

**CLIMATE, COMMUNITY AND BIODIVERSITY STANDARDS PROJECT DESIGN
DOCUMENT FORM FOR AFFORESTATION AND REFORESTATION PROJECT
ACTIVITIES (CCB-AR-PDD)**

**Reforestation in grassland areas of Uchindile, Kilombero, Tanzania & Mapanda, Mufindi,
Tanzania**



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I. BASIC DATA

Green Resources Limited (GRL) is a subsidiary of Green Resources AS of Norway. Green Resources AS is the leading plantation, carbon offset and renewable energy company in Eastern Africa. Green Resources conducts reforestation activities in a number of locations in Tanzania, Uganda and Mozambique deriving revenue streams from the sales of carbon offset and high quality timber and transmission poles, whilst simultaneously bringing community and environmental benefits. The Uchindile and Mapanda Forest Project also validated under the Afforestation Revegetation and Reforestation (ARR) category of the Voluntary Carbon Standards, VCS applies CDM approved methodology AR-AM0005 version 03.

Version 05: October 2nd, 2009.

II. GENERAL SECTION

G1. Original Conditions at Project Site

G.1.1 Describe the location of the project and basic physical parameters:

Location

Mapanda and Uchindile Forest Projects cover a total of 18,379 ha, of which 10,814 ha is the reforested area of the ARR VCS climate change mitigation project. They are located in Mufindi and Kilombero Districts, Iringa and Morogoro Regions of Tanzania in the Eastern part of Africa. The activity shall be carried out in two separate blocks of 12,121 ha, of which 7,252 ha is the reforested area of the ARR VCS project at Uchindile; and 6,258 ha, of which 3,562 ha is the reforested area of the ARR VCS project at Mapanda. The project boundaries and geographical locations are indicated below. The specific geographical positions (longitude/latitude) have been determined from topographic sheets, satellite images and actual planting area coordinates of the boundaries (polygons) established using GPS and stored in GIS.

Uchindile Forest Project (UFP) (see figure G1)

- **Project Boundary:** The UFP reforested area of the ARR VCS project is approximately 7,252ha, confined within a parcel of 12,121ha of land and located on the lower elevation of Mufindi Escarpment, between latitudes 8°39' 34" S to 8°44' 55" S and longitudes 35°23' 28" E to 35°32' 59" E , in an altitude of between 1100m and 1437m above sea level. The external boundaries are mainly rivers with Kihata to the West, Luiga to the North, and Mgelela to the South. The area is grassland where the landscape is dominated by undulating ridges with steep slopes. The topography is generally covered with steep valleys. The area is degraded grassland from frequent anthropogenic caused fires.

Mapanda Forest Project (MFP) (see figure G1):

- **Project Boundary:** The MFP reforested area of the ARR VCS project is approximately 3,562 ha, confined within a parcel of 6,258 ha of land and located on the lower elevation of Mufindi escarpment, within latitudes 8°24'30"S to 8°33'19"S longitudes. The altitude varies from 1400 m to 1753 m above sea level. The external boundaries are rivers and the government owned Sao Hill Forest plantation in the Western parts. In the north-east is village land and to the south is convergence of Mkungwe and Mwenga rivers. The area is degraded grassland from frequent anthropogenic caused fires.

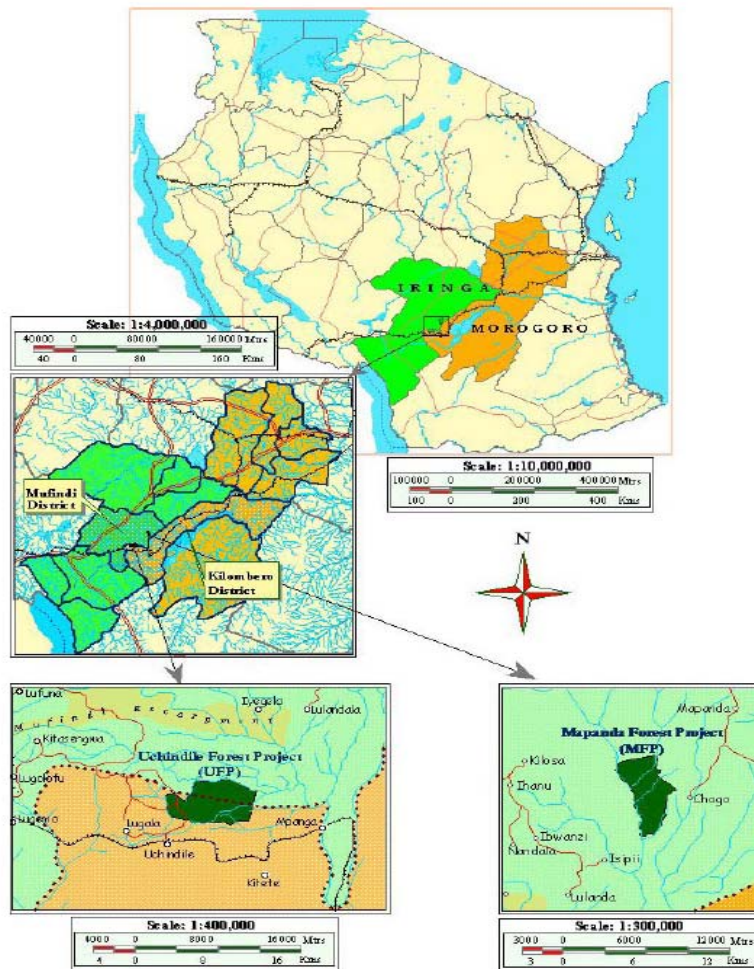


Figure G1: Location of the proposed A/R project activity

Both of the two blocks of Mapanda and Uchindile have similar characteristics; in that they are degraded grasslands with scattered shrubs and pockets of indigenous trees along river valleys and gullies. The baseline environmental conditions are described below.

Hydrology

UFP: The hydrology of the area is characterised by several rivers and small streams flowing through the area including the ones marking the borders of the project. Almost every valley bottom consists of swampy grounds portraying springs and rivers flowing out of the valleys. The major rivers flowing through Uchindile/Lugala are Ngokomiche, Kihata, and Luiga whose banks are covered with natural vegetation. A few small streams have their sources within the area of the Forest Project. Most of the streams flow into the Kilombero Valley which is to the south of the area.

MFP: The hydrology of Mapanda project area is characterized by major rivers, namely Mwenga river to the west and Mkungwe, Kiverege, Mvino and Kiumbo rivers all flowing into the Mwenga river. A few other small streams also have their sources in the project area. The river banks and valleys are covered by natural vegetation dominated by riverine tree species e.g. *Syzygium cordatum* and grassland that are left intact for protection purposes.

Climate

UFP: area has a bi-modal climate, characterised by a long dry season and a bi-modal rainfall distribution in short and long rain periods. On average, it receives an annual rainfall of about 1000 mm. The project area is located in a zone of potential evaporation varying between 800 - 1200 mm/year. The annually variation in potential evaporation is smaller and steadier as compared to rainfall. The short rainy season occurs during November-December and a longer season between March and May. The area is predominantly dry between July and October. The average temperature is around 16°C with the coldest months between May to August/ September. Winds normally blow from the North-East.

MFP: the mean annual precipitation is about 1050 mm, most of it falling between December and April/May, but with drizzles (showers) extending to June and sometimes July. The prevailing winds blow from East to West during the dry season and may blow from South-East to North-West during the wet season. The mean temperature is 12°C and the coldest months are May to July.

Soil

UFP: The soil in most of the areas originates from granites which are deeply weathered. This type of soil is moderately acid, poor, freely drained and markedly compacted near the surface where there is often a very high coarse grained soil fraction. The top soil have been exposed to annual fires and therefore exhausted in humus content and the pH varies from 4.4 - 6.5. The soil is in general red loamy sand (latosol). The slopes of the ridges are high and in some places range from 20 - 40%.

MFP: The soil in Mapanda project area is a mixture of red and yellow clays often with dark humus top soil whose agricultural productivity rating is medium. In some areas the top soil has been exposed to excessive annual fires and erosion, and therefore exhausted in humus content. Soil colour ranges from red clays to yellow. Soil pH ranges from 5.3 - 6.0. Some parts are prone to hardpans formation, which in most cases are found on ridges.

Ecosystems

UFP: Within the boundary of the project area there are existing patches of naturally growing shrubs and trees and vegetation cover, which are mainly observed along river banks, valleys and steep slopes. These are left as conservation areas so as to protect the areas from erosion by rainwater, as well as protect the rivers and streams from any negative hydrological impacts from the tree planting. The main species dominating native vegetation cover are *Combretum sp.* *Nuxia congesta*, grasses dominated by species of *hyperenia*, *aristida* and *themada* and shrubs species. The remaining areas are degraded grassland lands, and are not currently used for any activities due to poor soil and grasses which are not suitable for grazing.

MFP: The plantation area has patches of natural vegetation consisting of tree species such as *ficus*, *albizia*, savannah tree species and bushes. In river valleys riverine tree species can be observed dominated by *Syzygium cordatum*, *Syzygium guinense*. The present vegetation in the area is savannah - like commodities derived from montane forest. Remnants of the dominant species include *Parinari curatelifolia*, *Catha edulis*, *Maesa lanceolata*, *Albizia gumifera*, *Prunus Africana* and *Nuxia congesta*. At present the area is mainly grassland. Within the plantations the natural undergrowth is mainly *Hyperrhenia* grasses with few scattered trees and shrubs. The soil is a mixture of red and yellow clays, often with humus top soil.

G.1.2 Describe the types and condition of vegetation at the project site:

The vegetation in project area is categorized mainly into two major types; grassland and some scattered trees and shrubs. Before the project's inception the area was covered with 90 % grass¹. The classification of the hill tops and along the hills slopes are dominated by grass. The natural undergrowth is composed of patches of scattered trees and shrubs. The common species found in these slopes are *Prothea angolensis*, *Syzygium cordatum*, fern (*Tyelypteris confluens*). River valleys and valley bottoms are rich in tree species including *Syzygium cordatum*, *Bridelia micrantha* and *Gardenia imperialis* and fern (*Tyelypteris confluens*). In the absence of the project activity these patches of existing vegetation are threatened by frequent wild fires, caused by anthropogenic burning (see also annex 3 in the VCS PDD, section 2 for vegetation classification and stratification). Tree planting shall take place in pure grassland regarded as the project area.

¹ Ecological survey, Munishi and Wambura, 1996

G.1.3 Current carbon stocks at the project site(s), using methodologies from the Intergovernmental Panel on Climate Change’s Good Practice Guidance (IPCC GPG) or other internationally approved methodologies (e.g. from the CDM Executive Board):

The existing carbon stock was calculated following approved methodology A/R-AM0005 version 03 for CDM project activity in the area. The approved methodology recommends a hierarchical approach to stratification for both pre-project and with project scenarios. The methodology outlines factors to be considered during *ex-ante* stratification to be based on the regional scale, such as climate, topography or geographical conditions. Based on this stratification methodology, the baseline strata are based on variables that influence carbon stock changes in above-ground and below-ground biomass pools. These variables were identified as climate, soil, topography, vegetation type and anthropogenic pressure. The land use within the project boundary was identified as a continuation of the existing grassland thus not influencing baseline carbon stocks, and therefore not included as the stratification criteria. The two land areas included in this project, although located in two sites, occur within one climatic region, have similar soil types, topography and human induced pressure (e.g. uncontrolled fires). Official topographical map series with topographic details at 1:50,000 scale were used to identify land use/cover data and the information was ground-truthed with field surveys. Satellite images and interpretation of land cover images from the Institute for Research Assessment were acquired to determine the pre-existing conditions and the status of grassland before the project starts. The ground-truthing confirmed the presence of individual scattered trees and shrub vegetation in areas of unmanaged grasslands. The preliminary (*ex-ante*) stratification was carried out based on baseline land use/cover and topography information where vegetation was used to distinguish grasslands from forest lands along the river valley with insignificant variation. Two strata were identified during *ex-ante* stratification are:

1. Grassland with scattered trees and shrubs
2. Riverine vegetation with trees and shrubs

The approved methodology recommends estimating changes in carbon stocks in the living biomass of unmanaged grasslands based on land use categories identified in the baseline scenario: maintenance of grassland in its present state and the ARR implemented at a specified pre-project rate or a combination of both. The land use under the baseline scenario elaborated in section C.4 of the VCS PDD is grassland with scattered trees and pockets of shrubs.

The carbon stock change in aboveground and belowground biomass for the grassland is estimated based on vegetation data collected from temporary sample plots for grass, trees and shrubs using equation B.1 of the approved methodology AR-AM0005 v.03 (Section II.5). Since there are no pre-project A/R activities (Section II.5 (2)), the carbon stock changes in living biomass for this category are neglected.

The baseline net GHG removals by sinks estimated from grass, shrubs and trees and are assumed to be in steady state. Hence the sum of the carbon stock changes of the living biomass at the time before the project started is considered zero (See Section II.5 (1) Equation B.2). For areas with isolated/scattered trees, changes in carbon stocks of the living biomass are estimated using Equation B.3 in the approved methodology in Section II.5 (1).

The sum of changes in the living biomass estimated as part of the baseline prior to the project start is frozen and adopted as the baseline to represent the scenario in the absence of the project. According to the methodology, in applying equation B.3, the participants may choose to use the methods described in the step 5 of Section II.5 (2) for estimating the biomass in isolated trees. One of the suggested methods is the use of allometric equation (Equation B.13) which is considered good practice by the IPCC. The allometric equation linking above-ground diameter to mean diameter at breast height (DBH) used during baseline biomass estimation is the general biomass regression equation developed by Brown (1997) for moist tropical zones with trees DBH range from 5 – 148 cm.

$$Y = \text{Exp} (-2.134 + 2.530 \ln \text{DBH})^2$$

The DBH of most trees estimated was below 5cm. The allometric equation linking above-ground biomass to mean diameter at breast height uses dominant trees to determine biomass.

In accordance with the approved methodology, monitoring of the baseline is not required; therefore no data is collected during the crediting period. The baseline situation is frozen and shall again be assessed in the run-up to the second crediting period. Since the plausible and most likely land use is continuation of grassland in the state before the project started, the assessment of the baseline biomass on the vegetation cover obtained an average 0.557 t C/ha. (See also

² Brown S. (1997). Estimating biomass and biomass change of tropical forests. A primer. FAO Forestry Paper No.134. Rome, Italy. 55 p.

Annex 3 of the updated VCS PDD for a detailed description of the calculations of the baseline).³ Planting has taken place at the Uchindile and Mapanda Forest Projects since 1997. However, in accordance with the VCS rules only the tree growth which occurred on those lands post-2002 is counted as a VCU. The number in the VCU tables below reflects this. Exclusion of emission reductions from 1997-2001 shown in table G1c (i) is a conservative approach. Table G.1c (ii) shows monitored project sequestration between 2002 and 2100.

Since the grassland vegetation is assumed to be in a steady state, the carbon stock change will be released as a result of planting activities. The figures obtained after baseline assessment and final calculations of the carbon stock changes in above ground and below ground carbon pools in grasslands being debited due to planting are shown in table G1c. According to the planting plan (Table G1a and Table G1b), from year 2013 there will be no planting since the expected plantable area would have been planted.

Table G1a: Planted area (1997-2007) and species composition

Year of planting ⁴	Uchindile project			Mapanda project		
	Area planted per species (ha)			Area planted per species (ha)		
	Eucalyptus	Pine	Total	Eucalyptus	Pine	Total
1997	19	19	39	-	-	-
1998	153	241	394	121	-	121
1999	-	-	-	8	-	8
2000	-	-	-	-	-	-
2001	-	74	74	-	-	-
2002	112	26	138	98	-	98
2003	-	123	123	2	-	2
2004	161	28	188	85	-	85
2005	166	190	356	62	57	119
2006	99	-	99	15	526	541
2007	107	277	383	11	447	458
Total	817	978	1,795	402	1,030	1,432

³ Based on the latest decision from the EB to not take account for the grass biomass in the calculation of baseline.

⁴ “Year of planting” indicates the planting season crossing over from one year to the next. For instance the planting season referred to as year of planting 1998 refers to planting that took place from December 1997 to April 1998.

Table G1b: Scheduled plantable areas (2008-2013) and species composition

Year of planting	Uchindile			Mapanda		
	Area planted per species (ha)			Area planted per species (ha)		
	Eucalyptus	Pine	Total	Eucalyptus	Pine	Total
2008	361	148	508	72	260	332
2009	500	500	1,000	-	500	500
2010	500	500	1,000	-	500	500
2011	519	500	1,019	-	500	500
2012	653	500	1,153	121	298	419
2013	500	448	1,153	8	-	8
Total	3,033	2,596	5,629	201	2,058	2,259

Table G1c: Estimation of the baseline net GHG removals by sinks⁵

(i) Summary of net baseline GHG removals by sinks prior to the start of the crediting period

Year	Estimation of baseline net GHG removals by sinks (tonnes of CO ₂ e)
1997	78
1998	1,052
1999	16
2000	0
2001	151
Total (tonnes of CO₂ e)	1,297

(ii) Estimation of the baseline net GHG removals by sinks during the crediting period

Year	Estimation of baseline net GHG removals by sinks (tonnes of CO ₂ e)	Estimation of actual net GHG removals by sinks (tonnes of CO ₂ e)	Estimation of leakage (tonnes of CO ₂ e)	Estimation of net anthropogenic GHG removals by sinks (tonnes of CO ₂ e)
2002	482	39,963	0	39,481

⁵ The values in this table are the annual estimates of carbon stored in grasslands based on the planting schedules and the average storage potential for grasslands of 12 t C/ha.

2003	255	46,377	0	46,122
2004	560	44,994	0	44,434
2005	970	77,790	0	76,820
2006	1,307	66,058	0	64,751
2007	1,720	110,974	0	109,255
2008	1,718	139,009	0	137,291
2009	3,064	123,562	0	120,499
2010	3,064	162,883	0	159,819
2011	3,102	232,533	0	229,431
2012	2,963	83,421	0	80,457
2013	1,936	398,172	0	396,236
2014	0	527,580	0	527,580
2015	0	685,675	0	685,675
2016	0	529,791	0	529,791
2017	0	665,023	0	665,023
2018	0	357,574	0	357,574
2019	0	382,913	0	382,913
2020	0	227,323	0	227,323
2021	0	300,387	0	300,387
2022	0	-90,245	0	-90,245
2023	0	-233,399	0	-233,399
2024	0	-295,709	0	-295,709
2025	0	-293,312	0	-293,312
2026	0	-457,039	0	-457,039
2027	0	-267,167	0	-267,167
2028	0	262,163	0	262,163
2029	0	290,785	0	290,785
2030	0	253,379	0	253,379
2031	0	21,197	0	21,197
2032	0	-281,489	0	-281,489
2033	0	-301,237	0	-301,237
2034	0	-154,255	0	-154,255
2035	0	1,307	0	1,307
2036	0	-68,242	0	-68,242
2037	0	-158,156	0	-158,156
2038	0	-165,295	0	-165,295
2039	0	-122,230	0	-122,230
2040	0	-319,643	0	-319,643
2041	0	16,904	0	16,904
2042	0	463,385	0	463,385
2043	0	639,707	0	639,707
2044	0	429,419	0	429,419
2045	0	549,205	0	549,205
2046	0	208,169	0	208,169
2047	0	175,935	0	175,935
2048	0	251,481	0	251,481
2049	0	138,753	0	138,753
2050	0	-333,659	0	-333,659
2051	0	-553,045	0	-553,045
2052	0	-441,706	0	-441,706

2053	0	-766,056	0	-766,056
2054	0	-958,706	0	-958,706
2055	0	-667,246	0	-667,246
2056	0	81,807	0	81,807
2057	0	340,627	0	340,627
2058	0	451,422	0	451,422
2059	0	624,448	0	624,448
2060	0	338,583	0	338,583
2061	0	347,018	0	347,018
2062	0	388,878	0	388,878
2063	0	422,824	0	422,824
2064	0	-132,437	0	-132,437
2065	0	-204,123	0	-204,123
2066	0	-265,666	0	-265,666
2067	0	-238,048	0	-238,048
2068	0	-469,048	0	-469,048
2069	0	-190,073	0	-190,073
2070	0	487,543	0	487,543
2071	0	478,073	0	478,073
2072	0	186,004	0	186,004
2073	0	229,559	0	229,559
2074	0	62,172	0	62,172
2075	0	-296,808	0	-296,808
2076	0	-250,185	0	-250,185
2077	0	-261,326	0	-261,326
2078	0	-514,015	0	-514,015
2079	0	-503,203	0	-503,203
2080	0	-243,663	0	-243,663
2081	0	-162,805	0	-162,805
2082	0	-338,633	0	-338,633
2083	0	-18,991	0	-18,991
2084	0	624,939	0	624,939
2085	0	762,144	0	762,144
2086	0	387,226	0	387,226
2087	0	578,481	0	578,481
2088	0	238,211	0	238,211
2089	0	231,200	0	231,200
2090	0	239,473	0	239,473
2091	0	215,847	0	215,847
2092	0	-108,279	0	-108,279
2093	0	-365,757	0	-365,757
2094	0	-509,081	0	-509,081
2095	0	-557,694	0	-557,694
2096	0	-615,045	0	-615,045
2097	0	-662,816	0	-662,816
2098	0	-14,123	0	-14,123
2099	0	-86,180	0	-86,180
2100	0	-224,107	0	-224,107

Total (tonnes of CO2 e)	21,140.19	2,460,323.86	0	2,439,183.67
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G.1.4 Description of communities located in and around the project area, including basic socioeconomic information (using appropriate methodologies such as the livelihoods framework).

The project is located on the land of the “Hehe” people. The Hehe tribe is an ethnic and linguistic group based in the Iringa Region in south central Tanzania. The Hehe began as a number of chiefdoms made up of mixed people who were in some instances related to one another. Historically, no chiefdom had over 5 000 people. In contemporary Hehe society, the political authority of chiefdoms has been replaced by locally elected chairmen and village councils. In 1994 the Hehe population was estimated at 750,000⁶. The Hehe society is comprised mainly of Christians. The largest town⁷ in the region is Mafinga, and had in 2002, a population of 33 669. The main employment in the region is in agriculture, forestry, and in the tea industry.

GRL have conducted PRA’s and socio-economic studies since 1999 to understand the livelihoods of the villagers in the communities adjacent to the project areas.

1999⁸: Orgut Consultancy carried out an environmental impact assessment together with a socio-economic study of the surrounding communities in the area of study. This study analyzed the pre-existing conditions of the communities in the area. The project area itself was largely abandoned prior to the projects inception. This dates back to 1975 of Tanzania’s historic move towards ‘villagization’ under ‘Ujamaa Village Programme’ in which families living in rural isolation were moved into villages to live together and share common goods and properties. As such very few families were reported living in the area before the project commenced, as most of them were living in the village of Mapanda (Mapanda and Chogo) and Uchindile (Uchindile, Lugala and Kitete). The main land use was agriculture with limited livestock grazing. The economy was based on smallholder agriculture where crops were grown for food and the surplus sold. It was observed that the households within the area were very poor in terms of housing, education (illiteracy rate as high as 68 %) and health as well as lacking. The majority were living in mud houses roofed with thatched grasses and most were living below the poverty line with

⁶ Gordon, Raymond G., Jr. (ed.), 2005. Ethnologue: Languages of the World, Fifteenth edition. Dallas, Tex.: SIL International. Online version: <http://www.ethnologue.com/>

⁷ Considering population number.

⁸ EIA/SEIA prepared by Orgut Consultancy, Tanzania Branch 1999.

access to a maximum of 2 meals a day. Poor access to proper health facilities and medication led to high maternal and infancy death rates. Only 30 people stated that they were in employment.

- **2003**⁹: This socio economic survey showed that the accessibility to surrounding villages was improved. About 12 km of road was constructed/re-constructed by GRL. This has eased transportation and connection joining Lugala to Mgololo, Mgololo to Uchindile and partly constructed the road between Uchindile to Kitete. Mgololo is a small township where most of the facilities and services can be obtained. Compared to 1999, housing had improved by 50 %, with mud houses being replaced by bricks and corrugated iron sheets. Lugala Primary School was built, and it is stated in the survey that construction of this could not have been realized without the support of GRL. GRL also supported transportation of building materials. 102 people stated that they were in employment in villages surrounding the forest project. Unlawful actions and crime were reduced, mainly because of improved the improved socio-economic situation.
- **2006**¹⁰: Improved communication between villages in both Uchindile and Mapanda Forest projects; road construction, renovation and bridges were built. 12 bridges had been built to curb impassable areas. Communities were provided with free seedlings – 20 % of total seedlings were given away. Health facilities were improved and education and counselling given on devastating diseases such as malaria, HIV, syphilis, TB and gonorrhoea. Community woodlots had been established and environmental awareness increased.
- **2007**¹¹: The Company has provided medical support to Mufindi and Kilombero Districts worth Tsh 174 millions. Uchindile dispensary was supplied with medical equipment and medicine. GRL provides both temporary and permanent employment positions to surrounding communities. This has resulted in positive effects in relation to household income, micro-entrepreneurship, housing facilities (furniture's etc.). The villages have urged GRL to increase their workforce. The village council commended that GRL assisted on establishing more community woodlots – for improved landscape, environmental conservation and future incomes. Increased seedling supply has been requested by the majority of the villages as well as training for producing their own seedlings.
- **2008**¹²: To date, the project has employed around 50 permanent workers, and around 3-400 on temporary/causal basis. The local government and central government is financially gaining from the forest project through taxes, land rents, PAYEE, revenue

⁹ SEIA prepared by Dr. Mussami and E. Phillip. Approved in 2003.

¹⁰ EIA/SEIA prepared by Environmental Association of Tanzania (ENATA) 2006.

¹¹ SEIA prepared by GRL Community Development Manager, N. Ussiri 2007.

¹² EIA/SEIA prepared by Environmental Association of Tanzania (ENATA) 2008.

taxes, VAT, village levees, and school fees, which in turn will improve the social services of the surrounding villages.

Given the project started more than 10 years ago Green Resources is able to quantify the population growth and inward migration that has been experienced in the communities around the project area. GRL uses government census data for determining the population status for the villages. This data is also available at each village office. Since the project started, the population growth has increased, but it does not indicate a significant increase as a result of immigration but rather as a result of natural growth.

Table G 2a: Population dynamics - Uchindile Villages

Village	1994	1998	2003	2006	2007
Uchindile	1,020	1,103	902	1,060	935
Lugala	500	486	874	744	700
Kitete	314	419	357	214	450
Total	1,834	2,008	2,133	2,018	2,085

Table G 2b: Population dynamics - Mapanda Villages

Village	1998	2002	2006	2007
Mapanda	2,954	3,969	4,211	4,274
Chogo	1000	909	964	979
Total	3,054	4,878	5,175	5,253

Each village has an elected chairman and a village council. The village council consists of 25 representatives. Elections take place every 5th year, in which the following are elected: 1. Chairman (one representative), 2. Hamlet leaders (number depends upon number of hamlets in the village), All people above 18 years have voting right. Representatives for the different village committees are being elected; i.e. health, environment, financial, social and planning committee.

Within villages there are different groups and societies. Some institutions present are schools (nursery/primary/secondary), religious societies; both churches and mosque. Other organizations present are youth social clubs, women groups and also some of the villages have their own football teams.

The villagers have been involved since the early stages of the project development, and are continuously informed about project activities and plans. Stakeholders have the opportunity to have their say and give suggestions. The project has carried out extensive stakeholder consultations¹³ which has shaped the projects design. Stakeholders were consulted through meetings, semi-structured interviews, and focus group discussions to capture information pertaining to the project. Participatory Rural Appraisals were carried out in the villages to identify the problems, views and concerns of local stakeholders and incorporated into the project design and management plan. Villagers employed by GRL are trained on environmental conservation, diseases, pests and other risks.

G.1.5 A description of current land use and land tenure at the project site:

Land use

The existing vegetation in the area at the project start was unmanaged grassland with scattered trees and shrubs, exposed to annual fires (picture G1 below). The native vegetation cover would be forest, but this has been lost of the years, and forced back into gullies because of repeated fire events. The subsistence farmers also practised limited livestock grazing where cattle were mainly kept in kraals. At the time of the baseline assessment (EIA by Orgut Consultancy in 1999), the farmers were harvesting their last food crop from this area as the poor soil would not manage to give enough crops.

¹³ Socio Economic Impact Assessment Report (1999; 2003; 2006; 2007), Stakeholders' awareness report (2008). All reports available upon request.



Figure G2: Site conditions prior project commence

Land tenure

GRL inherited the land titles from Escarpment Forestry Company Ltd (EFC) which was taken over by GRL in 2001 and has a long term lease for the discrete areas of land from the Government for the purpose of long-term reforestation.

Table G3: Land tenure and legal title

Name	Villages	Area	Tenure	Deed
Uchindile	Uchindile, Kitete	12,121ha	99yrs from yr. 2000	50742
Mapanda	Chogo	1,606ha	99yrs from yr. 2003	8954 – MBYLR
	Chogo & Mapanda	4,652ha	99yrs from yr. 2003	8955 – MBYLR

G.1.6 Description of current biodiversity in the project area and threats to that biodiversity, using appropriate methodologies:

The project is developed on undulating hills and valley areas dominated by grass. The land is generally poor in ecological terms due primarily to poor soils caused by frequent burning of the vegetation by communities while attempting to open land for small scale farming and hunting. .

As such the area for reforestation is at the later stages of a successive fire regime where much of the natural forest has been removed.

The valley bottoms and gullies have a variety of plant life concentrated near rivers and streams. Ecological and botanical studies have been done in the area to identify flora, fauna and threatened and endangered spp. In this process as well as GIS departments using GPS points to collect information on the ground and analyse by Arcview/ArcGIS and stored in the database. The key species habitats were also analysed by means of GPS and recorded in Arcview/ArcGIS database. Based on the studies mentioned above the areas of study comprise of rare, threatened and endangered (RTE) spp. Some species are endemic to the area while others are of global attention. Plantation forestry will be carried out in the degraded grassland, and will not include any areas with more than isolated trees.

In the animal, bird and plant life study¹⁴ a transect method was adopted for species habitat analysis in which transects were laid in a variety of habitats to produce a representative sample of the study area. Based on these studies it was revealed that the area also contains high conservation value forest (HCV). In the ecological study done by Wildlife Conservation Society of Tanzania (WCST), emphasis was made to the Blue swallows, *Hirundo atrocaerulea* a bird that appears in the IUCN/Red list as endangered and threatened for East Africa. This bird was spotted during the survey at Uchindile project area. The Blue swallow *Hirundo atrocaerulea* is an intra-African migrant with breeding populations in South Africa, Swaziland, Zimbabwe, Mozambique, Malawi, Zambia, Democratic Republic of Congo and Tanzania (Turner & Rose 1989). During the breeding season the blue swallow comes to southern Tanzania (Earle 1987, Oatley 2001). In Eastern Africa the Blue Swallow breeds in northern Malawi, north-eastern Zambia, south-eastern Democratic Republic of Congo and south-western Tanzania (Turner & Rose 1989). The birds arrive at their breeding grounds in September to October, and depart again in April (Keith et al. 1992). As this species was sighted during an Ecological survey, this area must be considered as a potential for the blue swallows' survival. Areas of 1,698ha and 665.03ha for Uchindile and Mapanda respectively has been put aside specifically for the conservation of blue swallow and other native ecosystems. This area contains the basic requirements for blue swallows breeding including pure grass for nest building, wetlands and river banks for foraging, an altitude between 1,100m and 2,000m as well as protea tree species which are suitable for blue swallow perching and roosting. Conservation criteria are based on the experience from South African conservation

¹⁴ Ecological study by P. Munishi and J. Wambura (2006), Botanical study by Tanzania Tree Seed Agency (2006), Wildlife Conservation Society (2008)

of the blue swallow of 1486ha suggested by Wildlife Conservation Society of Tanzania during their study. Only one pair was spotted at Uchindile forest project during the survey and one bird far outside the project area at Mapanda village. Nest density in South Africa ranges from 1 pair in 52 ha to as little as 1 pair in 300 ha (Allan et al. 1987). The project has put aside sufficient area for conservation of the bird as it exceeds the recommendation of WCST, namely 1698 ha in UFP and 665.03 ha in MFP respectively of contiguous area of suitable blue swallow habitat.

More studies on species and their habitats are planned to allow for comprehensive monitoring and also identification and understanding of species of global importance in the area. Green Resources aims to restore connectivity to the wildlife. The project has left a wildlife corridor in the Eastern part of Uchindile where the project connects to Kilombero Game Controlled Area. This corridor allows for wildlife feeding and getting fresh water within the project boundary.

G.1.7 List of all IUCN Red List threatened species (which encompasses endangered and vulnerable species) and species on nationally recognized list (where applicable) found within the Project boundary.

Listed below are IUCN Red List of threatened species and the national list of threatened species found within the project boundary. The list includes mammals, plant and bird species as identified in both the ecological and botanical studies. During the first years of the project, the project conducted a detailed assessment of the different groups of fauna and flora in the area.

Table G4: Overview of mammals, birds and plant species found in the IUCN red list and CITES index.

S/N	Species Name	Life form	IUCN Red List	CITES	Status
1	<i>Osyris lanceolata</i>	Shrub			Endangered
2	<i>Catha edulis</i>	Shrub/tree			Threatened in Tanzania
3	<i>Cyathea thomsonii</i>	tree			Rare
4	<i>Calanthe sylvatica</i>	tree	Yes		Threatened
5	<i>Prunus africana</i>	tree		Yes	Endangered
6	<i>Hirundo atrocaerulea</i>	bird	Yes		Endangered
8	<i>Calanthe vestit</i>	tree	yes		Threatened
9	<i>Protea spp</i>	tree			Extinct and

					endangered
10	<i>Poeoptera kenricki</i>	bird			East African endemic
11	<i>Uhehe fiscal</i>	bird			Endemic in Iringa
12	<i>Aardvark</i>	animal		Yes	Endangered
13	<i>Anthus brachyurus</i>	Bird			Threatened
14	<i>Aloe vera</i>	shrub	yes	yes	Rare

Source: Ecological/botanical study, Environmental Impact Assessment reports

Among tree species mentioned table G4, Protea grows on grass defined by project participants as the project area. This tree has been identified to associate with blue swallows. However protea species occur in clusters within the planting areas. An area containing these trees has been conserved to provide perching and nesting environment for the blue swallows consistent with conservation of other native species. *Osyris lanceolata*, *Prunus africana*, *Calanthe vestit*, *Osyris lanceolata*, *Catha edulis*, *Cyathea thomsonii* also indicated in table G4 above occur in low density grassland, they grow better on wet conditions along the river banks and water courses mainly in valley bottoms. For this reason, they fall within buffer zones¹⁵. These species shall be protected following FSC Principles and Criteria which require one to two (30-60metres) tree length buffer upon identification of native trees within planting areas. This is to ensure that exotic tree species do not affect native and RTE trees in their growth processes as well as during harvesting operations. The identification of the species involves the planting team which is trained on RTE species identification during site marking operations. The planting team shall ensure sufficient distance is left between the RTEs, other native trees and planted trees.

G2. Baseline Projections

G.2.1 Description of the most likely land-use scenario in the absence of the Project activity, identifying whether the scenario assumes that existing laws or regulations would have required that project activities be undertaken anyway:

For supplementary information, please refer section C.5.1 of the VCS PDD.

¹⁵ 30 -60 meters from streams, riverine forest, valley bottoms, wildlife corridors and wetlands.

The land use was identified by the district development committee during field visits and was predominantly unmanaged grassland. In the absence of the project, the grassland will continue being degraded from fire.

Assessment of national sector policies and legislation, and if the activity would be allowed to take place anyway:

Tanzania has extensive cross linkages between sectoral policies and legislations, especially governing land and development of natural resources. The following sections give an assessment of the relevant national or sectoral policies:

a) Policies related to the creation of wood sources

The forestry sector is guided by the *National Forest Policy* adopted in March 1998, whose overall goal is to enhance the contribution of the forest sector to the sustainable development of Tanzania and the conservation and management of natural resources for the benefit of present and future generations. A *Beekeeping Policy* was also adopted in 1998. The *National Forest Programme* (NFP) is a ten-year framework (2001-2010) which guides implementation of the *Forest Policy* (FBD, 2001). The NFP is based on four implementation programmes: Forest Resources Conservation and Management; Institutions and Human Resources; Legal and Regulatory Framework; and Forestry Based Industries and Sustainable Livelihoods.

The Forest Act (No. 14 of 2002) provides for the management of forests which came into operation on the 1st July 2004 (Forest Act (Date of Commencement) Notice, 2004; Government Notice No. 160). The Forest Regulations, 2004 (Government Notice No. 153) were made under section 106(1) of the Forest Act (2002). During 2006, further revisions to forest legislation have included the Forest Amendment Regulations, 2006 and the Forest (Charcoal Preparation, Transportation and Selling) Regulations, 2006.

b) Legislation related to the requirements of A/R activities and wood use

1. The National Land Use Planning Commission Act No. 3 of 1984. The proposed ARR VCS project activity has been incorporated in the land use planning of the districts as per this act;
2. National Water Policy of 1991 empowers rural people/land owners to communally own water resources within their areas;
3. The Water Utilization Act of 1974 with amendment done in 1981 Act No. 10 (Miscellaneous amendment Act No. 8 of 1997) – this act with its amendments provide a

- guide for controlling the extraction of water for different uses as well as protection of water resources;
4. National Forest Policy of 1998 provides guidance on sustainable supply of forest products and services, and the conservation, development and management of forest resources for future generations;
 5. National Land Policy of 1995 recognizes a dual system of land tenure i.e. customary and statutory rights of occupancy. Section 4.2.18 provides conditions for transactions of land, which has a market value. The project participants have adhered to this policy as well as the Village Land Act No. 5 of 1999;
 6. Village Land Act No. 5 of 1999 provides procedures to transfer of village land to general or reserved land that can be used for investment. The project participants followed guidelines provided in this act in acquisition of the discrete areas of land for the ARR VCS activity;
 7. National Strategy for Growth and Reduction of Poverty (NSGRP) of June 2005 is committed to the Millennium Development Goals (MDGs). The proposed ARR VCS activity will create employment and contribute to the national GDP;
 8. Poverty Reduction Strategy of 2000 – with strategies to improve rural development, export and private sector development;
 9. The Environmental Management Act No. 20 of 2004 (section 63 on forest management according to the Forest Act No. 14 of 2002);
 10. Forest Act No. 14 of 2002 provides requirements for establishment and management of forests.

Policy and legislative revision took place in light of the linked forces of *decentralizing forest management, encouraging participatory forest management* (e.g. Joint Forest Management or Community Based Forest Management), and *ensuring forests contribute towards national poverty alleviation goals*. Although these programs have set overall development goals for forestry development, they are not legally-binding, and meeting the goals depends largely on the availability of funds. Participatory Forest Management (PFM) guidelines were drawn up in 2001. A key issue facing the forestry sector is that despite a relatively comprehensive institutional and legal framework (as detailed above), implementation is severely limited by *inadequate human and financial capacity and the delayed finalisation of various institutional arrangements*. As the domestic funds for the reforestation are limited, local farmers are usually not able to fully finance forest establishment because it is hard for them to get loans from banks for the purpose of afforestation or reforestation activities. Loans for agricultural activities are much easier to pay back because there is a three year payback condition.

In addition, forest management in Tanzania is also dependent upon a range of other sectoral policies and actors. For example, Participatory Forest Management (PFM) is dependent on land titling (*Land Act, 1999* and *Village Land Act, 1999*) and the enactment of village by-laws (*Local Government Miscellaneous Amendments Act, 1982*), all of which lie outside the jurisdiction of Forestry and Beekeeping Division. Other specific examples include the influence of infrastructure developments and energy demand on forests.

c) Other policy incentives and constraints

An assessment of sectoral policies with respect to opportunities and constraints for improving forest governance included promotion of private investment in forests plantation and management of the existing forests. The strategy for poverty reduction (NSGRP) also contains many direct references to the forestry sector. Environment and natural resources management have been mainstreamed in the Tanzanian National Strategy for Growth and Reduction of Poverty (NSGRP). 14 % of the targets in the strategy relate to environment and natural resources management and there are a considerable number of environmental interventions under non-environment targets. Development partners provide over 60 % of the budget of the forestry department since 1990. These are allocated mainly to conservation of the already depleting natural forests while the forest plantations are expected to be self-financed. Therefore, without the proposed ARR VCS project activity the project area will not be reforested, and with the project activity the goals of the on-going reforestation programs or policies will not be met.

The investment constraints in finance, technique and institutional barriers indicates that the only realistic and credible alternative available to the project participants is to establish forest plantations with incentives from VCS and replace the current land cover due to the economic reasons.

G.2.2a Provide a projection of future carbon stock changes in the absence of the project, based on the land-use scenario described above:

In the baseline scenario, the grassland is not expected to change because it is prone to seasonal fires and regeneration. The carbon sequestration from shrubs and bushes is not able to regenerate due to the successive fire regime which occurs in the absence of the project. This was therefore set at zero during the calculation of emissions in the baseline scenario. GHG emissions from biomass burning (non-CO₂-emissions) are monitored according to the VCS monitoring plan, section E of the VCS PDD.

G.2.2b If there is evidence that non-CO₂ greenhouse gas (GHG) emissions such as CH₄ or N₂O are more than 15% of the baseline GHG fluxes at the project site (in terms of CO₂ equivalents), they must be estimated.

The project proponents do not expect that other GHG-emissions, such as CH₄ and N₂O, will exceed 15 %, no fertilizers are to be applied at the plantation and the project does not practise tillage

G.2.3 Description of how the “without-project” scenario would affect local communities in the project area.

Population analysis carried out between 1988 to 1994 shows that the number of households remained constant. In 1988 there were 378 households while in 1994 there was a small increase of only 3 households, to 381. The majority of the houses (68%) had mud and pole-thatched roofs while 32 % of the households were constructed of mud bricks (some burnt and reinforced with cement) and roofed with corrugated iron sheets. 68 % of the total adults (above 18 years of age) at Uchindile had attended 7 years of primary school and 16 % had also attended secondary school. The area was affected by waterborne diseases such as diarrhoea, worms, dysentery and amoebiasis. Also eye diseases, venereal diseases, pneumonia, skin diseases, tuberculosis and malaria were predominant as a result of distant medical facilities. The economic gain of people was in 1999 very poor. Over 43 % of the villagers stated that they were earning less than TSHs 50,000 per year¹⁶.

Agriculture and/or labor are the main sources of income for local communities in the project area. However, due to severe soil erosion, agricultural production has suffered very much, land productivity is very low. Without the project the local communities would continue to live below the poverty line, with few improvements.

G.2.4 Description of how the “without-project” land-use scenario would affect biodiversity in the project area.

¹⁶ EIA report conducted by Orgut Consultancy (1999)

According to the EIA the project area has low potential in wildlife pre-project. The few animal species, which are offered refuge in the natural habitat include antelopes, wild pigs, monkeys, snakes, rabbits and birds.¹⁷

In the plantation area there are patches of natural vegetation consisting of tree species such as *Ficus*, *Albizia*, savannah tree species and bushes. In river valleys, riverine trees can be observed dominated by *Syzygium cordatum*. The present vegetation in the area is savannah-like communities derived from *montane* forest. Remnants of the dominant species include *Parinari culaterifolia*, *Catha edulis*, *Maesa lanceolata*, *Albizia gumifera*, *Prunus africana* and *Nuxia congesta*. The project area in the “without project” scenario would be under threat from uncontrolled fires. It is anticipated that ‘without the project’ the biodiversity would remain similar to now, or decrease further with continued fire further pushing back the remnant montane species further into valley bottoms.¹⁸

The EIA also highlights that species such as *Bridelia micrantha* and *Protea* have become very scarce due to heavy exploitation and hence these species are considered rare and should be protected.¹⁹ In the ‘without’ project scenario these species would not be protected, and would most likely continue to be exploited, and further endangered.

G.2.5 Description of how the “without-project” land-use scenario would affect water and soil resources:
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Under the ‘without-project’ scenario, uncontrolled fires will increase due to lack of general understanding of the fire threats and continuation of starting fires for small scale farming and hunting. Fires will diminish water conserving species along river valleys as the fire regime continues to push the vegetation towards water courses. This would have impacts on the water table with time. However, the long term extent to which these resources would be affected is not clearly understood, so the project participants shall continue to analyse the water scenario in the absence of the project in the baseline biodiversity study – through the study of a control area where ‘without-project’ condition continue. Given the trend of fire regimes, it is assumed that the

¹⁷ EIA Report on proposed Mafinga and Idete Forest Projects in Mufindi District, Iringa Region, Tanzania, ENATA, 2008

¹⁸ EIA Report on proposed Mafinga and Idete Forest Projects in Mufindi District, Iringa Region, Tanzania, ENATA, 2008

¹⁹ EIA Report on proposed Mafinga and Idete Forest Projects in Mufindi District, Iringa Region, Tanzania, ENATA, 2008

in water level would either decrease or remain at its level - no increase in hydrological flow is expected in the 'without project scenario'.

Exotic tree species such as Eucalyptus, have deep roots which are water demanding. However, there shall be no change in water levels as tree planting takes place 60 meters away from all water sources with regular water flow monitoring following recommendations from NEMC. For native habitat restoration purposes, the project plants native and water conserving species within the buffer zones to prevent depletion of water level, as well as conserving those which already exist there. At the start of the project, soil samples were analysed for their nutrients, composition and pH and monitored across years yet no significant changes are noted. The gauging stations installed at all rivers flowing in the project have not indicated changes in hydrological flow changes nor chemical composition. More indigenous trees shall be planted for conservation and research purposes. Monitoring reports²⁰ are developed annually to show progress of various parameters and checked accordingly. The parameters mentioned above are analysed in the monitoring reports together with their frequency. Frequency of monitoring of different variables follows indication of likely impact identified in the EIA/ ecological survey. The soil pit is visited after five years for soil sample collection, this implies fewer chances of soils being impacted by the plantation based on earlier studies at the project. Water samples are taken daily for hydrological level measurement and monthly for chemical composition measurements. This is to allow consistence in data due to impacts eucalyptus may cause associated with growth rates. So far monitoring results have not indicated changes in water levels nor soil composition. (See also sections CL.4.2 and B.2.1 in this PDD).

G3. Project Design & Goals

G.3.1 Provide a description of the scope of the project and a summary of the major climate, community and biodiversity goals.

Please refer section A.2 in the VCS PDD.

The major project activity is establishment of plantations.

Objectives of the proposed project activity:

²⁰ Green Resources Ltd, Monitoring reports, P. Mussami, 2003-2008

- To establish and manage forest plantations so as to contribute to the demand of high quality wood products from a sustainable managed forest. NB: The Government of Tanzania, through the Forestry Division in the Ministry of Natural Resources and Tourism (MNRT) encourages establishment of private forests plantations and admits that limited government financing has been a major setback in developing new forest plantations in the country^{21,22}. The implementation of the proposed ARR VCS project activity will therefore, benefit the forestry sector through an increase in the resource supply, management and overall sustainability.
- To sequester CO₂ through forest planting in grassland areas, generating high quality emission reductions in greenhouse gases (GHG) that can be measured, monitored and verified. The project participants strive to demonstrate that carbon sequestration from forest plantations is a viable instrument to encourage private investment in the forestry sector especially on grasslands and/or degraded lands.
- To promote environmental conservation, such as soil conservation, protection of water sources and enhancement of biodiversity through the protection and management of existing indigenous flora and fauna and where possible enrichment planting with indigenous species and fruits.
- To facilitate socio-economic development of the local communities through:
 - promotion of tree planting/reforestation activities in the local communities;
 - providing employment opportunities;
 - generation of income for the communities through the sale of carbon credits (10% of the benefits of all carbon credits will be used for community development projects)
- Infrastructure development of roads, buildings and other aspects, such as water supply and communication systems.
- To create employment to other Tanzanians apart from those in the village local communities.

Socio-economic benefits are brought to the native rural poor through project activity have been provided with

²¹ The forests in Tanzania, mostly public/natural forests, are under pressure of deforestation at an estimated annual rate ranging from 150, 000ha -450,000ha (Source: The Tanzania National Forest Policy (MNRT, 1998)). The Tanzania Forest Action Plan (MNRT, 2000) mentions Kilombero Forest Project (now called Uchindile Forest Project) as the only private plantation forest aiming at CO₂ sequestration and generation of VCUs for sale.

²² The Forest Policy (MNRT, 1998) and Forest Law (Forest Act, 2002) gives opportunities to the private sector to play key roles in the national economy, not only in the development of forestry sector but also to buy shares in the public industries including the public forestry industries: Mugasha et al, , (2004), Indicators and Tools for Restoration and Sustainable Management of Forests in East Africa, I-TOO working paper No. 3, State of Forests and Forestry Research in Tanzania, page 31.

1. Regular “around-the-year” employment.
2. Training on farming machineries and techniques, land-use planning, management and conservation is provided.
3. The project has also contributed to development of infrastructure (roads, buildings, and water supply and communication systems).
4. The project participants will set aside 10% of the carbon revenues obtained from the sale of the carbon credits for the benefit of the local communities to be spent on projects that support the community as a whole.
5. Improve accessibility to clean water by providing boreholes in the villages and settlements, where necessary.
6. Improved infrastructure: An estimated 200 km of roads will be constructed and approximately 100 km renovated, including river crossings and culverts. Road sign and signaling to avoid traffic accidents will be installed along the public roads that are used for the log transports etc.
7. In addition, the project will provide the capital needed to stimulate local sustainable development priorities such as improved social services: hospitals and schools to serve the local population.

Environmental benefits are delivered through creating consciousness among the villagers about effective utilization of their land, and reducing land degradation through fire. The project inspires and provides resources for villagers create their own community woodlots on their land. The project also promotes environmental conservation, such as soil conservation, protection of water sources and enhancement of biodiversity through the protection and management of existing indigenous flora and fauna and where possible enrichment planting with indigenous species and fruits.

Other environmental benefits include groundwater recharging; through better soil moisture conservation techniques, to result in rising water tables. And also, creating conservation zones to protect RTE, HCV-forests, native species and habitats improves the aesthetics of the area and thus contributes to raise the non-use value.

Regional and National Benefits: The proposed ARR VCS project activity will:

- 1) Demonstrate that carbon sequestration from forest plantations is a viable instrument to encourage private investment in the forestry sector.
- 2) Enhance institutional and management capacity for the forestry sector in Tanzania

- 3) Expand the timber plantations to reduce pressure on natural forests.
- 4) Contribute to significant increased revenue to the government, the district council and villages through sale of wood products.
- 5) Taxes and levies for the Tanzanian Revenue Authority.
- 6) Contribute to the pension of workers through the National Social Security Fund (NSSF).
- 7) In addition, the project will provide the capital needed to stimulate multiple national and local sustainable development priorities.

G.3.2 Describe each major project activity (if more than one) and its relevance to achieving the project's goals.
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To achieve the project goals, the following activities have been planned:

The Management Plan²³ has been developed for all aspects of project implementation and documenting decisions. This gives the scope and overview of all necessary activities and how they shall be implemented. This plan defines the local communities, how they shall participate and benefit from the proposed project activity.

Socio Economic Impact Assessment, the project proponents have conducted socio economic impact studies to the communities surrounding the project. These studies are partly done by external agencies, and also the company itself aims to analyze the socio economic standing of the community. Needs and concerns are incorporated in the management decisions to raise the socio economic wellbeing.

A monitoring program for GHG reductions and emissions, environmental and socio-economic wellbeing has been planned. In this program the community shall be sampled, mapped and assessed against various indicators of health, income, education, population patterns and infrastructure. The environmental variables such as species abundance, diversity, landscape connectivity, forest fragmentation, habitat, and other variables at risk of being negatively impacted shall be monitored.

²³ The management plan for the two areas exists in two separate documents and is available upon request or during validation/verification.

G.3.3 Provide a map identifying the project location, where the major project activities will occur, geo-referenced boundaries of the project site(s).

The project shall be implemented in two discrete areas, Uchindile and Mapanda located in two distinct areas (see table G5a below). The project boundaries and geographical locations are indicated below. The specific geographical positions (longitude/latitude) of the project boundary have been determined from topographic sheets, satellite images and actual planting area coordinates in accordance with VCS, FSC and other plantable area criteria.

Uchindile Forest Project (see figure G4a)

- Project Boundary:** This area of land is confined within a parcel of 12,121ha of land, located on the lower elevation of Mufindi Escarpment, between latitudes 8°39' 34" S to 8°44' 55" S and longitudes 35°23' 28" E to 35°32' 59" E , in an altitude of between 1 100m and 1 437m above sea level. The external boundaries are mainly rivers with Kihata to the West, Luiga to the North, Mgelela to the South. The area is grassland with the landscape dominated by undulating ridges with steep slopes. The topography is generally covered with steep valleys with gradient as high as 7- 10% in some locations.

Table: G.3.3.a: Plantable Area, and Land Use division at Uchindile Forest Project

Land Use	Area (ha)
Plantable Area	7252
Conservation/ Blue Swallow Habitat Area	1698
Experimental Site	118.5
Hydrological Buffer Zones	1402.15
Roads, Valley Bottoms, Gullies, Fire Breaks	1608.04
Total	12,121

Table G.3.3.b: The unique identification of the polygons for the UFP

BLOCK ID	Grid Coordinates (UTM)	
	Eastings	Northings
UFPBLOCK I	764576	9037500
UFPBLOCK II	767026	9034664
UFPBLOCK III	768652	9037758
UFPBLOCK IV	770328	9033967
UFPBLOCK V	773372	9034740
UFPBLOCK VI	777653	9034612
UFPBLOCK VII	778710	9037087
UFPBLOCK VIII	772778	9037758
UFPBLOCK IX	770663	9040931

Mapanda Forest Project (see figure G4b):

- Project Boundary:** The MFP project activity is confined within a 6,258 ha of land, located on the lower elevation of Mufindi Escarpment, within latitudes 8°24'30"S to 8°33'19"S and longitudes. The altitude varies from 1400m to 1753m above sea level. The external boundaries are rivers and the government owned Sao Hill Forest plantation to the West, to the North and the East is village land and to the south is convergence of Mkungwe and Mwenga rivers. The area is grassland.

Table G.3.3.c: Plantable Area, and Land Use division at Mapanda Forest Project

Land Use	Area (ha)
Plantable Area	3562
Conservation/ Blue Swallow Habitat Area	665.03
Experimental Site	88.2
Hydrological Buffer Zones	980.67
Roads, Valley Bottoms and Gullies	709.5
Fire breaks	252.6
Total	6,258

Table G.3.3.d: The unique identification of the polygons for the MFP

BLOCK ID	Grid Coordinates (UTM), 36S	
	Eastings	Northings
MFPBLOCK I	797103	9065791
MFPBLOCK II	798177	9062737
MFPBLOCK III	797019	9060526
MFPBLOCK IV	796450	9058019
MFPBLOCK V	795102	9065075
MFPBLOCK VI	793691	9066149
MFPBLOCK V II	795692	9068044

For maps of the plantable area and other land use within the total titled area of land at Uchindile and Mapanda allocated to Green Resources see figures G.3.3.a and G.3.3.b below:

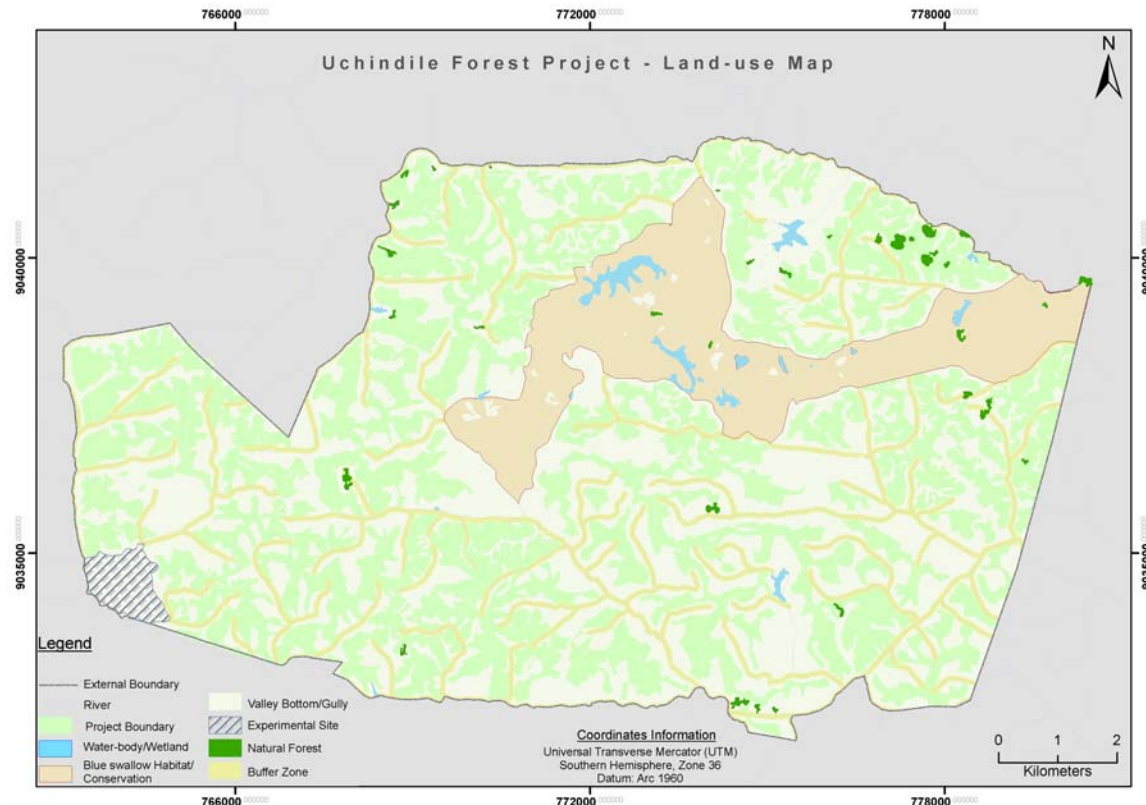


Figure G.3.3.a: Uchindile Forest Project Map showing plantable area and conservation areas.

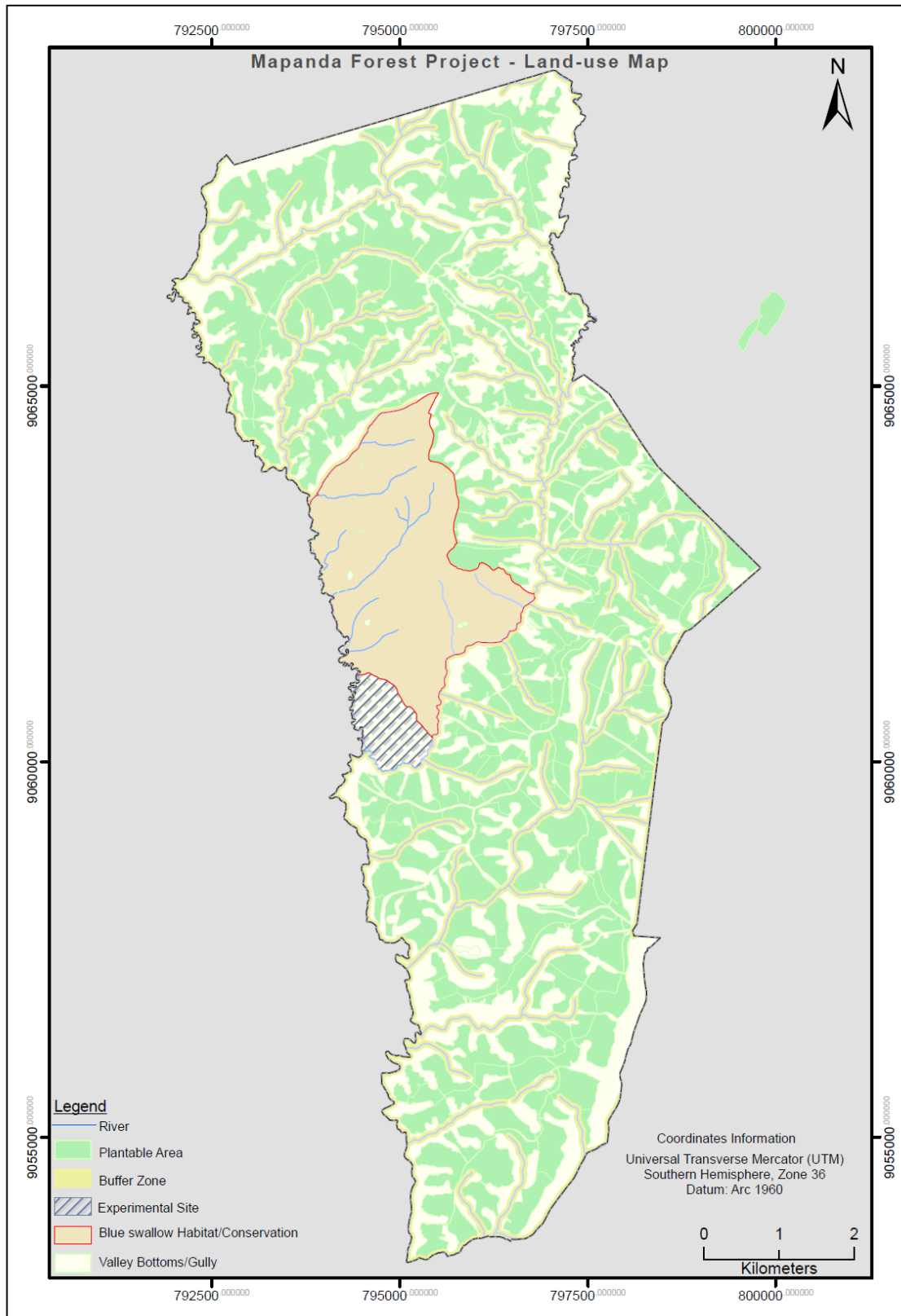


Figure G.3.3.b. Mapanda Forest Project Map showing plantable area and conservation areas.

G.3.4 Provide a timeframe for the project's duration. Describe the rationale used for determining the Project lifetime. If the accounting period for carbon credits differs from the project lifetime, explain.

The timeframe for the proposed project activity is 99 years. Based on the Tanzania Land Act, land can be leased for a maximum period of 99 years. The project promoters followed the procedures for land acquisition as guided by Ministry of Lands and Human Settlements (available on request and during validation/verification) and has title deeds for this area.

Uchindile Forest Project has a title deed for the area of land for a period of 99 years from 1st April 2000. Mapanda Forest Project has two titles of ownership both for a period of 99 years from 06th December 2003.

The crediting period follows VCS guidance, this project shall use a 99 years fixed crediting period commencing in 2002. The management plan for this project indicates long term stewardship over the chosen crediting period.

G.3.5 Identify likely risks to climate, community and biodiversity benefits during the project lifetime. Outline measures that the project plans to undertake to mitigate the risks.

The likely risks to the project include fire, invasive alien species, diseases and pests. Risks are also expected to communities and the environment. Description of how project shall respond to halt any negative effects is shown below:

Fires:

Fire is a major threat to both the plantation and other biodiversity. The project participants have developed an effective fire control system. To reduce the fire risk, the project has been broken down into blocks namely compartments. Each compartment is surrounded by earth road or a fire break, this is to easy fire management. In each of the two areas the project boundary is surrounded by fire line to avoid fires embarking into the project. The project has installed fire towers with radio communication and fire fighting equipments like fire beaters. There is also a standby fire patrol team with walkie talkies that communicates any fires spotted within and outside the project boundary. Moreover, with education campaigns and tree seedlings supply, it has been reported that fire burning has considerably been reduced at the area

Invasive Alien Species (IAS):

Some plant species were identified as invasive during an ecological study by WCST. These are *Acacia mearnsii*, *Rubus spp*, *Bambusa balcova*, *Psidium guajava*, *Lantana camara*, *Cleteria centata* and *Rubus spp*. These species shall be uprooted. However, According to WCST, these species do not cause major threats to the ecosystem.

Diseases:

Disease infestation affects growth and overall productivity of the forest. Workers health is also a determining factor to productivity. The project promoters have assessed this and responded accordingly. According to the Technical Note No. 1 of 2003 (available on request and for validation/verification as supporting documents), all seeds for planting in industrial forest plantations can be derived from improved seed sources i.e. seed orchards and as an interim measure from seed stands. Seed stands should be phased out as genetically improved seed becomes available from seed orchards. The project participants will initially purchase seeds from the Tanzania Tree Seed Agency or from approved foreign suppliers, and later have a mixture of such seed sources as well as from its own seed stands and orchards. The project participants do not use Genetically Modified Organisms (GMOs): Tanzania does not allow it, nor does the FSC.

In the case of disease or pest outburst in the plantation, experts in their control and research centres shall be consulted. The type of diseases and pests affecting planted trees will be monitored in collaboration with TAFORI, KEFRI, SUA and other research institutes in order to determine remedial and preventive measures. The monitoring of emerging pests and insects in and around the project area will be carried out to assist in the choice of species for plantation establishment and innovative steps to combat the pests and insects. Periodical assessment and reporting of risks of pests and insect attacks and/or plagues will be done so as to ascertain the safe handling of possible outbreaks. Workers will be trained and sensitized on diseases identification and reporting.

Risks to the community

Majority of the community defined by the project participants as workers are involved in plantation activities. Likely risks associated with communities include snake bites, cuts during plantation work and incidence of meeting harmful wildlife. If this happens while operating in the plantation the company shall ensure those involved with such incidences are properly attended to the nearby hospital. The project shall build dispensaries in the villages they operate and training on devastating diseases including HIV/AIDS, Cholera and Malaria will be provided consistent with supply of medical equipments. The project assists communities with the transport to medical

centres in instances where members of local communities fall sick. This is expected to reduce deaths and improve health conditions among communities. Furthermore, activities shall be carried out following the GRL plantation working instructions which illustrates safe working procedures.

Climatic risks

The project has not anticipated a significant climate risk, no droughts are projected, fires shall be reduced and more rainfall is anticipated with the long term effect of forestation. However, frequent checking shall be commissioned through monitoring of the activities.

G.3.6 Document and defend how local stakeholders have been or will be defined.

Local stakeholders are defined as people residing around the project sites including local village and ward governments and their departments, community members and community organizations. Moreover community members form an integral part of the work force in the project activity. The local stakeholders were defined and involved from the inception of the project²⁴, during early stages of land acquisition as well as during project implementation phase.. At early stages of land acquisition, meetings were held in the village. The project participants discussed with the community their aims to start afforestation project and community involvement as well as benefit stream to the communities adjacent to the project. During this time communities were asked to prioritise their needs based on areas the project would sponsor placing emphasis on education, health and infrastructure as major areas of economic development. The environmental impact assessment done by external agents also employed participatory approaches to integrate local stakeholder's views and incorporate their concerns to the management of this project. Further, stakeholders' participation has been planned through Participatory Rural Approaches, PRAs on annual basis. This is expected to bring feedback on project actions and outcomes. In this process, local stakeholders express their views and doubts and the company documents and incorporates into management decisions. The project management is responsible to ensure, community concerns are addressed properly and timely. Furthermore, 10% of the sales of carbon revenues shall be incorporated in the community support program to local stakeholders. This is in view to improve local environmental protection as well as help to reduce poverty by empowering communities. In this view, the project participants believe that they have taken care of local stakeholders' and will keep their cooperation with stakeholder throughout project life time.

²⁴ For review of stakeholder's comments please see section H in the VCS PDD.

G.3.7 Demonstration of transparency:

Local stakeholders are informed of the available information and documentation through meetings, seminars and company briefing during the annual plantation celebration party. Also, during PRA's the project participants provide information to the community about company activities, objectives and goals. The project documents are available for review. All project documentation is publicly accessible at, or near, the project site and/or at project proponents' offices; only financial and other information where confidentiality is needed is withheld. Local stakeholders have been informed how they can access the project documentation; and the key project documents have been made available in national languages, where applicable.

G4. Management Capacity

G.4.1 Document the management team's experience implementing land management projects. If relevant experience is lacking, the proponents must demonstrate how other organizations will be partnered with to support the project.

Green Resources Limited has employed a sufficient number of competent and qualified staff, including a well tested management structure. The employees` has extensive experience necessary for forest management and certification as well as relevant experience of forest management in the local area. Where specific skills are lacking, individuals, institutions and research centres shall be consulted. These have included researchers from Sokoine University of Agriculture, University of Dar es Salaam, Kenya Forest Research Institute, Tanzania Forest Research Institute, Tanzania National Environmental Management Council, Tanzania Tree Seed Agency, Vice President's Office Division of Environment, Wildlife Conservation Society of Tanzania, Rufiji Water Basin in Iringa, Mufindi Environmental Trust (MUET), Sao Hill Forests, Ministry of Natural Resources, Mufindi and Kilombero District Council.

G.4.2 Demonstrate that management capacity is appropriate to the scale of the project.

GRL has a well educated management team which is trained and experienced in plantation management. An interdisciplinary team of approximately 25 professionals who work on all GRL projects is based in an office at Sao Hill, where the sawmill is also located, in Mafinga Township (about 17 km south).

The project area lies approximately 110 km south from the head office. GRL has on site project management based at Uchindile and Mapanda Forest Projects. Mapanda has 43 permanent staff whilst Uchindile has 61. Under the authorization of GRL and Green Resources AS, the project management team is fully responsible for administrating and coordinating all project activities. GRL is facilitating and supervising the implementation of the proposed project activity, organizing technical training and consultation, organizing and coordinating all forest management activities including monitoring of biodiversity and communities. The staff is trained, and workshops and courses are provided to extend knowledge. The project is satisfied that the number of professionals is sufficient to carry out the activities.

G.4.3 Document key technical skills that will be required to successfully implement the project and identify members of the management team or project partners who possess the appropriate skills.

The project has a wide range of professionals for the implementation of proposed activities. These include foresters with extensive experience in forest management, engineers to support in road construction, environmental scientists, community development professionals, ecologists, botanists, hydrologists, surveyors and map designers, and individuals with significant experience working on conservation and climate change issues.

Geographical Information System (GIS) and Remote Sensing will be used for verification and monitoring of the proposed ARR VCS project activity. Although the project participants rely on in house staff, we also collaborates with local and regional forestry department/agencies, namely; Sokoine University of Agriculture, University of Dar es Salaam, Division of Environment, National Environment Management Council, Sao Hill Forests Project, Department of Forestry and Beekeeping, Tanzania Forestry Research Institute, Kenya Forestry Research Institute, Tanzania Tree Seeds Agency, Tropical Pesticides Research Institute and local NGOs. These partner organizations assist the GRL team through the provision of technical consultation and guidance as needed, including training courses, quality control checks and technical inputs for the preparation and implementation of the proposed project activity. Project participants will also seek advice from local, national, and international forestry and sustainable forest management experts where required.

G.4.5 Document the financial health of the implementing organization(s).

The proposed project activity is developed, implemented and managed by Green Resources Ltd., a Tanzanian registered subsidiary company wholly-owned by Green Resources AS, from Norway, which is providing primary financing. Further implementation of this project is made viable through carbon financing. The company is sufficiently capitalized to implement this project.

G5. Land Tenure

G.5.1 Guarantee that the project will not encroach uninvited on private property, community property, or government property.

This area is legally leased to GRL from the government. The project boundary has been mapped and demarcated by beacon as a requirement for the transfer of land title in Tanzania. The project implementation shall be confined to within the project boundary, to ensure no encroachment on either the community, private or government land.

G.5.2 Guarantee that the project does not require the relocation of people or any relocation is 100% voluntary and fundamentally helps resolve land tenure problems in the area.

The project areas was largely abandoned prior to the project inception, with the exception of a very limited number of migratory small scale farmers, who during early stages of negotiations with the company were amicably compensated and moved their activities to other lands close by their homes in neighbouring villages. The shifting was with free consent of the communities, and has been documented and arbitrated by district officials following all necessary procedures. Furthermore, the project has established solid partnerships with local communities and incorporated community views and ideas into management decisions.

G.5.3 Describe potential “in-migration” of people from surrounding areas, if relevant, and explain how the project will respond.

The project gives priority for employment at the Forest Project to people from the local villages. This is defined in writing in the agreement with the communities. As such employment is only awarded to people from outside those villages if there are enough employment opportunities. This is likely to limit ‘in-migration’ as people will only come if they know they will receive a job. In the case that more workers are needed for temporary period (such as planting season) than can be

met by villagers from the local communities then workers from outside will be housed in accommodation provided by the Forest Projects, on site.

G6. Legal Status

G.6.1. Guarantee that no laws will be broken by the project.

GRL is registered with the Tanzania Investment Centre (TIC) as a Tanzanian company. All the preliminary processes of land acquisition follow the government legal procedures. The Tanzania Environmental Policy, following a precautionary approach, insists that before any implementation of land-based projects, that an environmental impact assessment must be carried out to identify any negative impacts that may be caused and take precautionary measures to the proposed activities. In the case of this project, two external agencies from a government provided list were contracted to carry out the EIA for the two separate areas²⁵. GRL accords all the national and international legal requirements including environmental audit regulations from 2005. The project also applies ISO 9001 and 14001 procedures of Environmental Management Systems and the principles of the Forest Stewardship Council (FSC).

G.6.2. Document that the project has, or expects to secure, approval from the appropriate authorities:

GRL holds letters of approval for environmental impact assessment both from NEMC and Tanzania Investment Center (TIC).

G7. Adaptive Management for Sustainability (optional)

G.7.1 Demonstrate how management actions and monitoring programs are designed to generate reliable feedback that is used to improve project outcomes.

Green Resources believes that community participation in making management decisions and planning is essential to generate positive socio- and economic outcomes. As such the project has employed a process for hearing from the communities. An effective community monitoring program has been designed that aims to assess project community support programs and monitor changes in community livelihoods overtime. The monitoring of the biodiversity shall capture necessary information on variability, diversity and abundance of species and biodiversity under

²⁵ Orgut Consultancy and Environmental Association of Tanzania.

risk of being negatively impacted by project activities. Reforested lands shall be monitored for confirmation of the information provided regarding site preparation and planting. Survival checking of planted seedlings is checked within 2-3 weeks after planting, and replacement of all dead seedlings is done in the same planting season. The final survival assessment is conducted using temporary sampling plots established just before the following planting season. If the survival rate is lower than 80 %, beating up is carried out during the following planting season. Information of species and planting for each stratum and sub-stratum shall be recorded on each planting and/or seedling event.

The forests are managed according to the description in the forest management plan and consistent with the approved methodology. Monitoring of the following management activities is carried out from year 4 after the plantation establishment through until the end of the rotation (see section E1.2 and E1.3 in the VCS PDD for further details).

Every 3 months, local stakeholders are invited by the project to meet and share information on failures and achievements, and allow expression of their views, concerns and opinions which brings feedback about project actions and helps to improve management.

G.7.2 Describe the a management plan for documenting decisions, actions and outcomes and sharing this information with others within the project team, so experience is passed on rather than being lost when individuals leave the project.

The management plan, MP²⁶ for this project is in place. This is a management document that gives a summary of all the activities, available technologies and the management actions. It is developed consistent with the Tanzania forestry policy underpinning that any forest exceeding 50 ha should be managed following a management plan. A 5 year-medium term management plan has been prepared with regular reviews at the end of each year. All decisions pertaining to project development are documented in the management plan. The planning department based at Green Resources Ltd head office in Mafinga, is responsible for identifying relevant information and documentation. All stakeholders of have access to this document and are welcomed to contribute their views during the development stage. Lesson learned forms²⁷ are also developed where all

²⁶ GRL Management plans for Mapanda and Uchindile projects, V.G Nambombe and P. Mussami revised 2007

²⁷ GRL Lesson learned forms, Mapanda and Uchindile projects, 2008

notable lessons are documented and shared with staff, this is ensure knowledge remain within the project if staff leave the company.

The development of the MP itself also involved collecting views and comments from the local stakeholder and is based on local conditions, available facilities and the latest technologies. Both the full and summary versions (shared with local communities) indicate transparency with regards to company actions and outcomes; this is documented in the summary section of the MP. The MP mentions the commissioning of an internal Site Specific Environmental Impact Assessment prior to start of any specific activity. This is meant to incorporate local views as well as increase community understanding on forest management among other things. In this process, communities are asked to express their views and concerns regarding an activity to be undertaken in a specific areas such as road construction, nursery activity opening of a new compartment (see also sections 3.1.1, 3.1.5 and 3.9 of the MP). Community involvement in planning is also mentioned in section 3.3 of the MP. Regular meetings with communities and the plantation cerebation ceremonies are not documented the MP but have a significant contribution in sending the message back to the company on its actions. The company believes in active participation; such collection methods as PRA, interviews and open discussions shall encourage local stakeholders to participate and make an impact on the development and design of the management plan. Stakeholder's interests, opinions and concerns shall be ensured. All the plantation's management decisions and prescriptions are documented in a transparent manner and archived. The project management team and other staff participate in the development and have access to this document; they are fully informed of the progress with regards to the plans. The MP is not fixed; it is subject to changes with the existing local climatic and administrative conditions. When the MP is approved, the Project Manager shall read a summary of the plan to the employees and the plan shall be distributed, in its full version, to the village office.

The project proponents shall strive to meet the goals as documented in the management plan. Any deviance emanating as a result of external causes (climate variability, new technology) shall be regularly documented and updated in the MP (see section G.3.7 in this PDD for documentation and transparency policy).

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G.7.3 Demonstrate how the project design is sufficiently flexible to accommodate potential changes and that the project has a defined process in place to adjust project activities as needed.

The proposed project will be implemented following the management plan. The management plan is regularly updated depending on changes in the existing conditions improvements that are necessary. Lessons learned, views and suggestions of the stakeholders are also incorporated into the management plan where appropriate. During the implementation of the project, the observed and the expected results will be compared, which will help in monitoring the activities. Any deviations shall be recorded and updated in the management plan.

G.7.4. Demonstrate an early commitment to the long-term sustainability of project benefits once initial project funding expires, including e.g. a new project; securing payments for ecosystem services; promoting micro-enterprise; and establishing alliances to continue sustainable land management.

GRL is funded by private investments, initially by Green Resources, but also by carbon financing. Commitments to support community projects will be sustained throughout the project lifetime. The project developer will derive a dual income in the long term from the sale of timber and VERs. Green resources business model is for sustainable reforestation following FSC principles, with reforestation occurring immediately after harvesting. Green Resources has a 99 year lease of the land. The pine and eucalyptus undergo full harvest after year 21 and 13 respectively. The crediting period is fixed at 99 years. . The management plan indicates long term stewardship beyond the tenure of the first commitment period.

Ownership and management as documented in the Management Plan

The company acquired a 99 year lease of land from the Government of Tanzania at Uchindile village, Uchindile Ward Kilombero District and at Chogo and Mapanda villages, Mapanda Ward, Kibengu Division, and Mufindi District. GRL has a title of ownership for this area. Land acquisition followed the required procedures as guided by the Ministry for Lands, Tanzania. The procedure, which is guided by Village Land Act No 5 of 1999, requires compliance to benefit sharing property rights and security of land tenure and in compliance with village land use plan to ensure that enough land is available for village activities and that not more than 33 % of the total village land is given out for investment. The title dead for the project is 12,121 ha for Uchindile and 6,264 ha for Mapanda after considerations and recognition of community rights.

Green Resources Limited has employed a sufficient number of competent and qualified staff. This staffs has relevant skills of forest establishment and management from recognised universities and other institutions and have relevant experience in the field of forestry. For

specific skills, institutions and research centres are consulted to undertake studies in the project. These include Sokoine University of Agriculture, University of Dar es Salaam, Kenya Forest Research Institute, Tanzania Forest Research Institute, Tanzania National Environmental Management Council, Tanzania Tree Seed Agency, Wildlife conservation society of Tanzania, Rufiji Water Basin in Iringa, Mufindi Environmental Trust (MUET), Sao Hill Forests, Ministry of Natural Resources, Mufindi and Kilombero District Councils and individuals.

G8. Knowledge Dissemination

G.8.1. Describe how they will document the relevant or applicable lessons learned:

The project participants have developed forms for documenting “lesson learned”. All notable lessons learned in the forest project shall be documented on-site into these forms held at the project manager’s office. The carbon certification and FSC officers are responsible for reviewing whether there are new lessons learnt to enter into the forms at each plantation every 3 months following conversation with the plantation management. In addition once a year Green Resources convenes a plantation managers meeting, for all its managers where lessons learnt are shared.

G.8.2. Describe how they will disseminate this information in order to encourage replication of successful practices:

Various research projects have been carried out prior to and during the implementation of the forest project. The research undertaken will have far reaching impacts. These include botanical and ecological surveys, pest and diseases, soil and water quality/quantity, socio-economic and site-suitability studies. GRL either employ external agencies or professional senior staff. External agencies includes Orgut consultancy, Environmental Association of Tanzania, (ENATA). Other consulted institutions are Tanzania Tree Seed Agency (TTSA) to carry out the botanical survey in 2006; Kenya Forest Research Institute, (KEFRI) to check presence of diseases in 2004 and 2006; Rufiji Water Basin Office, Iringa Regional Water Office and Sokoine University of Agriculture (SUA) to measure water and soil quality and quantity. Soil and water studies have been conducted since the start of the project and monitored to date. Meteorological stations have been installed to collect weather and precipitation patterns.

GRL strives to reinforce its collaboration with Forestry Research Institutes. Furthermore, the company has commissioned its own research department headed by professional senior staff on

forestry and seeds to carry out research on: tree species, site suitability and biodiversity. The company hopes that this shall ensure smooth investigation, prevent and minimize possible disease and pest outbreaks. Introduction of new exotic tree species brought to the project area are planted on trial basis and their performance assessed, considering impacts to the biodiversity growing concurrently before large scale planting occurs (see also section F.3.2 of the VCS PDD).

Through lesson learned forms held at the project manager's office, all notable lessons in the forest project shall be documented on-site and disseminated through seminars and meetings as well as when external experts, guests and other parties visit the project. During the annual planting party^{28,29} day presentations on the company's progress during the preceding year as well as training on diseases and fires are done.

From time to time, GRL and GRAS offer staff the chance to participate in both national and international conferences. Apart from the training plan, training is also documented in the summary section of the Management Plans under the heading "development of staff and training", GRL work Instruction section 5.1 and minutes and other evidence on previous training session³⁰ are available. Further workshops and trainings on RTEs³¹, certification issues³² and fires³³ have been conducted covering a wide variety of local communities. Technological transfer from one project to another shall be encouraged through Project Managers' meetings within the GRAS group of companies. This involves sharing field experience from various projects, not only in Tanzania but elsewhere in East Africa where GRAS is operating. For the forest projects themselves there is a formalized schedule where the project manager chairs meetings to discuss with staff and workers on-going matters. At these meetings, the project manager shares information on any new lessons learned. Experience from project activities is documented and archived for the future.

The majority of field workers at the project are from the local community. Training is provided to the staff to enable them to carry out their role at the plantation. The training that has been given so far (2008) includes; fire control in community woodlots, nursery and operations for establishing exotic and indigenous tree species, increasing the company workers' awareness of

²⁸ GRL minutes for the annual plantation party, 2008, 2009

²⁹ Training documentation done by health department Mufindi district hospital and the forest officer Mufindi district council

³⁰ Green Resources, minutes local stakeholders training 2008

³¹ GRL, stakeholders consultation training and awareness of company activities, V. Nambombe, V. Kimey and S. Msilu, 2008

³² GRL community training, Victor Kimey, Samson msilu 2008

³³ Fire training by fire brigade Iringa region

what type of species are in the RTE category, which ones are invasive and on the 'High Conservation Value Forests' (HCV), as well as training on tree diseases and poisonous mushrooms. Also training on social aspects such as health, including HIV/AIDS and Malaria, has been done.

In 2008, two meetings were conducted at Ismila Hotel in Iringa Municipal and Makambako Township. In August 2007, communities from Lindi Region visited the project for learning various technical issues developed by the project. This was planned by the project. Stakeholders have been identified and they are invited every three months to discuss on company progress and they document their suggestions. Presentation to academic institutions and government agencies has been done. University students from Sokoine University of Agriculture are invited every year. It is desirable that the information they acquire shall be disseminated to other locales over the nation. Expertise from other sides of the world is also invited to see what the project is doing and they also present their views to the company. This sharing of information helps to improve skill building among staff in the execution of their activities.

III. CLIMATE SECTION

CL1. Net Positive Climate Impacts

Refer section C and D1 of the VCS PDD for supplementary information.

CL.1.1 Estimate the net change in carbon stocks due to the project activities. The net change is equal to carbon stock changes with the project minus carbon stock changes without the project (G2). Alternatively, any methodology approved by the CDM Executive Board may be used. Define and defend assumptions about how project activities will alter carbon stocks over the duration of the project or the project accounting period.

The project applies AR-AM0005 methodology version 03 for CDM project activity entitled "Afforestation, Reforestation project activities implemented for industrial and/or commercial uses". The baseline scenario in this project is based on estimation of carbon stock changes as a result of unmanaged use of grasslands which is subject to frequent burning in the absence of the project.

The project participants use the baseline approach from paragraph 22 (c) of the VCS ARR modalities and procedures: “Changes in carbon stocks in the pools within the project boundary from the most likely land use at the time project starts”. The selected approved methodology is applicable to the proposed ARR-VCS project activity as it complies with and is applicable under the conditions provided in the methodology.

Testing the eligibility of land³⁴ for the approved methodology to fit ARR-VCS project was carried out as shown in the VCS PDD (section C.1) and assessment of applicability³⁵ and justification of the approved methodology is shown in (section C.3.) of the VCS PDD.

The estimates of the actual net GHG removals by sinks in the project activity are based on the carbon stock change in aboveground and belowground biomass estimated using equations described in section II.7 of the approved methodology. The changes in carbon stocks in the living biomass pool are estimated based on the changes in carbon stocks of the living biomass of trees (gain and losses) minus increase in emissions of GHG within the project activity boundary. As described in section B and section C in the VCS PDD, carbon stock changes in pools of soil organic matter, dead wood and litter are not accounted as part of the net GHG removals by sinks.

Changes in carbon stocks:

Verifiable changes in carbon stocks of living biomass of trees (above ground and below ground) occurring annually is estimated using Equation B.15. For above ground- and below ground biomass, equations B.16 and B.17 are used. The living biomass at any particular time is estimated from the gain and losses in living biomass of trees through equations B.18- B.21. In absence of the project and regional specific parameters during PDD preparation for the biomass expansion factors (BEF), Wood density (D), Carbon fraction (CF) and Root to shoot ratio, the project participants uses default values from the GPG LULUCF 2003 (Table 3A.1.10) and from other relevant regional and peer reviewed literature. The BEFs given in Table 3A.1.10 represent

³⁴ The assessment of the eligibility of land has been conducted based on the decision by the EB35-Annex 18 that provides “Procedures to demonstrate the eligibility of lands for afforestation, reforestation and revegetation VCS project activities”.

³⁵ The project participants use the baseline approach from paragraph 22 (c) of the VCS ARR modalities and procedures: “Changes in carbon stocks in the pools within the project boundary from the most likely land use at the time project starts”. The selected approved methodology is applicable to the proposed ARR VCS project activity as it complies and is applicable under the conditions provided in the methodology.

averages for average growing stock or age. The project participants uses the following BEF in the carbon model; pine1.3³⁶, eucalyptus2.0. The variables to be used in equation B.18 and B.19 are shown in the table D.1 below:

Table CL.1.1. Parameters used to calculate carbon stocks

Biomass Expansion Factor (BEF)		Wood density (D)		Carbon Fraction (CF)	Root to shoot ratio (R)	
<i>P.patula</i>	<i>E.saligna</i>	<i>P.patula</i>	<i>E.saligna</i>	0.50	<i>P.patula</i>	<i>E.saligna</i>
1.3	2.0 ³⁷	0.45	0.8 ³⁸		0.32 ³⁹	0.35 ⁴⁰

Biomass Expansion Factor (BEF)		Wood density (D)		Carbon Fraction (CF)	Root to shoot ratio (R)	
<i>P.patula</i>	<i>E.saligna</i>	<i>P.patula</i>	<i>E.saligna</i>	0.50	<i>P.patula</i>	<i>E.saligna</i>
1.3	2.0 ⁴¹	0.45	0.8 ⁴²		0.32 ⁴³	0.35 ⁴⁴

The parameters as listed in Table CL.1 (a) fall within the range provided by the GPG LULUCF 2003 (Table 3A.1.10). During verification, the biomass expansion factors (BEF), Wood density (D), Carbon fraction (CF) and Root to shoot ratio (R) for *Eucalyptus saligna* and *Pinus patula* will be established by the project participants and compared with the default values used during the preparation of the PDD. The growth data from Sao Hill Forest Project were used to project the growth of the plantations. These data are from the government plantation which is located in similar climatic conditions. The project participants conduct annual inventories to verify applicability of these data in the project.

During *ex-post* calculations, the growth data (standing volume per hectare) are collected and converted into biomass through wood density and Biomass Expansion Factors (BEF) and root-shoot ratio (R) using equations and steps described in the methodology.

³⁶ Taken from Table 3A.1.10 of the GPG LULUCF 2003. Value taken for Tropical Pine

³⁷ Teobaldelli et al, 2009, Generalized functions of biomass expansion factors for conifers and broadleaved by stand age, growing stock and site index, Forest Ecology and Management Vol 257 pp1004-1013

³⁸ Taken from the book 'The Commercial Timbers of Tanzania' by J.M.Bryce revised edition of 1999.

³⁹ Taken from Table 3A.1.8 10 of the GPG LULUCF 2003. Mean value taken from the Conifer Forest/Plantation category with aboveground biomass (t/ha) of 50-150.

⁴⁰ Taken from Table 3A.1.8 10 of the GPG LULUCF 2003. Mean value for Eucalypt Plantation taken for biomass of 50-150 t/ha.

⁴¹ Teobaldelli et al, 2009, Generalized functions of biomass expansion factors for conifers and broadleaved by stand age, growing stock and site index, Forest Ecology and Management Vol 257 pp1004-1013

⁴² Taken from the book 'The Commercial Timbers of Tanzania' by J.M.Bryce revised edition of 1999.

⁴³ Taken from Table 3A.1.8 10 of the GPG LULUCF 2003. Mean value taken from the Conifer Forest/Plantation category with aboveground biomass (t/ha) of 50-150.

⁴⁴ Taken from Table 3A.1.8 10 of the GPG LULUCF 2003. Mean value for Eucalypt Plantation taken for biomass of 50-150 t/ha.

The approved methodology recommends estimating the annual decrease or losses of the carbon in living trees as a result of commercial harvest and fuel wood harvest. There will be no fuel wood harvest during the crediting period. The growth data used follow similar technical guides provided by the government. Any changes due to thinning will be captured during monitoring events in the Permanent Sample plots (PSPs). The impact of disturbances e.g. losses from fire and pests are considered to be small and are a result of natural event. For losses due to commercial harvest and fuel wood harvest which occur during crediting period, these shall be calculated using equations B.20 – B.25 from the approved methodology.

Project Emissions:

The actual net GHG removals by sinks (annual and cumulative) is the carbon stock change in above- and below-ground biomass minus the increase in anthropogenic emissions as listed in Table CL2 below.

Table CL1a: Estimation of actual net GHG removals by sinks and estimation of actual net anthropogenic GHG removals by sinks (see also general section).

Summary of net baseline GHG removals by sinks prior to the start of the crediting period

Year	Estimation of actual net GHG removals by sinks (tCO ₂ e)	Estimation of net anthropogenic GHG removals by sinks (tCO ₂ e)
1997	0	-78
1998	0	-1,052
1999	0	-16
2000	4,320	4,320
2001	53,509	53,358
Total (tonnes of CO ₂ e)	57,829	56,532

Table CL1.b Estimation of actual net GHG removals by sinks and estimation of actual net anthropogenic GHG removals by sinks during the crediting period

Year	Estimation of actual net GHG removals by sinks (tCO2e)	Estimation of net anthropogenic GHG removals by sinks (tCO2e)
2002	39,963	39,481
2003	46,377	46,122
2004	44,994	44,434
2005	77,790	76,820
2006	66,058	64,751
2007	110,974	109,255
2008	139,009	137,291
2009	123,562	120,499
2010	162,883	159,819
2011	232,533	229,431
2012	83,421	80,457
2013	398,172	396,236
2014	527,580	527,580
2015	685,675	685,675
2016	529,791	529,791
2017	665,023	665,023
2018	357,574	357,574
2019	382,913	382,913
2020	227,323	227,323
2021	300,387	300,387
2022	-90,245	-90,245
2023	-233,399	-233,399
2024	-295,709	-295,709
2025	-293,312	-293,312
2026	-457,039	-457,039
2027	-267,167	-267,167
2028	262,163	262,163
2029	290,785	290,785

2030	253,379	253,379
2031	21,197	21,197
2032	-281,489	-281,489
2033	-301,237	-301,237
2034	-154,255	-154,255
2035	1,307	1,307
2036	-68,242	-68,242
2037	-158,156	-158,156
2038	-165,295	-165,295
2039	-122,230	-122,230
2040	-319,643	-319,643
2041	16,904	16,904
2042	463,385	463,385
2043	639,707	639,707
2044	429,419	429,419
2045	549,205	549,205
2046	208,169	208,169
2047	175,935	175,935
2048	251,481	251,481
2049	138,753	138,753
2050	-333,659	-333,659
2051	-553,045	-553,045
2052	-441,706	-441,706
2053	-766,056	-766,056
2054	-958,706	-958,706
2055	-667,246	-667,246
2056	81,807	81,807
2057	340,627	340,627
2058	451,422	451,422
2059	624,448	624,448
2060	338,583	338,583
2061	347,018	347,018
2062	388,878	388,878
2063	422,824	422,824
2064	-132,437	-132,437

2065	-204,123	-204,123
2066	-265,666	-265,666
2067	-238,048	-238,048
2068	-469,048	-469,048
2069	-190,073	-190,073
2070	487,543	487,543
2071	478,073	478,073
2072	186,004	186,004
2073	229,559	229,559
2074	62,172	62,172
2075	-296,808	-296,808
2076	-250,185	-250,185
2077	-261,326	-261,326
2078	-514,015	-514,015
2079	-503,203	-503,203
2080	-243,663	-243,663
2081	-162,805	-162,805
2082	-338,633	-338,633
2083	-18,991	-18,991
2084	624,939	624,939
2085	762,144	762,144
2086	387,226	387,226
2087	578,481	578,481
2088	238,211	238,211
2089	231,200	231,200
2090	239,473	239,473
2091	215,847	215,847
2092	-108,279	-108,279
2093	-365,757	-365,757
2094	-509,081	-509,081
2095	-557,694	-557,694
2096	-615,045	-615,045
2097	-662,816	-662,816
2098	-14,123	-14,123
2099	-86,180	-86,180

2100	-224,107	-224,107
Total (tonnes of CO2 e)	2,460,324	2,439,184

The project tables from years 1997 -2001 are included to indicate net positive GHG removals during that time period, so their exclusion from total net project GHG is conservative. The crediting period commences in year 2002 in line with VCS guidance. According to the VCS AFOLU Methodological guidance for ARR the maximum number of carbon credits to be assigned to the project shall not exceed the project’s net carbon stock benefits (i.e., project minus baseline carbon stocks, including long-lived wood products) averaged across the harvesting/rotation cycles during the project crediting period. For this project with a cumulative total of **2,439,183.67** tCO2 over the 99 crediting period 2002-2100 it implies that the project cannot sell credits beyond a ceiling of **3,538,663.3** tCO2 which is equal to the cumulative mean over the crediting period. The cumulative mean is higher than the cumulative total because the cumulative total falls at a time where there is a dip in the carbon stock due to harvesting, whilst the cumulative mean relates to the average carbon stock held at the plantation over time which is higher.

CL.1.2 Factor in the non-CO2 gases CH4 and N2O to the net change calculations (estimated in CL.1.1.) if they are likely to account for more than 15% (in terms of CO2 equivalents) of the project’s overall GHG impact.

Non-CO2 gas are not expected to exceed 15 % of the overall GHG emissions, however these shall be included in the monitoring plan.

CL.1.3 Demonstrate that the net climate impact of the project (including changes in carbon stocks, and non-CO2 gases where appropriate) will give a positive result in terms of overall GHG benefits delivered.

Implementation of the project is expected to give positive climatic impacts to the area. The forest cover will contribute to a reduction of green house gases emissions by acting as carbon sinks. In addition to the quantified carbon benefits of project, tree growth is also expected on villagers own land outside the project boundary – the project gives away free seedlings to the community and encourage them to develop their own woodlots close to the project area. The project participants believe that these woodlots shall account for more than 5 % of the total planted area through offering 20 % of the total amount of seedlings raised annually. In the project boundary

3,538,663.3 million tCO₂e across the 99 crediting period shall be sequestered by the project activity as compared to what would have occurred in the absence of the project.

CL2. Offsite Climate Impacts (“Leakage”)

CL.2.1 Estimate potential offsite decreases in carbon stocks (increases in emissions or decreases in sequestration) due to project activities.

No leakage is occurring as a result of the project activities in accordance with the leakage rules stipulated in applied methodology. Leakage due to activity shifting is not occurring since the area under the project activity had no activity occurring on it pre-project. See also table D.2.1 of the VCS PDD.

CL.2.2 Document how negative offsite impacts resulting from project activities will be mitigated and estimate the extent to which such impacts will be reduced. Estimate the extent to which the negative offsite impacts will be reduced adequately.

As explained above, the project does not expect negative offsite impacts as a result of project activities. The project shall rather produce positive impacts outside the project boundary by sequestering a huge amount of CO₂ as a result of the establishment of community woodlots as part of the free seedling give-away programme which the company is offering. Also the fire education campaigns will help to reduce emissions from forest burning.

CL.2.3 Subtract any likely project-related unmitigated negative offsite climate impacts from the climate benefits being claimed by the project:

No unmitigated impacts are expected. The possible negative offsite climate impacts are considered to be mitigated through project design. In the case that negative impacts arise, these shall be identified through the monitoring programme, the project participants shall ensure any negative impacts are mitigated accordingly.

CL3. Climate Impact Monitoring

CL.3.1 Have an initial plan for how they will select carbon pools and non-CO₂ GHGs to be monitored, and the frequency of monitoring. Potential pools include aboveground biomass, litter, dead wood, belowground biomass and soil carbon. Pools to monitor

must include any pools expected to decrease as a result of project activities. Relevant non-CO₂ gases must be monitored if they account for more than 15% of the project's net climate impact expressed in terms of CO₂ equivalents.

Please refer section E in the VCS PDD for selection of carbon pools, and monitoring frequency.

Monitoring data on the verifiable changes in carbon stock will be gathered according to the procedures described in the AR-AM0005 methodology. The VCS monitoring plan shall be followed. The non-CO₂ GHGs shall as well be included into the monitoring program. The Monitoring Plan assists the project entity in establishing a credible and transparent monitoring and operating procedures and facilitates data collection, recording, and estimation of emission reduction and relevant project information required for the verification of the emissions reduction units. The monitoring plan forms the basis for production and delivery of emission reduction units. It is expected that the project entity adhere to the Monitoring Plan in order to accurately monitor and measure the project development impacts and prepare for periodic review of the project performance.

The provisions of this monitoring plan will be adopted as a key component of the forestry project activity and should be included in the operational manuals. Strict adherence to the guidelines set out in this monitoring plan is necessary to measure and track the project performance. In particular, changes in the operational procedures and changes to the baseline and project emissions and emission removals that are monitored should be monitored and the information recorded as prescribed in the PDD and to facilitate verification.

The project participants shall use standard nationally available procedures to monitor all activities and operations. The procedures shall be provided as guidance in measuring, documenting and estimating the net GHG removals by sinks. All measured and experimental data shall be documented and archived.

Operational procedures under this monitoring plan are defined as those of measuring and estimating net carbon stock changes associated with the plantations under the project. In order to supply the required information on changes in carbon pools, the project entity shall measure and estimate biomass volumes as per the standard forestry inventory operational procedures. The project entity's inventory procedures are based on statistically valid sampling procedures and on registered software, which performs biomass volume calculations upon scientifically designed

allometric equations. Since it complies with the methodology, it can thus be used as the main measurement and monitoring parameters.

The project participants shall keep records of all activities like changes in the actual planted areas, nursery operations, site preparation and forest management. Emissions from the use of fossil fuels, firewood, fertilizer and activities outside the boundary that are a result of the project activity shall be recorded and achieved. The project entity shall prepare all the relevant operational instructions and present them in written format. The project participants shall measure the above ground biomass and use the most conservative factors from GPG LULUCF for estimation of the below ground biomass. Based on the input data on the above -ground biomass volume provided by the project entity's inventory system, the estimation and monitoring of net carbon stock changes are preformed using the appropriate formula presented in the approved methodology. The DOE shall check the consistency with the methodology and it shall also verify that the project operator is able to adequately manage the data as per this MP.

The project participants shall prepare monitoring procedures for all silvicultural activities and carbon stock changes within the project activity boundary based on the monitoring frequency provided in the approved methodology. These procedures shall be communicated in the form of written and oral instructions and shall include responsibilities of personnel. The personnel shall be trained on job, workshops, and technical conferences to ensure knowledge management and that the project staff is trained for specialized professionalism.

The monitoring plan provides flexibility and shall also include the monitoring frequency recommended under national standards which can be amended in response to changes that may occur in the project activity as long as such amendments are in line with the general monitoring process described in this plan and are approved by a DOE during verification audits.

CL4. Adapting to Climate Change and Climate Variability (optional)

CL.4.1 Identify likely regional climate change and climate variability impacts, using available studies.

National and regional climate change impact studies are available. The Intergovernmental Panel on Climate Change (IPCC) did an assessment in 2001 on the consequences of climate change and climate variability in Africa; Third Assessment Report (TAR) chapter 10. Africa is highly vulnerable to the various manifestations of climate change. The most critical challenges in

particular are given in table CL4.

Table CL4a: Summary of the most critical climate change impacts assessed by IPCC

Systems	Impacts
Land degradation	<ul style="list-style-type: none"> - Arid and semi-arid areas are likely to increase in northern Sahara and southern Africa: by 5 – 8 % - Arid and semi-arid areas are likely to increase (desertification).
Crop yield	<ul style="list-style-type: none"> - By 2020: yield of rain-fed agriculture could reduce by 50 %
Water	<ul style="list-style-type: none"> - Increase in runoff and flooding - Increase drought risk - Impacts enhanced by poor water management - Water stress
Natural resource management and biodiversity	<ul style="list-style-type: none"> - Forest ecosystems: species loss, extinction, dramatic shift or changes in species range and increased fire occurrence - Forest net primary production to decline in the long term
Human health	<ul style="list-style-type: none"> - Temperature rises: increased vectors of diseases such malaria - Sea level rises: increased cholera epidemics and other waterborne diseases

Source: IPCC Third Assessment Report, ch. 10, 2001.

This vulnerability assessment to climate change is marked by high uncertainty. However, these impacts are based on Africa as a whole and will not be applicable to the same extent for each country. The diversity of African climates, high rainfall variability, and a very sparse observational network make precise predictions of future climate change difficult at the sub-regional and local levels.

A national study entitled “Development and Climate Change in Tanzania” was carried out in 2003 by a joint group of experts in collaboration with external donor agents. Data analysis with MAGICC/SCENGEN involved selection of suitable models which were run through the IPCC B2 SRES scenario (IPCC third assessment Report, TAR) to foresee the climate change trend in Tanzania. The study produced projection of climate change for Tanzania as indicated in table CL.4b of this document. This study projected mean annual temperature rise of 2.2 °C by 2100, somewhat higher increases (2.6 °C) over June, July and August, and lower values (1.9 °C) for December, January, February. Low standard deviations relative to the mean indicate good agreement across the 11 models chosen. The other study conducted earlier ‘The Initial National

Communication of Tanzania (2003)', projected a temperature increase between 3-5 °C under a doubling of carbon dioxide scenario, which was benchmarked to the year 2075. The lower estimates of MAGICC/SCENGEN in this study is likely from the use of more recent scenarios (SRES) and multiple (17), more recent (post 1995) GCMs with a better treatment of aerosols in the MAGICC/SCENGEN analysis. The Tanzania National Communication meanwhile relied on four earlier generation models (primarily the UK1989), as well as older (unspecified) emissions scenarios. Both sets of analyses however show temperature increases, and furthermore the patterns of seasonal temperature increase are consistent⁴⁵.

Table CL.4b: GCM estimates of temperature and precipitation changes

Year	Temperature change mean (standard deviation)					Precipitation mean (standard deviation)					%
	Annual	JJA ⁵	SON ⁶	DFJ ⁷	MAM ⁸	Annual	JJA ⁵	SON ⁶	DFJ ⁷	MAM ⁸	
2030	0.9 (0.20)	1.0 (0.21)	.8 (0.17)	.8 (0.30)	0.9 (0.30)	4.1 (5.05)	-2.4 (7.98)	3.9 (10.04)	6.6 (8.06)	2.2 (5.34)	
2050	1.3 (0.28)	1.5 (0.31)	1.2 (0.25)	1.1 (0.43)	1.3 (0.44)	5.9 (7.30)	-3.5 (11.53)	5.6 (14.51)	9.6 (11.64)	3.1 (7.72)	
2010	2.2 (0.49)	2.6 (0.54)	2.1 (0.43)	1.9 (0.75)	2.3 (0.77)	10.2 (12.70)	-6.0 (20.07)	9.7 (25.27)	16.7 (20.27)	5.4 (13.44)	

Sources: Development and Climate Change: focus Mount Kilimanjaro, 2003

However, the minor changes in temperatures projected over the 99 years period are not expected to affect the plantation performance. This is because trees chosen for reforestation are proven robust and well adopted to the areas planted. Evidence is made from the neighbouring larger plantation planting similar species over 30 years. Furthermore, research shall remain the major means for identification of robust species from guaranteed sources, and site species suitability studies shall be carried out before planting, as well as on-going research and awareness of mitigation measures to protect the trees against any potentially harmful climate change impacts.

CL.4.2 Demonstrate that the project has anticipated such potential impacts and that appropriate measures will be taken to minimize these negative impacts.

⁴⁵ Development and Climate change in Tanzania, focus of mount Kilimanjaro, (Agrawala *et al.* 2003)

GRL is carrying out several different activities to minimize risks from negative climatic impacts. The project is planting species which are robust in terms of adaptability and will be tolerant to changes in temperature and precipitation. Increased risk of fire and droughts are not projected by these studies at the project area nor in Tanzania. The project is installed with thunderstorm detectors to check and avoid lightening that might cause natural fires. GRL, through training shall ensure that employees and communities are aware of possible causes and measures for climate risks. However, the long history of forestry management from Saohill forest plantation growing adjacent to this project, no significant climatic risks is expected. In case of any impacts, measures shall be taken including consultation with experts and use of project experienced and trained staff. Moreover, the plantations are located in areas classified as dry forest with rainfall less than 1500 mm per annum. Most of these areas have short rainy season and long dry season with erratic rainfall patterns. The soil in these areas are mostly deep and fairly well drained but with good water holding capacity. The Eucalyptus spp are known to have a deep root system. The species have survived in the environment for many decades. The species have also shown ability to withstand long dry season after 2-3 years⁴⁶. Hence, the potential to resist none-permanent drought at maturity is high, while the chance of permanent drought under the present climate change impact trend is unknown in the next 99 years.

Precipitation and temperature data shall be recorded through meteorological stations installed at each project site, this data shall be monitored across the year and compared between years. Data on rainfall and temperature for Uchindile are given, figure CL1a and CL1b. At Mapanda the meteorological station was not installed until recently but since the two projects occur in similar climatic conditions, Uchindile is assumed to be a representative of the two sites. Data are given as averages for each month during the whole period of 2002-2008. The data recording have been collected by GRL staff on a day to day basis during monitoring activities.

⁴⁶ *The Commercial Timbers of Tanzania*, J. M. Bryce, revised edition of 1999.

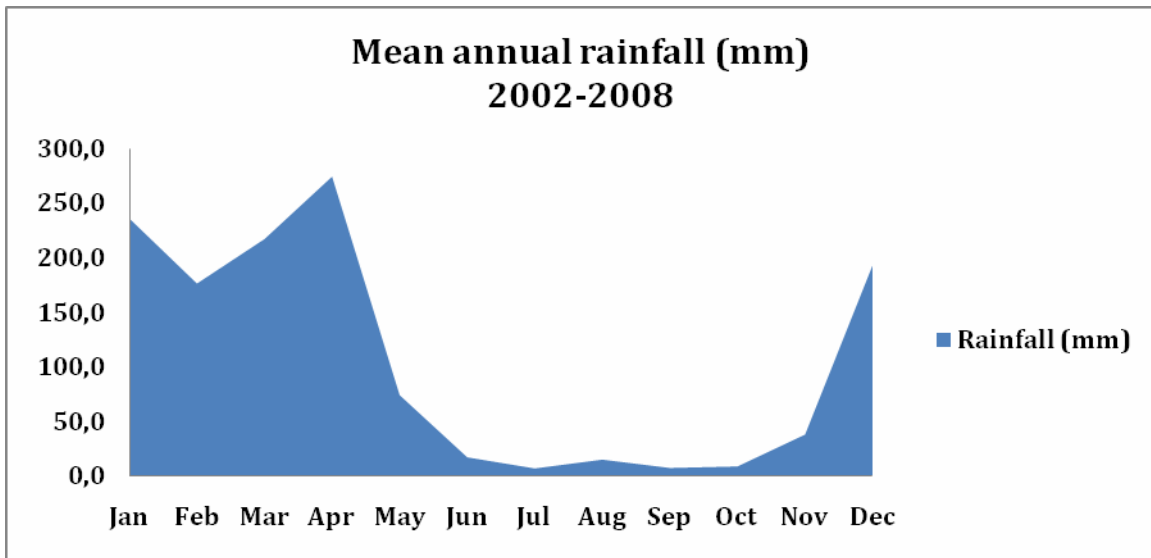


Figure CL1a: Annual mean rainfall during the period 2002-2008.

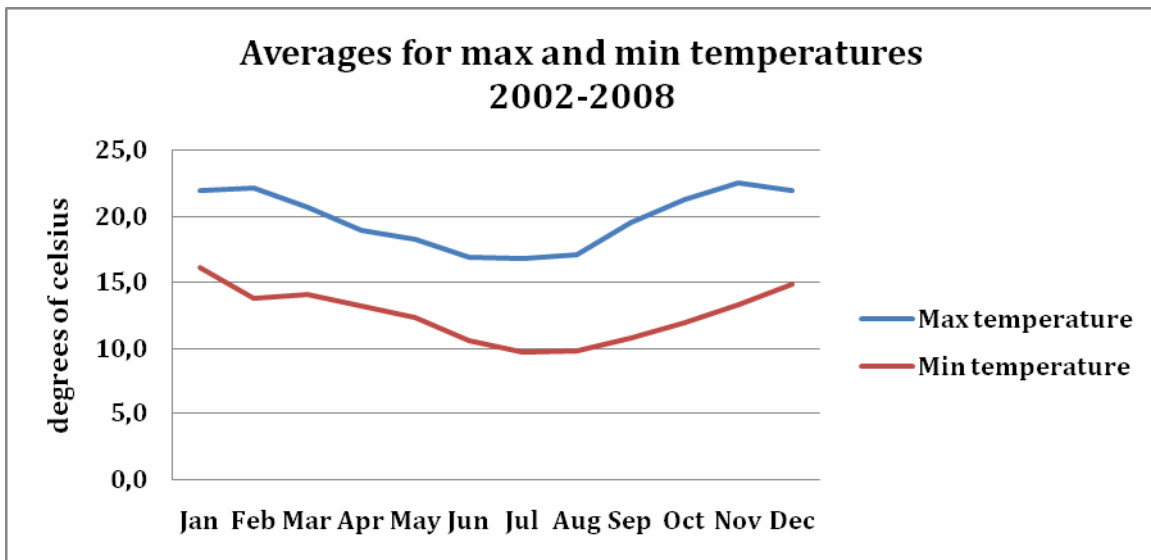


Figure CL1b: Mean maximum and minimum temperatures recorded in the period 2002-2008.

To minimise environmental unpredictable environmental risks and ease management, the plantation will be divided into blocks or compartments. This will help to spread risks in case of disasters, fires and minimize exposure of extensive land during harvesting⁴⁷.

CL5. Carbon Benefits Withheld from Regulatory Markets (optional)

⁴⁷ Work Instructions and Guidelines for plantation operations, GRL 2008.

CL.5.1 Demonstrate that at least 10% of the total carbon benefits generated by the project into regulated GHG markets will not be sold. Projects can sell these carbon benefits in a voluntary market or retire them.

All of the carbon credits from this project will be sold into the voluntary market. This project has received validation under the Voluntary Carbon Standard (VCS) in 2009.

IV. COMMUNITY SECTION

CM1. Net Positive Community Impacts

CM.1.1. Use appropriate methodologies (e.g. the livelihoods framework) to estimate the net benefits to communities resulting from planned project activities. A credible estimate of net benefits must include changes in community wellbeing given project activities. This estimate must be based on clearly defined and defensible assumptions about how project activities will alter social and economic wellbeing over the duration of the project. The “with project” scenario must then be compared with the baseline scenario of social and economic wellbeing in the absence of the project (completed in G2). The difference (i.e., the net community benefit) must be positive.

An assessment of the project baseline scenario⁴⁸ in terms of socio-economic status involved a questionnaire survey methodology backed up with primary data mainly the Tanzania national census, local village council growth pattern and development data and historic background accrued through elders at the project inception. Since then this data has been compared to socio economic analysis studies by project participants employing Participatory Rural Appraisal methodology. With bottom up methods using focus groups and interviews communities were able to participate to identify and prioritise their problems, needs, concerns and proposal on how community projects would be supported, as well enabling Green Resources to assess how their livelihoods were being effected over time by the projects implementation. Recently the company has been developing a new community monitoring plan which is aimed at tracking the welfare and livelihoods of specific families, which cover the range of starting livelihood levels in the village, from the poorest of the poor, to those in a relatively stronger position. The questionnaire will be administered not only in villages impacted by the project, but also in villages outside the

⁴⁸ Ecological study by Orgut consultants, Tanzania Branch, 1999

influence of the projects activities. The later will serve as a ‘control’ to essentially compare the changes in livelihood over time with and without project.⁴⁹

The following indicators of community development will be used in the new community monitoring plan - health, education, infrastructure, food security, social amenity as well as safe drinking water inline with the long term project community support program.

The previous studies have indicated improvement in community livelihood for those communities living in close proximity to the project, but the new monitoring approach will track changes quantitatively for specific families over time which will enable more specific comparison.

Based on earlier studies, local communities were very poor at the start of the project, with most living below the poverty line. The project expects to raise the livelihood of communities through supporting education by building and maintaining schools, improving infrastructure mainly roads and bridges, improving health services by building dispensaries, giving health education and facilities as well as provision of safe drinking water. This is in addition to employment offered to local communities, tax and levies paid to the local government.

There are both socio-economic and economic impacts arising from the proposed project activity. The Company has supported development programs to the surrounding communities since 1998. This has resulted in a number of benefits which have enhanced the livelihoods of many of villagers.

Table CM 1: Short summary of GRL community support⁵⁰.

Aspect of improvements	Activity/support/ Benefit
Education	<ul style="list-style-type: none"> - Supporting materials for building primary/secondary schools and teacher’s houses since 1998 - training
Health status	<ul style="list-style-type: none"> - building of dispensaries - providing medical equipments to hospitals

⁴⁹ Draft checklist of the socio-economic monitoring of forest carbon projects in the southern highlands, GRL, 2009.

⁵⁰ Community support details are documented in the community monitoring form.

	<ul style="list-style-type: none"> - HIV and malaria training
Housing	<ul style="list-style-type: none"> - Better economic conditions for villagers have impacted their housing; building bricks, furniture etc.
Women	<ul style="list-style-type: none"> - Improved the female status by employment
Infrastructure	<ul style="list-style-type: none"> - Improved accessibility by bridges and road constructions/improvements
Environment	<ul style="list-style-type: none"> - Soil moisture conservation - Training on pests and diseases, and environmental awareness - Providing free seedlings
Poverty alleviation	<ul style="list-style-type: none"> - Employment opportunities have given increased income to households - Increased revenues to the local government; levies, taxes etc. - Households can provide nutrition rich food more often as they have more capital

For a summary of the results of the socio economic studies please refer to section G.1.4 in the PDD. With the support mentioned above the company is expecting to bring net positive community impacts.

CM.1.2a Document local stakeholder participation in the project’s planning. If the project occurs in an area with significant local stakeholders, the project must engage a diversity of stakeholders, including appropriate sub-groups, underrepresented groups and women living in the project vicinity.

The project has carried out extensive stakeholders’ consultation which has shaped the project design. Stakeholders were consulted through meetings, semi-structured interviews, and focus group discussions to capture information relating to the project. Participatory Rural Appraisals were carried out in the villages to identify the problems, views and concerns of local stakeholders and incorporated into the project design and management plan.

CM.1.2b Describe how stakeholders in the project's area of influence will have an opportunity before the project design is finalized, to raise concerns about potential negative impacts, express desired outcomes and provide input on the project design. Project developers must document stakeholder dialogues and indicate if and how the project proposal was revised based on such input.

As mentioned on preceding sections, the project design considered community views, concerns and opinions. The company has frequently been making contact with various stakeholders through discussions, company briefings, and through questionnaires for their references and for seeking comments including benefits accruing from the company, company weaknesses/strengths or problems and expectations of local community from the company that they may have in the course of project implementation. Both Mapanda and Uchindile Forest Projects have collected comments from a diversity of stakeholders. Stakeholders' representative includes; teachers, village leaders, priests, woman groups, youth groups and villagers household. The comments have been taken into account and improved by the project proponents, and are pointed out as follows:

Comments from stakeholder's in Mapanda and Uchindile, PRA conducted in December 2008:

- Mapanda Village leaders expressed that the company has provided seedlings thus villagers have planted their own woodlots and are undertaking environmental protection. There is improvement in assistance to local community on social service provision e.g. building of schools and maintenance of nurse's house, health services and infrastructures.
- It was also expressed that GRL is conserving special specific areas such as natural forest, graves and areas of worship.
- Conservation of endangered species.
- Environmental education is provided; conservation, FSC and VCS
- The communication between the communities and the company have improved, which brings credibility.

Furthermore, the project is planning meetings with potential stakeholders once every three month. During this event, the project participants mention progress and discuss with the stakeholders giving their comments to the project. These include representatives from throughout the district where the project is located.

CM.1.3. Formalize a clear process for handling unresolved conflicts and grievances that arise during project planning and implementation:

The company's operating procedure manual (procedure 02) clarifies how any grievances, complaints and conflicts raised by stakeholders shall be handled. This procedure describes the methods of possible complaint and conflict resolution, raised about the work or any activities conducted by GRL, so as to guarantee the resolution.

The procedure manual of conflict resolution states that every person, inside or outside GRL, can make a complaint against the organization's actions, behaviour, documents, certification process, forest management, etc. Complaints, disputes and issues of contention must be submitted in writing to the attention of the Managing Director, either at the reception of the company, by mail or via complaint boxes at the plantation projects which are emptied monthly and delivered to the head office by the plantation managers.

Suggestion boxes have been installed around the villages so that anyone who wants to can give their feedback on the project. Grievances and complaints can also be raised in village meetings. Green Resources believes it has put into place a transparent, timely and clear process for resolving any issues which arise.

Project design is based on views from stakeholders. Stakeholders are communicated through meetings, semi-structured interviews, and focus group interviews to capture information pertaining to the project. Participatory Rural Appraisals are held in the villages to identify the problems, views and concerns for the local stakeholders and are to be incorporated in the management practices. All grievances raised by stakeholders shall be sorted out based on procedure 2 of the company operating procedure manual (refer CM.1.7.) These shall be documented and the company shall let stakeholders know the output for their resolution.

To date there has not been any severe contentions pertaining to the project. The community claims on the promises made during land acquisition are being handled accordingly. Clearer documentation of their claims shall be made and a resolution found of which all stakeholders will be made aware. Communities have expressed their satisfaction with the communication between company and villages.

If the complaint regards the Organization, the person with the complaint is to put it in writing, and it is presented to the Committee and the Managing Director of GRL and a dossier for the case is opened. The Managing Director assigns the issue to be solved by the relevant Department, which then forms a responsible committee to solve the issue and documents the procedure of steps taken to solve it. The committee of the relevant department is responsible to inform the Documentation Manager of state of progress of solving the issue in 15 days time. The Documentation Manager (hereinafter the DM) informs the concerned person/s and/or Organization/s of this progress or of potential extension of resolution because of the extent of the issue. The DM registers the resolution in the Registry. If the concerned person/s and/or Organisation/s have any complaint on the result the notice of appeal shall be resolved within 30 days. (Please refer annex II.a. for full version of the company procedures).

CM2. Offsite Community Impacts

CM.2.1 Identify potential negative offsite community impacts that the project is likely to cause.

The project does not expect any offsite negative socio economic impacts resulting from the project. The EIA/SEIA assessors called attention to different areas that the project potentially could have a negative impacts on if not avoided by the project in advance. The comments from stakeholders are given in section H.2, of the VCS PDD, and resolution/mitigation measures are given in section H.3, of the VCS PDD. Wages shall be paid on time and, Green Resources will fulfill the promises made to the villages during land acquisition, provide seedlings and training free of charge.

CM.2.2 Describe how the project plans to mitigate these negative offsite social and economic impacts.

In the EIA/SEIA report approved by NEMC in 2008, possible socio-economic impacts of the project were discussed. In CM.2 these impacts are presented, as well as mitigation measures which will be implemented by GRL.

Table CM2: Possible negative socio-economic impacts and mitigation measures adopted by GRL:

Affected area	Mitigation measure/Provision by GRL
<p>Social- and health services</p>	<ul style="list-style-type: none"> - Well-equipped health facilities are now in close vicinity to the villages - water sources are monitored on a frequent basis - employment opportunities which increase village economies - education/counseling on communicable diseases etc.
<p>Land use change</p>	<ul style="list-style-type: none"> - The project promoter has chosen land in the villages where there is adequate land for expansion for the villagers in several years to come -crop yield were poor and landscape is too hilly for pastoral activities; at a long term basis – the soil will not be suitable for agricultural activities - The project will offer alternative source of income by providing employment and other income generating activities.
<p>Resettlement and compensation</p>	<ul style="list-style-type: none"> - GRL followed local customs and legal procedures when claiming the land - the few households who were required to give away land were compensated sufficiently and have moved to close by areas where they continued their activities - Stakeholder comment will be sought throughout the duration of the project at regular intervals
<p>Employment gains</p>	<ul style="list-style-type: none"> - Migration will be prevented by offering employment opportunities to those who are residents in the project surrounding villages - GRL shall assist local village governments in imposing strict development control to avoid unplanned settlements - the forest project will facilitate in education opportunities in order to get more skilled people for permanent employment

Conflict over shared resources	<ul style="list-style-type: none"> - If necessary GRL will assist the villages in establishing bore holes to avoid interference with pastoralist and domestic use - frequent monitoring of the water source to prevent and measure contamination is addressed in the monitoring report
Infrastructure	<ul style="list-style-type: none"> - GRL will construct roads and bridges where necessary; to prevent traffic accidents and ease access to adjacent villages -employ licensed drivers for their operations
Cultural sites	<ul style="list-style-type: none"> - The site at Chogo shall be demarcated and mapped and protected for ritual ceremonies by local people - The graveyards shall also be protected. Planting shall be done 10 m away from the sites.
Unattended Forest Cover	<ul style="list-style-type: none"> - Retain key personnel to attend and patrol the forests to avoid the forests being hideout for criminal and endanger the public

CM.2.3 Evaluate likely unmitigated negative offsite social and economic impacts against the social and economic benefits of the project within the project boundaries. Justify and demonstrate that the net social and economic effect of the project is positive.

No unmitigated negative offsite social and economic impacts are anticipated. All negative impacts – offsite and within project boundary – will be mitigated, using the measures described above. The monitoring plan including mitigation measures to address any potential risks will be implemented.

CM3. Community Impact Monitoring

CM.3.1 Define the initial plan for how they will select community variables to be monitored, and the frequency of monitoring. Potential variables include income, health, roads, schools, food security, education and inequality. Include in the monitoring plan, community variables at risk of being negatively impacted by Project activities.

Community monitoring is planned through comprehensive socio-economic survey after three years while stakeholders' consultations shall be carried out annually through PRAs and other workshops at three months intervals. In the comprehensive community study, such variables as poverty level/income, infrastructure, food security, housing, education, health and social behaviours shall be analysed. This study shall either be conducted by Green Resources experienced staff or external agents. The study shall involve representative groups within the community, from the poorest of the poor to those in better standing in the community, including underrepresented groups and be gender sensitive. The variables shall be appraised and compared with time. The annual and quarterly consultation intends to derive feedback from communities on project actions and outcomes. The major objective of monitoring communities is to monitor the impact of the project on community livelihoods and well being. This monitoring will be consistent with VCS monitoring plan given annex 4 of the VCS PDD.

CM4. Capacity Building (optional)

CM.4.1 Explain how the capacity building is structured to accommodate the needs of communities, not only of the project.

Capacity building is being carried out at various levels – with both employees of the company, and also the wider communities.

The following types of training are provided for the purposes of both in house and external capacity building; (please refer section G.8 in PDD)

1. Workshops and Lectures

Lectures are carried out once per year during plantation celebration party by various field specialists (depending on workers suggestions and achieved skills) from the District. Workshops are carried out with local stakeholders every three months this shall include a majority of local stakeholders, NGOs and CBOs.

2. Training programs

There is no formal training (class training) for community woodlots but awareness of how to plant trees and how to take care of community woodlots is provided by project managers/supervisors during provision of tree seedlings.

3. On the job training

Furthermore, the company has planned exchange programs for its employees within the different forestry projects. For example, employees from Lindi Forest project (a GRL project in its initial stages) have been visiting the forest projects in the southern highlands to investigate and learn

more about plantation management techniques (and vice versa). This is to transfer knowledge; lessons learned and improve operation activities at other sister projects. Visits like this shall be conducted once a year every dry season. The project management shall be in charge in ensuring this is met.

CM.4.2 Explain how the capacity building is targeted to a wide range of groups, not just elites:

The company has a comprehensive education campaign⁵¹ that covers, a wide range of people including teachers, village leaders, women groups, youth groups, local workers and subsistence farmers. This campaign intends to educate the communities in conserving their environment, protecting RTEs and also covers some health issues in which communities are informed on common diseases and precautions to prevent the spread of disease. In this view, it can be observed that not only a certain class of people is represented but the community as a whole are represented; from leaders down to the grass roots (see also section G8.4 in this PDD).

The company has put together a 5 year training program with a schedule for specific operations (see appendix III). The training is organized and centralized by GRL. The individual project (MFP and UFP) makes recommendations for its training needs. The 5 year plan is liable for review on an annual basis depending on prevailing conditions. Training programs will be implemented in order to improve skills and knowledge of the staff and eventually enhance their work efficiency and enable them to adopt new technology. On the job training will also be carried out at work sites for both supporting staff and causal workers to ensure that the project has a highly skilled and motivated workforce. See also section G.8.2 for evidence of training.

CM.4.3 Explain how the capacity building is targeted to women to increase their participation:

The company, by law, mentions the role of women to the project; women are encouraged to participate in decision making and implementation of various activities. As such the company is gender sensitive and will enhance women capacity building as well as development and implementation of various programs. Any support given to the communities shall benefit both men and women.

⁵¹ This includes plantation celebration ceremony events where various lectures are given to communities; training sessions on fires by the fire brigade; company staff trainings on diseases, fires, certification issues and rare, threatened and endangered species.

CM.4.4 Explain how the capacity building is aimed to increase community participation in project implementation:

Annually, one day is set for celebrating with the community. On this day, the project informs the community about evaluation and achievements of the project in the year accompanied by more training on fire prevention and diseases. Government leaders and other stakeholders at the district level are also invited to this event. Research Institute representatives as well as students from Sokoine University of Agriculture are also invited. It is desirable that the information they acquire shall be disseminated to other regions over the nation. This sharing of information helps to improve skill building among staff in the execution of their activities.

CM5. Best Practices in Community Involvement (optional)

CM.5.1 Demonstrate that the project was developed with a strong knowledge of local customs and that, where relevant, project activities are compatible with local customs:

In early stages of project development and during EIA/SIA study, the local customs and norms were reviewed, and wherever possible the project was developed to ensure these were not compromised. For example; the area contains graves yards and other cultural sites which have been demarcated, mapped and protected. Tree planting shall be done at a distance of 10 metres away from these sites. The sites of special interests (SSI) were identified in cooperation with the stakeholders.

The project will cooperate with the local communities to ensure customary norms are followed by respecting customs and norms of the surrounding communities. Entering these sites shall be given under permission by project management. The projects will assist adjacent local village governments in imposing strict development control to avoid unplanned settlements and disrupting local community and polluting the surrounding environment due to mushrooming of economic activities by service providers and vendors.

CM.5.2 Show that local stakeholders will fill all employment positions (including management) if the job requirements are met. Explain how stakeholders will be selected for positions and where relevant, must indicate how traditionally

underrepresented stakeholders and women, will be given a fair chance to fill positions for which they can be trained.

The project offers employment to residents of the area (more than 50 permanent positions), while the number of temporary workers goes to 500 and 700 per day for Mapanda and Uchindile, respectively. The surrounding community is given first priority, as stated in the community agreements with GRL, and as documented in the management plan. The company standard operating procedure 06: 'Employee Selection Procedure' (Annex II), shows selection criteria for workers in the project. Local stakeholders with relevant skills are highly encouraged to fill higher positions. Particular care shall be taken to ensure that selection criteria are not in any way directly or indirectly discriminatory on grounds of gender, race, disability, religion or belief.

CM.5.3 Demonstrate that the project complies with international rules on worker rights:

GRL intends to exceed compliance with local and international laws and regulations in its operations. The Tanzanian employment and labour Relations Act, which was amended in 2004 is the latest legislation that governs GRL's employment and staffing at the local level. However, this law falls short in a number of areas. It is in for this reason that GRL has sought consultation from Nomogaia foundation, a global human rights initiative to carry out a study on worker's rights at the company. This study is expected to bridge the gap between the local and global laws, and put forward recommendations for the company's compliance with worker's rights. The later shall be included in the company code of practice. GRL shall ensure the following workers' rights are properly met as proposed by this study:

- Rights to health
- Non discrimination right/women's right
- Right to safe working environment/worker's rights
- Freedom of Assembly/right to join a trade union
- Right to develop and
- Social license to operate

By laws and regulations will be developed to ensure the communities around and plantation workers are aware of their rights. The Tanzania Plantation and Agricultural Worker's Association (TPAWU) is an association for which all plantation employees are members. Plantation workers at Uchindile and Mapanda are members for this association. This organization operates under Tanzanian rules, giving guidance on workers' rights and safety at the work site. Mapanda and Uchindile workers have in addition to their representative project leaders, the district and regional

leaders who are government agents. Periodically they check company compliance with laws as well as updating workers with new constitutional amendments through meetings held at the project sites. These meetings are also attended by the project management. From this study, it is expected that company communication with workers in regard to their rights shall be proposed. Given the company also complies with the FSC Principles and Criteria, the company shall ensure compliance with workers rights both national and international.

Social relations shall continue to be reinforced through meetings, gatherings and discussions with village leaders and local communities with the aim of sorting out solutions to perceived problems, enhancing fire protection programmes and improving the workforce availability for achieving the set targets.

<p>CM.5.4 Comprehensively assess situations and occupations that pose a substantial risk to worker safety</p>
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Green Resources realize that forestry operations need to be run carefully to minimize risks to workers. Such activities that cause substantial risks are categorized based on the operational activity including fire protection, harvesting, site preparations and silvicultural operations, road construction, logging, loading, hauling and skidding.

Site preparation will involve walking amongst grasses; as such workers are likely to face snake bites. Workers could also get injured by their equipment. During silvicultural operations, accidents as a result of improper maintained equipments and lack of skills is another risk. Similarly, harvesting, thinning, road construction, loading and unloading, hauling and skidding are potential risks involving the activities mentioend above. These activities shall be conducted following the GRL work instruction⁵² which highlights safety working procedures. Workers shall be properly trained at the onset of every operation, equipments shall be well sharpened, repaired and maintained for the next job. Employee involved in operations shall be dressed in Personal Protective Equipments, PPEs these include protective boots, overcoats, gloves, masks etc.

Risks from fire incidences shall be addressed separately through the fire protection plan⁵³, by properly training the fire crew and the use of modern fire protection technologies and equipments. The modern equipment involves less human contact with the burning fires. The project

⁵² Work Instructions and guidelines for plantation operations, GRL 2008

⁵³ GRL fire protection plan

boundary will be cleared with fire breaks to avoid fires from outside the project area and ease fire management. During fire incidences, all workers shall be in PPEs, fire fighting methods that involves little human-fire contact shall be employed, trucks shall be used to supply water and facilitate movement of workers. The project has so far been providing personal protective equipments during fire fighting including, masks, boots, groves, the fire beaters, radio communication and bicycles. In addition lightening detectors have been installed at the plantation to reduce the risk of natural causes of fires by storms.

For those involved in accidents in operations at the plantation, first aid and medical treatment shall be provided.

V. BIODIVERSITY SECTION

B1. Net Positive Biodiversity Impacts

B.1.1 Describe the appropriate methodologies used to estimate changes in biodiversity as a result of the project. Base this estimate on clearly defined and defensible assumptions:

In the absence of the project, it is expected that land use shall continue as unmanaged grassland. This is due to lack of financing for commercial forestry that appears as the best alternative scenario to the area. Fires started by communities under the without project scenario will continue to reduce biodiversity of the area; the soil will loose more of its fertility and render the area unable to support tree growth in the without project scenario. Similarly in the without project case due to lack of conservation knowledge and the high level of poverty in the surrounding communities, more extinction of the RTE and other native species is expected. This indicates an enormous loss of local biodiveirsity to the project area over time.

The Environmental Impact Assessment commissioned by the project participants applied environmental assessment methodology guidelines established for Tanzania to determine and examine the project ecological baseline scenario tracking the historical background of the existing biodiversity and analysing potential impacts for the proposed project activity. This was followed by an ecological survey⁵⁴ which applied transect method where transects of 4 m wide were established in each of selected strata in a predetermined direction and extended into the strata to cover as much variations as possible. In each stratum information collected included

⁵⁴ Ecological Survey by Munishi and Wambura, July 2007

identification of all plant species and wildlife encountered, observations on signs that can indicate wildlife presence such as droppings, nests, animal tracks/burrows, carcass or other animal remains and consulted local villagers to gather information on wildlife and tree aspects basing on historical record. These studies and the land eligibility survey by both the District land surveyors and the project participants applied GIS techniques using land cover maps for the year 2000 compiled from Landsat TM 30x30m using bands (4, 5 and 3) and 1:50,000. The spatial biodiversity information collected has been put into GIS, for comparison over time.

Following these studies the biodiversity monitoring has been done through annual ecological surveys consistent with the VCS monitoring methodology plan (Annex 4 section 6.1 of the VCS PD).

Green Resources has now decided to implement a new biodiversity monitoring plan across its operations which aims at quantifying in more robust terms changes overtime to biodiversity at the project, as well as comparing biodiversity changes as a result of the project to a control site outside the influence of the area of the project. A terms of reference⁵⁵ has been developed to design this new monitoring plan, at both a generic level for all Green Resources Forest Projects, and also specifically for Uchindile and Mapanda. An expert shall be commissioned to carry out a baseline biodiversity analysis.

B.1.2 Describe possible adverse effects of non-native species on the area's environment, including impacts on native species and disease introduction or facilitation. If these impacts have a substantial bearing on biodiversity or other environmental outcomes, the project proponents must justify the necessity of using non-native species over native species.

The possible adverse effects of the planted tree species is suppression of the grass and shrub as a result of canopy closure. This scenario is still less harmful to biodiversity than annual fires and the 'without project' scenario. Tree species planted are not invasive and therefore do not impact native trees in the region. No disease introduction is expected as a result of exotic tree planting. Furthermore, the grass on which trees are to be planted is not the natural vegetation cover, but rather the result of the anthropogenic-led fire regime. The project in addition to protection of the

⁵⁵ Invitation for the development of a company wide biodiversity monitoring plan guidelines for Green Resources Plantations, and tailored to Uchindile and Mapanda Reforestation projects, August 2009

ecosystem shall bring economic benefits to the local community and the local government. This contrasts the situation whereby the land remains idle and degrading.

The planted exotic species are obtained from high quality stock generated from genetically superior seed well adapted to the prevailing site conditions and broadened within and between species so as to ensure sustainability of the plantations against pests, diseases and climatic fluctuations. The project's program of planting indigenous tree species outside the project area is expected to sustain the natural habitat, conserve the soil as well as water resources and biodiversity beyond the project zone. The native tree species planted on trial basis prior to the start of the project had a poor performance but the company will continue to improve its understanding of growing conditions for native species, and carry out trials and research in this field.

B.1.3 Identify all IUCN Red List threatened species and species deemed threatened on nationally recognized lists that may be found within the project boundary. Project proponents must document how project activities will not be detrimental in any way to these species.

During the ecological survey conducted in 2006, two tree species were identified as rare or endangered. The tree species are *Osyris lanceolata* and *Prunus Africana*, occurring in riverine vegetation that remains intact and therefore does not fall within the plantable land area. Appendix II of CITES also points out two orchid species, one aloe species as endangered and one tree species, *Cythea thomsonii*, as rare (See also table G4 for a full list). Most of these species grow better under favorable conditions close to water sources within the buffer zones. A few tree species have been identified within the project area. Areas with such trees will be conserved following FSC criteria of one to two tree lengths equal to 30-60 meters buffer to avoid impacts of exotic tree growth and harvesting operations to the native trees. None of these native species shall be affected by the plantation activity as they are protected and regularly monitored. At project site, information and pictures of the RTE's found within the area are put up at the office including their local name, and workers are instructed to report the presence of any of these species in the project area. Management prescriptions are prepared and conservation status shall be recorded, monitored and archived. Awareness campaigns will also be carried out to educate staff and the local communities on the importance of the rare or endangered trees species so that their habitats are conserved and protected. Apart from this, all epithet orchids, wetlands and swamps will be

protected by means of a 30 m⁵⁶ and 60 m⁵⁷ buffer zone because they are associated with riverine trees which need protection prescribed in the Water Right Act and NEMC, respectively. This is in accordance with the Country Biodiversity Study (BCS 1995) which points out the low level of endemism in the ecological zone.

B.1.4 Identify all species to be used by the project and show that no known invasive species will be used.

Two main species, eucalyptus and pine, are selected for plantation establishment in the project area. These are *Eucalyptus saligna*, *Eucalyptus grandis*, *Eucalyptus camadulensis* and *Pinus patula*. Native species shall be planted outside the project area to enhance soils and for water conservation. Other exotic species of hardwood varieties are selected to broaden the number of species, to promote use of other and less known species, and to improve the health and resilience of the established plantations. The less known species are not considered as part of the removals to be claimed from the A/R project activity. The project participants believe that more heterogeneity will reduce the risk to pests and diseases. The choice of these native species offers the best chance for the success of plantations with respect to local ecological benefits, wood supply, soil and site stabilization, and improvement of the landscape.

The exotic species listed below have been screened against the information provided in the global database of invasive species and are not invasive in Tanzania.

Table B1: Species to be planted by the project participants.

SPECIES SELECTED	TYPE
<i>Pinus patula</i>	Exotic softwood
<i>Eucalyptus saligna</i>	Exotic hardwood
<i>Eucalyptus grandis</i>	Exotic hardwood
<i>Khaya anthotheca</i>	Indigenous hardwood
<i>Eucalyptus saligna</i>	Exotic hardwood

⁵⁶ The width of 30m buffer is recommended in the Water Right Act (2000) and this was the law governing water bodies referred to in the EIA study conducted in 1999.

⁵⁷ All areas planted from 2005 are being governed by the Environmental Management Act 2004 stating a buffer of 60m

<i>Pinus elliottii</i>	Exotic softwood
<i>Cordia africana</i>	Indigenous hardwood
<i>Eucalyptus camaldulensis</i>	Exotic hardwood
<i>Prunus africana</i>	Indigenous hardwood

B.1.5 Guarantee that no genetically modified organisms will be used to generate carbon credits:

The forestry policy of Tanzania discourages the use of Genetically Modified Organisms in plantations. No genetically modified organisms (GMOs) are to be planted in this project and hence no carbon credits shall be claimed from these species. The seedlings production shall not involve seed culture, but direct sowing on the ground and the project shall ensure seeds for planting are to be obtained from known seed sources.

B2. Offsite Biodiversity Impacts

B.2.1 Identify potential negative offsite biodiversity impacts that the project is likely to cause:

As mentioned section G.1.6 of this document, the project area was earlier abandoned and so was not under pressure from community land use practices due to its unsuitability for agriculture. A full list of threatened species is given table G.4. Aloe tree specie named *Aloe vera* was identified during botanical survey by TTSA and two orchid species named *Calanthe sylvatica* and *Calanthe vestita* were also identified during this study while blue swallow was identified during an ecological survey. However these species occur in very small numbers.

In the without project case, the major threat to the biodiversity is fires set by communities during hunting and small scale farming outside the project boundary. This scenario is expected to continue in the ‘without project scenario’.

The company collaborates with the government in stopping fires. Whilst the local government impose penalty to community members found setting fires, the company gives a free seedlings and technology incentive to communities not to set fires. With free tree seedlings supplied,

community woodlots surround the project, fire education campaigns have helped to reduce the threat in fear to lose their wood lots and destruction of the environment. These efforts have significantly changed community attitudes on fires. Tree planting is expected to suppress grass with canopy opening but this is considered less harmful compared to fires which negatively impacts almost all the biodiversity in the area. A minimum of 30 meters planting buffer shall be set around any rare species identified in the project area to avoid growth disturbance with Eucalyptus and pine and also during harvesting. A sufficient project area has been conserved for blue swallow. In addition, research is being undertaken by the project to identify more rare, threatened and endangered species and take conservation actions in collaboration with communities.

Furthermore, the plantation shall be established in degraded. The grasslands are not the native biodiversity at the project area, it is derived from continuation of anthropogenic caused burning. The project participants believe that converting the low value grassland into commercial forestation is the means to put value to the land in the project area. Biodiversity benefits are being accrued through conservation of native vegetation and reduction of burning. Further enrichment with native tree species shall be carried out. The stock is in place summing 3,708 seedlings of *Croton megalocarpus* and 5,148 seedlings *Markhamia lutea* for 2009/2010 planting season which are both native species of the area. Plans to procure *Markhamia obtusifolia* for the next planting season are also in place. These species shall be planted in addition to Eucalyptus and pine, outside the VCS planting area, but still within the boundaries of the overall land that Green Resources has been given title to in the area. *Cordia africana* and *Newtonia buchananii* perform well in most types of soils and are tolerant to weather changes; this tree shall also be planted for timber. *Syzigium cordatum* also known as ‘Water Berry’ shall be planted along rivers for water conservation and enrichment purposes. Research is being sought to find more native species suitable for the project area to boost native tree planting at the project.

All likely negative biodiversity impacts and their mitigation measures have been discussed through this document. No activities are expected to threaten biodiversity outside the project boundary as a result of this project activity. Moreover, following project design, any negative offsite biodiversity impacts shall be identified by the monitoring program. The project participants shall seek for measures to address any negative impacts as they arise.

B.2.2 Describe how the project plans to mitigate these negative offsite biodiversity impacts:
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As stated section B.2.1 above, the project has not expected negative offsite biodiversity impacts

as a result of project activity. The project is expected to generate positive offsite biodiversity impacts through planting native trees that help conserve water resources and restore biodiversity, education campaigns for the RTEs to the community and reduction of fires which threatened the biodiversity.

B.2.3 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:

All likely negative offsite biodiversity impacts emanating as a result of project development shall be mitigated by the project participants. Any negative biodiversity identified by the monitoring scheme or those foresee during the EIA study shall be regularly checked and addressed in a timely manner. The project intends to cause net biodiversity benefits outside the project boundary and throughout the project's lifetime. The project areas were vulnerable to fire, caused by hunters, honey collectors and farming methods. Continuation of these fires in the without project scenario would limit survival and multiplication of habitats for fauna, flora outside the project area. This will result into a significant loss of biodiversity in the long term. As means of monitoring, fire-prevention and managing protective zones the project proponents expects to enhance the biodiversity compared to the status quo.

B3. Biodiversity Impact Monitoring

B.3.1 Describe the initial plan for how they will select biodiversity variables to be monitored:

Biodiversity impact monitoring is planned through annual ecological field surveys by external agents as well as the project monitoring department. The monitoring scheme shall assess changes in biodiversity across the year. These changes shall be compared with the baseline scenario. Biodiversity attributes to be monitored both in the project areas as well as in buffer zones outside the project area shall include: species abundance changes in habitat and landscape connectivity, and type of species encountered and their occurrences. Biodiversity monitoring will keep track of these attributes changes as the project goes on. The monitoring scheme shall ensure that any changes identified are registered, quantified and rectified. The biodiversity monitoring shall be conducted consistent with the VCS monitoring plan, Annex 4. The company put out a Terms of Reference for tender to find a local expert who can develop a quantitative biodiversity monitoring programme for UFP and MFP projects. An agreement for completion of the work is currently

being set up with Sokoine University of Agriculture, Tanzania.

The monitoring plan and guidance will include:

- Appropriate indicators of biodiversity that should be monitored and which can be compared inside and outside the project area, and over time to include terrestrial plants, avian, mammals, fish important insects and selected aquatic flora and fauna
- Identification of sampling technique for monitoring the selected indicators
- Appropriate methods for analysis, quantification and interpretation of data collected
- A tool on how to select key indicators for the generic monitoring guidance document
- Development of data entry sheets, and analysis and recommendations

The approach to be used will involve:

- First the identification of biodiversity indicators. Indicators usually demonstrate changes in biodiversity. Depending on the level of management the indicators will be grouped into two broad categories according to what they assess may be Response Indicators or Pressure Indicators
- Visit to specific field sites for assessment of area specific conditions and review of project documents
- Second discussions with relevant staff and other stake holders for review and refinement of the selected indicators for appropriateness and acceptability. This will be done in a series of meetings possibly with appropriate staff in Mafinga and Dar es Salaam.

Response indicators

- The Response Indicators will be those that can assess how species, groups, or ecosystem attributes respond to pressures on the ecosystem.
- These will therefore involve those indicators that allow for direct measurement of the biota e.g. the number of certain organisms of importance in a given area, diversity indices, similarity indices and presence or absence of a given organism.
- They can provide information about other biodiversity elements, as well as the ones directly sampled.
- These indicators are expected to give a more direct understanding of biodiversity though may be more difficult to measure and assess the result.
- Response indicators will be the most appropriate for monitoring over the long term and will be the major focus for the current monitoring plan

Pressure indicators

- The Pressure indicators to be considered will be those that measure processes that threaten aspects of biodiversity such as those related to establishment of plantations in a natural ecosystem, impacts of different plantation management regimes (by species) fire regimes, zonation of the plantations among others.
- These indicators will be more appropriately used across large scales.
- It is therefore likely to be used when developing the generic guidance document in conjunction with response indicators

Other indicators

- Where appropriate indicators may be difficult to assess surrogate measures will be used. These measures will be used where there may be a clear relationship between the abundance or presence of a given organism and a certain pressure e.g. fire regimes, plantation establishment, and management treatment among others. In this case the extent of the pressure can be measured as a surrogate of the population of the organism in question.

B4. Native Species Use (optional)

B.4.1 Show that the project will only use species that are native to the region, or justify that any non-native species used by the project are superior to native species for generating concrete biodiversity benefits:

The selection of species for planting (sub species of Eucalyptus and Pine) was mainly based on their adaptability to the land, and the long experience of plantation and silvicultural practises for these species. The area in which the project is implemented contains poor soils and the native species growth is very low. Eucalyptus and Pine grows fast due to their low nutrient demand and adaptation to high rainfall and altitudes. These species have been screened against invasive species and have no proven adverse effects on the native species. Project participants believe that converting the low quality grassland which is under threat of frequent burning to plantation forestry is the best way to protect the environment. Biodiversity benefits are therefore expected through protection of native trees and other biodiversity by creating conservation areas within the project area and monitoring throughout the project boundary.

The 20% of total seedling shared to the community will help to reduce pressure on trees for fuel

and other purposes. This program is also expected to reduce fire incidences in the area outside the project boundary.

B5. Water and Soil Resource Enhancement (optional)

B.5.1 Identify project activities that are likely to enhance water and soil resources:

Project activities that are likely to enhance the soil and water resources:

- Setting aside a buffer zone of 60 metres on both sides of the water sources is recommended by NEMC as a sufficient area that avoids interference of the exotic species with water resources.
- Indigenous water conserving tree species planted in the buffer zones is expected to maintain the soil moisture content and fertility in wetlands allowing ecosystem multiplication and repository sites for birds.
- Establishment of community woodlots and education campaigns
- Establishment of preventive fire regimes

B.5.2 Credibly demonstrate that these activities are likely to improve water and soil resource compared to the baseline, using justifiable assumptions about cause and effect, and relevant studies:

There is no clear proof that the project implementation shall improve water and soil resources. However, the project is not expected to cause negative impacts to these resources as well. The net positive impacts to soils and water from planting exotic tree species is entirely dependent on the project design. The project proponents realize that eucalyptus trees have a higher growth rate associated with greater uptake for water and nutrients. Tree planting at 60 meters away from and at altitudes higher than the water courses is not expected to lower the water table. Moreover rainfall intensity is expected rise as a result of larger forestation. The conservation techniques (see B.5.1 above) to retain the soil moisture will be practised at the plantation sites and such measures are expected to enhance groundwater recharge. In addition, organic material as falling leaves, twigs, bark and fallen fruits will remain within the area and serve humus supply. This distinguishes the project from the baseline scenario where the biomass shall keep burning.

Soil and water analysed for their chemical composition (at Sokoine University of Agriculture and Iringa Water Office) have not shown any changes in salinity, soil fertility and pH in comparison to the baseline scenario. The monitoring of water flow level at the plantation has not shown any

decreases over the past years. (Water and soil monitoring reports exists and are available upon request). Furthermore, the baseline biodiversity study is expected lay down the basis for monitoring changes in water and soil resources with project activities.