Monitoring Plan for the Climate, Community and Biodiversity Standards (CCBS)

Kariba REDD+ Project

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1. Introduction

1.1 Project Description and Location

The *Kariba REDD+ Project* is a project aimed at reducing greenhouse gas emissions by minimizing deforestation and degradation. It is located in northwestern Zimbabwe, partly along the southern shore of Lake Kariba, the largest artificial lake in the world by volume. Baseline conditions for the project area consist of extreme poverty causing the conversion of forestland to cropland or grazing land for small-scale subsistence farming. Other baseline activities include logging of timber for domestic use, fuelwood collection, and vast forest (bush) fires.

The project area spans across four provinces, Matabeleland North, Midlands, Mashonaland West and Mashonaland Central, which are administered by four Rural District Councils (RDCs), Binga, Nyaminyami, Hurungwe and Mbire (for detailed information and geographic coordinates see PDD). The project is community-based and implements activities in conjunction with the local population (see PDD section G3.2).

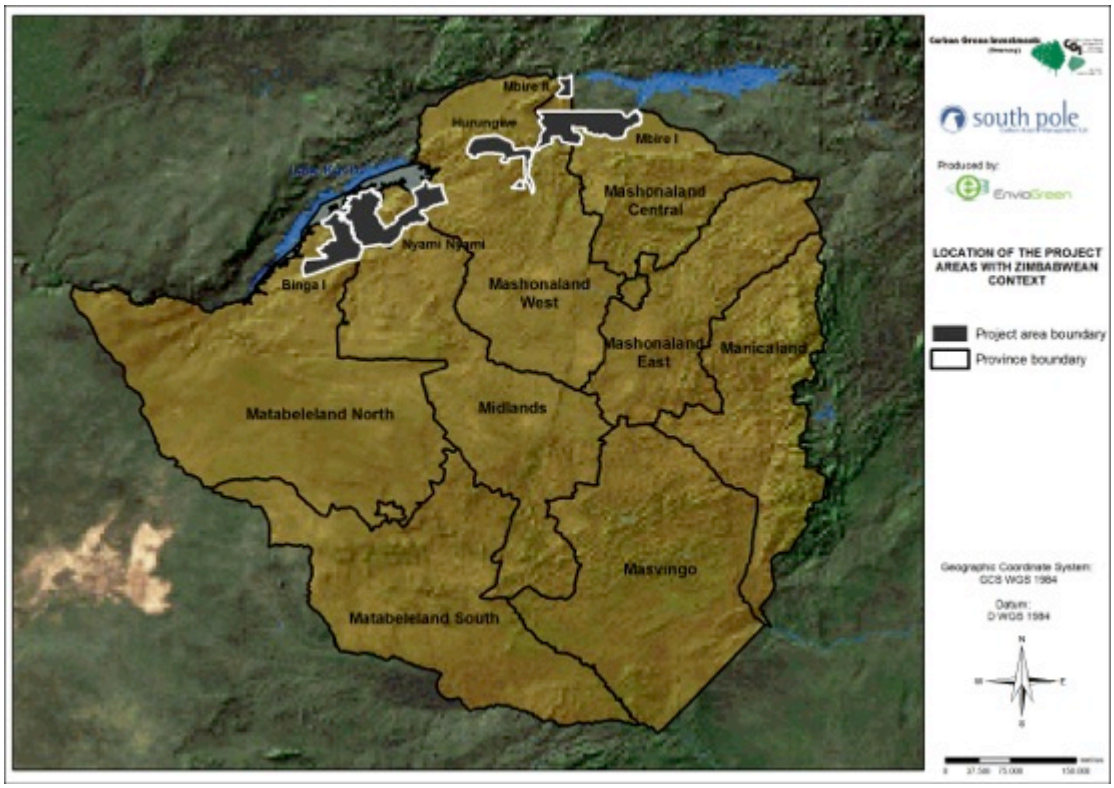

Figure 1: Location of the project in Zimbabwe

In addition to the benefits of GHG emissions reductions, funds from the project will be filtered back into the communities to improve the community, educational and medical facilities. Infrastructure, such as bridges, are improved and restored. Financial opportunities are improved through beekeeping and direct employment through the project activities. The local communities are educated on sustainable natural resource management and the causes of, and solutions to, climate change. By reducing the pressure on vegetation from promoting conservation farming, floral and faunal biodiversity will be protected. Finally, wildlife under pressure from poaching will be protected by patrols created and reinforced by project activities.

1.2 Geology

The project area is dominated by late/mid to pre-Cambrian formations, Triassic grits and sandstones, and intrusive granites and gneisses. The geomorphology of the area is characterized by flat or undulating plains with granodiorite intrusions that often rise up above the woodland and take the shape of rounded hills (also known as dwalas or inselbergs[1]).

1.3 Soils

In the west, around the town of Binga, the soils are mostly formed from the sandstones and quartzites of the Triassic and Permian. These soils belong to the Siallitic group of the Calcimorphic order, which are unleached soils with large reserves of weatherable minerals. The soils are moderately shallow to moderately deep, fine to medium-grained, loamy sands. There are also isolated patches of deep sands with <10% silt and clay in the upper 2m of the soil with very little reserves of weatherable minerals.

South of Binga, along the base of the Chizarira escarpment, deep, medium-heavy-textured, dark brown colluvial soils (clays and silts) prevail, usually with a calcareous layer below 120cm depth. Moving east towards Sengwa, the soils become very shallow lithosols, typically <25cm deep, lying over weathering rock or gravel with patches of deep heavy clays.

Moving east, much of Nyaminyami has sandstone / quartzite derived siallitic soils and shallow lithosols on the escarpment. The Gache Gache area has patches of heavier clay soils overlain in places by colluvial and alluvial quarzitic sands. From the western part of Hurungwe extending eastwards along the escarpment the area is covered with shallow lithosols derived from phillites and quartzites. Further east, the soils consist of kaolinite, shallow to moderately deep, brown-reddish brown, fine-medium grained, sandy loams that lie over sandy clay loams, formed from gneisses.

Mbire soils are a combination of sandy siallitic soils with areas of sodic soil. Natric or sodic soils contain significant amounts of exchangeable sodium within 80cm of the surface. The sodium ions destabilize the clay lattice, which renders these soils extremely susceptible to erosion once the A horizon is removed. Soil capping is common.

1.4 Climate

According to the World Map of Köppen Geiger Climate Classification[2], the project area is overlapped by three different classes: Aw (equatorial winter dry), Cwa (warm temperate, winter dry, hot summer) and BSh (arid, steppe, hot arid). It is a typical continental/east coast climate, with summers that are humid due to unstable tropical air masses or onshore trade winds. Annual rainfall is 765 mm (see PDD). Average mean temperature is 31°C with a monthly average minimum in July of 26°C and average maximum in October of 36°C**.** Yearly average relative humidity is 61%. The general climate of the Zambezi Valley is hot and dry with a short rainy season from November to April. Evapotranspiration is high and exceeds rainfall in most months, except in December, January and February in the middle of the rainy season. In terms of general land classification, the eastern parts of the project area (Binga, Nyaminyami) fall under "Extensive Farming Region" where the "rainfall is too low and erratic for the production of even drought resistant fodder and grain crops." Given the rainfall amount and pattern, the only sound farming system is cattle/game ranching. Towards the western parts of the project area (Hurungwe, Mbire) annual precipitation is higher and allows semi-extensive and semi-intensive farming.[3]

[1] http://www.worldwildlife.org/wildworld/profiles/terrestrial/at/at0719_full.html

[2] http://koeppen-geiger.vu-wien.ac.at/present.htm#maps

[3] Surveyor General of Zimbabwe, 1984. Natural regions and farming areas available online at http://eusoils.jrc.ec.europa.eu/esdb_archive/eudasm/africa/maps/afr_zw2012_sm.htm.

1.5 Vegetation

Binga is largely dominated by Colophospermum mopane (Mopane) woodland with patches of Brachystegia (miombo) woodland, while in Nyaminyamini and Mbire there is Mopane in the lower laying areas with miombo at higher elevation and Hurungwe is predominately all miombo woodland.

C. mopane is particularly resistant against soil capping, thus it is dominant where extensive capping occurs, i.e. on basalt-derived clay soils. It also tolerates high levels of mineralization, as occurs in mudstone-derived soils. Mopane woodlands are frequently co-dominated by *Terminalia stuhlmannii*. Other typical trees species are *Combretum apiculatum*, *Kirkia acuminata*, *Erythroxylum zambesiacum*, *Commiphoramollis*, *C. glandulosa*, *C. mossambicensis* and *Acacia nilotica*. The shrub layer is up to five meters high and is usually not thick; it consists of *Ximenia americana*, *A. nilotica*, *Dalbergia melanoxylon*, *Gardeniaresinflua*, *Grewia flavescens* and *G. bicolor*. The grass layer is not well developed, comprising *Aristida sp.*, *Eragrostis viscosa*, *Chloris virgata,Digitaria sp*. and *Heteropogon contortus*.

Miombo is the vernacular term for the seasonally dry, deciduous woodlands, dominated by *Brachystegia, Julbernadia* and/or *Isoberlinia*, that are widespread across southern Africa. In the Southern Miombo Woodland (SMW) in the project area, *B. spiciformis* and *J. globiflora* predominate. Other common tree species include *Uapaca kirkiana, B. boehmii, Monotes glaber, Faurea saligna, F. speciosa, Combretum molle, Albizia antunesiana, Strychnos spinosa, S. cocculoides, Flacourtia indica* and *Vangueria infausta*. Grass cover in the miombo woodland is usually denser and higher than in mopane woodland and consists of perennial species, providing a high fuel load and making fire a major threat. Typical grass species include *Loudetia simplex,Andropogon gayanus, Pogonarthria squarrosa, Stereochlaena cameronii, Heteropogon contortus, and Tristachya sp..* The ecoregion can be found in association with a number of other vegetation communities. Where drainage is poor, acacia savannahs or grassland may become locally dominant. Other associated vegetation includes dry deciduous forest and thicket, as well as deciduous riparian vegetation.

2. Monitoring

Monitoring Responsibilities

All monitoring activities will be carried out by Carbon Green Africa, with support from the local RDCs. Data is uploaded to a central online server upon collection. This furthers accuracy and transparency and minimizes data loss.

2.6 CL3. Climate Impact Monitoring

A detailed monitoring plan with procedures, tools, and equations is given in the VCS Project Decription, chapter 4, page 75 ff. Project ID 902, Project Methodology VM0009.[4]

[4] https://vcsprojectdatabase2.apx.com/myModule/Interactive.asp?Tab=Projects&a=2&i=902&lat=%2D16%2E8184067184111&lon=28%2E7615526227228&bp=1

2.7 CM3. Community Impact Monitoring

CM3.1 Develop an initial plan for selecting community variables to be monitored and the frequency of monitoring and reporting to ensure that monitoring variables are directly linked to the project's community development objectives and to anticipated impacts (positive and negative).

Regular monitoring of the project's impacts on local communities is undertaken. This is separated into direct and indirect effects of the project. Direct effects are measured by evaluating data reported by the OGM teams. Indirect effects are assessed by interviewing people in the project area. A basic questionnaire collects information from all sampled people while two specific questionnaires are tailored toward (a) direct beneficiaries of the project (e.g. people that have participated in workshops) and (b) employees. Monitoring takes place either continuously, or upon verification – at least every five years; the latter in case extra studies like interviews or remote sensing analyses are necessary. The ultimate goal is that all monitoring data is uploaded on an internet platform directly upon data collection.

Figure 2: Children attending class at one of the supported schools

Direct effects

Project activity	Indicator	Frequency	
		Monitoring	Reporting
Improved agriculture	Number of workshops conducted	Continuously	Upon verification
	Number of workshop participants	Continuously	Upon verification
	Number of community gardens established	Continuously	Upon verification
	Number of boreholes established	Continuously	Upon verification
	Number of boreholes resuscitated	Continuously	Upon verification
Beekeeping	Number of workshops conducted	Continuously	Upon verification
	Number of workshop participants	Continuously	Upon verification
	Number starting kits handed out	Continuously	Upon verification
Fuelwood plantations	Number of workshops in tree planting & seedling production	Continuously	Upon verification
	Number of workshop participants	Continuously	Upon verification
	Area of established plantations	5 yearly	Upon verification
Social forestry	Number of traditional shrines mapped in the forest wards	5 yearly	Upon verification
Brick making	Number of active molding machines	5 yearly	Upon verification
OGM teams	Total employees in OGM teams	yearly	Upon verification
	Total salary spent for OGM teams	Continuously	Upon verification
	Number of team days spent on fire management	Continuously	Upon verification
	Number of grievances received from communities	Continuously	Upon verification
Community Fund	Number of schools supported	Continuously	Upon verification
	Amount of money spent for schools	Continuously	Upon verification
	Number of clinics supported	Continuously	Upon verification
	Amount of money spent for clinics	Continuously	Upon verification

Number of school bursaries	Continuously	Upon verification
Amount of money spent for schools	Continuously	Upon verification
Total funds spent	Continuously	Upon verification
Number of issues	Continuously	Upon verification

Newsletter

Indirect effects

A sample of households in the project area will be interviewed at least on a five-year basis to gain this information. A general questionnaire is asked to all people interviewed while two specific sections apply to direct beneficiaries of the project, or respectively to employees, only.

Guiding monitoring questions for all people in the project area

Indicator	**Frequency**	
	Monitoring	**Reporting**
Annual household income (in US$)	5 yearly	Upon verification
Number of household members	5 yearly	Upon verification
Gender of household head	5 yearly	Upon verification
Age of household head	5 yearly	Upon verification
If not in school: employment status	5 yearly	Upon verification
If still in school: educational level aimed for	5 yearly	Upon verification
Education of household head (none, primary, secondary, tertiary)	5 yearly	Upon verification
In favor of the project? (yes/no)	5 yearly	Upon verification
Direct involvement in the project (yes/no)	5 yearly	Upon verification

Guiding monitoring questions specifically for direct beneficiaries

Indicator	Frequency	
	Monitoring	**Reporting**
Has your livelihood improved through your project involvement?	5 yearly	Upon verification
Has your food security increased?	5 yearly	Upon verification
Have your conditions for education improved?	5 yearly	Upon verification
Have your conditions for healthcare improved?	5 yearly	Upon verification
How could the project be improved?	5 yearly	Upon verification
Do you know who to address for your grievances (yes/no)	5 yearly	Upon verification

Guiding monitoring questions specifically for employees

Indicator	Frequency	
	Monitoring	**Reporting**
Annual household income before the employment (in US$)	Continuously	Upon verification
Are you from the project area? (yes/no)	5 yearly	Upon verification
Did you gain knowledge on sustainable natural resource management? (1-5)	5 yearly	Upon verification
Did you receive sufficient training to do your work properly? (1-5)	5 yearly	Upon verification
How does your wage compare to your previous jobs? (1-5)	5 yearly	Upon verification
How well have you been trained to prepare you for dangerous situations? (1-5)	5 yearly	Upon verification
Do you know who to address for your grievances (yes/no)	5 yearly	Upon verification

CM3.2 Develop an initial plan for how they will assess the effectiveness of measures used to maintain or enhance High Conservation Values related to community wellbeing (G1.8.4-6) present in the project zone.

In line with the monitoring campaign of indirect project effects for communities, which is scheduled on a 5 yearly basis (see section CM 3.1), maintenance and enhancement of High Conservation Values (HCVs) is assessed.

The two identified HCVs related to community wellbeing are:

- HCV5: Areas fundamental to meeting basic needs of local communities (e.g. subsistence, health); and
- HCV6: Areas critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

To cover these two HCVs, the following questions are included into the interviews making part of the community monitoring:

HCV 5:

- "Are you, or members of your household, restricted in collecting forest products including building material, firewood and fruits?"
- "If yes, did you get alternatives offered to collecting these products in natural forests"? (for fruits, building material and firewood separately)
- "Are these alternatives attractive to you?" (for fruits, building material and firewood separately)

HCV6:

- "Are you or members of your household restricted in using the forest to fulfil your cultural needs?"

Furthermore, grievances will be reported. This will assist in assessing how HCVs relate to the wellbeing of communities and whether HCV areas enjoy widespread support.

2.8 B3. Biodiversity Impact Monitoring

B3.1 Develop an initial plan for selecting biodiversity variables to be monitored and the frequency of monitoring and reporting to ensure that monitoring variables are directly linked to the project's biodiversity objectives and to anticipated impacts (positive and negative).

The *Kariba REDD+ Project* will reduce the pressure on wildlife in the project area by reducing the deforestation rates – thus conserving habitat. Furthermore, anti-poaching patrols will establish a strong presence in the project area and contribute to the conservation of wildlife. To monitor these anticipated impacts, the monitoring plan includes indicators to assess the still ongoing poaching activities in the project area. Other indicators help assess the biodiversity of flora and fauna in the project area. This set of indicators will yield a holistic picture of the biodiversity status and pressure on wildlife over time in the project area. Data collection for biodiversity monitoring takes place continuously in line with the project activities and is reported upon verification.

Figure 3: On-the-Ground-Management team setting up a sampling plot.

Specifically, the following variables are monitored in line with the project:

Project activity	Indicator	Frequency	
		Monitoring	Reporting
Poaching	Number of snare wires found	Continuously	Upon verification
	Number of poachers arrested	Continuously	Upon verification
	Poached game encountered	Continuously	Upon verification
	Team-days spent patrolling	Continuously	Upon verification
Animal species richness	Species sighted in the field[5]	Continuously	Upon verification
	Number of animals per species	Continuously	Upon verification
	Number of threatened species	Continuously	Upon verification
Plant species richness	Tree species observed in the biomass sampling plots[6]	Continuously	Upon verification
	Number of individuals per tree species	Continuously	Upon verification

[5] All species encountered and whose tracks are found are recorded. For threatened species see Annex table 1.

[6] A list of tree species being monitored is on the central online server.

B3.2 Develop an initial plan for assessing the effectiveness of measures used to maintain or enhance High Conservation Values related to globally, regionally or nationally significant biodiversity (G1.8.1-3) present in the project zone.

The identified High Conservation Values (HCV1) are covered by the standard monitoring procedure as outlined in section B3.1. The approach described therein includes monitoring of all threatened species that qualify as being of HCV1 within the project area.

3. Gold Level Monitoring

3.9 GL1. Climate Adaptation Impacts

The project comprises a range of activities beneficial to climate change adaptation. These include, but are not limited to:

- Diversification of employment and income beyond agriculture, such as beekeeping.
- Implementing conservation agriculture with different crops and varieties contribute to climate change adaptation and water conservation. Conservational agriculture increases pest resilience, while certain applied crops such as groundnut and sorghum are relatively unaffected by climate change. Furthermore, the project makes use of the region's potential to increase irrigation for agriculture by reinstating and building boreholes.
- The project's adaptive management will identify and address further issues of climate change adaptation.

Monitoring of these climate adaptation impacts will go in line with other monitoring activities. Indicators concerning agricultural productivity and employment opportunities such as through honey production will also be used to monitor climate adaptation impacts.

3.10 GL3. Exceptional Biodiversity Impacts

The project fulfills the criteria for GL3 as outlined in the PDD. Continuous biodiversity monitoring with special attention to vulnerable, endangered, and critically endangered species will assess the continued occurrence of threatened species. This way, the exceptional biodiversity impacts of the project will be monitored in the area.

See Appendix table 1 for a list of threatened animal species present in or close to the project area.

4. Annex: Threatened Animal Species

Table 1: Threatened animal species

English Name	Scientific name	Comments
CRITICALLY ENDANGERED SPECIES (CR)		
Black rhino	*Dicero bicornis*	Probably none left in the project area, but a few in adjacent national parks. These could move back into the project area once rigorous anti-poaching activities are in place.
ENDANGERED SPECIES (EN)		
African wild dog	*Lycaon pictus*	Only very few still remain in the area.
VULNERABLE SPECIES (VU)		
Lion	*Panthera leo*	The project area is a perfect habitat for lions, but there are very few in the area.
Southern ground hornbill	*Bucorvus cafer*	The project is prime breeding ground for the ground hornbill and a healthy number still exists in the area.
Common hippo	*Hippotamus amphibius*	There is a large amount of hippo in Kariba Lake.
African elephant	*Loxodonta africana*	The populations in the project areas have been seriously depleted by poaching and over-hunting in the last decade, but there are still substantial numbers in the National Parks Estate (NPE). During the rainy season some herds move out of NPE to raid crops in nearby fields.
Cheetah	*Acinonyx jubatus*	Probably none left in the area; there used to be a fair number in the past decade.
Lappet-faced vulture	*Torgos tracheliotos*	There are still a few lappet-faced vultures in the region but they are on the decline.
White-headed vulture	*Trigonoceps occipitais*	There are still a good number of white-headed vultures in the area.