The Kariba REDD+ project

CCBS Project design document (PDD)

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South Pole Carbon Asset Management

Version 1

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Kariba REDD+ project

2) The version number of the document:

Version 1

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G1. Original Conditions in the Project Area

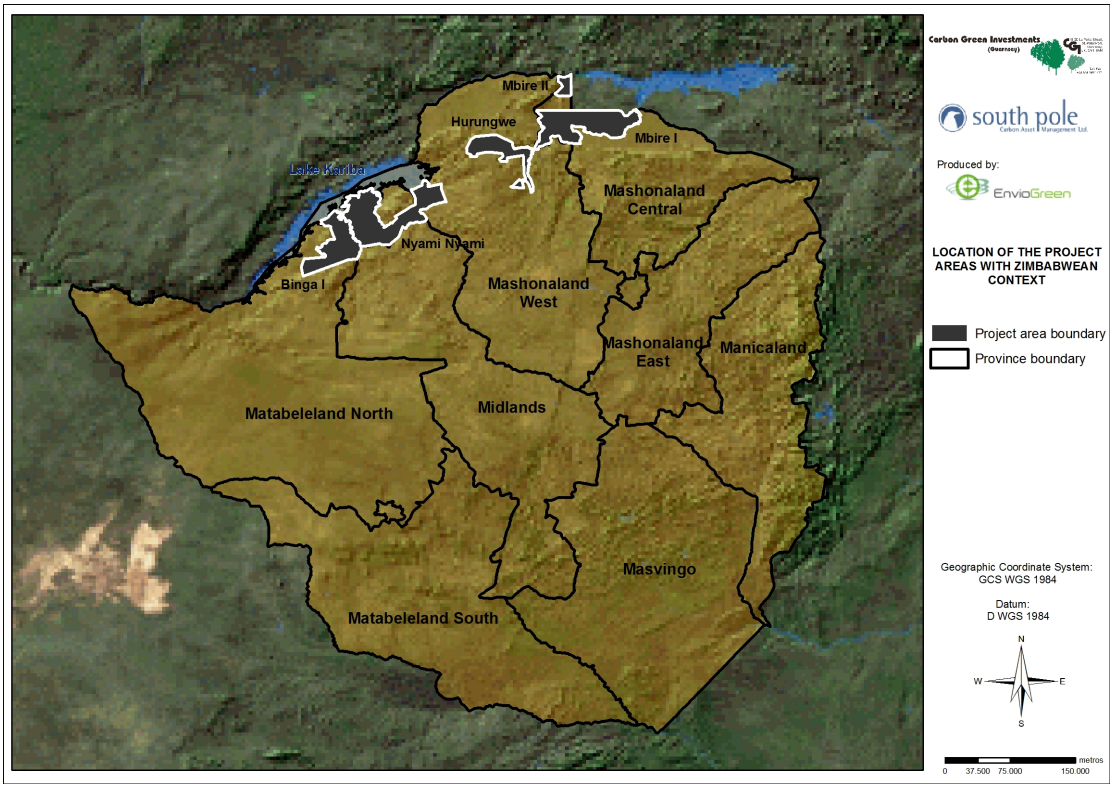
General information

G1.1 The location of the project and basic physical parameters (e.g., soil, geology, climate).

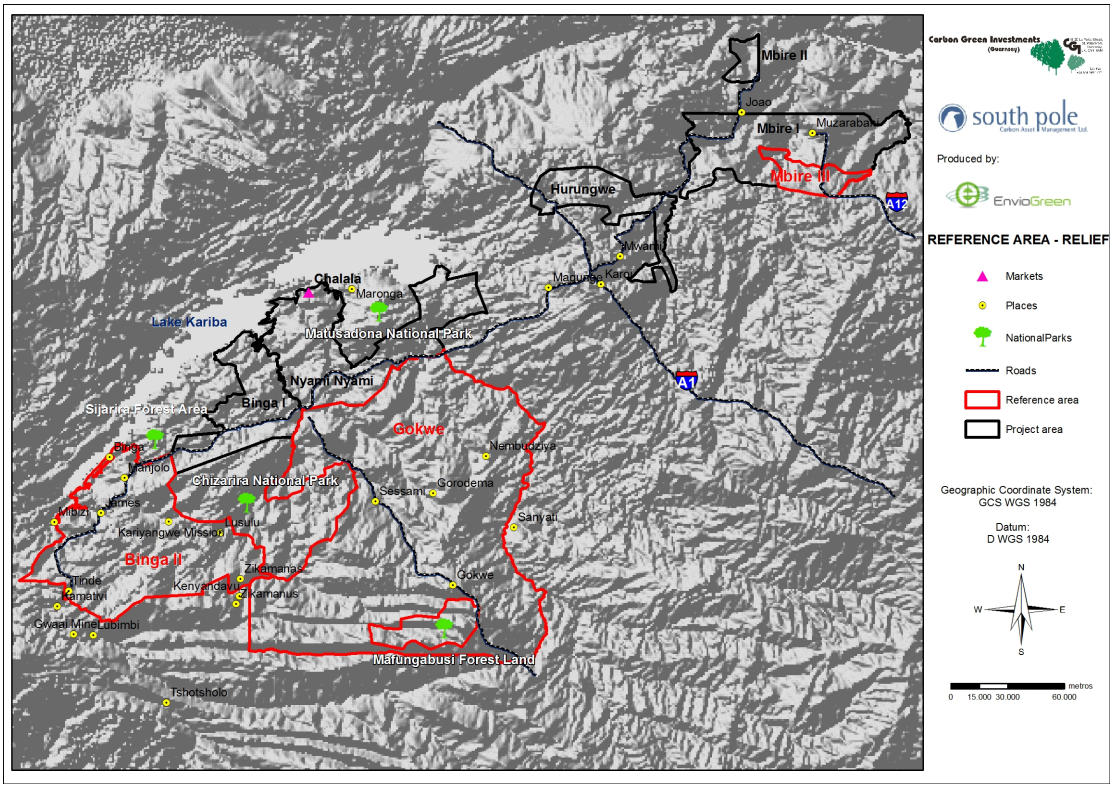
Location

The Kariba REDD+ project is located in northwestern Zimbabwe, partly along the southern shore of Lake Kariba, the largest artificial lake in the world by volume. The project area spans four provinces: Matabeleland North, Midlands, Mashonaland West and Mashonaland Central. The project is administered by four Rural District Councils (RDCs): Binga, Nyaminyami, Hurungwe and Mbire (see Map 2 and Map 2). The project is community-based and implements activities in conjunction with the local population (see section G3.2). As the affected communities all live within the boundaries of the project area, the project zone

equals the project area in this project. A brief description of the four participating RDCs is given below.



Map 1: Location of the project in Zimbabwe



Map 2: Location of the project area (in black) and reference area (in red). Participating RDCs are labeled separately

BINGA

The Binga RDC area is located in the Matabeleland North province. It covers 211'041 hectares and encompasses a prime wildlife area that includes 22 kilometers of Lake Kariba shoreline. It serves as a corridor, connecting the Chizarira National Park, the Omay South Wildlife Area and the Matusadona National Park. The resulting area makes for a vast and contiguous wildlife area that is roughly 900'000 ha in size.

NYAMINYAMI

The Nyaminyami RDC area lies in the district of Kariba in the province of Mashonaland West. The Nyaminyami area covers 369'931 ha and connects the Matusadona National Park with the Charara Safari Area. It shares borders with the Binga RDC area. Ecotourism is popular in Nyaminyami, and the most popular ecotourism destination is the shore of Lake Kariba, with its several fishing and safari camps.

HURUNGWE

The Hurungwe RDC lies in a remote, rural part of the province of Mashonaland West. It is adjacent to Mana Pools National Park and covers 150'018 ha.

MBIRE

The Mbire area covers 346'941 ha within the province of Mashonaland Central. It serves as a stepping-stone between Mana Pools National Park in the northwest and the Umfurudzi Safari Area in the southeast.

Geology

The project area is dominated by late/mid to pre-Cambrian formations, Triassic grits and sandstones, and intrusive granites and gneisses. Common commercial mineral resources include gold and copper. Diamonds and limestone are found in the sandstone formations. 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]).

Soils

Soils are derived from the underlying geology, although there are some colluvial deposits along the base of the Zambezi River escarpment, and narrow strips of alluvium along the banks of the larger rivers. In the west, around the town of Binga, the soils are formed from the sandstones and quartzites of the Triassic, Permian, and to a lesser extent, the Cretaceous and Umkondo formations. These soils belong to the Siallitic group of the Calcimorphic order, meaning they are unleached soils with large reserves of weatherable minerals, and sometimes with calcareous accumulations in the sub soil.[2] 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, are deep, medium-heavy-textured, dark brown colluvial soils (clays and silts), usually with a calcareous layer below 120cm depth. Where Karro mudstones form the underlying rock, the soils are greyish-brown, sandy-clay loams in which saline areas often occur. Moving east towards Sengwa, the soils become very shallow lithosols, typically <25cm deep, laying over weathering rock or gravel with patches of deep, heavy-textured clays.

Moving east, much of Nyaminyami has sandstone / quartzite derived siallitic soils. The Gache Gache area has patches of heavier clay soils overlain in places by colluvial and alluvial quarzitic sands. The western part of Hurungwe is covered with shallow lithosols derived from phillites and quartzites. Further east, the soils are kaolinitic, where the clay fraction is predominately kaolinite and there may be free oxides of iron and aluminum, particularly in depressions and seasonal wetlands. These soils are moderately shallow to moderately deep brown-reddish brown fine-medium grained sandy loams over sandy clay loams formed from gneisses. These soils have better agricultural potential than those in the east.

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 de-stabilise the clay lattice and these soils are extremely susceptible to erosion once the A horizon is removed. Soil capping is common.

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

[2] Surveyor General, 1979, Provisional soil map of Zimbabwe Rhodesia. Available online under http://eusoils.jrc.ec.europa.eu/esdb_archive/eudasm/africa/maps/afr_zw2006_so.htm

Climate

According to the World Map of Köppen-Geiger Climate Classification[3], 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 Table 1). 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. The rainy season is the only time that underground water aquifers can be replenished. 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.[4]

Table 1: Annual rainfall in mm at different location in the project area and the reference area[5]

Project Area	Town	Rainfall (mm)
Hurungwe	Makuti	788
Hurungwe	Karoi	804.1
Nyaminyami	Kariba	765.5
Binga	Binga	731.7
Reference Area	Gokwe	762.7

G1.2 The types and condition of vegetation within the project area.

The western and central parts of the project area (Binga, Nyaminyami, and parts of Hurungwe) are largely *Colophospermum mopane* (mopane) woodland, while in the eastern part (parts of Hurungwe and Mbire) *Brachystegia* woodland or miombo is more widespread.

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

[4] 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.

[5]http://www.climate-charts.com/Countries/Zimbabwe.html

Mopane woodland is a varied vegetation type found on deep grey-to-brown sandy clay loam to clay soils formed from Karoo mudstone. Soil surface capping/cracking is widespread due to the clay-rich soil. It is characterized by a dominance of 8-12m high *Colophospermum mopane*. *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 occurrs in mudstone-derived soils. Mopane woodlands can be 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 1-6m 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*.

Because of the nature of the soils, mopane woodlands are prone to soil erosion. The grass layer is generally constituted by short, annual grasses. The shorten grass layer provides little fuel to fire. Thus fire is less abundant in mopane woodland compared to miombo woodland.

Picture 1: Mopane woodland. Trees are 18-20m tall

Miombo is the vernacular term for the seasonally dry, deciduous woodlands that are widespread across southern Africa. These woodlands, dominated by *Brachystegia, Julbernadia* and/or *Isoberlinia*, extend across 2.7 million km^2 of some of the world's poorest countries.[6,7]Spread throughout southern Africa, the Southern Miombo Woodland (SMW) ecoregion is distributed in several sections across the Central African Plateau. The largest

[6]Campbell B. (ed.),1996, The Miombo Transition: Woodlands & Welfare in Africa, CIFOR, Bogor.

[7]http://www.worldwildlife.org/wildworld/profiles/terrestrial/at/at0719_full.html, retrieved on 16-06-2011.

section covers most of Zimbabwe and spills over into Mozambique on the eastern side of the Chimanimani Mountain Range.

Miombo woodland in the project area is sometimes mapped as drier Zambezian miombo. *B. spiciformis* and *J. globiflora* predominate in the SMW. 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 than it is in mopane woodland. 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.

In miombo woodlands, the grass layer is of perennial species, denser and higher, providing a high fuel load, making fire a major threat. Typical grass species include *Loudetia simplex, Andropogon gayanus, Pogonarthria squarrosa, Stereochlaena cameronii, Heteropogon contortus, and Tristachya sp.*

Clearing for cultivation and tree cutting for firewood and poles are threatening all of the woodlands.

Picture 2: Miombo woodland. Trees are 10-12m tall

Table 2 shows the most common tree species in the project area.

Table 2: Most common tree species in the project area

Scientific name	Common name
Acacia karoo	Sweet Thorn
A. nigrescens	Knob Thorn
A. nilotica	Scented pod Acacia
Adansonia digitata	Baobab
Albizia antunesiana	Purple-leaved Albizia
Brachystegia boehmii	Mufuti
B. spiciformis	Musasa
Colophospermum mopane	Mopane
Combretum apiculatum	Glossy Combretum
C. molle	Velvet-leaved Combretum
Commiphora glandulosa	Tall firethorn corkwood
C. mollis	Soft-leaved Commiphora
C. mossambicensis	Pepper-leaved Commiphora
Diospyros mespiliformis	Ebony
Diplorhynchus condylocarpon	Horn-pod tree
Erythroxylum zambesiacum	Zambezi coca tree
Faurea saligna	Beechwood
F. speciosa	Broad-leaved beechwood
Flacourtia indica	Batoka plum
Julbernadia globiflora	Munondo
Kirkia acuminata	White Syringa
Monotes glaber	Pale fruited Monotes
Strychnos cocculoides	Monkey Orange
S. spinosa	Monkey Orange
Terminalia pruniodes	Purple Pod Terminalia
T. sericea	Silver Terminalia
T. stuhlmannii	Zigzag Terminalia
Trichilia emetica	Natal Mahogany
Uapaca kirkiana	Muzhanje / Mahobohobo
Vangueria infausta	African Medlar

G1.3 The boundaries of the project area and the project zone.

The project area was displayed earlier (see Map 2 and Map 2). The different RDCs participating in the project are shown in Table 3.

Table 3: Participating Rural District Councils (RDCs), constituting the project area

RDC Name	Size in ha	Most Northern/ Southern latitude	Most Eastern/ Western longitude
Binga	211'041	17°2'28,18''/17°42'30,60''	28°15'3,45''/27°38'2,03''
NyamiNyami	369'931	16°45'41,79''/17°23'43,09''	29°7'40,75''/28°2'16,67''
Hurungwe	150'018	16°15'28,94''/16°50'41,98''	30°25'29,37''/29°22'43,57''
Mbire	346'941	15°37'30,75''/16°23'39,79''	31°7'6,48''/30°2'49,26''
Total	1'077'930		

Climate Information

G1.4 Current carbon stocks within the project area(s), using stratification by land-use or vegetation type and methods of carbon calculation (such as biomass plots, formulae, default values) from the Intergovernmental Panel on Climate Change's 2006 Guidelines for National GHG Inventories for Agriculture, Forestry and Other Land Use (IPCC 2006 GL for AFOLU) or a more robust and detailed methodology.

As current carbon stocks, we include above-ground live biomass, below-ground live biomass and soil carbon. As land cover classes, we identify forest, grassland and cropland.

For the carbon stock of the forest land cover we use the values reported by Ryan et al. (2010)[8]. The study sampled an woodland area of 27 ha in Mozambique, neighboring Zimbabwe with similar biophysical characteristics. We use this study because of its stringent methodology, actuality and because no comparable study had been published from Zimbabwe. The carbon stocks of forest per area are shown in Table 4.

[8]Ryan, C.M, Williams, M. & J. Grace (2011): Above- and Belowground Carbon Stocks in a Miombo Woodland Landscape of Mozambique. BIOTROPICA 43(4): 423–432.

Table 4: Carbon stocks per ha of forest, after Ryan et al. (2011)

Above-ground biomass in tC ha^{-1}	Below-ground biomass in tC ha^{-1}	Soil carbon until 0.50m depth in tC ha^{-1}	Total carbon in tC ha^{-1}
24.8	8.5	76.2	109.5

For grassland we apply the IPCC (2006) GHG Inventory Guidelines[9] default value for total biomass of tropical–dry grassland after conversion from other land use, which is 8.7t ha^{-1}.[10] Applying a carbon fraction CF of 0.5, this results in 4.35 tC ha^{-1}. For grassland soil carbon we conservatively add the soil carbon of forest minus 20 % percent soil carbon loss as calculated for the emission factor from conversion of forested land.[11] Therefore we use the carbon stocks for grassland as shown in Table 5.

Table 5: Carbon stocks per ha of grassland

Total biomass in tC ha^{-1}	Soil carbon until 0.50m depth in tC ha^{-1}	Total carbon in tC ha^{-1}
4.35	61.0	65.35

For cropland we use our calculation for the emission factor from conversion of forested land to cropland. As perennial crops are harvested after every rotation and below-ground biomass of crop plants left to rot we assume a 90 % loss of above- and below-ground carbon stocks from forest. For cropland soil carbon we conservatively add the soil carbon of forest minus 20 % percent soil carbon loss as calculated for the emission factor from conversion of forested land. The resulting carbon stocks are displayed in Table 6.

Table 6: Carbon stocks per ha of cropland.

Above-ground biomass in tC ha^{-1}	Below-groundbiomass in tC ha^{-1}	Soil carbon until 0.50m depth in tC ha^{-1}	Total carbon in tC ha^{-1}
2.48	0.85	61.0	64.33

Carbon stock per hectare land cover type is converted to the carbon stock by multiplication by the area of each land cover type. This was based on Landsat satellite image analysis of

[9] http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html

[10] Ibid. Table 6.4.

[11] This is based on the VCS methodology VM0009 that allows to account for a soil carbon loss of 20% per year due to deforestation. We conservatively assume that one year after conversion, no more soil carbon losses occur.

June 2011 images. The land cover in a representative area of 429'000 ha was assessed and extrapolated to the whole project area. Land cover other than forest, grassland and cropland, such as settlements and bare ground, were conservatively considered to have a carbon stock of zero.

The resulting carbon stock in the project area and the area of each land cover are shown in Table 7.

The current carbon stock in the project area is about 81 MtC.

Table 7: Present area of land relevant land cover types and carbon stock in the project area

Land cover	Area in ha*	Carbon stock in tC
Forest	682'937	74'781'610
Grassland	60'480	3'686'880
Cropland	41'365	2'659'338
Total		81'127'828

* Note that other land cover types such as settlements and bare ground are excluded here, as their carbon stock is conservatively assumed to be zero.

Community Information

G1.5 A description of communities located in the project zone, including basic socio-economic and cultural information that describes the social, economic and cultural diversity within communities (wealth, gender, age, ethnicity etc.), identifies specific groups such as Indigenous Peoples and describes any community characteristics. Community characteristics may include shared history, culture, livelihood systems, relationships with one or more natural resources, or the customary institutions and rules governing the use of resources.

Most of the local population belongs to the Tonga or the Shona ethnic group. In the districts of Binga and Nyaminyami, the majority of the population is Tonga. The Tonga tribe traditionally cultivates small gardens in fertile areas along the rivers. During the flooding of Lake Kariba, many of them lost their land along the shore of the Zambezi River. In the districts of Hurungwe and Mbire, the majority of the population belongs to the Shona tribe. The Shona traditionally engage in pasture farming and agriculture.

Immigration of external groups is negligible. Between 2001 and 2003 the government of Zimbabwe enticed large numbers of people to move from their villages to commercial farms. The farms were portrayed as "new homeland" and a promise of agricultural finance was made by the government. Financial backing for the project never materialized. That event, in addition to hyperinflation which surfaced around 2007, caused most people to leave the commercial farms and move back to their villages and engage in subsistence

agriculture. This, in turn, led to the clearing of more land. Now, with a multi-currency-based economy in place, many people avoid working in towns and prefer instead to engage in small-scale farming in their home areas.

A study based on questionnaires and focus group discussion was carried out in 2011 to assess the social baseline in the project zone[12]. The study targeted all four districts that are involved in the project: Binga, Nyaminyami, Hurungwe and Mbire. The results of the study are shown in Table 8, Table 9 and

[12] Environment Africa (2011): Enhancing livelihood and food security among rural communities through reduction in deforestation and degradation. Harare, Zimbabwe. This report can be provided to the auditor upon request.

Table 10. Most of the interviewees indicated at least primary education, while around 50% also went to a secondary school. Around 85% of the households were reported as headed by males.

Table 8: Characteristics of households by district

Characteristic		Hurungwe	Nyaminyami	Binga	Mbire
Total population		65'378	34'374	118'824	115'952
Questionnaires		103	79	92	98
Gender	male	71.8	40.5	42.9	81.4
	female	28.2	58.2	57.1	18.6
Marital Status	married	76.7	83.5	81.5	92.9
	single	6.8	6.3	7.6	0
	Divorced	2.9	1.3	3.3	1
	Widower/Widow	13.6	8.9	7.6	6.1
Education	Primary	35	34.2	29.3	40.8
	Secondary	51.5	50.6	45.7	41.8
	Tertiary	5.8	1.3	16.3	3.1
	None	7.8	13.9	8.7	14.3
Household head	Female headed	17.6	14.1	17.6	10.2
	Male headed	82.4	84.6	82.4	87.8
	Child headed	0	1.3	0	0

Field crops are the most important source of income. Fishery is also significant in the districts along the shore of Lake Kariba. Livestock, however, only provides very limited income. Formal and informal employment is very rare in the area.

Table 9: Most important sources of household income

Most important income source	Hurungwe	Nyaminyami	Binga	Mbire

Field crops	80.4	68.8	74	100
Garden crops	3.1	3.1	0	0
Livestock	3.1	3.1	8	0
Fishery	0	10.9	14	0
Informal work	3.1	9.4	2	0
Formal employment	1	0	0	0
Remittances	9.3	4.7	0	0

Table 10: Annual household income from various sources

		Income Source							
District	**Income range in USD**	**Field**	**Garden**	**Livestock**	**Fishing**	**Informal Employ-**	**Formal employ-ment**	**Remit-tances**	**Curio curving**
Hurungwe	0-50	11	35	38	100	35	10	30	33
	50-200	15	46	24	0	24	30	25	33
	200-500	30	13	21	0	12	10	35	33
	500-1000	14	6	10	0	18	50	5	0
	>1'000	31	0	7	0	12	0	5	0
	Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Nyami-nyami	0-50	31	67	48	100	45	67	50	0
	50-200	48	29	52	0	27	0	50	0
	200-500	18	5	0	0	18	0	0	0
	500-1000	2	0	0	0	0	0	0	0
	>1'000	2	0	0	0	9	33	0	0
	Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**0**
Binga	0-50	58	77	56	0	75	73	77	0
	50-200	28	20	22	0	15	20	8	0
	200-500	12	3	17	33	5	0	8	0
	500-1000	0	0	5	67	5	0	8	0
	>1'000	2	0	0	0	0	7	0	0
	Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**0**
Mbire	0-50	66	19	21	0	21	42	44	0
	50-200	11	48	61	0	53	33	22	0
	200-500	7	26	13	0	11	17	28	0
	500-1000	10	7	3	0	11	0	0	0
	>1'000	6	0	3	0	5	8	6	0
	Total	**100**	**100**	**100**	**0**	**100**	**100**	**100**	**0**

G1.6 A description of current land use and customary and legal property rights including community property in the project zone, identifying any ongoing or unresolved conflicts or disputes and identifying and describing any disputes over land tenure that were resolved during the last ten years.

Land tenure

The land in the project area is communally-owned land. Since 1988, when the Rural District Council Act[13] came into force, the Rural District Councils (RDCs) have been administering the land at the district level. RDCs include democratically elected councils for each ward (comparable to municipalities) and the chiefs, which are the traditional leaders. RDCs are headed by a CEO and a chairman. The project proponents have set up legal agreements with the RDCs (see section G5.2).

The project zone was not impacted by the Zimbabwean land reforms. This is because the soils of the project area are less fertile and the area is more remote than lands near Harare. The less favorable lands in the project area were never cultivated by Europeans. Thus, they were not impacted by the tenure conflicts associated with land reform.

Land use

Common land uses include agriculture and livestock farming. Forests are also used to collect firewood and building material.

Subsistence agriculture on plots called "*machambas"* is often based on slash-and burn methods, thereby leading to significant deforestation. Common crops for domestic consumption are corn (*Zea mays*) and millet (*Panicoideae sp*.).

Cultivation of traded crops is generally rare. Cotton (*Gossypium hirsutum*)is cultivated on a relatively large share of fields in Mbire. In the district of Hurungwe, tobacco cultivation (*Nicotiana sp*.) is widespread, leading to major deforestation. The demand for land for tobacco cultivation is increasing due to the need for fresh land on which to grow new tobacco crops in order to avoid the risk of root-knot nematodes that damage tobacco plants.

Livestock farming is limited in the area (see Table 9). Overgrazing on poor soils reportedly occurs in some parts of the area. Major livestock are goats and cows. Donkeys are occasionally kept for transportation.

Forests are used as an important source of firewood by local communities. This causes degradation of the forests. Mainly in Hurungwe, wet wood is also collected, which is used in the tobacco curing process.

Safaris for tourists were an important income source in the past. During a project called CAMPFIRE[14], the substantial incomes from safari tourism were distributed in the

[13] http://www.parlzim.gov.zw/cms/Acts/Title29_LOCAL_GOVERNMENT/RURAL_DISTRICT_COUNCILS_ACT_29_13.pdf

[14]Frost, P., I. Bond (2008), The CAMPFIRE programme in Zimabwe: Payments for wildlife services. Ecological Economics 65(4), 776-787.

communities and used as compensation for damages caused by elephants. The project was quite successful. During the economic breakdown, however, poaching activities increased strongly, thereby limiting options for safaris. This in turn decreased the funds available and activities by the CAMPFIRE project.

Poaching, especially of elephants, is a continuing problem and has resulted in severe losses of animals despite protection efforts[15]. Anti-poaching activities still prevail in the area, but they are facing a severe lack of funding.

Biodiversity Information

G1.7 A description of current biodiversity within the project zone (diversity of species and ecosystems) and threats to that biodiversity, using appropriate methodologies, substantiated where possible with appropriate reference material.

The project area lies within the Zambezian biome of the Zambezi basin.[16] The major ecosystems include mopane, miombo and riparian woodland, for which the vegetation is described in section G1.2. The project area is an important wildlife area, showing significant populations of African elephants, lions, impalas, hippos and crocodiles along with a wide variety of birds, including the IUCN red list vulnerable species Southern Ground Hornbill, Lappet-faced Vulture, and White-headed Vulture. An extensive biodiversity assessment in an adjacent area found a total of 150 mammal, 504 bird, 133 reptiles and 274 butterfly species.[17]An extensive list of common species in the project area is listed in Annex 1 to the present document.

A biodiversity monitoring system will be implemented as part of the project activities (see section B3.1). A list of endangered species that occur in the project area is provided in section G1.8. The most common tree species are listed in Table 2. The Kariba REDD+ project will serve as a corridor between existing national parks, namely Mana Pools, Matusadona and Chizarira national parks.

In the past, the natural resources of the project areas supported significant populations of wildlife, including elephants. In turn this supported a variety of tourism and safari activities. However, the economic and political crisis over the past decade has led to a decrease in tourism. Poaching has also escalated in the project area. As a result, wildlife populations have been severely reduced. Reference material about the biodiversity in the project area is listed in Annex 1 to the present document.

[15]Gruesome pictures of elephants killed by poachers available upon request.

[16]Timberlake, J. (2000), Biodiversity of the Zambezi basin. Occasional Publications in Biodiversity No. 9, Biodiversity Foundation for Africa, Bulawayo, Zimbabwe. Availbale online under http://www.biodiversityfoundation.org/documents/BFA%20No.9_Zambezi%20Basin%20Biodiversity.pdf.

[17]Timberlake, J. & Childes, S. (2004), Biodiversity of the Four Corners Area: Technical Reviews. Occasional Publications in Biodiversity No. 15. Biodiversity Foundation for Africa,Bulawayo & Zambezi Society, Harare, Zimbabwe. Available online under http://www.biodiversityfoundation.org/publications.htm.

G1.8 An evaluation of whether the project zone includes any of the following High ConservationValues (HCVs).

The area hosts several threatened species. They are listed in Table 11. This qualifies the project area as a HCV1: "Areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g. endemism, endangered species, refugia)". [18] Furthermore, the natural resources in the project area provide crucial livelihoods and cultural values to the local communities. Fruits are collected for food and typical homesteads are constructed exclusively from naturally available materials, such as construction wood, clay-rich soil and certain grasses for roofing.

In terms of cultural identity, e.g. the Baobab tree (*Adansonia digitata*) is important. Traditionally chiefs are buried in hollow Baobab trees. Other tree species also have cultural importance such as Musasa (*Brachystegia spiciformis*).[19]Therefore, the project area also qualifies as 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).

Picture 3: A Baobab tree (*Adansonia digitata*) in the Mbire district. Chiefs are traditionally buried in hollow Baobab trees

[18]See http://www.hcvnetwork.org/

[19]See Sacred forests in Byers et al. (2001), „Linking the Conservation of Culture and Nature: A Case Study of Sacred Forests in Zimbabwe". Human Ecology, 29(2), 187-218.

Table 11: Endangered species in the project area. Levels of threat refer to the classification by the IUCN.[20]

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 overhunting 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.

[20]http://www.iucnredlist.org/

G2. Baseline Projections

G2.1Describe the most likely land-use scenario in the absence of the project following IPCC 2006 GL for AFOLU or a more robust and detailed methodology, describing the range of potential land-use scenarios and the associated drivers of GHG emissions and justifying why the land-use scenario selected is most likely.

IDENTIFICATION OF ALTERNATIVE LAND USE SCENARIOS

An initial Public Rural Appraisal (PRA) conducted by Environment Africa[21] revealed the following alternative land use scenarios:

- Conversion of forestland to cropland or grazing land for subsistence and small-scale farming
- Logging of timber for local and domestic use
- Fuelwood collection

CONSISTENCY OF CREDIBLE LAND USES WITH ENFORCED MANDATORY LAWS AND REGULATIONS

All of the alternative land use scenarios above represent legal land uses. Within the project area, none of these activities violate any law. Actively lit forest fires are also widely observed, but are not a legal activity. However, fires are typically not sanctioned.

G2.2Document that project benefits would not have occurred in the absence of the project, explaining how existing laws or regulations would likely affect land use and justifying that the benefits being claimed by the project are truly 'additional' and would be unlikely to occur without the project.

INVESTMENT ANALYSIS – SIMPLE COST ANALYSIS

The project activities to mitigate deforestation in the area (see section G3.2) cost the project proponent a significant amount of money annually.[22,23] There exist no significant income to offset these costs without carbon revenues (some income is generated from rudimentary tourism). In the absence of the active protection, both physical and that created by partnering with the communities to create economic alternatives, the land in the project area will be cleared for the alternative land-use scenarios identified in section G2.1. This

[21]A summarizing presentation is provided separately to the auditor. The full reports (one per RDC) are available upon request.

[22] A financial plan of the project is provided to the auditor.

[23]In 2009 the management of Songo resulted in a loss of US$ 7'500 (Restoration and Rebuilding of Conservation within Zimbabwe. Songo Wildlife Management Area).

was, in fact, the case prior to the project's arrival. The baseline scenarios do not face any economic barriers.

COMMON PRACTICE ANALYSIS/BARRIER ANALYSIS

It is common practice to protect wilderness areas in Africa and to provide sustainable development support for rural African communities. Governments or donor agencies normally fund these activities, and do not expect financial return from the project activities, especially activities outside of National Parks. It is not common practice for private companies that are not donor funded, such as the present project proponent, to protect forested wilderness in Africa for financial return in the absence of AFOLU revenues, especially outside of National Parks. The project proponent's project is the first AFOLU Project Activity of its type in Zimbabwe, and one of the very first in Africa.

The project can therefore be classified as not being common practice but first-of-its-kind.

In summary,

- the CGI Kariba REDD+ project is not the only credible alternative land use consistent with enforced mandatory applicable laws,
- one of those alternative land uses, that of conversion to cropland or grazing land is by far the most likely baseline land use,
- the CGI Kariba REDD+ project passes the investment analysis test as it is not a financially viable land use without the AFOLU VCS project revenues, and
- the project activities are not common practice.

Therefore the project is additional.

G2.3Calculate the estimated carbon stock changes associated with the 'without project' reference scenario described above.

The main drivers of deforestation are likely to be persistent in the future in the "without project" scenario. These drivers are conversion of forests to agricultural land (cropland) and conversion to grassland, be it for the sake of creating pastures or by deforestation caused by over-harvesting wood products.

Our satellite image analysis (see section G1.4) revealed an annual deforestation rate of 1.30% for the period 2009-2011. We assume that this value is representative for the future development. Furthermore, we assume that half of the converted land is turned into cropland and the other half into grassland. Accordingly, 12'178 ha of forest are converted in the project area annually to cropland or grassland.

This conversion is partly accompanied by fire, resulting in non-CO_2 GHG emissions, of which we consider CH_4 and N_2O emissions. We assume that half of the conversion is done by burning. Of the carbon lost due to fire, we assume that 1% is emitted as CH_4 and 99% as

CO_2.[24] Furthermore, according to IPCC (2006) default emission factors, we assume 0.0294 kg N_2O are emitted per kg CH_4 emitted. For conversion of non-CO_2 GHG emissions to CO_2e, standard IPPC conversion factors are applied.

Resulting emissions under the "without project" scenario are displayed in Table 12. Total annual emissions are about 1.5 $MtCO_2e$, which sums up to 46 $MtCO_2e$ over the next 30 years.

Table 12: Emissions of CO_2, CH_4 and N_2O from conversion of forest

	Conversion with fire	Conversion without fire	All conversion
Annually converted area in ha	4'439	4'439	8'878
Annual CO_2 emissions in tCO_2e	720'291	727'567	1'447'858
Annual CH_4 emissions in tCO_2e	66'142	0	66'142
Annual N_2O emissions in tCO_2e	23'189	0	23'189
Total annual emissions in tCO_2e	809'623	727'567	1'537'190
Total emissions over 30 years in tCO_2e	24'288'677	21'827'010	46'115'687

G2.4 Describe how the 'without project' reference scenario would affect communities in the project zone, including the impact of likely changes in water, soil and other locally important ecosystem services.

Under the "without project" baseline scenario, deforestation due to agricultural expansion and over-use of the local forest and wildlife resources will continue.

Uncontrolled poaching and the resulting local extinction of large mammals have already almost led to a collapse of the local safari operators. This has had a severe impact on local communities because safaris have been a major source of income and employment in the past (see CAMPFIRE project as described in section G1.6). As a side effect, the project will allow safari operators in the project area to re-establish and maintain sustainable safari tourism.

Deforestation due to agricultural expansion and over-use of wood resources will continue in an uncontrolled way in the absence of the project. Direct negative impacts on local livelihoods include e.g. increased necessary efforts to collect the fuel wood needed for everyday purposes. The decreased forest cover has severe impacts on properties and services of the local ecosystems. Exposed soils erode and degrade, leaving them unsuited for future cultivation. Furthermore, increased erosion leads to increased siltation, a problem for the adjacent Lake Kariba and its hydropower facilities. Other hydrological impacts of

[24]Houghton, R. (2005), Tropical deforestation as a source of greenhouse gas emissions. In: Moutinho, P. and S. Schwartzman, Tropical Deforestation and Climate Change. Amazon Institute for Environmental Research. Washington DC, USA.

deforestation include reduced groundwater recharge, increased dust levels and more erratic rainfall.[25]

All of the mentioned effects have a strong negative impact on the livelihoods of local communities. In the without project scenario they will hardly be mitigated, if at all.

G2.5Describe how the 'without project' reference scenario would affect biodiversity in the project zone (e.g., habitat availability, landscape connectivity and threatened species).

Biodiversity is declining not only in Zimbabwe[26], but also within the project area, where e.g. the Black Rhino went locally extinct (see Table 11).

The main reason for the loss of biodiversity in Southern Africa is habitat loss, mostly due to agricultural expansion[27]. To give a quantitative indication, if 1% of a forest patch is turned into monoculture agriculture annually, in over 30 years about 11% of the species diversity will be lost, at a landscape level.[28] Under the baseline scenario, agricultural expansion will continue. Species that can be hunted will suffer from massive additional pressure due to uncontrolled poaching. As a consequence, under the baseline scenario, the project area's biodiversity will be under massive pressure and thus decline significantly over the lifetime of the project. Particularly, large mammals will be lost from the area. Further agricultural expansion will also lead to the loss of the area's biological connectivity function (see section G1.7). As a consequence, biodiversity outside the project zone will suffer as well.

G3. Project Design and Goals

G3.1 Provide a summary of the project's major climate, community and biodiversity objectives.

The following bullet points summarize the major objectives of the Kariba REDD+ project. The project will:

[25]Meher-Homji, V. M. (1991), Probable impact of deforestation on hydrological processes, *Climatic Change* 19: 163-73.

[26] Pandey, K. et al. (2006), Biodiversity Conservation Indicators: New Tools for Priority Setting at the Global Environment Facility. See Zimbabwe's country profile at http://www.indexmundi.com/facts/zimbabwe/gef-benefits-index-for-biodiversity.

[27] Biggs, R. et al. (2008), Scenarios of biodiversity loss in southern Africa in the 21st century. *Global Environmental Change* 18, 296-309.

[28] This assumes a forest patch size of 10,000 ha and frontier deforestation. Mosaic deforestation will lead to an even higher loss of biodiversity. Source: Koh, L. P. et al. (2010), An overhaul of the species-area approach for predicting biodiversity loss: incorporating matrix and edge effects. Journal of Applied Ecology 46, 1063 – 1070. Calculations were done using the online tool available at http://www.speciesextinctioncalculator.com/.

- Reduce emissions from deforestation and forest degradation in the project area in a way that can be measured, reported and verified. The project proponent seeks validation under the VCS and the CCBS in order to ensure that the carbon stock changes are rigorously measured and verified.
- Ensure sustained availability of wood supply for domestic use to the local population while providing alternatives to wood harvested from natural forests.
- Contribute to community development and poverty alleviation by providing a new source of revenue to local communities from the sale of carbon credits and other sustainable income sources such beekeeping and by direct employment.
- Improve the availability of social, educational and health related services to the local communities.
- Build capacity within the local communities to improve their natural resource management and cope with climate change.
- Sustain and enhance biodiversity by reducing the pressure on the vegetation, thus conserving viable habitat for floral and faunal biodiversity.
- Create a successful example that can be replicated in Zimbabwe and elsewhere. The project will be the first-of-its-kind in Zimbabwe; follow-up projects in Zimbabwe are already being considered.
- Ensure major benefits are sustained beyond the lifetime of the project.

G3.2 Describe each project activity with expected climate, community and biodiversity impacts and its relevance to achieving the project's objectives.

IMPROVED AGRICULTURE

In the project area, access to technology and investment in rural subsistence farming is absent. The Kariba REDD+ project includes a program aimed at improving rural agricultural productivity through provision of inputs and equipment, maintenance and establishment of infrastructure and training of local farmers.

The Kariba REDD+ project will promote conservation agriculture techniques that have the potential to increase the agricultural output of given plots and thus reduce the need for rotational agriculture. Techniques applied in conservation agriculture include planting basins, use of organic manure, precision planting, moisture conservation through mulching and making the most of the first rains, and minimal use of inorganic fertilizers. To promote conservational agriculture, training sessions will be held following the FAO's Farmer Field School approach.[29] Inputs such as tools and seeds will be provided.

Where tobacco cultivation is a major driver of deforestation (mainly in the Hurungwe RDC) the project will promote the use of alternative high-value crops such as garlic and chili. This will reduce the demand for wood used in the tobacco curing process. Chili and garlic will be

[29] http://www.fao.org/nr/land/sustainable-land-management/farmer-field-school/en/.

promoted by the provision of seeds and tools as well as training on cultivation, marketing, and how to minimize post-harvest losses.

To further increase agricultural production, community gardens will be established. This will be done where water is available from boreholes. For protection against wildlife, community gardens will be fenced. As the community gardens are cultivated quite intensively, they are expected to contribute significantly to food production, thus reducing pressure on subsistence agriculture on the forest. Where necessary, boreholes will be newly established or maintained. The management of boreholes is seen as an opportunity to make agriculture on existing plots more attractive than on newly deforested plots, where no boreholes are available.

BEEKEEPING

Keeping bees adds value to standing forests and enables the locals of the area to generate income streams that do not cause deforestation.

Selected wards in the Kariba REDD+ project RDCs will pioneer the beekeeping project activity with the communities and these will act as reference wards during scaling up to the rest of the wards. On the ground, beekeeping activities include workshops on the construction of beehives and assistance in processing and marketing of the produced honey within regional markets. A processing center will be set up in the medium term of 3-5 years. The project partner, Environment Africa, is experienced in promoting sustainable honey production, constructing processing centers for honey and marketing the honey.

From the perspective of locals, beekeeping will increase the value of the standing forest. The nectar of a tree located within a radius of two km from a hive puts tangible value on the tree, providing some protection to about 1'200 ha per location of hives. Beehives can be constructed using waste wood from sawmills in the region. "Cultivated" beehives can produce 15 - 30 kg per harvest and up to three harvests per year, which can generate incomes of 500-1000 USD/year. The honey-processing centres can add further value to beekeeping through the production of wax and candles, and more efficient honey extraction with a honey extractor.

FUELWOOD PLANTATIONS

The establishment of sustainably managed fuelwood plantations has the potential to reduce the pressure on natural forests and improve the livelihoods of locals because labor force becomes available that would otherwise be needed to collect fuelwood.

The tree planting project activity will aim to create an alternative source of fuel wood for tobacco curing and household use. In the Hurungwe district, the project will work with the tobacco companies. These companies give seeds of the fast growing eucalyptus tree (*Eucalyptus robusta*, *E. tereticornis)* but do not provide other necessary hardware (e.g. planting pockets) and training on how to do the nurseries, planting and management of the trees.

The project will also promote the multipurpose trees Moringa (*Moringa oleifera*) for nutritional purposes and Jatropha (*Jatropha curcas*) for live fencing and soap making (providing an additional stream of income). Some of the multipurpose trees will be planted in irrigation schemes and community gardening projects. Communities will be trained in

tree planting and seedling production as precursors for the actual tree planting. The trees to be planted are fast growing in nature and can give good firewood in five years; they are also good in that they have a very high coppicing capacity. Planting trees will have additional benefits for the climate, but this is not planned to be accounted for as the projects aims to certify its emission reductions under a VCS REDD methodology.

SOCIAL FORESTRY – INDIGENOUS KNOWLEDGE SYSTEMS

The indigenous knowledge in forest conservation and management will be documented and shared across the project areas. The areas and trees that are of value to indigenous peoples will be recognized and mapped. This will enhance the conservation efforts of the forest resources. The mapping exercise will also highlight areas with abundant non-timber forest product resources that the communities consider for income generation. These include fruits, murara and thatch grass. The communities will be trained in sustainable harvesting, processing and marketing. This also enhances conservation, as the communities will get more tangible benefits from their resources.

FIRE MANAGEMENT

Fires are native to dry miombo woodlands during the dry season, but have increased due to man-made fires associated with poaching and – to a lesser extent – charcoal production. Tourists may also be responsible for some fires. Fire breaks next to roads and along the RDC's Safari concession boundary in the south towards settled areas (e.g., Binga and Hurungwe) will be established and maintained by setting controlled fires at the start of the dry season to avoid the spread of high-dry-season fires. Firebreaks will be intermittently established at the eastern/southern side of roads and, then on the western/northern side in the following year. The controlled fires burn the vegetation covering the soil, but not the trees ("cold fires", see Picture 4). Fire management will reduce the degradation of the forest, allow the forest to recuperate [30] and stop and slowly reverse soil carbon loss. To maximize carbon benefits of fire management, fire management should begin in areas with carbon-rich soils and in areas with fairly non-impacted forestlands. Controlled burning is therefore an important activity in keeping bush fire damage to a minimum. The best way to conduct a controlled burn or cold fire is to burn the grass in the early months (March to May) as soon as the grass can burn. This creates a "cold" burn, which burns very little vegetation except grass. Grass, if burned at the right time, is not completely burnt. This allows a fresh flush of green grass to rejuvenate, giving more grazing grass for the fauna and creating an inherent firebreak that is supposed to stop "hot fires" later in the season.[31] Controlled burning will be carried out by the project's on-the-ground-management teams (see below).

Additionally, awareness campaigns will be done and other training on fire making, fire fighting and management will be conducted. In terms of suppression of "hot fires", critical

[30] Miombo species are known to be able to survive the destruction of their aboveground parts (Chidumayo, 1997; Frost, 1996; Nyerges, 1989; Robertson, 1984). They are generally good at re-sprouting and can reproduce from root suckers; 15 years of mattocking were required to kill Brachystegia spp. (Robertson, 1984). Re-sprouting is a common response to destruction by fire.

[31] E.P.S. "Fire: controlled burning explained (cold burn)"

forest fires hot spots will be supported with firefighting equipment/tools that the on-the-ground-management teams will be equipped and trained with.

Picture 4: Vegetation after "cold fire" and road serving as fire break

ALTERNATIVE AND SUSTAINABLE BUILDING MATERIALS (BRICK MAKING)

The local communities typically use wood to build their huts or burn bricks from clay soil, which also requires substantial amounts of wood. This results in more deforestation and degradation of forest resources. The project will promote the Hydraform technology as an alternative, which requires less wood resources. To get this project activity started, a Hydraform molding machine has been purchased and will be used for the project. This will be run by local youths, thereby creating new income generation opportunities.

ON THE GROUND MANAGEMENT TEAMS

The Kariba REDD+ project will be present within the local communities via its on-the-ground-management (OGM) teams. OGM teams will include one team leader, two trackers, one community game scout, one National Parks scout (when necessary for anti-poaching follow ups) and one camp attendant. All team members will be recruited locally. CGI will have a strong influence on the selection of team leaders, to ensure their reliability. The will be one OGM team per RDC, where they have a steady office/camp, that will also serve as a contact point for the local population. The OGM teams will be in charge of:

- patrolling the area to prevent illegal deforestation,

- maintaining technical equipment (e.g. water pumps) if provided by the project,
- fire prevention via "cold fires" and fire fighting where possible (see above),
- carrying out the project monitor requirements according to the applied standards,
- maintaining roads to ensure accessibility of the project area,
- facilitating the relations to the local authorities, and
- receiving feedback and grievances from the local communities.

COMMUNITY AND PROJECT SUSTAINABILITY FUND

A significant (20% of net profit) share of the project's carbon income will be invested into general activities promoting and guaranteeing sustainability of the project. The project is being undertaken on communal lands and as such it is imperative the people within these communities have their lives enriched by the project. The project proponents feel that this aspect of the revenue distribution is the most important of them all. A board will decide upon the use of the Community and Project Sustainability Fund's resources. The board will comprise of Carbon Green Africa (CGA) Trust[32] members in conjunction with selected members of the Community and Council from each RDC. Oversight will be given by CGI to ensure all CCBS criteria are met and funds are reaching their required targets.

The fund will be used to improve health and education in the project area.

Health improvements include the following:

- Targeted clinics will have all required improvements made and basic amenities will be brought up to an acceptable standard. New buildings will be constructed where applicable.
- Availability, quality and number of healthcare practitioners per clinic will be assessed and salaries of the practitioners will be reviewed and subsidized where required.
- Targeted clinics will be stocked with required basic drugs and dressings etc. so that the majority of common illnesses/injuries can be treated immediately.
- A "Healthcare Officer" will be appointed to assess, monitor and manage this initiative. The Healthcare Officer will report to Board of Community Fund who will direct funds accordingly.

[32]Carbon Green Africa (CGA) is the name of the local trust that will receive the net revenue on the sale of the VERs, distribute it accordingly as per Revenue Distribution Agreement and ensure all is done in a fair manner, including overseeing Community and Project Sustainability Fund. Board members will include two CGI members, a local lawyer and local/regional climate change representatives. A scheme representing the CGA trust's structure is provided to the auditor.

Education improvements include the following:

- Targeted schools will have all required improvements made, and basic amenities (e.g., roofing, desks, windows, stationary, books, food) will be brought up to an acceptable standard. New buildings will be constructed where applicable.

- Numbers, distribution and salaries of teachers will be assessed and subsidized when necessary, ensuring an acceptable pupil/teacher ratio.

- Targeted schools will have a bursary initiative to subsidize all pupils' fees. For example, the Community Fund will pay for 50% of all pupils' fees, enabling many children to come to school that might not be able to come otherwise due to financial constraints. In turn this will relieve families of financial pressure associated with sending their children to school and will maximize attendance.

- Climate change and environmental conservation topics will be added to the curriculum and careers within the sector/project will be encouraged after leaving school.

- In order to assess and monitor, an "Education Officer" will be appointed to manage this initiative. The Education Officer will report to the Board of the Community Fund who will direct funds accordingly.

NEWSLETTER

During the project lifetime, Carbon Green Investment (CGI) will publish a newsletter, which is foreseen to be issued on a quarterly basis. The newsletter will be in English as well as Shona and Tonga, the local languages. Topics covered by the newsletter will include the following:

- General information and progress of the project
- Topics of environmental awareness and education
- Grievances regarding the project and responses by CGI
- Job advertisements as part of the project's local recruitment procedure
- Other topics to be agreed upon in cooperation with the local RDC administration

The newsletter will be printed in Harare and delivered via the OGM teams. It will be made available in the RDC offices, and in central points in each ward, such as schools and clinics.

G3.3 Provide a map identifying the project location and boundaries of the project area(s), where the project activities will occur, of the project zone and of additional surrounding locations that are predicted to be impacted by project activities (e.g. through leakage).

The project activities will be implemented in the whole project area, as indicated in Map 2. The fuelwood plantation activity will focus on the Hurungwe district, as there the deforestation pressure due to wood demand for tobacco curing is high (see section G1.6).

G3.4. Define the project lifetime and GHG accounting period and explain and justify any differences between them. Define an implementation schedule, indicating key dates and milestones in the project's development.

Both the project lifetime as well as the GHG-accounting period is set at 30 years, starting from October 1, 2011. Therefore the project's 30-year crediting period is scheduled to end on September 30, 2041. As the project activities are designed to be self-sustainable over the long run, the project impacts are expected to last longer than 100 years. Nevertheless, the financial architecture of the Kariba REDD+ project includes 20% of the net revenues being transferred to a Community and Project Sustainabilty Fund. Besides the use for community upliftment purposes, this fund will ensure that the basic funding can be continued for at least a total of 100 years.

G3.5 Identify likely natural and human-induced risks to the expected climate, community and biodiversity benefits during the project lifetime and outline measures adopted to mitigate these risks.

The Kariba REDD+ project is managed by an alliance of experienced project partners. Together, the project partners have a successful track record in working with communities, managing wildlife and ecosystems, preventing and fighting fires, doing business in Zimbabwe and developing projects for the carbon markets (see section G 4.2). Furthermore, the project proponents have the financial capacity to make all necessary initial investment before the project is generating any revenue. Being mostly of Zimbabwean nationality, the project partners have a strong motivation for a long-term involvement in the Kariba REDD+ project. Thus, we consider any "internal"[33] and project management risks of project failure as minor.

External human-induced risks to the project include tenure and political risks. The project is established on land that is not owned by the project proponent, but by the respective RDCs. Therefore, there is always a certain tenure risk, as the land is ultimately under control of the RDCs. However, we address this risk in the best possible way by seeking early consultation and approval of the RDCs to each of the projects components. Furthermore, there are

[33]See VCS AFOLU Non-Permanence Risk Tool v3.0, which is available online at http://www.v-c-s.org/sites/v-c-s.org/files/AFOLU%20Non-Permanence%20Risk%20Tool%2C%20v3.0.pdf.

established long-term contracts with the RDCs, covering the whole lifetime of the project. We believe that close cooperation with the local communities is the key to success for our project and already feel a strong support by the locals. The political risk in Zimbabwe is clearly not negligible. Nevertheless, the project area was not affected by the conflict between European landowners and black rural population in the past, due to poor quality of the soils and ethnic homogeneity of the project area. Furthermore, our project management team has a long track record of working in Zimbabwe and is very experienced in dealing with the local conditions.

The only severe natural risks are drought and extreme fire events. Fire is a natural occurrence and the ecosystems in the project area are adapted to it. However, we are very aware of the crucial role of fires in our project. To reduce the loss of fire, we designed fire management project activities (see section G3.2). These activities and associated measures have proven, in the past, to be effective in managing fire. With regard to the proposed project, they will reduce the fire-related losses of vegetation to a bare minimum. In addition to fire, drought threatens the project activities that focus on agricultural improvements. However, we are very aware of this risk and designed our project to enhance adaptation to drought in the project area (see sections G3.2 and GL1.4).

The mentioned risks are identified based on the project team's experience in working in Zimbabwe and the available scientific evidence. However, new issues could arise during the lifetime of the project. We explicitly address this by applying adaptive management techniques. On an annual basis, the project proponent (CGI) will hold an "adaptive management workshop". During this workshop, the results of the monitoring procedures as well as the received feedback from locals and employees will be discussed. The goal of these workshops is to steadily improve the effectiveness and efficiency of the project while identifying new emerging risks and addressing them appropriately. As a designated Adaptive Management Officer, Pieter Bezuidenhout will be responsible for compiling the necessary information, holding the annual workshop and ensuring that the on-the-ground management practices reflect the workshop's outcomes.

G3.6 Demonstrate that the project design includes specific measures to ensure the maintenance or enhancement of the high conservation value attributes identified in G1 consistent with the precautionary principle.

Conservation of threatened species—those with identified natural high conservation value (HCV1)—lies at the core of the Kariba REDD+ project's activities. By reducing the deforestation rate in the project area, the project will preserve the habitat for endangered and vulnerable species. Anti-poaching patrolling will address the intensive poaching challenge.

In terms of the high conversation values related to the communities (HCV5 and HCV6), these are maintained by our community-based approach. We aim to change natural resource management by setting incentives, providing viable alternatives to deforestation and through education. Namely, access to forest lands is not restricted. Thereby, all cultural values of the woodlands to the locals are preserved. In terms of supply of building material for housing, this will not be restricted. Rather, the project aims to provide a more attractive alternative via its hydraform project activity (see section G3.2).

G3.7 Describe the measures that will be taken to maintain and enhance the climate, community and biodiversity benefits beyond the project lifetime.

The project activities are designed to be financially self-sufficient in the long run. By opening new sources of income, and after initial investments have been made and capacity reaches a certain level, the local population will perpetuate the project activities because it will be in their self-interest to do so. Thus we expect continued project activities to continue far beyond the lifetime of the project. Nevertheless, the financial architecture of the Kariba REDD+ project includes 20% of the net revenues being transferred to a Community and Project Sustainability Fund. This fund will ensure that the basic project activities can and most likely will be continued for at least a total of 100 years.

G3.8 Document and defend how communities and other stakeholders potentially affected by the project activities have been identified and have been involved in project.

During the project design, we sought early consultation with the local stakeholders. Specifically, the project proponents maintained close contact with the RDC administration in the project area (see section G5.3).

Additionally, a local stakeholder consultation was held in each of the four RDCs between September 20 and October 7, 2011. In compiling the list of local stakeholders, the following groups were included:

- Community members affected by the project
- Community leaders including:
    - Representatives of local associations
    - Representatives of RDC administration and RDC councils
    - Traditional leaders (chiefs)
    - Local NGOs working on related projects

The goals of the stakeholder consultations were to discover and assess opinions and views about the project, and to obtain locals' viewpoints about the project during open discussion sessions. Stakeholders were identified and invited two weeks before the consultation took place. Invitations were printed in English and the local language Shona and were accompanied by a non-technical project description.[34]

More detailed documentation of one of the SHC meetings is provided separately to the auditor.

[34] Both invitation and non-technical project description are available online under http://www.southpolecarbon.com/dev-gold.htm.

G3.9 Describe what specific steps have been taken, and communications methods used, to publicize the CCBA public comment period to communities and other stakeholders and to facilitate their submission of comments to CCBA.

All participants of the stakeholder consultation were advised that the PDD would be available for public comment and were asked to give feedback on it. In order to make the PDD draft available to the locals, one hard copy was made available to each office of the participating four RDCs. RDC employees were encouraged to collect feedback (written or verbal) on the PDD draft from the local communities. In addition, with regard to the call for feedback during the SHC meetings, at the beginning of the public comment period the project proponents issued a flyer encouraging communities to comment on the CCBS PDD. The flyer was translated into the local language and distributed to highly-frequented points within the project areas (RDC offices, schools, hospitals, etc.).

G3.10 Formalize a clear process for handling unresolved conflicts and grievances that arise during project planning and implementation. The project design must include a process for hearing, responding to and resolving community and other stakeholder grievances within a reasonable time period.

A grievance procedure was implemented as part of the project. The procedure includes four different options to the communities, by which they provide potential grievances regarding the project in written or verbal form: directly to CGI, via the OGM teams, via the Liaison Officer or via the RDC. By providing four different options, we attempted to "widen the net" to include the views of all stakeholders. We are committed to provide a written response to any grievance with 30 days. Furthermore, all grievances and our feedback will be published in our quarterly newsletter that will be distributed to the stakeholders in the project area (see section G3.2). Annex 2 to the present document details our grievance procedure.

G3.11 Demonstrate that financial mechanisms adopted, including projected revenues from emissions reductions and other sources, are likely to provide an adequate flow of funds for project implementation and to achieve the anticipated climate, community and biodiversity benefits.

The project's revenues will derive from the sale of carbon certificates. The carbon-related income will be sufficient to cover the project's costs even if the vintage of certificates should be lower than anticipated. A financial plan has been provided to the auditor.

G4. Management Capacity and Best Practices

G4.1 Identify a single project proponent, which is responsible for the project's design and implementation. If multiple organizations or individuals are involved in the project's development and implementation the governance structure, roles and responsibilities of each of the organizations or individuals involved must also be described.

Carbon Green Investments Guernsey (CGI) is the project proponent. CGI is a Guernsey-based company established to facilitate REDD projects in Zimbabwe. CGI is the project's central entity involved in project management, development, implementation and operation—both from a technical and a financial perspective. Expertise in project development, carbon monitoring and accounting is provided by South Pole Carbon Asset Management Ltd. ("South Pole")[35], a globally active carbon project developer and consultant, with a successful track record in forest-based carbon projects.

CGI cooperates with several additional local partners. Black Crystal Consulting ("Black Crystal")[36]is a Zimbabwean environmental consulting agency that supports the biodiversity component of the project. Environment Africa[37] is an NGO working in Southern Africa, which contributes its expertise and experience to the community engagement side of the project.

G4.2 Document key technical skills that will be required to implement the project successfully, including community engagement, biodiversity assessment and carbon measurement and monitoring skills. Document the management team's expertise and prior experience implementing land management projects at the scale of this project.

CGI was founded by dedicated Zimbabwean individuals with a long track record of doing business in Zimbabwe. CGI is committed to long-term engagement with Zimbabwean rural communities. Key staff of CGI include Robert Hume, Steven Wentzel, Heather Ziemann, Susan Childes, Chris Moore, Pieter Bezuidenhout and Charles Ndondo. Except Robert Hume, all of CGI's key staff are of Zimbabwean nationality. Details of key staff are listed below:

Robert Hume is CGI's CEO. He holds a Masters Degree in Business Management of the University of Exeter and has six years professional experience in private equity management, working in London, South Africa and Zimbabwe.

Stephen Wentzel is CGI's founder and CFO. In Zimbabwe, he has successfully established several start-up companies.

[35] http://www.southpolecarbon.com/

[36] http://blackcrystal.co.zw/

[37] http://www.environmentafrica.org/

Heather Ziemann is employed as the company administrator of CGI and has extensive knowledge in this department from her past years of experience in dealing with local and international company relations on an administrative level. She has worked for offshore investment companies and brings this experience into CGI to deal with investor relations and management.

Susan Childes has a decade-long track record of working in Zimbabwe in environmental management and consultancy. Among other task, she did Environmental Impact Assessments, environmental management plans, and ecological assessments. She has a very good knowledge of the vegetation and wildlife in the project area.

Chris Moore grew up and spent most of his life in the project area, providing him with excellent knowledge about local traditions and attitudes. During his professional career, he worked for different institutions on fire protection and management.

Pieter Bezuidenhout is an experienced (former) safari-hunter with expert knowledge on the social aspects and wildlife in the project area. He is fluent in Afrikaans, Shona and Swahili.

Charles Ndondo acts as the project's liaison officer to the local communities. He has previously worked as managing director for a safari operator in the project area. Before that he was a police officer.

Community-based REDD projects designed in a pro-poor, pro-biodiversity manner obviously require a lot of different skills and knowledge in order to be successful over the long run. We believe that we managed to create a team that covers all aspects of the projects with excellent and experienced experts.

CARBON MONITORING AND MEASUREMENT

South Pole has a long and successful track record working on forestry-based carbon projects. In 2011, South Pole was elected the Best Project Developer of the Voluntary Carbon Markets.[38] A profile of the company has been provided to the validator. South Pole oversees the development of appropriate project design and monitoring techniques in line with the guidelines of the CCBS and the VCS.

On the ground, assessment of carbon stocks and supervision of monitoring teams will be provided by Black Crystal. Black Crystal has a long track record in working with natural resources in Zimbabwe and neighboring countries. The five professionals working for Black Crystal have a combined experience of 50 years. Black Crystal's extensive track record includes environmental impact assessments, environmental management mandates, socio-economic and archaeological and historical assessments. They are the preferred consultancy partner of Environment Africa, which is also involved in the Kariba REDD+ project. A capability statement of Black Crystal is available upon request.

COMMUNITY ENGAGEMENT

Environmental Africa (EA) is very experienced in working with communities in Southern Africa. EA carried out the initial community assessment (baseline study) in the project area,

[38]http://envirofinance.wordpress.com/2011/02/11/whatever-happened-to-jp-morgan/

assisted during project design and helped CGI develop and implement the community impact monitoring plan.

Furthermore, CGI has recruited Chris Moore, who has spent most of his life in the project area and is very well connected within the area's communities. He will deal with community-related issues of the project during its operation.

BIODIVERSITY ASSESSMENT

The Kariba REDD+ project's biodiversity assessment is supervised by Black Crystal. On the ground, CGI recruited former professional safari guides, who are very familiar with the area and its wildlife, namely Warren Thorne, Pieter Bizuidenhout and Rob Lee. These individuals will be responsible of setting up monitoring and patrolling teams. They have superior knowledge of the local biodiversity and bring with them the necessary field experience to perform the assessment.

FIRE CONTROL AND FIRE FIGHTING

Fire control measures will be implemented by Chris Moore. Chris worked for seven years in the fire-control field for the Kwazulu Natal Fire Protection Association and the Zimbabwe Timber Producers Association. He is experienced in both implementing fire control techniques as well as passing on his knowledge as a trainer. Chris is supported by Warren Thorne and Pieter Bizuidenhout, who – as former safari guides –know the project area very well.

G4.3 Include a plan to provide orientation and training for the project's employees and relevant people from the communities with an objective of building locally useful skills and knowledge to increase local participation in project implementation.

Capacity building and knowledge enhancement are essential to gaining the support of locals and ensuring the effectiveness and long-term success of the project. Employees will receive extensive training. Specifically, members of the OGM teams will receive comprehensive training to enable them to fulfill their different responsibilities (see section G3.2). The training will encompass aspects that are specific for various employment positions, including risk avoidance and awareness. Additionally, the employees will be educated about environmental issues (e.g., climate change) and labor issues (e.g., rights of laborers) (see section G4.5).

Training and capacity building is also the main approach in our agricultural strategy (see section G3.2), which aims to train farmers to apply more productive farming techniques.

Further training and awareness raising will be included as part of our schooling program and our newsletter. The newsletter will raise awareness and capacity by including general topics related to environmental issues and rural development (see section G3.2).

G4.4 Show that people from the communities will be given an equal opportunity to fill all employment positions (including management) if the job requirements are met. Project proponents must explain how employees will be selected for positions and where relevant, must indicate how local community members, including women and other potentially underrepresented groups, will be given a fair chance to fill positions for which they can be trained.

The project proponents perceive the creation of local employment as a major project benefit for the local communities and a key to project success (because it creates support for the project via the creation of jobs). We therefore aim to – wherever possible – fill positions with local employees. Job advertisements will be published in the project's newsletter and communicated via the RDC offices and ward heads, to ensure that it reaches locals on the ground. To facilitate employment, extensive training workshops both at the beginning and throughout the employment will take place. As part of our monitoring procedure, we will track key information of each employee. This will allow us to adapt our recruitment approach to ensure that it is not biased in terms of gender or income level.

G4.5 Submit a list of all relevant laws and regulations covering worker's rights in the host country. Describe how the project will inform workers about their rights. Provide assurance that the project meets or exceeds all applicable laws and/or regulations covering worker rights and, where relevant, demonstrate how compliance is achieved.

The employment and worker's rights in Zimbabwe are governed by the Labour Act.[39]Employees of the Kariba REDD+ project will be informed about their rights at the commencement of the employment. The major relevant sections of the Labour Act are as follows: Part II of the Act clearly speaks of the fundamental rights of employees; Part III deals with unfair labour practices; Part IV deals with general conditions of employment; Part V deals with wage and salary control; Part VI will deal with workers committees formation and functions; Part VII deals with workers trade unions; Part VIII deals with employment councils; Part IX deals with employment boards; Part XI deals with Labour Relations Tribunal; and Part XII deals with the determination of disputes and unfair labour practices.

To ensure the workers know and use their rights, they are encouraged to form workers committees, within which all issues related to the employment are discussed and subsequently brought forward to the CGI team. Additionally, the trade union is encouraged to regularly visit the project to ensure fair employment conditions.

[39] http://www.parlzim.gov.zw/cms/Acts/Title28_MANPOWER_AND_LABOUR_RELATIONS/LABOUR_ACT_28_01.pdf

G4.6 Comprehensively assess situations and occupations that pose a substantial risk to worker safety. A plan must be in place to inform workers of risks and to explain how to minimize such risks.

The safety of our OGM teams is very important to us. Obviously anti-poaching patrolling and fire fighting carry significant risk. Our OGM teams are trained by experienced members of the project team. Warren Thorne will train the OGM teams in patrolling, tracking and police techniques. To ensure the teams are appropriately trained, Warren will join them on their patrols during the early phases of setting up the teams and frequently later on to guarantee a high standard of their work.

On the fire management side, the project team's expert Chris Moore (see section G4.2) will train the OGM teams on effective techniques and appropriate risk management. After an intensive initial phase of training, Chris will continuously supervise the teams and ensure a professional working style.

Upon new recruitment, team leaders will be in charge of the training. However, this will be supervised in the earlier stages of the OGM team by Pieter Bizuidenhout and/or Warren Thorne. The community monitoring process will include a mechanism to assess the appropriateness of the team member's training (see section CM3.1).

Next to effective training, ensuring a supply of appropriate equipment will minimize the risk exposure of the project's team members. We expect our employees to perfom their jobs in a professional manner and will do whatever it takes in terms of training and equipment to make this possible.

G4.7 Document the financial health of the implementing organization(s).

Carbon Green Investments is a privately funded project developer and implementer. To date the company has injected in excess of 750,000 USD in the project and has access to a further 500,000 USD. This amount is sufficient to see the project to revenue-generating status. If for some reason we require further funding to develop and see the project to self-sustainable figures, we have access to direct credit lines through other business, which have cross shareholdings with CGI.

With so much of the income from the project being devoted back to the project rather than profitability, it leaves CGI in a positive financial position from project inception.

G5. Legal Status and Property Rights

G5.1 Submit a list of all relevant national and local laws and regulations in the host country and all applicable international treaties and agreements. Provide assurance that the project will comply with these and, where relevant, demonstrate how compliance is achieved.

Zimbabwe has signed the Kyoto Protocol and has a Designated National Authority (DNA). However, to date, Zimbabwe has hosted neither a CDM project activity nor a carbon project related to the voluntary carbon market. Zimbabwe is also not yet a part of the UN-REDD process.[40]

The Forest Act and the Communal Lands Forest Produce Act (CLFPA)[41] are the principal pieces of legislation that govern the exploitation and protection of forest and woodland resources in Zimbabwe. The CLFPA was established 1987 and gives inhabitants of communally-owned land (such as RDCs) the right to exploit its forest products. It is also explicitly referred to in the Rural District Council Act (see section G1.6).

The Ministry of Environment and Natural Resources, through its line parastatals (the Forestry Commission, the Environmental Management Agency and the Department of National Parks and Wildlife Management), is the major player in forest biodiversity management. Other sectors such as agriculture, construction and water have both direct and indirect impacts on forest resources. However, there is no formal cooperation between the two sectors as the role of trees and woodland is not clearly defined in Zimbabwe's agricultural policy. Zimbabwe is a signatory to a number of international conventions but has in the past had difficulties attracting funding sources to implement related obligations or compromises. To date, Zimbabwe has not started formal preparations for a REDD+ mechanism.

G5.2 Document that the project has, or expects to secure, approval from the appropriate authorities.

Since the Rural District Council Act came into force in 1988, the project area has been owned by the RDCs. RDCs have the sole right of managing the land use in the project area and do so based on a democratically elected council.

CGI, as the project proponent, has sought the close cooperation with the four RDCs in the project area since the first activities related to the project. Agreement and sound cooperation are believed to be keys to the project's success. After a first phase of consultation of the RDCs, applicable agreements with all four RDCs of the areas involved have been signed. The agreements establish the REDD project as a common effort (in terms of implementation and benefit sharing) undertaken by the RDCs and CGI. The RDCs are

[40] http://www.un-redd.org/AboutUNREDDProgramme/tabid/583/Default.aspx

[41] http://faolex.fao.org/docs/pdf/zim8819.pdf

mentioned as integral partners in implementing measures to decrease deforestation. Accordingly, 30% of the net revenue to the project, generated by the sale of VERs, are assigned to the RDCs. In RDCs, where safari operators lease the land from the administration[42], the safari operators have been included in the legal framework and rewarded according to their contributions to the project activities. In these RDCs, a "Bilateral Agreement for Verified Emission Reductions" has been established between the respective RDC and the leaseholder. CGI then established "Sole and Exclusive Mandate Agreements for Verified Emission Reductions" with the leaseholders. Where there are no leaseholders, the "Bilateral Agreement for Verified Emission Reductions" has been directly signed with the RDC. All contracts are valid over 30 years. Copies of all contracts are provided to the auditor as supplementary information. For an overview of the signed contracts refer to Table 13.

G5.3 Demonstrate with documented consultations and agreements that the project will not encroach uninvited on private property, community property or government property and has obtained the free, prior, and informed consent of those whose rights will be affected by the project.

Within all four affected RDCs, CGI has sought early support for the Kariba REDD+ project by holding meetings to inform the local communities and receive their feedback on the planned project activities. This was done prior to signing the agreements with the communities, to ensure their support at an early stage. Additional stakeholder sessions were held to again inform and consult the local communities after the project planning was more advanced and in order to provide opportunities to express concerns about and influence the implementation of the project (see section G3.8).

Table 13: Timeline of meetings and agreements with the local communities

RDC	Meeting	Date
Binga	Informative meeting with Council Members	February 17, 2011
	Signature of Agreement between leaseholders and RDC	January 25, 2011
	Signature of Agreement between leaseholders and CGI	March 17, 2011
	Additional SHC meeting	September 15, 2011
Hurungwe	Informative meeting with Council Members	February 15, 2011

[42]This is the case in the RDCs Nyami Nyami (leaseholder: Chapungu Safaris), Hurungwe (leaseholder: Hurungwe Safaris), Binga (leaseholders Songo Wildlife Management Area and Big Game Trophy's Ltd.).

	Signature of Agreement between leaseholders and RDC	March 14, 2011
	Signature of Agreement between leaseholder and CGI	March 17, 2011
	Additional SHC meeting	September 20, 2011
Mbire	Informative meeting with Council Members	February 15, 2011
	Signature of Agreements between RDC and CGI	March 18, 2011
	Additional SHC meeting	September 22, 2011
Nyami Nyami	Informative meeting with Council Members	February 17, 2011
	Signature of Agreement between leaseholders and RDC	March 1, 2011
	Signature of Agreement between leaseholder and CGI	March 17, 2011
	Additional SHC meeting	October 7, 2011

G5.4 Demonstrate that the project does not require the involuntary relocation of people or of the activities important for the livelihoods and culture of the communities.

We guarantee that no involuntary relocation of people will take place related to the project activities. We also communicated this principle to the local administrations involved in the project and will insist on strict compliance with this principle. Should relocation be favorable to reach the project targets, we will strongly rely on incentives to achieve this.

G5.5 Identify any illegal activities that could affect the project's climate, community or biodiversity impacts (e.g., logging) taking place in the project zone and describe how the project will help to reduce these activities so that project benefits are not derived from illegal activities.

There is widespread poaching of wildlife and illegal cutting of trees in the project area. Reducing poaching is part of the core project activities (see section G3.2). Therefore, we believe that we have addressed this issue as well as possible. Previous experience with the CAMPFIRE project in the area showed that anti-poaching activities are feasible and

beneficial to the communities as long as sufficient funding is available. The Kariba REDD+ project will provide this funding. By creating legal employment opportunities, the project will reduce the number and frequency of illegal activities in the area. Other illegal activities have neither been observed nor expected in the project area.

G5.6 Demonstrate that the project proponents have clear, uncontested title to the carbon rights, or provide legal documentation demonstrating that the project is undertaken on behalf of the carbon owners with their full consent.

No national, explicit laws on REDD or carbon ownership exist in Zimbabwe. The RDCs have, jointly with the management of all soil and above-soil natural assets including trees and biomass, the right to environmental goods and services in the area[43].

While no explicit carbon rights are established, the Rural District Council Act declares the RDC's right to "take measures for the conservation or improvement of natural resources" (Section 6) and furthermore to be funded by "amounts received by the council in terms of the Communal Land Forest Produce Act" (Section 118g). Therein, it is stated that: "The inhabitants of any Communal Land shall have the right, within that Communal Land, to exploit for their own use any forest produce" (Section 4 (1)).

The project's agreements with each RDC in the project area transfer the carbon rights to the project proponents. The contracts establish the Kariba REDD+ project as the common project of the project proponent and the local RDCs. The contracts give CGI the rights to develop, establish and market the project with support of the RDCs and establish a benefit sharing of the carbon revenues. The benefit sharing agreement specifies that 30% of the gross revenue go to CGI, 30% of the net revenues go to the land owner (RDCs) and 10% of the net revenues go to the leaseholders if any exists and they are engaging in the project activities. Further, 20% of the net revenue is used to create the Community and Project Sustainability Fund, which is established to create extra benefits to the local communities (see section G3.2). Copies of the contracts are separately provided to the auditor.

[43] See the Rural District Council Act (discussed in section G1.6) and the Communal Lands Forest Produce Act (discussed in section G 5.1).

III. Climate Section

CL1. Net Positive Climate Impacts

CL1.1 Estimate the net change in carbon stocks due to the project activities using the methods of calculation, formulae and default values of the IPCC 2006 GL for AFOLU or using a more robust and detailed methodology. The net change is equal to carbon stock changes with the project minus carbon stock changes without the project (the latter having been estimated in G2). This estimate must be based on clearly defined and defendable assumptions about how project activities will alter GHG emissions or carbon stocks over the duration of the project or the project GHG accounting period.

The Kariba REDD+ project will generate a Net Positive Climate Impact due to avoided deforestation in the project area.

The project target is to reduce deforestation as far as possible, or even to fully stop it. For the sake of this Climate Impact estimation, we conservatively assume an effectiveness that increases over time, starting at 10% in year one and leveling off at 70% in year 7. The carbon stock changes in tC in the "with project" case and the "without project" case, along with the net change in carbon stocks are shown in Table 14.

Table 14: Project effectiveness in reducing deforestation and changes in carbon stocks with and without the project in tC yr^{-1}

Year	1	2	3	4	5	6	≥7
Project effectiveness	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Stock changes without project in tC yr^{-1}	-396'855	-396'855	-396'855	-396'855	-396'855	-396'855	-396'855
Stock changes with project in tC yr^{-1}	-357'169	-317'484	-277'798	-238'113	-198'427	-158'742	-119'056
Net changes in tC yr^{-1}	39'685	79'371	119'056	158'742	198'427	238'113	277'798

Over the project duration of 30 years, the net cumulative change of the carbon stock is 7'500'554tC (about 7.5MtC). This is equivalent to 27'502'033 tCO_2 (27.5 $MtCO_2$).

CL1.2 Estimate the net change in the emissions of non-CO_2 GHG emissions such as CH_4 and N_2O in the with and without project scenarios if those gases are likely to account for more than a 5% increase or decrease (in terms of CO_2-equivalent) of the project's overall GHG emissions reductions or removals over each monitoring period.

Estimation of non-CO_2 GHG emissions is based on conservative assumptions detailed in section G2.3, and the project's effectiveness is shown in the previous section (CL1.1). The resulting net changes in CH_4 and N_2O emissions are shown in Table 15.

Table 15: Emission of non-CO_2 GHGs with and without the project and net reductions in $tCO_2e\ yr^{-1}$

Year	1	2	3	4	5	6	≥7
Effectiveness	0.1	0.2	0.3	0.4	0.5	0.6	0.7
CH_4 emissions without project $tCO_2e\ yr^{-1}$	66'142	66'142	66'142	66'142	66'142	66'142	66'142
N_2O emissions without project $tCO_2e\ yr^{-1}$	23'189	23'189	23'189	23'189	23'189	23'189	23'189
CH_4 emissions with project $tCO_2e\ yr^{-1}$	59'528	52'914	46'300	39'685	33'071	26'457	19'843
N_2O emissions with project $tCO_2e\ yr^{-1}$	20'870	18'551	16'232	13'913	11'594	9'276	6'957
Net reduction of CH_4 emissions in $tCO_2e\ yr^{-1}$	6'614	13'228	19'843	26'457	33'071	39'685	46'300
Net reduction of N_2O emissions in $tCO_2e\ yr^{-1}$	2'319	4'638	6'957	9'276	11'594	13'913	16'232

Cumulatively over 30 years, the net emission reduction of non-CO_2 GHGs alone is 1'688'360 tCO_2e (1.7 $MtCO_2e$).

CL1.3 Estimate any other GHG emissions resulting from project activities. Emissions sources include, but are not limited to, emissions from biomass burning during site preparation, emissions from fossil fuel combustion, direct emissions from the use of synthetic fertilizers, and emissions from the decomposition of N-fixing species.

Other emissions of GHGs during the project will be negligible and are therefore omitted.

CL1.4 Demonstrate that the net climate impact of the project is positive. The net climate impact of the project is the net change in carbon stocks plus net change in non-CO_2 GHGs where appropriate minus any other GHG emissions resulting from project activities minus any likely project-related unmitigated negative offsite climate impacts (see CL2.3).

The net reduction in CO_2 emissions is calculated as the CO_2 equivalent of the net change in carbon stock that is not emitted as CH_4. Based on section G2.3, 99% of the carbon stock change is emitted as CO_2, on land that is converted by burning. Where burning is not part of the conversion process, 100% of the net carbon stock change is emitted as CO_2.

The net climate impact is calculated by adding the net emission reductions of CO_2 and non-CO_2 GHGs. No other significant GHG emissions or leakage are assumed to occur (see sections CL1.3 and CL2.1). The results are shown in Table 16.

Table 16: Net reduction in emission of CO_2 and non-CO_2 GHGs and total net reduction of the project in tCO_2e

Year	1	2	3	4	5	6	≥7
Net reduction in emission of non-CO_2 GHGs in tCO_2e	8'933	17'866	26'799	35'732	44'666	53'599	62'532
Net reduction in emission of CO_2 in tCO_2e	144'786	289'572	434'358	579'143	723'929	868'715	1'013'501
Total net reduction in tCO_2e	153'719	307'438	461'157	614'876	768'595	922'314	1'076'033

Compared to the without-project scenario, the project reduces the emissions of CO_2 and non-CO_2 GHGs by about 29.1 $MtCO_2e$ over 30 years. The project, therefore, has a strong positive net climate impact.

CL1.5 Specify how double counting of GHG emissions reductions or removals will be avoided, particularly for offsets sold on the voluntary market and generated in a country with an emissions cap.

Zimbabwe has signed the Kyoto Protocol, but being a Non-Annex 1 country it did not commit to emissions reductions. Zimbabwe has not set its own emission cap. Therefore, created emission reductions are not double-counted by any national reduction scheme.

The Kariba REDD+ project aims to certify its emission reductions under the VCS, the best-accepted carbon standard for the voluntary carbon market.[44] The VCS requires registration

[44] State of the Voluntary Carbon Markets 2011, Ecosystems Marketplace and Bloomberg New Energy Finance.

of all emission reductions in an independent registry, where each single VER can be identified and is tracked from issuance to retirement. Furthermore, South Pole Carbon Asset Management Ltd. – the project partner responsible for the commercialization of the carbon credits – applies a sophisticated internal accounting scheme to guarantee a complete track record of emission reductions before issuance. This guarantees that emission reductions are only sold once, be it pre-issuance in a forward transaction or post-issuance in a spot deal.

CL2. Offsite Climate Impacts ('Leakage')

CL2.1 Determine the types of leakage that are expected and estimate potential offsite increases in GHGs (increases in emissions or decreases in sequestration) due to project activities. Where relevant, define and justify where leakage is most likely to take place.

We understand leakage as being a major threat to the effectiveness of climate mitigation projects, particularly in the land-use sector.

The following potential leakage channels have to be assessed in the Kariba REDD+ project.[45]

ACTIVITY SHIFTING (PRIMARY LEAKAGE)

The main primary leakage threat is agricultural conversion prevented by the project simply shifts outside the project area. There are two arguments why this is not likely to happen:

- The Kariba REDD+ project covers a large area totalling 1'077'930 ha. Therefore, most of the local population is unlikely to establish agricultural fields outside the project area because it is out of reach given their reduced mobility.
- More important, the Kariba REDD+ project actively assists the local population in increasing the efficiency of their agricultural on already existing plots. Increased agricultural output will make shifting of plots to outside the project area highly unlikely.

Activity shifting could occur if the project reduces employment in the area and lowers income to the local population. Our project, however, will have the opposite impact: agricultural intensification and general community enhancing activities are designed to improve rural livelihoods. And local employment will be created as a result of the project, directly improving the income of the recruited locals.

MARKET LEAKAGE (SECONDARY LEAKAGE)

Lower harvest of wood products leads to a scarcity of wood and therefore a higher price. This could lead to increased harvest of wood outside the project area and thus leakage of

[45]See Wunder, S., How do we deal with leakage? In: Angelsen, A. (ed.) 2008, Moving ahead with REDD: Issues, options and implications. CIFOR, Bogor, Indonesia.

emissions. Even though the low mobility of the local communities reduces this risk, our fuelwood plantation project activity is designed to mitigate this risk (see section G3.2). By establishing sustainably-managed woodlots within the project area, the wood resource needs of locals will be provided without causing forest deforestation/degradation. The long-term presence of the Kariba REDD+ project team in the area ensures appropriate support in developing this long-term solution for the provision of sustainable wood products.

In sum, no leakage of emissions is expected from the Kariba REDD+ project into adjacent areas. Nevertheless, as part of the validation under the VCS, an extensive leakage monitoring system will be established. As part of this monitoring procedure, a leakage belt around the project area will be identified and continuously monitoring for increased deforestation rates as a result of the project. Should any leakage of deforestation into the leakage belt be monitored, this will be deducted from the net GHG emission reductions.

CL2.2 Document how any leakage will be mitigated and estimate the extent to which such impacts will be reduced by these mitigation activities.

Due to the design of our project activities, no leakage is expected. Therefore no mitigation measures are established other than the core project activities (described in the previous section).

CL2.3 Subtract any likely project-related unmitigated negative offsite climate impacts from the climate benefits being claimed by the project and demonstrate that this has been included in the evaluation of net climate impact of the project (as calculated in CL1.4).

No leakage is expected.

CL2.4Non-CO_2 gases must be included if they are likely to account for more than a 5% increase or decrease (in terms of CO_2-equivalent) of the net change calculations (above) of the project's overall off-site GHG emissions reductions or removals over each monitoring period.

No leakage is expected.

CL3. Climate Impact Monitoring

CL3.1 Develop an initial plan for selecting carbon pools and non-CO_2 GHGs to be monitored, and determine the frequency of monitoring. Potential pools include aboveground biomass, litter, dead wood, belowground biomass, wood products, soil carbon and peat. Pools to monitor must include any pools expected to decrease as a result of project activities, including those in the region outside the project boundaries resulting

from all types of leakage identified in CL2. A plan must be in place to continue leakage monitoring for at least five years after all activity displacement or other leakage causing activity has taken place. Individual GHG sources may be considered 'insignificant' and do not have to be accounted for if together such omitted decreases in carbon pools and increases in GHG emissions amount to less than 5% of the total CO_2-equivalent benefits generated by the project. Non-CO_2 gases must be included if they are likely to account for more than 5% (in terms of CO_2-equivalent) of the project's overall GHG impact over each monitoring period. Direct field measurements using scientifically robust sampling must be used to measure more significant elements of the project's carbon stocks. Other data must be suitable to the project site and specific forest type.

The Kariba REDD+ project employs scientifically robust GHG inventory methodologies in all relevant land cover classes (woodland, cropland, grassland) as demanded by the 'Good Practice Guidance Chapter 4.3 Land use, Land use change and Forestry (LULUCF) Projects'[46]. Table 17 gives an overview on included pools and GHGs.

Table 17: Monitored GHGs

Sources	Gas	Included/ excluded	Justification / Explanation of choice
Biomass burning (above-ground)	CO_2	Included	Counted as *carbon stock* change
	CH_4	Included	Estimated in units of CO_2e, using the ratio of climate forcing values from the IPCC GHG
	N_2O	Included	Estimated in units of CO_2e, using the ratio of climate forcing values from the IPCC GHG
Biomass decay (below-ground)	CO_2	Included	Counted as *carbon stock* change
Soil carbon loss	CO_2	Included	Counted as *carbon stock* change
Dead wood	CO_2	Excluded	Not a significant source
Litter	CO_2	Excluded	Not a significant source
Combustion of fossil fuels by vehicles	CO_2	Excluded	Not a significant source
	CH_4	Excluded	Not a significant source
	N_2O	Excluded	Not a significant source

[46]IPCC (2006): Good Practice Guidance for Landuse, Land Use Change and Forestry Projects. http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/Chp4/Chp4_3_Projects.pdf

	CO_2	Excluded	Not a significant source
Use of fertilizers	CH_4	Excluded	Not a significant source
	N_2O	Excluded	Not a significant source
	CO_2	Excluded	Not a significant source
Livestock emissions	CH_4	Excluded	Not a significant source
	N_2O	Excluded	Not a significant source

Values of soil carbon, above-ground and below-ground biomass were taken from regional literature (See G1.4). For CH_4 and N_2O emissions from above-ground biomass burning we estimated GHG emissions in units of CO_2e using the ratio of climate forcing values from the IPCC GHG Guidelines.

The extent of each land use of the project, reference and leakage area will be monitored in a five-year interval via Landsat imagery and the classification scheme applied for historic land use analysis used for establishment of the baseline (See G2.3). As natural regeneration of degraded lands is not eligible for additional CO_2e benefits under the aspired VCS Methodology VM0009 we only monitor the remaining forest cover area of the previous time step for new deforestation (i.e., gross deforestation). CO_2e benefits will only be claimed for avoided deforestation and forest degradation of the remaining forest area against the approved baseline – not for regeneration of previously degraded woodland. The regeneration of degraded woodland is still strongly aspired and encouraged by the proposed project activities.

Each land use map resulting from the Landsat imagery will be compared to the previous time step and a change detection map calculated. This results in land use transition matrices of the project, reference and leakage area. Thus, decreasing CO_2e stocks due to land use changes can be calculated and compared to the baseline scenario and the eligible carbon benefits from avoided deforestation and forest degradation of the Kariba REDD+ project reported.

The conversion of forests to agricultural land and grassland will be assessed via Landsat imagery and *in situ* control points at each interval. Accuracy of the land use classification will be reported with each monitoring interval.

CL3.2 Commit to developing a full monitoring plan within six months of the project start date or within twelve months of validation against the Standards and to disseminate this plan and the results of monitoring, ensuring that they are made publicly available on the internet and are communicated to the communities and other stakeholders.

We commit to develop a full monitoring plan within the required time frame and submit it to the CCBS for dissemination on its website. Additionally, we will also publish the complete CCBS monitoring plan on South Pole Carbon's website.[47]

[47]Under http://www.southpolecarbon.com/dev-gold.htm.

IV. Community Section

CM1. Net Positive Community Impacts

CM1.1 Use appropriate methodologies to estimate the impacts on communities, including all constituent socio-economic or cultural groups such as indigenous peoples (defined in G1), resulting from planned project activities. A credible estimate of impacts must include changes in community well-being due to project activities and an evaluation of the impacts by the affected groups. This estimate must be based on clearly defined and defendable assumptions about how project activities will alter social and economic well-being, including potential impacts of changes in natural resources and ecosystem services identified as important by the communities (including water and soil resources), over the duration of the project. The 'with project' scenario must then be compared with the 'without project' scenario of social and economic well-being in the absence of the project (completed in G2). The difference (i.e., the community benefit) must be positive for all community groups.

The Kariba REDD+ project is both community based and incentive based. Virtually all project activities aim on improving the local communities' livelihoods and providing attractive alternatives to the unsustainable use of natural resources. The communities will benefit in many ways from the project, and it is virtually certain that the benefits will not materialize in the absence of the project.

More specifically, the projects agricultural and beekeeping activities aim at increasing the local income level. Direct employment, e.g. for the OGM teams, will significantly improve the livelihoods of the employees and their families. The communities directly gain a fair share of the carbon revenue generated by the project (see section G5.6). Benefits towards even broader and poorer sections of the communities are ensured by dedicating a significant part of the project's carbon revenue exclusively to community enhancement, primarily via investments in improved health and education. This is realized via the Community and Project Sustainabilty Fund, where the locals have significant influence on deciding on the use of the funds (see section G3.2).

As all of these benefits will most surely not materialize without the project. The project proponents believe strongly that the project will have a positive impact on the local communities.

CM1.2 Demonstrate that no High Conservation Values identified in G1.8.4-6 will be negatively affected by the project.

The project area is identified as being of the community-related High Conservation Values 5 (fundamental basic needs) and 6 (cultural identity). The project will not include restriction

of access and therefore does not limit the local communities' ability to use the land for their cultural needs, such as burying their chiefs in hollow Baobab trees.

In terms of fundamental needs, the project will follow an incentive-based approach to reduce the use of forest resources, rather than a restrictive approach. This implies a) that reduced benefits from not using forest resources are being (over-)compensated for and b) forest resources are still available for use by locals.

By way of example, one major source of deforestation is conversion to agriculture. This is often necessary due to poor agricultural techniques but results in low outputs from existing plots. With its activities to improve the local agriculture, the project aims to reduce the necessity of shifting agriculture by making the harvest more sustainable on a single plot. This in turn reduces the incentive to apply shifting agriculture. The result is a benefit for both the climate (reduced deforestation) and the local communities (higher agricultural output).

To take another example, in terms of building material the project will not restrict the use of forest resources to housing construction but will provide a more environmentally friendly alternative in the form of Hydraform bricks (see section G3.2).

CM2. Offsite Stakeholder Impacts

CM2.1 Identify any potential negative offsite stakeholder impacts that the project activities are likely to cause.

No negative offsite stakeholder impacts are expected to occur. Rather, the project is expected to have positive offsite impacts. Reduced reforestation, for example, reduces erosion and in so doing reduces siltation in Lake Kariba. The cumulative costs of degradation in Zimbabwe through siltation of dams and waterways have been estimated to have a major impact on Gross Domestic Product (GDP).[48]

CM2.2 Describe how the project plans to mitigate these negative offsite social and economic impacts.

Not applicable.

CM2.3 Demonstrate that the project is not likely to result in net negative impacts on the well-being of other stakeholder groups.

Not applicable, as not other stakeholder groups have been identified (see section G3.8).

[48]Gore et al. 1992; Grohs, 1994, in Prince et al. (2009)

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 will be undertaken. This will be separated into direct and indirect effects of the project. In the following, variables to be monitored and their monitoring frequency are presented. The monitoring results will be covered in the monitoring reports that are issued at least every five years.

DIRECT EFFECTS

Project activity	**Indicator**	**Frequency**	
		Monitoring	**Reporting**
Improved agriculture	Number of farmers trained in conservation agriculture	Continuously	5 yearly
	Number of community gardens established	Continuously	5 yearly
	Number of boreholes established	Continuously	5 yearly
	Number of boreholes maintained	Continuously	5 yearly
Beekeeping	Number farmers trained	Continuously	5 yearly
	Number starting kits handed out	Continuously	5 yearly
	Number honey processing centers built	Continuously	5 yearly
Fuelwood plantations	Area established plantations	5 yearly	5 yearly
	Area mature plantations that can be harvested	5 yearly	5 yearly
Social forestry	Number wards in which traditionally conserved forest is mapped	5 yearly	5 yearly
Brick making	Number of active molding machines	5 yearly	5 yearly

OGM teams	Total employees in OGM teams	5 yearly	5 yearly
	Number of man days spent patrolling	Continuously	5 yearly
	Number of man days spent on fire management	Continuously	5 yearly
Community Fund	Number of schools supported	Continuously	5 yearly
	Number of clinics supported	Continuously	5 yearly
	Number of school bursaries	Continuously	5 yearly
	Total funds spent	Continuously	5 yearly
Newsletter	Number of issues	5 yearly	5 yearly

INDIRECT EFFECTS

A sample of RDC households will be interviewed to gain this information.

Indicator	**Frequency**	
	Monitoring	**Reporting**
Annual household income (in US$, five classes)	5 yearly	Upon verification
Gender of household head	5 yearly	Upon verification
Age of household head	5 yearly	Upon verification
Employment status	5 yearly	Upon verification
Involvement in the project (yes/no)	5 yearly	Upon verification
Benefiting from the project (five classes)	5 yearly	Upon verification
Education of household head (none, primary, secondary, tertiary)	5 yearly	Upon verification
Cash crops produced? (yes/no)	5 yearly	Upon verification
Which cash crops	5 yearly	Upon verification

SPECIFIC MONITORING OF EMPLOYEES AND DIRECT BENEFICIARIES OF THE PROJECT

Basic data of employees are registered upon recruitment. Every fifth year, there will be a more extensive set of questions asked of every employee. Direct beneficiaries are community members that receive direct support (material or though training). Basic data will be monitored for these, in order to allow any bias in the beneficiaries, e.g. regarding gender or household income (see section GL2.5).

Indicator	**Frequency**	
	Monitoring	**Reporting**
Age	Continuously	Upon verification
Gender	Continuously	Upon verification
Annual household income (in US$, five classes)	Continuously	Upon verification
Annual household income before the employment (in US$, five classes)	Continuously	Upon verification
Education (none, primary, secondary, tertiary)	Continuously	Upon verification
Did you gain knowledge on sustainable natural resource management? (five classes)*	5 yearly	Upon verification
Did you receive sufficient training to do your work properly? (five classes)*	5 yearly	Upon verification
Do you earn more or less money that in previous jobs? (five classes)*	5 yearly	Upon verification
Are you from the project area? (five classes)*	5 yearly	Upon verification
Is your work dangerous? (five classes)*	5 yearly	Upon verification
Did you receive training to prepare you for dangerous situations? (five classes)*	5 yearly	Upon verification
Do you know who to address for your grievances (yes/no)*	5 yearly	Upon verification

* Note: these questions are only applicable to employees, not to direct beneficiaries.

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 well-being (G1.8.4-6) present in the project zone.

Assessment of maintenance and enhancement of High Conservation Values (HCVs) will be included as part of the project's standard monitoring procedure. More specifically, it will be covered in the monitoring campaign of indirect project effects, which is scheduled on a 5 yearly basis (see section CM 3.1).

The two identified HCVs related to community well-being 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?"
- "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 foresto fulfil your cultural needs?"

CM3.3 Commit to developing a full monitoring plan within six months of the project start date or within twelve months of validation against the Standards and to disseminate this plan and the results of monitoring, ensuring that they are made publicly available on the internet and are communicated to the communities and other stakeholders.

A full community monitoring plan will be developed within twelve months of validation. It will be made public via the CCB website. Publication within the communities will be achieved via publication in the project's newsletter (see section G3.2). The full CCBS monitoring plan will be published additionally on South Pole Carbon's website.[49]

[49] At http://www.southpolecarbon.com/dev-gold.htm.

V. Biodiversity Section

B1. Net Positive Biodiversity Impacts

B1.1 Use appropriate methodologies to estimate changes in biodiversity as a result of the project in the project zone and in the project lifetime. This estimate must be based on clearly defined and defendable assumptions. The 'with project' scenario should then be compared with the baseline 'without project' biodiversity scenario completed in G2. The difference (i.e., the net biodiversity benefit) must be positive.

As outlined in section G1.7, the wildlife in the area has suffered strongly from the economic breakdown in Zimbabwe and the consequent increase in poaching activities. Furthermore, deforestation and forest degradation destroys fauna and flora and the natural ecosystems that support them. Land use change via agricultural expansion is the most important driver for loss of biodiversity in Southern Africa.[50] Unmitigated poaching activities will put additional pressure on the biodiversity (See also section G2.5). Our experiences from the field show the project area's wildlife strongly decreased over the past few years. Given this, it is unlikely that significant populations of large mammals will be left in the mid-term in the absence of the project activity.

The "with project" scenario includes several activities directly or indirectly enhancing biodiversity. None of the project activities is foreseen to have a negative effect on biodiversity in the area. Reduced deforestation will fight loss of biodiversity at its very root, which is the destruction of habitat. By doing so, the project area's important corridor function for adjacent national parks is restored (see Map 3). Patrolling is an integral part of our project (see section G3.2). Patrolling reduces the pressure on biodiversity caused by severe poaching, thus allowing biodiversity to flourish. As a consequence, safaris will be possible in the future. The success of the CAMPFIRE project demonstrates that sustainable safari tourism is possible and can bring substantial benefits to the local communities (see section G1.6).

In summary, the project is expected to have a strong positive effect on the area's biodiversity.

[50] Biggs, R. et al. (2008), Scenarios of biodiversity loss in southern Africa in the 21st century. Global Environmental Change 18, 296-309.

Map 3: Location of main national parks of Zimbabwe. Red ovals indicate the main areas of the Kariba REDD+ project fulfilling connectivity functions

B1.2 Demonstrate that no High Conservation Values identified in G1.8.1-3 will be negatively affected by the project.

As stated in section G3.6, the identified HCV1 will be strongly enhanced by the project. Reduced forest loss and less poaching pressure will significantly improve the habitat conditions for threatened wildlife in the project area.

B1.3 Identify all species to be used by the project and show that no known invasive species will be introduced into any area affected by the project and that the population of any invasive species will not increase as a result of the project.

The project will use species during its agricultural activities and woodlot establishments (see section G3.2). Invasive species will not be used.

Species used in the Kariba REDD+ project include the following:

- *Allium sativum*
- *Arachishypogaea*
- *Capsicum sp.*
- *Colophospermummopane*
- *Eucalyptus robusta*
- *Eucalyptus tereticornis*
- *Jatrophacurcas*
- *Manihotesculenta*
- *Moringaoleifera*
- *Sorghum bicolor*

B1.4 Describe possible adverse effects of non-native species used by the project on the region's environment, including impacts on native species and disease introduction or facilitation. Project proponents must justify any use of non-native species over native species.

The project proponents do not promote any species that are not already cultivated in Zimbabwe. Selected non-native species can provide substantial benefits. These species include the multi-purpose species *Jatropha curcas* and *Moringa oleifera*, but also the traditional agricultural species *Capsicum sp.*, *Allium sativum*, *Sorghum bicolor, Manihotes culenta* and *Arachis hypogaea*. Eucalyptus species have become naturalized in Zimbabwe.[51] They are included in the woodlot plantation project activity because they are known to be very fast growing. Thus, they can provide substantial relieve to resource demand from existing natural forests over a relatively short time. Apart from these non-native species, wherever possible the project proponents promote native species, such as *Colophospermum mopane*, which is very suited for fuelwood cultivation.

B1.5 Guarantee that no GMOs will be used to generate GHG emissions reductions or removals.

We guarantee that no GMO are used in any project activity.

51- Palgrave, K. C. (2002), Trees of Southern Africa. Struik Publishers, Cape Town, South Africa.

B2. Offsite Biodiversity Impacts

B2.1 Identify potential negative offsite biodiversity impacts that the project is likely to cause.

No negative offsite biodiversity impacts have been identified. Rather, by providing a corridor for wildlife in three adjacent national parks, we believe the project will have a positive impact on biodiversity outside the project area. This positive impact could also include improvement of the habitat conditions for such threatened species as the Black Rhinoceros (*Diceros bicornis*), of which few individuals are left in the adjacent national parks. Leakage of poaching activities is not possible as there is hardly any wildlife left outside the project area, except for the well-guarded national parks. Furthermore, the poachers mostly live within the project area, where they will benefit from new the project activities. The poachers have a low level of mobility and cannot easily displace themselves to far-away locations.

B2.2 Document how the project plans to mitigate these negative offsite biodiversity impacts.

Not applicable.

B2.3 Evaluate likely unmitigated negative offsite biodiversity impacts against the biodiversity benefits of the project within the project boundaries. Justify and demonstrate that the net effect of the project on biodiversity is positive.

Not applicable.

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).

Our biodiversity monitoring plan is based on guidelines published by UNEP and The King Mahendra Trust for Nature Conservation in Nepal.[52] We adapt the framework of pressure,

[52]Tucker, G., et al. (2005), Guidelines for Biodiversity Assessment and Monitoring for Protected Areas.King Mahendra Trust for Nature Conservation and UNEP WCMC. Cambridge, UK.

state and response of biodiversity to develop a monitoring system that is both effective and efficient. The following variables are foreseen to be monitored during the project:

PRESSURE

- The number of wire snares encountered by patrols (monitored continuously, reported upon verification, likely every five years)
- The number of poached game (monitoring continuously reported upon verification)

STATE

- The number of big game and endangered animals[53] encountered by patrols per man-days spent patrolling (monitored continuously, reported every five years). These species are used as indicator species for the state of the biodiversity in the area.[54]A list of all commonly monitored species is provided in the monitoring plan.
- The number of tree species on permanent carbon monitoring plots (monitored and reported upon verification)

RESPONSE

- Increase the number of anti-poaching patrols and number of man-days spent patrolling per year (monitored continuously, reported upon verification)
- Arresting poachers (monitored continuously, reported upon verification)

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 covers the standard monitoring procedure as outlined in the previous paragraph.

B3.3 Commit to developing a full monitoring plan within six months of the project start date or within twelve months of validation against the Standards and to disseminate this plan and the results of monitoring, ensuring that they are made publicly available on the internet and are communicated to the communities and other stakeholders.

[53]This includes all species denoted in Table 11.

[54] See Gardner, T. (2010), Monitoring forest biodiversity: improving conservation through ecologically-responsible management. Earthscan, London UK and Washington USA.

Based on the foregoing discussion, we commit to developing a monitoring plan within twelve months of validation and make it publicly available to both the local communities and the broader public via the CCBS website. The full CCBS monitoring plan will also be made available on South Pole Carbon's website.[55]

V. Gold Level Section

GL1. Climate Change Adaptation Benefits

GL1.1Identify likely regional climate change and climate variability scenarios and impacts, using available studies, and identify potential changes in the local land-use scenario due to these climate change scenarios in the absence of the project.

Zimbabwe is very likely to heat up during this century. The temperature is predicted to increase by 2°C by 2030 and 3.5°C by 2070, according to the (intermediate) A1B scenario of the IPCC. At the same time, rainfall in Zimbabwe is likely to decline by 10 - 20 % by 2050.[56,57]

As a result, local communities will be forced to adapt to this changing climate. Without proper adaptation, agricultural production is likely to decrease, negatively affecting locals' livelihoods.

GL1.2 Identify any risks to the project's climate, community and biodiversity benefits resulting from likely climate change and climate variability impacts and explain how these risks will be mitigated.

Climate change will affect both vegetation and biodiversity.[58]However, we are convinced that the project's community enhancement and conservation activities will not be threatened by climate change, that is, they will not be more vulnerable than under any baseline scenario. Furthermore, the project will strengthen the communities' capacity to cope with future climate change. We perceive our forest conservation efforts as an

[55]At http://www.southpolecarbon.com/dev-gold.htm

[56]http://www.undp.org.zw/index.php?option=com_content&view=article&id=9&Itemid=14

[57] Solomon, S., et al. (eds.), 2007, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

[58]Araújo et al. (2006), How Does Climate Change Affect Biodiversity? *Science* 313 (5792): 1396-1397.

investment in ecosystem health, which is an accepted measure of climate change adaptation.[59]

In terms of other activities such as establishment of sustainable woodlots and improved agriculture, the project explicitly addresses future climate change, e.g. by selecting agricultural techniques that better conserve moisture (see section G3.2).

The complex nature of interactions between climate change and natural resources virtually ensure that over the lifetime of the project new risks will emerge; risks that have not yet been identified and anticipated. We address this in the best possible way by applying an adaptive management strategy (see section G3.5). This ensures that new impacts of climate change that emerge over the lifetime of the project will be recognized and appropriately addressed in the project management.

GL1.3 Demonstrate that current or anticipated climate changes are having or are likely to have an impact on the well-being of communities and/or the conservation status of biodiversity in the project zone and surrounding regions.

As referred in section GL1.1, the temperature in the project area is predicted to increase by 2°C by 2030, i.e. within the project time. The 2°C limit is widely perceived as a critical threshold beyond which a temperature increase has severe impacts on ecosystems and human livelihoods relying on them.[60]Productivity of main crops such as maize and wheat, for instance, is likely to decrease substantially by 2030.[61]Therefore anticipated climate change will have a significant impact on ecosystems and humans in the project area.

GL1.4 Demonstrate that the project activities will assist communities and/or biodiversity to adapt to the probable impacts of climate change.

Most common adaptation strategies include diversification of income beyond agriculture, different crops and varieties, irrigation and water conservation and conservational agriculture.[62]

The Kariba REDD+ project is promoting all of these adaptation strategies on a large scale in the project area.

Introduction of honey production systems will provide new income opportunities to large parts of the local population, beyond traditional farming activities. This will help to alleviate the impact of climate extremes on the locals' livelihoods and add real value to standing

[59]Hachileka, E. (2009), An Appraisal of community vulnerability and adaptation to Climate Change in Mapai, Chicualacuala District, using the CRiSTAL Tool. UNDP-Mozambique.

[60]Pachauri, R. K. &Reisinger, A. (eds.) (2007), Climate Change 2007: Synthesis Report. IPCC, Cambridge, UK.

[61]Lobell et al. (2008), Prioritizing Climate Change Adaptation Needs for Food Security in 2030. *Science* 319(5863), 607-610.

[62]Below, T. et al. (2010), Micro-level Practices to Adapt to Climate Change for African Small-scale Farmers. A Review of Selected Literature. IFPRI Discussion Paper 00953. International Food Policy Research Institute.

forests. Honeybees can live in very different climatic zones. There are subspecies of *Apismellifera* occurring in northern Europe and sub-saharan Africa.[63] Our beekeeping activity will use exclusively local wild bee species, caught using catcher boxes. This will promote local bee species diversity, as well as reduce the risk of climate change to our beekeeping activities. Our beekeeping is therefore likely to be possible also in a changing climate.

Additionally, as many locals as possible will also benefit from direct employment in relation to the project, thus providing income diversification.

Along its agricultural improvement activities, the project will enhance drought-resistant species and varieties as well as conservational agriculture. Certain agricultural species such as groundnut, cassava and sorghum are likely to be relatively unaffected by climate change in Southern Africa.[64] Meanwhile, conservational agriculture activities as promoted by the project (see section G3.2) have a proven potential to mitigate the effects of drought that have to be expected as a result of climate change.[65]

Irrigation in Zimbabwe's northern region is a sustainable means of climate change adaptation. The potential of irrigation within the basin of the Zambezi River is relatively high. Zimbabwe uses only 53% of its area that would be suited for irrigation.[66]Establishment, recovery or maintenance of the boreholes area by the Kariba REDD+ project will contribute significantly to the climate change adaptation in the project area.

The project's adaptive management approach will help to continuously address issues of adaptation that emerge with a changing climate.

GL2. Exceptional Community Benefits

GL2.1 Demonstrate that the project zone is in a low human development country OR in an administrative area of a medium or high human development country in which at least 50% of the population of that area is below the national poverty line.

The Human Development Index of 2010 puts Zimbabwe last of all ranked countries (169), with a value of 0.140 (to give a comparison, Germany scores 0.885, and the average of Sub-Saharan Africa is 0.389).[67]

[63]Grünewald, B. (2010), Is Pollination at Risk? Current Threats and Conservation of Bees. *GAIA* 19(1), 61-67.

[64]Lobell et al. (2008). Prioritizing Climate Change Adaptation Needs for Food Security in 2030. *Science* 319(5863), 607-610.

[65]Thierfelder C., P. Wall (2009), Investigating conservation agriculture systems in Zambia and Zimbabwe to mitigate future effects of climate change. *African Crop Science Conference Proceedings* 9, 303-307.

[66]Frenken, K. (ed.), (2005) Irrigation in Africa in figures. AQUASTAT Survey – 2005. FAO water reports 29. FAO, Rome, Italy.

[67]http://hdrstats.undp.org/en/countries/profiles/ZWE.html

GL2.2 Demonstrate that at least 50% of households within the lowest category of well-being (e.g., poorest quartile) of the community are likely to benefit substantially from the project.

The project's Community and Project Sustainability Fund is structured to benefit whole communities, specifically including the poorest members of society.

The project team's public rural appraisal revealed that 8-13% of the local adult population had not received any education (see Table 8). The portion of children not going to primary school dropped during Zimbabwe's economic problems over the last years. It is estimated, that about one quarter of the children are not sent to school because their parents cannot afford to send them. Primary education for one child costs about US$ 30 per year. Next to other activities, the Community and Project Sustainabilty Fund will set up a bursary scheme to enable poor households to send their children to school (see section G3.2). In this bursary scheme, 50% percent of the school schemes are paid for by the project. In addition, further investments in the schools are made to enhance the quality of the schools, create an appropriate learning environment, and enhance capacity. In addition to investments in education, the poor will also benefit from our investments in health infrastructure.

Overall, we are convinced that the poorest members of the local communities will strongly benefit from our project.

GL2.3 Demonstrate that any barriers or risks that might prevent benefits going to poorer households have been identified and addressed in order to increase the probable flow of benefits to poorer households.

Barriers to involvement of the poorer households could result from existing social barriers. As a result, poorer parts could be actively excluded from community activities by the remaining sections of the community. Also, poorer parts could be less proactive themselves. During our involvement in the project area, we have not noticed such dynamics. The communities seem relatively homogenous. However, as part of our community monitoring system (see section CM3.1), we aim to identify such barriers. Should any barrier come to our attention, we will react to it and adapt our policies to address it. This will be part of our adaptive management approach and will be under the responsibility of our Adaptive Management Officer, Pieter Bezuidenhout (see section G3.5).

GL2.4 Demonstrate that measures have been taken to identify any poorer and more vulnerable households and individuals whose well-being or poverty may be negatively affected by the project, and that the project design includes measures to avoid any such impacts. Where negative impacts are unavoidable, demonstrate that they will be effectively mitigated.

The project fully relies on incentive-based community involvement in reaching its forest conservation targets. The only potential negative impact we identified resulted from increased anti-poaching patrolling. Recently, an unsustainable level of poaching has surfaced in the project area. In fact, the level of poaching is so great, it will likely drive most

wildlife to extinction within a short time. Controlling poaching will stop unsustainable over-hunting. Safari tourism in the project area has generated significant income and employment in the past. The CAMPFIRE project showed that benefits created from safaris can be distributed in a way that benefits the entire community.[68] This will eventually leave former poachers better off.

GL2.5 Demonstrate that community impact monitoring will be able to identify positive and negative impacts on poorer and more vulnerable groups. The social impact monitoring must take a differentiated approach that can identify positive and negative impacts on poorer households and individuals and other disadvantaged groups, including women.

As standard practice, the Kariba REDD+ project will monitor household-income class and gender of any direct beneficiary of the project's activities. This can then be compared to the results of the monitoring of indirect benefits, which are based on randomized sampling within the communities (see section CM3.1). Cross-comparison of gender and household-income class of direct beneficiaries with all locals will then reveal any bias towards richer sections of the communities. We intend to distribute direct benefits in an unbiased or pro-poor biased manner and commit to take corrective action should we discover any bias against the poorest locals.

GL3. Exceptional Biodiversity Benefits

The project area of the Kariba REDD+ project fulfills both vulnerability criteria GL3.1.1 and GL3.1.2. The area hosts African wild dogs (*Lycaon pictus*), which are endangered (EN) species according to the IUCN. Furthermore, the project area contains many individuals of vulnerable (VU) species, such as African elephant (*Loxodonta africana*), Lion (*Panthera leo*) and Cheetah (*Acinonyx jubatus*), among others (see Table 11). The presence of these species has been proven by both literature and experts, as well as by partners of the Kariba REDD+ project, which have a long track record of working with wildlife in the area.

Also, the project will fulfill important connectivity functions between adjacent National Parks (see Map 3) and preserve habitats within the area of the international Kaza conservation initiative in Southern Africa.[69]

Standardized monitoring of the occurrence of the biodiversity will be implemented as part of the biodiversity monitoring procedures (see section B3.1). A special focus will be placed on endangered species, as conservation of those species is perceived as a major biodiversity benefit of the Kariba REDD+ project.

[68]Frost, P., I. Bond (2008), The CAMPFIRE programme in Zimabwe: Payments for wildlife services. Ecological Economics 65(4), 776-787.

[69]http://www.kavangozambezi.org/

Picture 5: African Elephant (*Loxodonta africana*) and its traces in the project area

Annex 1: Biodiversity Information

List of common species in the project area

Plants	*Acacia karoo* *Acacia nigrescens* *Acacia nilotica* *Adansonia digitata* *Adenia karibaensis* *Albizia antunesiana* *Andropogon gayanus* *Aristida brainii* *Aristida meridionalis* *Aristida pilgeri* *Aristida stipitata* *Brachystegia boehmii* *Brachystegia spiciformis* *Chloris virgata* *Colophospermum mopane* *Combretum apiculatum* *Combretum molle* *Commiphora glandulosa* *Commiphora mollis* *Commiphora mossambicensis* *Cyclantheropsis parviflora* *Digitaria eriantha* *Digitaria milanjiana* *Digitaria ternata* *Diospyros mespiliformis* *Diplorhynchus condylocarpon* *Eragrostis viscosa* *Erythroxylum zambesiacum* *Euphorbia cooperi*

	Euphorbia decidua *Euphorbia persistentifolia* *Faurea saligna* *Faurea speciosa* *Flacourtia indica* *Heteropogon contortus* *Heteropogon contortus* *Hippocratea volkensii* *Jamesbrittenia myriantha* *Julbernadia globiflora* *Kirkia acuminata* *Loudetia simplex* *Maerua salicifolia* *Maerua salicifolia* *Monotes glaber* *Pavonia rogersii* *Pogonarthria squarrosa* *Selaginella imbricata* *Stereochlaena cameronii* *Strychnos cocculoides* *Strychnos spinosa* *Terminalia pruniodes* *Terminalia sericea* *Terminalia stuhlmannii* *Trichilia emetica* *Tristachya lualabaensis* *Tristachya rehmannii* *Tristachya superba* *Uapaca kirkiana* *Vangueria infausta*
Mammals	*Acinonyx jubatus* *Aepyceros melampus* *Aethomys chrysophilus*

	Aethomys namaquensis *Canis adustus* *Canis mesomelas* *Cercopithecus aethiops* *Crocuta crocuta* *Dicero Bicornis* *Elephantulus brachyrhynchus* *Equus burchelli* *Felis caracal* *Felis serval* *Genetta genetta* *Graphiurus murinus* *Hippopotamus amphibius* *Hippotamus amphibius* *Hippotragus equinus* *Hippotragus niger* *Hystrix africaeaustralis* *Kobus ellipsiprymnus* *Lepus saxatilis* *Loxodonta Africana* *Lycaon pictus* *Mus minutoides* *Oreotragus oreotragus* *Ourebia ourebi* *Panthera leo* *Panthera pardus* *Papio ursinus* *Paraxerus cepapi* *Phacochoerus africanus* *Potamochoerus larvatus* *Raphicerus sharpei* *Redunca arundinum* *Saccostomus campestris*

	Steatomys pratensis *Sylvicapra grimmia* *Syncerus caffer* *Tatera leucogaster* *Taurotragus oryx* *Thallomys paedulcus* *Tragelaphus scriptus* *Tragelaphus strepsiceros*
Birds	*Apalis flavida* *Bucorvus cafer* *Camaroptera brevicaudata* *Cisticola galactotes* *Egretta vinaceigula* *Eremomela scotops* *Hyliotaa ustralis* *Monticola angolensis* *Nectarinia manoensis* *Prinia flavicans* *Trigonoceps occipitalis* *Agapornis nigrigenis* *Lamprotornis chloropterus* *Lamprotornis mevesii* *Thamnolaea arnoti* *Tockus erythrorhynchus* *Torgos tracheliotos*
Butterflies	*Acraea acrita* *Acraea atergatis* *Acraea atolmis* *Appias epaphia contracta* *Bicyclus angulosus selousi* *Bicyclus ena* *Charaxes bohemani*

	Charaxes druceanus *Charaxes guderiana* *Charaxes penricei* *Charaxes saturnus* *Colotis celimene amina* *Colotis eris* *Colotis ione* *Colotis vesta* *Dixeia doxo parva* *Junonia actia* *Junonia cuama* *Lepidochrysops glauca* *Melanitis leda* *Nepheronia buquetii buquetii* *Nephronia argia* *Nephronia thalassina* *Neptis kiriakoffi* *Neptis penningtoni* *Papilio constantinus* *Pentila pauli obsoleta* *Pentila tropicalis* *Tagiades flesus*
Reptiles	*Arthroleptis stenodactylus* *Bufo fenoulheti fenoulheti* *Causus defilippii* *Crocodylus niloticus* *Dalophia pistillum* *Elapsoidea boulengeri* *Elapsoidea guentheri* *Gerrhosaurus nigrolineatus* *Heliobolus lugubris* *Ichnotropis capensis* *Leptotyphlops incognitus*

	Monopeltis rhodesiana *Pachydactylus oshaughnessyi* *Panaspis maculicollis* *Rhinotyphlops mucruso* *Thelotornis capensis oatesii* *Tomopterna krugerensis* *Trachylepis punctulata* *Trachylepis wahlbergii* *Xenocalamus bicolor*

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Annex 2: Grievance Procedure

Note: CGI commits to provide written feedback to grievances within 30 days. All grievances and feedback to it are to be published in the project's newsletter (see section G3.2).

Figure A1: Grievance procedure of the Kariba REDD+ project