and accompanied by rangers; •All plots were permanently marked and trees tagged for follow up monitoring purposes; •The project applies an allometric equation which was developed through destructive sampling of 113 trees from 19 species with DBH of 2 to 39cm; •Tree biomass was calculated using miombo woodland allometric models (power model and log model). The log model was found to have a lower error level, but slightly overestimated biomass so for reasons conservativeness, the following power model was used: Wood Biomass (kg) = $0.0446 \times DBH^{2.765}$ Belowground tree biomass was determined using a local peer reviewed root-shoot ratio of 0.54 (Chidumayo, 2013); •SOC was quantified in 12 soil pits to a depth of 1m (o-10cm, 10-30cm and 30-100cm). Soils were analyzed using Walkley & Black (1934) method and bulk density by volume method. Soil organic carbon (SOC) is 192. 6 tCO2e/ha and decays to 131.7 tCO2e/ha in the proxy area. A proxy area was used to measure residual biomass and soil organic carbon in an area that is representative of the end land use (subsistence agriculture) described by the baseline scenario. Carbon stock Baseline emissions are quantified through the Biomass Emissions Model (BEM) and Soil Emission Model (SEM). changes Both models rely on an underlying model for deforestation in the reference area, which is determined by parameters α , β , γ and θ . Since the project achieved a good model fit without the need to consider covariates, parameters y and θ have been excluded; Aboveground trees biomass is assumed to be removed, converted to charcoal and subsequently burnt in the baseline scenario. The biomass that is not converted to charcoal is burnt on site. The residual biomass that remains in the baseline scenario, as determined by plot samples, is 8.6 $t_{CO_2}e/ha$. Total carbon stock changes are based on an initial field based pilot study and IPCC default values. The current carbon stock estimates and change estimates are conservative. •There were no changes in project stocks during first monitoring period. **GHG** emissions Conservatively excluded non-Co₂ emissions **Net emissions** 1,381,507 tCO2e (over first 10 years)

Project GHG emissions reduction strategy



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Scope	Avoided Unplanned Deforestation		
Activities	■Community Sensitization, Education and Consultation, to ensure that 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-Based Deforestation Mitigation Projects, which address local drivers of deforestation by improving local livelihoods and providing meaningful alternatives to deforestation-dependent livelihood activities;		
	 Protection, Enforcement and Monitoring activities to ensure that project boundaries are known and respected by all parties. 		
Leakage mitigation strategy	BCP's Leakage Mitigation Strategy has three main components: community sensitization and consultation, community decision making structure and development of deforestation mitigation projects followed by project implementation then monitoring of outcomes resulting community benefits and decrease in deforestation.		
Non-permanence risk mitigation strategy	 ■The project will invest in publicizing the project locally and internationally to mitigate risks of expropriation; ■The multi-year financing facility helps to insure the project against credit shock prices in the critical early years of a REDD+ project when cash flows are needed; ■The project proponent has established a not-for-profit organization (BioCarbon Partners Trust) to leverage donor funds to help counter the risk of low carbon; ■The project is exploring diversifying revenues into tourism and will invest in marketing the project and its strategic conservation and poverty reduction benefits in order to seek higher credit prices; ■BCP will be implementing a fire management system (firebreaks and controlled, rotational early burns) in partnership with neighbouring communities, with the aim of preventing potentially damaging, hot, late season fires; ■Elephant damage risk will be mitigated by introducing a rotational grazing system along with opening and closing access to artificial water points. 		
Additionality	 Investment analysis: Particularly, simple cost analysis shows the project is not a financially viable without the AFOLU VCS project revenues; Implementation barriers: Current conservation activities (sport hunting and eco-tourism) are not producing any 		

income	to	allow	development	of	improved	land	use
management programmes;							

- •Investment barriers: There is no significant income or funding other than carbon revenues for the implementation of deforestation mitigation activities;
- •Institutional barriers: There is currently a near complete lack of enforcement of local forest legislation due to capacity and funding constraints within government institutions;
- •Social barriers: The spread of deforestation and demand for charcoal outside the region can be attributed to an increase in population;
- •Common practice analysis: Conservation projects on private and communal land are not common at all.

With-project emissions



Effectiveness of measures	No information
Carbon stock changes	No additional calculations
GHG emissions	Non-CO2 GHGs omitted (CH 4 and N $_2$ O conservatively excluded).
Leakage	Types Activity Shifting Leakage: The main project leakage risks are charcoal production and agricultural conversion shifting elsewhere. The project will mitigate leakage through sustainable eco-charcoal pilot program, subsistence agriculture, building community governance structures, mitigation activities and community covenants. Markets Effects Leakage: There is no commercial timber harvesting in the project zone. The miombo woodlands do not have high enough densities of high timber value species and market shifting is not considered as a potential source of leakage. Leakage monitoring: Annually Deduction None
Non-permanence risk	Buffer: 14%
Ex-ante estimated net greenhouse gas emissions reductions	Total over crediting period: 6,309,472 t CO₂e (First 30 years) Annual average: 210,315.7 t CO₂e (First 30 years) Annual average per ha: 5.24 t CO₂e (First 30 years)
Monitoring of carbon stock changes and	Parameters i. Conservancy trespassing and boundary transgressions ii. Parameters associated with plot measurements

emissions

iii. Fire

iv. Parameters associated with harvested area for charcoal production

Methods

- i. Patrols
- ii. Sample plots (30 permanent 1 ha plots used for leakage monitoring)
- iii. Direct observation by scouts and inventory teams
- iv. Monitoring by BCP staff

Frequency

- i. Monthly
- ii. Annually
- iii. Monthly
- iv. Monthly

Activity shifting leakage area is monitored on annual basis

All permanent biomass monitoring plots will be measured at least every five years

Stakeholder identification and engagement



Stakeholders identified

The Project Zone is comprised of 28 villages in four community zones namely Chilimba, Mweeshangómbe, Namanongo and Ndubulula. The Zone was defined to include all stakeholder communities that were involved in deforestation activities (charcoaling or agriculture) in or near to the Project Area.

Identification process

- •Remote sensing was used to identify communities in the area surrounding Rufunsa Conservancy;
- Extensive on-the-ground consultation process was conducted to identify communities that were most involved in deforestation activities:
- Baseline Survey provided further information to identify stakeholders and their dependency upon deforestationrelated activities.

Full and effective participation



Access to information and consultation

- •Consultation with local stakeholders began in February 2012, and has continued ever since. BCP has held multiple consultation and sensitization meetings in every village in every zone within the project zone;
- Conducted over 51 Community Sensitization Meetings that have resulted in the sensitization of over 1,160 heads-of-households;
- *SOP (Standard Operating Procedure) outlines rigorous standards for the content and presentation of information at formal Sensitization Meetings. The purpose of the SOP is to ensure that the content presented at each formal meeting is in compliance with

the principles of ensuring FPIC, and also aims to raise stakeholder awareness, engagement and interest in project activities.

Participation in design, implementation and monitoring

■BCP develop a comprehensive Community Engagement Strategy that focuses heavily on consultation with local stakeholders and involvement of the local community in project design, implementation and decision-making processes about REDD-related projects;

BCP plans to continue engaging local stakeholders through an ongoing project design and implementation process that combines the following elements:

- ■Community Sensitization
- Promote understanding of REDD+ and BCP activities
- Allow community members to make informed decisions
- Identification of Potential Projects
- ➤ BCP Baseline Survey information and research
- Consultation with local communities
- Project ID Worksheets
- Community Coordinators
- ■Zone Development Committees (ZDC)
- Representative consultation and decision-making body
- Builds upon traditional leadership structures
- One for each zone, two representatives from every village and one Lead Representative
- Representatives must be democratically elected from each village
- Help to identify best project types and designs, implementers, and implementation sites
- ■Project Consultation Meetings
- Consultation between community, government and BCP representatives
- Representatives from all 4 Zones- 4 ZDC Lead Representatives
- Allows for information-sharing, consultation, discussion, advice
- Seek areas for collaboration and partnership
- ■Traditional Leadership
- Village Headmen/Headwomen must be involved in and support final decision-making processes
- Implementation
- Community Coordinators
- Community Project Officers (CPOs)
- Community Covenants Agreements between BCP and local communities are designed to serve as mutually binding "contracts" that link project activities and community interventions with deforestation mitigation and biodiversity

- enhancement efforts, including reducing the risk of leakage;
- Projects will be launched in partnership between BCP and local communities
- Promotion of local ownership of projects will be undertaken
- ➤ BCP support is conditional upon community support for deforestation mitigation and forest protection.

Feedback and grievance redress procedures

BCP has a well-established and publicly known grievance mechanism. Grievances that are submitted to BCP will be documented, reviewed and managed by a third party (representative from an appropriate NGO in Zambia), to prevent any conflict of interest. Project management will attempt to resolve all reasonable grievances, and commit to providing a written response within 30 days. The grievance mechanism is clearly outlined in BCP's Human Resources Manual, SOPs concerning community engagement and social monitoring as well as all contracts that are signed between BCP and community representatives.

Worker relations and safety

- •All scouts are trained by professional hunters and trainers (anti-poaching work, wildlife management, firearm safety, arrest techniques). Also, their knowledge of animal behaviour (having all grown up in the bush) helps them to avoid dangerous situations with animals;
- ■BCP has a reaction plan in case of unfortunate crisis. Scout teams have access to transport and communication. Also, scouts have been issued with strict official rules of engagement procedures to minimize risk and exposure to armed poachers;
- •Prior to participating in any company supported activity, the company requires participants to openly discuss any potential risks involved in the activity. Staff members are also expected to communicate any potential risks involved in the activity, and to provide participants with any necessary Personal Protective Equipment (PPE);
- Risks of vehicle accidents will be minimized through high standard of vehicle maintenance, equipped with all legally mandated safety equipment and ensuring that drivers are current, well-trained and adequately monitored. Motorcycle riders are required to wear project-issued helmets and boots at all time;
- ■Participants in different activities were provided with safety equipments and additional training to ensure safe production practices.

Communities



Without-project scenario

- •Majority of people remain below poverty line and heavily dependent on charcoal production and subsistence agriculture for their survival;
- •Local residents have little chance of improving their

livelihoods due to poor or costly markets. Also, high deforestation rates indicate the unsustainable nature of current community livelihoods;

- •Inefficient dry land farming methods are likely to lead to soil fertility decline;
- •Deforestation in watersheds is likely to decrease the sources of soil and groundwater;
- Local people reliant on wild ungulates for their protein needs, leading to the extermination of most of the large game in the project zone hindering eco-tourism business.

With-project scenario

Expected net benefits

- •Participatory approach (women, youth and marginal groups) to involve in project activities;
- Sustainable use of forest resources (charcoal production);
- •Community ownership of finances, projects and businesses;
- •Environmental protection and resilience to climate change;
- •Improved living standard through higher yield and productivity;
- •Creates employment due to new business opportunities;
- •Improved access to resources due to transportation;
- •Improved nutrition, food security, health and education.

Possible negative impacts on other stakeholders and mitigation strategy

The project will not have any negative impact on other stakeholders. It is likely that the positive benefits of the project (higher profit yielding charcoal production) may well spread outside of the boundaries.

However, if any negative impacts arise, BCP's grievance mechanism would continue to be in effect, and BCP representatives would respond to community concerns within the same 30 days.

Impact monitoring

Indicators

Annual household income; Household size, age and gender composition; Income from agriculture and charcoal production; Participation in conservation agriculture; Participation in eco-charcoal production; List of major assets; Highest education level in household; Number of dependents attending school; Direct and indirect benefits from Lower Zambezi REDD+ Project; Employment status.

Methodologies

- Baseline community survey (socio-economic data)
- •Community survey monitoring (Interview questions)

Frequency

Every two years

Biodiversity and ecosystem services



Without-project scenario

- •Reduced large animal diversity due to poaching and habitat degradation;
- •Conversion of forested lands to cropland through charcoal production and subsistence agriculture;
- Almost all native species have disappeared on croplands (large mammals, tree species, avifauna, large cohort of invertebrates) resulting negative impact on threatened species (predators, vultures/birds of prey);
- Rufunsa Conservancy is approximately 10 % of the Lower Zambezi NP. If the Conservancy is deforested then the ecosystem will lose the important park buffer zone. In addition, deforestation in Rufunsa Conservancy will fragment connectivity between Chiawa Game Management Area and the northern portion of the Lower Zambezi National Park as the Conservancy serves as a habitat linkage between the two areas.

With-project scenario

Expected net benefits

- •Increase in locally threatened large mammals (such as sable and roan) to healthy densities;
- Locally present endangered species such as the African elephant, lion and African wild dog will benefit from a significant swathe of habitat;
- Decrease of catastrophic late season fires;
- Improved health of woodlands due to the increase in large ungulates and reduction of late season fires;
- Continued survival of an entire suite of miombo woodland species;
- •Maintenance of eco-system functioning and integrity in forests managed for the production of eco-charcoal using the shelter system.

Possible negative offsite impacts and mitigation strategy

There will be no negative impacts on biodiversity or biodiversity habitat as one of the main aims of the project is to enhance and conserve biodiversity.

Although no negative impacts of the project are envisioned, pro-active adaptive management on the part of the project proponent will address any possible negative impacts.

Impact monitoring

Indicators

Large mammal type and location; HCV type and location; Human wildlife conflict incidents; Scout patrol days; Number of tree species in permanent plots.

Methodologies

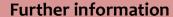
■Scout-based monitoring (estimate changes in wildlife
numbers)

- ■Geographic Information System
- Regular plot sampling and adaptive management to detect invasive species
- Biomass monitoring
- Fixed plot monitoring

Frequency

Continuous; however, scout patrol was done on monthly basis and number of tree species in permanent plots were measured on annual basis.

	Progress			
	Validation	VCS validation report issue date: October, 2013		
		CCBS validation report issue date: April, 2013 (Gold Level)		
	Verification	VCS verification period and report issue date:		
		01 October 2009 – 01 October 2013; 4 April 2014		
		02 October 2013 – 30 September 2014; 13 August 2015		
		CCBS verification period and report issue date: Not verified as of 1st December 2015		
	Number VCUs issued	Number: 545,050		
		As of: 1st December 2015		





■VCS Project Database:

http://www.vcsprojectdatabase.org/#/project_details/1202

■CCBA Projects:

http://www.climate-standards.org/?s=Lower+Zambezi+REDD%2B+Project

Documents Reviewed

■VCS Design Document: file:///C:/Users/intern.Po3-

IBo3E/Downloads/PROJ DESC 1202 19FEB2014%20(1).pdf

•VCS Validation Report: file:///C:/Users/intern.Po3-IBo3E/Downloads/VALID_REP_1202_04APR2014.pdf

■VCS Monitoring Report: file:///C:/Users/intern.Po3-

IBo3E/Downloads/MONIT_REP_1202_01OCT2009_01OCT2013.pdf

■CCBA Project Design Document:

https://s3.amazonaws.com/CCBA/Projects/Lower_Zambezi_REDD%2B_Project/Validation/BCP_LowerZambezi_REDD+Project_PDD_CCB_21Jun_2013.pdf

■CCBA Validation Report:

 $https://s3.amazonaws.com/CCBA/Projects/Lower_Zambezi_REDD\%2B_Project/Validation/VO12079-BioCarbon+CCB+Final+Report+June+2013+(1).pdf$