

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

**Reforestation in grassland areas of Idete, Mufindi District,  
Iringa Region, Tanzania.**

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## I. BASIC DATA

Green Resources Limited (GRL) is the leading plantation, carbon offset and renewable energy company in Eastern Africa. Green Resources AS are conducting reforestation activities in a number of locations in Tanzania, Uganda and Mozambique, with the purpose of deriving revenue streams from the sale of carbon offsets and timber, whilst simultaneously bringing community and environmental benefits. The Idete Forest Project (IFP) is developed by GRL. This project is also applying for the Clean Development Mechanism (CDM) validation and verification under the A/R category with approved methodology A/R AM0005 version 03.

Date of document: May 20<sup>th</sup> 2009.

## II. GENERAL SECTION

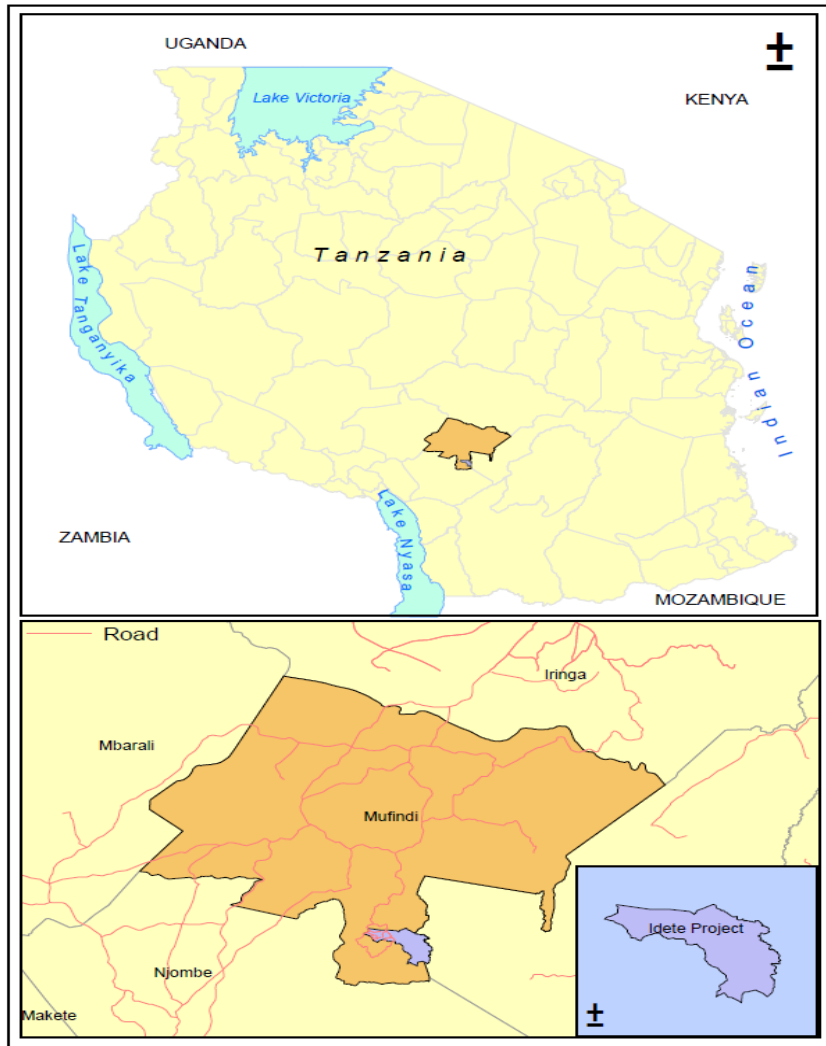
### G1. Original Conditions at Project Site

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

##### *Location*

The specific area of project activity is located in the southeastern part of Tanzania (Figure G1). The specific geographical positions (longitude/latitude) have been determined from topographic sheets, satellite images and actual planting area coordinates of the boundaries (polygons) are established using GPS, and stored in GIS.

- **Project Boundary:** The area of land is confined within a parcel of 11,500 ha of land, located on the lower elevation of Mufindi Escarpment, between latitudes 8°52' S - 8° 59' S and longitudes 35°11' E - 35° 23' E of altitudes between 1100 m and 1535 m above sea level. The external boundaries are mainly rivers, valleys and cleared lines/paths.



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

***Hydrology***

The major rivers that flow in the project area are the Mnyera River and the Idete River flowing in to the east of the project area and draining into the Ruaha River. Riverbanks and valleys are covered with natural vegetation dominated by riverine tree species, e.g. *Syzygium cordatum* and grasslands that will be left intact by the project for hydrology and biodiversity protection purposes. Floods are not common occurrences in the project area.

***Climate***

The area has a mean annual precipitation of 1050 mm, most of it falling between December and April/May, but with occasionally drizzles and showers extending to June and sometimes July.

The prevailing winds blow from East to West. Mean annual temperature is about 12<sup>0</sup>C and the coldest months are May to July. The climate of the area is characterised by a long dry season predominantly between July and October and a bi-modal rainfall distribution of short and long rain periods. The short rainy season occurs during November-December while the long rains fall between March and May. The project area is located in a zone of high potential evaporation varying between 800 - 1200 mm/year (section A.5.1 in the CDM PDD).

#### ***Soil and Topography***

The project site is located in an area characterised by undulating landscapes with slopes over 60% and soil derived mainly from granite that is deeply weathered and consists of a mixture of red and yellow clay loams with dark humic top soil. In most areas the agricultural productivity rating of the soil is medium. The upper soil layer has been exposed to excessive annual traditional/accidental fires in most parts, and therefore largely devoid of humus.

#### **G.1.2 Types and condition of vegetation at the project site:**

The vegetation in the project area is mainly unmanaged grassland and some remnants of scattered native species of miombo trees and shrubs including *Parinari culaterifolia*, *Albizia gummifera*, *Prunus Africana* and *Nuxia congesta*, *Uapaca kirkiana*, *Brachystegia* and *Jubermadia species*, which covers a larger part of the hillsides. In the lower sections and riverbanks, riverine tree species such as *Ficus lutea*, *Prunus Africana* and *Syzygium cordatum* are dominant. .

Under the trees and in open areas, the natural undergrowth mainly consists of short and tall grass comprising *Hyparrhenia rufa*, *Diheteropogon ampelactens*, *Londetia simplex* and *Cymbopogon excavatus* with some areas of scattered bushes, trees and shrubs. This vegetation will be left intact to offer refuge to wildlife, enhance native biodiversity, and protect the areas from erosion by rainwater as well as to protect the rivers and streams from drying up.

#### **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 for CDM project activity in the area. Carbon stocks in the living biomass of unmanaged grasslands have been estimated assuming maintenance of the grassland in its present state. The land use

under the baseline scenario, as elaborated in Section C.4 of the CDM PDD, falls under one stratum namely; “grassland with scattered shrubs and isolated trees“. The carbon stock change in aboveground and belowground biomass for the grassland is estimated based on the vegetation data collected from temporary sample plots for trees and shrubs. In accordance with guidance contained in paragraph 35 of EB 42 meeting report, GHG emissions due to removal (loss) of herbaceous vegetation as a component of non-tree biomass are neglected in this methodology. As such herbaceous vegetation was not sampled or included in emissions. It is assumed that both trees and shrubs are in a steady state. This is evidenced by the fact that the area has been grassland with scattered shrubs and isolated trees for over three decades. No annual changes in the carbon stocks of the living biomass have been noted.

The carbon stocks in the baseline stratum in the trees and shrubs were estimated through 37 nested sampling plots of 0.15 hectares. For trees, Chave et al.<sup>1</sup>, an equation for dry forests using the DBH and height parameters was used to estimate biomass. For shrubs, an allometric equation developed through destructive sampling at the Idete Forest Project was used. A root to shoot ratio of 0.32 and 0.35 for the pine and eucalyptus respectively was applied and a carbon fraction of 0.5 to convert biomass to carbon. (Full details of the baseline survey can be found in annex 3 in the CDM PDD).

The sum of the carbon stock changes for the living biomass at the time before the project started is considered to be zero. 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. The baseline situation shall only be assessed again in the run-up to the second crediting period. The assessment of the baseline biomass on the vegetation cover obtained an average of 0.961 tC/ha.

The baseline emissions are calculated by applying a baseline value of 0.961 t C/ha. It is assumed that all biomass will be lost during site preparation.

**Table G1a: Planted area (2001-2007) and species composition**

Species	Year	Area planted (ha)						
		2001	2002	2003	2004	2005	2006	2007
<b>Pine</b>		80	54	171	45	566	479	889
<b>Eucalyptus</b>		0	240	6	360	470	178	161
<b>Total</b>		80	294	177	405	1036	657	1050

<sup>1</sup> Chave et al. 2005. Tree allometry and improved estimation of carbon stocks and balance in tropical forests. *Oecologia* (2005) 145: 87–99.

**Table G1b: Planting plan (2008-2013) areas and species composition**

Species	Year	Area to be planted (ha)					
		2008	2009	2010	2011	2012	2013
Pine		792	784	756	791	301	324
Eucalyptus		388	390	399	230	321	364
<b>Total</b>		1180	1174	2329	1021	622	688

**Table G1c: Estimation of the ex ante baseline net GHG removals by sinks**

Year	Estimation of baseline net GHG removals by sinks (tCO <sub>2</sub> e)
2006	0
2007	0
2008	0
2009	0
2010	0
2011	0
2012	0
2013	0
2014	0
2015	0
2016	0
2017	0
2018	0
2019	0
2020	0
2021	0
2022	0
2023	0
2024	0
2025	0
<b>Total for crediting period (2006-2025) (tCO<sub>2</sub> e)</b>	0

**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 occurring in Makungu and Kiyowela wards 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 to a number of 750,000<sup>2</sup>. The Hehe society is comprised mainly of Christians. The communities are represented by substantial farmers which live outside the project boundary. They are small scale farmers growing annual crops for subsistence farming and livestock keeping mainly in kraals. The planting area itself was largely abandoned prior to the projects inception.

The largest township in the region is Mafinga, which had a population of 33 669 in 2002. The main employment in the region is in agriculture, forestry and the tea industry. Within each of the two wards there are four villages; Makungu ward: Kitasengwa, Lugolofu, Lugema and Makungu; and Kiyowela ward: Mangunguli, Idete, Kiyowela and Isamla. Among the eight villages, the three that lie closest to the project and are most affected by its activity are Idete, Kiyowela and Makungu.

**Table G2: Population dynamics Idete Forest Project**

<b>Idete Forest Project</b>	
<b>village population dynamics 2007</b>	
<b>Idete</b>	3 490
<b>Makungu</b>	838
<b>Kiyowela</b>	6 125
<b>Total</b>	10 453

Each village has an elected chairman and a village council. The village council consists of 25 representatives. Elections take place every 5<sup>th</sup> 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 rights. Representatives for the different village committees are also elected; i.e. health, environment, financial, social and planning committee. Within the villages there are different groups and societies. Some institutions present are schools (nursery/primary/secondary), religious societies; both churches and mosque. Other organizations that exist are youth social clubs, women groups and also some of the villages have their own football teams.

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<sup>2</sup> Gordon, Raymond G., Jr. (ed.), 2005. *Ethnologue: Languages of the World*, Fifteenth edition. Dallas, Tex.: SIL International. Online version: <http://www.ethnologue.com/>

Before the project activities started, the project participants consulted an external agent<sup>3</sup> to carry out an Environmental Impact Assessment (EIA), which also included a socio-economic assessment, to identify any possible environmental and social impacts to the surrounding communities and suggested measures to combat these. Following the recommendations from the Environmental Association of Tanzania (ENATA), the project participants carried out socio economic studies employing participatory techniques. These included the Participatory Rural Appraisal (PRA), Semi-structured interviews, focus group discussions, village meetings and questionnaire methods. Parameters assessed included housing, education, income, health, infrastructure and culture.

It was revealed in the study by ENATA in 2005 that the area is situated in a area where there are typically poor communities who were located in remote areas and where access to social services was inadequate pre-project. Medical data indicated high death rates among infancy and maternity, as well as transmissible diseases such as malaria and typhoid. No proper infrastructure connected the wards to Mgoilolo, which was the nearby center for medical treatment and other basic human needs. Very few completed their primary education.

Socio-economic studies illustrates that the surrounding communities have benefited from the implementation of the forest project. GRL has constructed roads to ease communication between villages, and offers free transport for sick people. Medical equipment is provided to the nearby dispensary in Idete, and information on diseases like malaria, syphilis and HIV are provided. Employment opportunities are offered to the local workforce in the surrounding villages. Until now, GRL have employed 17 workers on a permanent basis, and more than 350 workers on a day to day basis. And the employment opportunities are expected to increase as the project activities expands. Giving the villagers these employment opportunities has also increased the overall income to the households, and more children are completing their primary and secondary education as their family now can afford to pay the school fees. Through the support of the company, one primary and one secondary school have been built and old schools have been renovated. Free seedlings to establish community woodlots are provided by GRL, as well as training on woodlot management, and tree diseases.

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

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<sup>3</sup> Environmental impact assessment on proposed Mafinga and Idete Forest projects in Mufindi District Iringa Region conducted by Environmental Association of Tanzania, (ENATA) in Oct 2006.

### *Land use*

The project area is implemented in a single area with relatively uniform characteristics of grassland with scattered shrubs and isolated trees (see figure G2 below), exposed to annual fires. Along river valleys and gullies there are pockets of forest...



**Figure G2: Idete project baseline vegetation condition**

### *Land tenure*

Green Resources Limited has acquired a 99 year land lease from the Government of Tanzania for the parcel of land at Idete village, Kiyowela Ward, Kasanga Division in Mufindi District. GRL negotiated the acquisition with the relevant authorities in accordance with Land Law of 2006 where the land is granted by the village under the supervision and mandate of the District authorities and authenticated by the Ministry Lands and Human Settlement Development through Regional Office in Mbeya. The Title Deed was registered on 17<sup>th</sup> April 2009 for a total parcel of land of 14, 164.2 ha with registration no. LR/MBY/T/13334-MBYLR/4, title no. 13334-MBYLR and Land Office no. 270481.

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

### **Flora**

Four different vegetation types have been identified in the areas; valley bottom wetlands and riparian areas, natural grasslands, wooded grasslands and miombo woodlands. Bottomland wetlands had the highest proportion of species compared to all other vegetation types followed by grasslands. Wooded grasslands and miombo woodlands had almost the same proportion of species.

The valley bottom wetlands/riverine vegetation is a vegetation type found along valley bottoms where conditions allow water logging. A total of 155 plant species were identified in this vegetation type. In an order of abundance the species in this vegetation type include *Ficus lutea*, *Mcharara*, *Mgwasi*, *Londetia simplex* (Nees) C.E Hubbard, *Mung'wasi*, *Nymphaea nguchali*, *Prunus africana*, *Themeda triandra* Forssk, *Cymbopogon excavatus*, *Cynodon* sp, *Panicum maximum* Jacq, *Faurea saligna* Harvey., *Oxtenanthera abyssinica*, *Vernonia* sp, *Dombeya rotundifolia* (Mast) Planch, *Erythrina abyssinica* D.C.ssp *abyssinica*, *Macaranga capensis*, *Sorghum bicolor*, *Annona senegalensis* Pers, *Bersama abyssinica*, *Catha edulis* (M.Vahl.) Forssk, *Cyperus ajax* C.B. Clarke, *Osmunda regalis* L.*Cynodon* sp, *Mchavala*, *Parinari curatelifolia*, *Setaria sphacelata*, *Syzygium cordutum* Hochst ex Krauss and *Cyperus ajax* C.B. Clarke (Ecological survey report 2008). The riverine vegetation include streamside vegetation and may also be found along gullies, rejuvenating landslide scars and other types of valleys or depressions where conditions do not allow continuous water logging. Separating the riverine from the wetlands vegetation the dominant species in this part include *Prunus africana*, *Bridelia micrantha*, *Macaranga capensis*, *Khaya anthotheca*, *Cartha edulis*, *Syzygium cuminii*, *Syzygium guinensis*, *Harungana madagascariensis*, *Myrianthus hostii*, *Tralepisium madagascariensis*, *Rauvolfia caffra*, *Ficalhoa laurifolia* (mkundikwava).

Miombo woodland at Idete is a vegetation type typical of highland Miombo with the genus *Brachystegia* as the most dominant species mixed with other miombo genus like *Uapaca*, *Parinari Combretum* and *Protea*. A total of 58 plant species were identified in this vegetation type dominated by *Brachystegia microphylla* Harms., *Uapaca kirkiana**Eragrostis* sp, *Periploca linearifolia* Dill.& A.Rich, *Aristida* sp, *Combretum molle*, *Londetia simplex* (Nees) C.E Hubbard, *Myrica salicifolia* A.Rich, *Mnyangamembe*, *Sparmannia ricinocarpa* (Eckl & Zey) Kuntize, *Faurea saligna* Harvey., *Osyris lanceolata* Hochst. & Stend., *Parinari curatelifolia* Planch.ex Beth., *Protea caffra* and *Protea roupelliae*.

The wooded grasslands are vegetation with scattered shrubs and small trees. A total of 59 plant species of different growth forms were identified in this vegetation type. The dominant plant

species are *Protea cafra*, *Aristida* sp, *Hyparrhenia rufa* (Nees) Stapf *Psorospermum febrifugum*, *Bridelia micrantha*, *Eragrostis* sp, *Vernonia lasiopus* O.Hoffm. *Protea rauliae*, *Protea welwitschii* Engl., *Cartha edulis*, *Cymbopogon excavatus*, *Pteridium aquilinum*, *Melinis minutiflora* P. Beauv., *Allophylus abyssinicus*, *Apodytes dimidiata* Arn., *Mpalama*, *Muhulataranga* and *Vitex mombassae* Vatke. This vegetation type is common in the plateau of central and southern Tanzania which include the southern highlands in Iringa and Mbeya.

### **Wildlife**

Different wildlife species were observed either directly, through signs of presence, or on the other hand some were reported through discussions with the local people. About 31 mammal species belonging to 16 families were recorded. Of these species 16% were observed directly in the field, 17% through signs of presence and 55% through local people reports of animal presence. The mammal species observed in Idete Forest Project have local significance in regard to local socio economic activities as 42% were reported to be vermin to crops and domestic animals implying local people-wildlife conflicts.

### **Birds**

A total of 132 bird species belonging to 51 families were recorded and /or reported to occur in the Idete Forest Project and surrounding areas. Of these species 6 (5%) are Northern migrants, 5 (4%) are African migrants and 1 (11%) were both Northern and African migrants. In total 12 (9%) were migratory birds, 11 (8%) were pests, 9 (7%) were eatable mostly Columbids while ducks were 16 (12%). Two species of ecological concern were observed one being a rare species (African Black Duck) and the other being vulnerable - Blue Swallow (*Hirundo atrocaerulea*). Blue Swallows locally known as Kinyanyamba bluu is a vulnerable species (VU), and African migrant (AM). According to the local people the species is also an environmental indicator for the onset of the wet season rainfall, migrating from Lupembe to Mufindi in November/ December) and vice versa in April/May. These birds use Idete Forest Project at Kisitu and surrounding areas as stopovers where they are seen perching on trees, 2 to 3 days before proceeding with their journey. During ecological survey the blue swallow and the African black duck were observed only once.

### **Threats**

The project region is prone to continued deforestation leading to habitat destruction and fragmentation. The major threats to the natural ecosystems are illegal logging and hunting, mining, land clearing for agriculture and gathering of forest products, and seasonal fires. All

riverine, valley bottom wetlands, water bodies and areas consisting of high conservation value forest and RTE's will be left intact for protection purposes and restoration of native biodiversity. The vulnerable blue swallow and the rare African duck is rarely observed in wetlands and swaps – both sites characterized as valley bottom wetlands, which will be conserved by the project.

**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 is a list of species found in the project area which feature on either the IUCN Red List of threatened species or the national list of threatened species found within the project. 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 G3: Rare, threatened and endangered species (RTE).**

S/N	Name	Life form	IUCN/RED List	National status
1	Open bill Stork	bird	Threatened	-
2	<i>Hirundo atrocaerulea</i>	bird	VU	Threatened
3	<i>Anas sparsa</i>	bird	LC	Rare
5	Green Pigeon	bird	VU	-
8	Hamerkop	bird	Threatened	-
9	Black Crake	bird	Threatened	-
10	Long-tailed Cormorant	bird	Threatened	-
11	Pygmy Falcon	bird	Threatened	-
12	Purple Grenadier	bird	Threatened	-
13	African Broadbill	bird	Threatened	-
14	Black Kite	bird	Threatened	-
16	African golden Oriole	bird	Threatened	-
17	African Black-headed Oriole	bird	Threatened	-
18	Red-throated Spurfowl	bird	Threatened	-
19	Temminck's Courser	bird	Threatened	-
20	Cut-throat	bird	Threatened	-
21	Lead-coloured Flycatcher	bird	Threatened	-
24	Square-tailed Drongo	bird	Threatened	-
25	Prunus Africana	tree	Threatened	Threatened
26	Osyris lanceolata	tree	Endangered	Endangered

27	Orchid		Threatened	Threatened
28	Catha edulis	tree	Threatened	Threatened
29	Aloe sp	liana	Threatened	Threatened

Key: LC= Least concerned, VU= Vulnerable  
Source: *Ecological study Idete Forest Project*<sup>4</sup>,

Based on the studies carried out in the project area, the listed species above occur in areas considered for protection; valley bottoms, buffer zones<sup>5</sup> and conservation areas. There will be no planting of exotic species within the conservation areas, buffer zones etc. Only native species and water conserving species will be planted in the areas set aside for protection purposes to ensure enrichment and restoration of native biodiversity.

## **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:**

Please refer to sections C.5.1 in the CDM PDD.

The land use was surveyed by the Mufindi District development committee during village land use planning which is a requirement for the Village Land Act of 1999. During this time, the project area land was ranked to be marginal and infertile due to successive fire regime. Thus unsuitable for other economic activities.

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

The national and sectoral policies and legislation of Tanzania are analysed in relation to forestry and land use in the context of the A/R CDM project activity:

##### a) Policies related to the creation of wood sources

Tanzania has 39.83 million ha of forests and other wooded land according to global forest assessment report for Tanzania by FAO<sup>6</sup>, which about 45% is of land area. Nearly 2/3 of this

<sup>4</sup> Tanzania Bird Checklist available at:  
<http://www.birdingsafaris.co.tz/doc/TanzaniaBirdChecklist%5B1%5D.pdf>  
IUCN Red List

<sup>5</sup> 30 -60 meters from streams, riverine forest, valley bottoms, wildlife corridors and wetlands.

<sup>6</sup> GFRA/Food and Agriculture Organization, 2005

consists of woodlands on public land and 13 million ha have been gazetted as forest reserves (MNRT, 1998). The forest reserve areas include catchment forests and plantation forests mainly consisting of exotic species such as *Pinus patula* and *Cupressus lusitanica*.

Areas categorized as public land are under extreme pressure from expansion of agricultural activities, livestock grazing, seasonal fires, charcoal burning and other human activities. VPO (1998) outlines other causes of deforestation as relating to poverty, loss of traditional knowledge on forest management, poor agricultural practices, population growth and expanding human settlements. These factors have been the major drivers of deforestation that between 1990 – 2005 is estimated to about 412,000 ha per annum in Tanzania (State of the world forest, FAO 2009).

Since independence in 1961, the forest policy on plantations mostly targeted the establishment of government owned plantations. As a result, by mid 1990s, government industrial plantations covered around 80,000 ha located in different blocks countrywide and were largely financed by foreign aid (MNRT, 1998). However, the trend of forest cover depletion and the inability of the natural forest to sustain growing demand for wood product prompted government policy and legislative review. The resulting legislation provided for greater participation of the private sector and other stakeholders in plantation forestry activities and conservation of natural forest on public lands. By 1990, plantation forest covered a total area of 150,000 ha (0.4% of total forest cover) which has remained constant. Essentially the prime motive that led to the establishment of these forests was to form a base for future forest industries and to cover the expected future forest wood deficit from the natural forest resource base (Ahlback, 1986).

This trend undoubtedly calls for a more radical initiative for the establishment of a culture of ownership and sustainable use of forest resources by all Tanzanians. In view of this, in 1998/1999 as a first step, the government of Tanzania launched a national campaign calling for the planting of 100,000,000 trees before the year 2000. This led to the proclamation of 1st January each year as National Tree Planting Day (PMO, 2000). The campaign was in line with the national forest policy of 1998. Among others, the policy advocates greater participation of all stakeholders in forest management through joint management agreements, with appropriate user rights, benefits and responsibilities defined (MNRT, 1998). The vision for the future is to transfer most management activities of forest and forest resources to the private sector, executive agencies, village governments, non-governmental organizations (NGOs) and individuals.

The revision of the forest policy in 1998 was succeeded by the revision of the forest legislation in 2002. This was despite the fact that the target of the campaign of 1998 was surpassed (MNRT, 2000) and the responses from the private sector and other non-governmental stakeholders to the revised forest policy had been regarded as positive.

In respect to the level of participation in management and conservation of forest resources by non-governmental stakeholders, the net expansion of forest plantation in the country up to 2005 remained at zero percent (GFRA/FAO, 2005). Out of the total plantation forest area, about 80,000 ha is state owned forest plantations and less than 70,000 ha is privately owned.

Several factors have contributed to the poor response by the private sector to the new forest policy and the call of the national tree planting campaign. Among them are the lack of incentives and the unattractiveness of the sector for large-scale investment, emanating from lack of readily available funding for investment in plantation forestry and the resulting risk to long-term investment. Thus, the promise of additional revenue stream that can be provided through the sale of CERs is seen by the project proponents as the only mechanism to attract funds to allow the development of this reforestation project.

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 A/R CDM 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 provides 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 for the transfer of village land to general or reserved land that can be used for investment. The project participants followed guidelines provided in this act for the acquisition of the discrete areas of land for the A/R CDM activity;

7. National Strategy for Growth and Reduction of Poverty (NSGRP) of June 2005 is committed to the Millennium Development Goals (MDGs). The proposed A/R CDM 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) Assessment of demand and supply of wood resources for industrial and commercial purposes:

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 have provided over 60 % of the budget for 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 A/R CDM 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 the form of finance, technical and institutional barriers indicates that the only realistic and credible alternative available to the project participants is to establish forest plantations with incentives from CDM and replace the current land cover due to 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 or for the area to regenerate into forest because it is prone to seasonal fires. No regeneration is occurring. The future carbon stocks were therefore set at zero for the calculation of emissions in the baseline scenario.

Please refer section C.5.2 in the CDM 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 CH<sub>4</sub> and N<sub>2</sub>O, will exceed 15 % thus they are neglected.

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

Prior to the project inception, nine families practised small scale farming in the proposed project area ( although they lived in the villages). These families were amicably compensated to shift their activities to the neighbouring village following formal procedures defined by district officials. The land where they practised their agriculture has been excluded from the CDM project area from which the carbon credits are calculated from . Without the project, the local communities would continue to live in villages outside the plantable area below the poverty line, with few improvements to their livelihood anticipated.

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

Under the “without project” scenario, the grassland area shall be in threat of human and seasonal fires, which implies loss of biodiversity and habitat for local flora and fauna as well as environmental services. This loss also directly affects the conservation of the soil and disturbance of ecological processes. The ecological study identified rare, threatened and endangered species (RTEs) meaning that the area is rich in biodiversity. These species will need areas where they avoid being extinct, and that are suitable for them to live.

Please refer section F, table F.1.1 for detailed mitigation measures given in EIA prepared by ENATA 2008.

**G.2.5 Description of how the “without-project” land-use scenario would affect water and soil resources:**

The land is unmanaged grassland and suffers from soil erosion that threatens streams and aquatic life. As already mentioned in the “business as usual” scenario, the reforestation area shall be in severe threat of uncontrolled fires (seasonal and human made). Fire leaves the ground unprotected and, therefore, more susceptible to erosion. In the ‘without project’ scenario, the lands will degrade further and the soil erosion will become more and more severe.

**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:**

The objectives are as follows:

The overall objective of the A/R CDM activity is to contribute to meeting the growing demand for quality wood products from well-managed plantation forests while also contributing to sustainable environmental management, community development and poverty alleviation in Tanzania.

**Specific objectives of the proposed A/R CDM project activity:**

- (1) To establish and manage forest plantations to meet the growing demand for high quality wood products. 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 cause of set backs in developing new forest plantations in the country. The implementation of the proposed A/R CDM project activity will therefore, benefit the forestry sector through an increase in the resource supply, management and overall sustainability of national resource base.
- (2) To sequester carbon dioxide through forest planting, 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 unmanaged grasslands and/or degraded lands.
- (3) 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 tree species.
- (4) To facilitate socio-economic development of the local communities through:
  - promotion of tree planting/reforestation activities in the local communities;
  - provision of employment opportunities;
  - Support for development initiatives for the communities through the sale of carbon credits.
  - Establishing 650 ha of community “carbon“ woodlots in the Idete Ward on village owned land, with the objective of generating VERs and achieving certification against the Climate, Community and Biodiversity Alliance

- Designating 10 % ownership of the carbon revenues generated by the project to Idete and Makungu villages.

**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 to 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. Moreover, creating conservation zones to protect RTE, HCV-forests, native species and habitats improves the aesthetics of the area and thus contributes to increase the non-use value.

#### **Regional and National Benefits:**

The proposed A/R CDM 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 the pressure on natural forests.
- 4) Contribute to significant increased revenue to the government, the district council and villages through sale of wood products.
- 5) Provide 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.

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

**Management plan (MP):** the management plan clearly documents the way in which the project shall be implemented, including all issues relating to nursery and forestry practises, worker rights, community relations and environmental considerations.

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

**Environmental Impact Assessment (EIA) and Ecological Survey:** environmental impact assessments and ecological surveys are executed on a continuously basis. External agencies and company staff shall carry out these on an annual basis. Such studies shall identify any species that needs special concern, their use, abundance, habitat and life form. Consistent with the national Environmental Act, EIA`s shall analyse both baseline environmental conditions and any changes as the project is implemented. The EIA shall include suggestions of how to prevent and combat any adverse impacts that the project may arise.

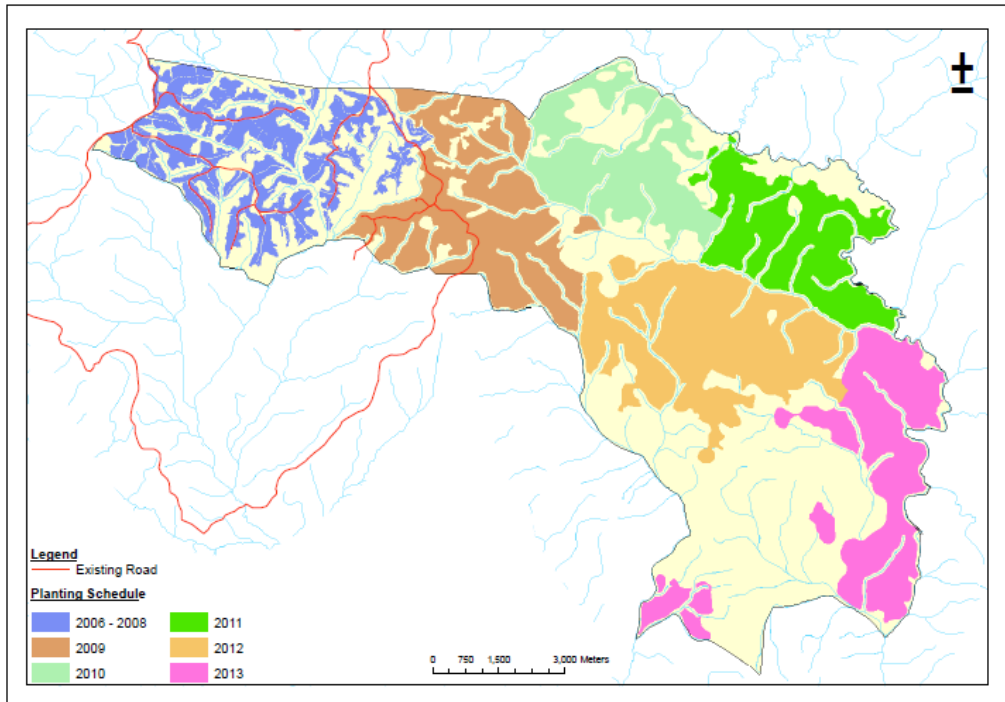
**Monitoring plan:** The company has developed a monitoring plan consistent with the CDM rules and guidelines. The project participants shall monitor the biodiversity and the socio economic wellbeing of the communities. In this program, the community shall be sampled, mapped and assessed against various 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.

**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 boundaries and geographical location of the proposed CDM A/R project activity is 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.

- **Project Boundary:** This area of land is confined within a parcel of 11,500ha of land, located on the lower elevation of Mufindi Escarpment, between latitudes 8°52' S - 8°

59' S and longitudes 35°11' E - 35° 23' E of altitudes between 1100m and 1535m above sea level. The external boundaries are mainly rivers, valleys and cleared lines/paths.



**Figure G3: Map of the Idete Forest Project area showing geographical boundaries of the actual planting areas- each colour signifying specific year(s) of planting.**

**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 the Ministry of Lands and Human Settlements.

The crediting period is 20 years, twice renewable, to give a total of 60 years in line with CDM provisions. The management plan for this project documents GRL’s long-term stewardship beyond the tenure of these crediting periods.

**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 in the project include fire, invasive alien species, diseases and pests. Descriptions of how the project shall respond to halt the effects are given below:

**Fires:** Fire poses a threat to the forest in the area and is likely to affect both the plantation and biodiversity. The project participants have developed an effective fire control system. The project boundary is surrounded by fire lines. The fire lines keeps a distance at 15-30 meters between compartments, and 30-60 meters at the project boundary. A fire tower has been constructed. Fire towers will act as fire look outs, and shall be installed with radio communication and fire fighting equipments. There is also a standby fire patrol team with “walkie talkies” for communication and to raise the alarm if any fires are spotted inside or outside of the project boundary. Fire crew shall be equipped and trained with personal protective equipment.

**Site preparation:** All plantings shall be carried out in the grasslands where minimum site disturbance is required. 30cm × 30cm square pits shall be made manually following contour lines. Seedlings shall be transported to within a short distance of the compartments and shall be done by small vehicles to minimize site disturbance.

**Pest and disease:** Disease infestation affects growth and overall productivity of the forest. According to the plantation management guidance` technical note no. 1 of 2003<sup>7</sup>, all seeds for planting in industrial forest plantations will be derived from known and improved seed sources i.e. seed orchards and as an interim measure from seed stands. The project participants will 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. No Genetically Modified Organisms (GMOs) shall be used as directed in the technical note referred to above and for FSC certification.

Based on experienced from sister projects in the area, the risk of diseases is very minimal. However, monitoring shall be performed in collaboration with research institutions like Tanzania Forest Research Institute (TAFORI), Kenya Forest Research Institute (KEFRI) and Sokoine University of Agriculture (SUA), to assist in determine potential impacts and propose mitigation measures. Trial plots shall be executed to identify the species best suited to the particular site. Workers will be trained and sensitized on disease identification and reporting.

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<sup>7</sup> Prepared by the Ministry of Natural Resources and Tourism of Tanzania (available on request and for validation/verification as supporting documents).

**Fertilizers:** No fertilizers are expected to be applied in the project area, however a little fertilizer is applied in the nursery to boost seedling growth. The application of fertilizers is in line with environmental pollution control measures. Workers are trained on handling and disposal of the containers and fertilizer bags after use. Moreover, these risks are considered insignificant to the project area, and to date no case has been noted and the management assumes improving measures will be applied limiting their negative impacts.

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

The local stakeholders were defined and involved from the inception of the project<sup>8</sup>. They have been consulted for their suggestions and comments regarding the project activity. Local stakeholders are defined as; local people residing around the project sites, local government (i.e. village councils) and the project's staff on site. At early stages of land acquisition, meetings were held in the village. These stakeholders include:

1. Local villagers residing around the project sites
2. Projects' staff working on/off site
3. Local governance
4. Religious and cultural leaders

The project participants discussed with the community their opinion of the community in contributing land to implement the project and how the community would participate and benefit from the project activities. The environmental impact assessment also considered the views of the local stakeholders to incorporate their concern and propose measures in the case that any of them would be affected negatively by the project activities. A PRA assessment is conducted annually. In this process, local stakeholders express their views and doubts and the company documents and incorporates them into their management decision.

### **G.3.7 Demonstration of transparency:**

The local communities and stakeholders will be involved in the development and implementation of the project's management plan, and in the management decisions regarding the Idete Forest project. All efforts will be made to inform the communities and other stakeholders that they can access project information, comment on, and influence its

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<sup>8</sup> For review of stakeholder's comments please see section H in the CDM PDD.

management. All project documentation is publicly accessible at, or near, the project site and/or project proponents' local/regional/central offices; only financial and other information where confidentiality is needed is withheld. Key project documents have been made available in regional/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 has a well qualified and experienced management team in place to ensure that the Idete Forest Projects is implemented effectively. The company has senior local management with a track record in planting, forestry and carbon operations which are also supported by the management team at GRAS, who interact with them remotely, and visit the plantations every few months.

Where specific skills are lacking, individuals, institutions and research centres shall be consulted. To date these have included individual 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 the Mafinga Township (about 17 km south).

GRL has on site project management based at Idete Forest Project. 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 the 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 A/R CDM project activity. Although the project participants rely on in house staff, GRL also collaborate 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. Due to equity private placements, the company is currently enjoying good solvency, guaranteeing that its long-term expansion plans and targets can be accomplished. The sustainability of this project is made possible through carbon financing.

## **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, following the consent of the local communities following a clearly defined process executed at the local, district and national level. 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 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 area was largely abandoned prior to the project inception, with the exception of nine families practising small-scale farming. During early stages of negotiations these families were consulted by the company and amicably compensated and moved with free consent their activities to other lands close by their homes in neighbouring villages. However, the small area where they did practise their activities (less than 5 hectares) is not included in the project boundary. This is in accordance with the procedures for land lease in Tanzania, so no conflict over the use of the resource is anticipated.

### **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 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 processes for land acquisition follow the government legal procedures. GRL accords all the national and international legal requirements and the FSC Principles and Criteria. The Tanzania Environmental Policy in its precautionary approach insists that before any implementation of land-based projects, an environmental impact assessment must be carried out to identify any adverse impacts and take precautionary measures to the proposed activities. 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)<sup>9</sup>.

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

GRL holds letters of approval for environmental and socio-economic impact assessments from both the National Environment Management Council (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 local and 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 getting feedback 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 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 of planted seedlings is checked within 2-3 weeks of 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

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<sup>9</sup> FSC certification is in process. Audit is planned in 2010.

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 CDM 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 for this project is in place, and is open to anyone for review. All management decisions pertaining to project development are documented in the management plan. The planning department, based at GRL Head Office in Mafinga, is responsible for identifying relevant information. The development of the management plan involves views and comments from the stakeholders and relies upon local conditions, available facilities and the latest technologies. 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 management plan is not fixed; it is subject to changes with the existing local climatic and administrative conditions. When the management plan 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 management plan (see section G.3.7 in this PDD for documentation and transparency policy).

**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 project participants have developed the Management Plan for this project to act as a directive so that all decisions are documented. However the MP is subject to review to accommodate local circumstances, unexpected events and introduction of any new technologies.

**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 rotation age for the trees is 25 years and crediting period is 20 years with two renewable periods. The management plan indicates long-term stewardship beyond the tenure of the first commitment period.

#### **Ownership and management as documented in the Management Plan**

Land in Tanzania is by law ‘state property’ and can only be leased from the Government for a specific period and in consultation with and approval by the local communities within whose jurisdiction the land lies. The land areas of this project were under customary law occupied by villages owning the land but remained idle. The project participants is following all procedures and steps laid down by the government of Tanzania under the Ministry of Lands and Human Settlements for acquisition of the discrete land areas for a 99 year lease.

GRL has obtained District approval and an offer for a long term lease from the Ministry of Lands for a long term lease for the discrete areas of land from the Government for the purpose of reforestation. Benefit provision for the local communities such as job creation and community support have been agreed in addition to direct annual payments to the government for the lease of the land. As the future legal leaseholder for the land GRL has the exclusive rights to accumulated CERs. This is to

say that the holder of the Title Deed of the land (whose name is the Title Deed) has right to the proceeds of the land.

## **G8. Knowledge Dissemination**

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

All activities related to the IFP are documented through written reports, including activities such as fieldwork/inventories, awareness raising, community meetings, training workshops etc. The project participants have in addition developed forms for documenting “lessons learned”. All notable lessons learned in the forest project shall be documented on-site into these forms and held at the project manager’s office.

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

Each year, during the dry season, the company has its annual planting party day. This day is chosen for celebrating with the local communities and other stakeholders. During the day presentations are given detailing the company’s progress during the previous year.

Furthermore, the project encourages and facilitates staff to participate in both national and international conferences. Workshops, seminars and training are held to spread knowledge to cover a wide variety of local communities. The lessons learned are disseminated through these seminars and meetings. 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 meeting to discuss with staff and workers ongoing 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.

Various research has been done prior to and during the forest project. This includes botanical and ecological surveys, pest and disease, soil and water quality/quantity, socio-economic and site-suitability studies. GRL employ either 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 pattern.

The Company shall 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, as well as prevent and minimize possible disease and pest outbreaks. Introduction of new exotic tree species brought to the project area shall be planted on trial basis and their performance shall be assessed with consideration given to the impacts on biodiversity growing concurrently before large scale planting (see also section F.3.2 of the CDM PDD).

The majority of field workers at the project are from the local community. Training is provided to staff to enable them to carry out their role at the plantation. Below is a list of the areas of training conducted at Idete Forest Project that demonstrate transfer of technology/technology expertise:

**1. Training of local community on nursery and silvicultural operations for establishing exotic and indigenous tree species:**

This was conducted with the purpose of help ensure plantation workers and local communities have the necessary knowledge and skills on nursery and silvicultural operations. The project manager divided the training into two parts, namely nursery and silvicultural operations, conducted it.

**(a) Training on Nursery operations**

This aimed at providing nursery workers the necessary techniques on nursery operations such as seed sowing, pricking out, watering, weeding, pot mixing, root pruning, etc.

**(b) Training on silvicultural operation.**

This is always done for all new employees in the company to let them understand the way to perform different silvicultural operations such as planting, weeding, pruning, thinning, and other forest operations carried out up to harvesting.

Many of the workers have demonstrated technology transfer by using the knowledge back in their villages by establishing and managing their own woodlots with greater success using the knowledge acquired from the company.

## **2. Training workshop on monitoring, prevention and control of out-break of diseases and pests as recommended by research institutions.**

Dr Mussami, Research and Monitoring Manager of GRL conducted this at IFP in March, 2008 and it is planned to be conducted once every year. Plantation workers were trained on the signs, prevention and control of diseases and pests outbreak. Over 30 people attended the training, and topics covered during the training included:

- **Diseases and pest signs**

Description of different diseases and pest signs were made by displaying the common signs of diseases using pictures of affected trees. This aimed to create awareness to plantation workers on disease signs at the plantation to report to the project manager to prevent further spread and treatment.

- **Diseases and pest control**

Methods used in controlling pests and diseases when they occur were described in detail in this session. The workers acquired much information on ways of controlling pests and diseases breakout and spread.

Due to the training, greater awareness has been created among local people and workers increasing their effectiveness at detecting and reporting signs of diseases or pests immediately when they are discovered. It has placed them in a stronger position to understand different diseases and pests that can affect their own trees in woodlots as well.

## **3. Training of stand-by fire fighters.**

Yearly training courses on ways to fight against forest and buildings fires are implemented, this year the training was conducted by the Army Fire Brigade of Iringa in April, 2008 for six days. Two approaches were used in the training:

- 1. Theoretical knowledge:**

Workers were trained on issues including the effect of forest and buildings fires, types of forest fires, fire protective gears, etc.

- 2. Practical implementation:**

Workers were trained on forest and building fire suppression using modern technology (fire extinguishers) and other items used in fire fighting. Also training was given on the use of tractor pumps, using hoses and branches, running with hoses and rolling and unrolling of hoses. During training, site visits took place with practical demonstrations to show the ways to attack forest fires on different fronts. Training on the use of other fire fighting equipment was also carried out at the same time.

#### 4. Training of workers on management of fertilizer

Project Manager Mr. Aron Laizer has conducted this at Idete Forest Project for nursery workers, as fertilizer application in the field will not be a common practice in the project so is only applicable for nursery workers at this time. All nursery workers were taught good handling of fertilizers by showing appropriate containers for the handling of fertilizers, safety gear for handling fertilizers and other agro-chemicals.

### III. CLIMATE SECTION

#### CL1. Net Positive Climate Impacts

Please refer section C and D.1 in the CDM PDD for supplementary information to the checklist question.

**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 A/R AM0005 methodology version 03 entitled “Afforestation and reforestation project activities implemented for industrial and/or commercial uses”. The baseline scenario in this project is based on an 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 CDM A/R 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 A/R CDM project activity as it complies with and is applicable under the conditions provided in the methodology. Testing the eligibility of land<sup>10</sup> for the approved methodology to fit A/R CDM project was carried out as shown in the CDM PDD (section C.1)

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<sup>10</sup> 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 and reforestation CDM project activities”.

and assessment of applicability<sup>11</sup> and justification of the approved methodology is shown in (section C.3.) of the CDM 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 which are 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 any increase in emissions of GHG within the project activity boundary. As described in section B and section C in the CDM 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 averages for average growing stock or age. The project participants uses the following BEF in the carbon model; pine 1.3<sup>12</sup>, eucalyptus 2.0. The variables to be used in equation B.18 and B.19 are shown in the table CL1a below:

**Table CL1a: 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>		<i>P.patula</i>	<i>E.saligna</i>
1.3	2.0 <sup>13</sup>	0.45	0.8 <sup>14</sup>	0.50	0.32 <sup>15</sup>	0.35 <sup>16</sup>

<sup>11</sup> The project participants use the baseline approach from paragraph 22 (c) of the CDM A/R 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 A/R CDM project activity as it complies and is applicable under the conditions provided in the methodology.

<sup>12</sup> Taken from Table 3A.1.10 of the GPG LULUCF 2003. Value taken for Tropical Pine.

<sup>13</sup> Teobaldelli et al, 2009, Generalized functions of biomass expansion factors for confers and broadleaved by stand age, growing stock and site index, Forest Ecology and Management VOI 257 pp1004-1013

The parameters as listed in Table CL1a 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.

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 follows similar technical guides provided by the government. Any changes due to thinning will be captured during monitoring events in the Permanent Sample plots (PSPs). 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 removal by sinks (annual and cumulative) is the carbon stock change in above and below ground biomass minus the increase in anthropogenic emissions. These are listed in Table CL1b below.

**Table CL1b: Estimation of actual net GHG removals by sinks and estimation of actual net anthropogenic GHG removals by sinks**

Comment [NCL1]:

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<sup>14</sup> Taken from the book ‘The Commercial Timbers of Tanzania’ by J.M.Bryce revised edition of 1999.

<sup>15</sup> 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.

<sup>16</sup> Taken from Table 3A.1.8 10 of the GPG LULUCF 2003. Mean value from the Temperate broadleaf forest/plantation category taken for biomass of 50-150 t/ha.

Year	Estimation of actual net GHG removals by sinks (tCO <sub>2</sub> e)	Estimation of net anthropogenic GHG removals by sinks (tCO <sub>2</sub> e)
2006	0	-496
2007	3199	2363
2008	14127	11804
2009	37939	33586
2010	80207	77283
2011	140450	137442
2012	218454	213361
2013	299288	295430
2014	392298	392298
2015	479982	479982
2016	521287	521287
2017	514756	514756
2018	490920	490920
2019	307187	307187
2020	193329	193329
2021	155038	155038
2022	-207171	-207171
2023	-162207	-162207
2024	-142883	-142883
2025	-277000	-277000
Average over crediting period (2006-2025) (tCO <sub>2</sub> e)	152,960	151,815
Total for crediting period (2006-2025) (tCO <sub>2</sub> e)	3,059,200	3,036,310

Therefore the net amount of GHG that is expected to be sequestered through the reforestation in the 2006-2025 crediting period is 3,036,310 tCO<sub>2</sub>e. It is also important to note that these estimates are based only on the plantable area. The areas left free for conservation, or the

sequestration from reforestation with species other than pine and eucalyptus was not included in this estimation.

**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 emissions are considered negligible and count for well under 15 % of the overall GHG impact.

**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 sequestering more than 3 million tCO<sub>2</sub>e.

**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.**

There are no offsite decreases in carbon stocks as a result of the project.

**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.**

Negative offsite climate impacts are not expected.

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

n/a

**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.**

The CDM monitoring plan shall be followed (see section E of the CDM PDD). The non-CO<sub>2</sub> GHGs accounts for less than 15 %, of the project's net climate impact and thus considered negligible. The provisions of this monitoring plan will be adopted as a key component of the 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, the baseline scenario the project's emissions and the emission removals shall be monitored and the information recorded as prescribed in the CDM PDD, and to facilitate verification.

The project participants shall keep records of all activities such as 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 archived. 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 verify that the project operator is able to manage the data adequately as per the monitoring plan.

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 staffs are trained for specialized professionalism.

The project monitoring is expected to cover the first crediting period of 20 years with a renewal of up to two times.

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

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

No national or regional climate-change impact studies are currently available. The Intergovernmental Panel on Climate Change (IPCC) carried out, an assessment on the consequences of climate change and climate variability in Africa in 2001, namely the 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 CL4: Summary of the most critical climate change impacts assessed by IPCC**

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

*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.

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

GRL are aware of these potential negative impacts of climate change, and have sought to minimize the risk of them through several different measures. The project is planting species

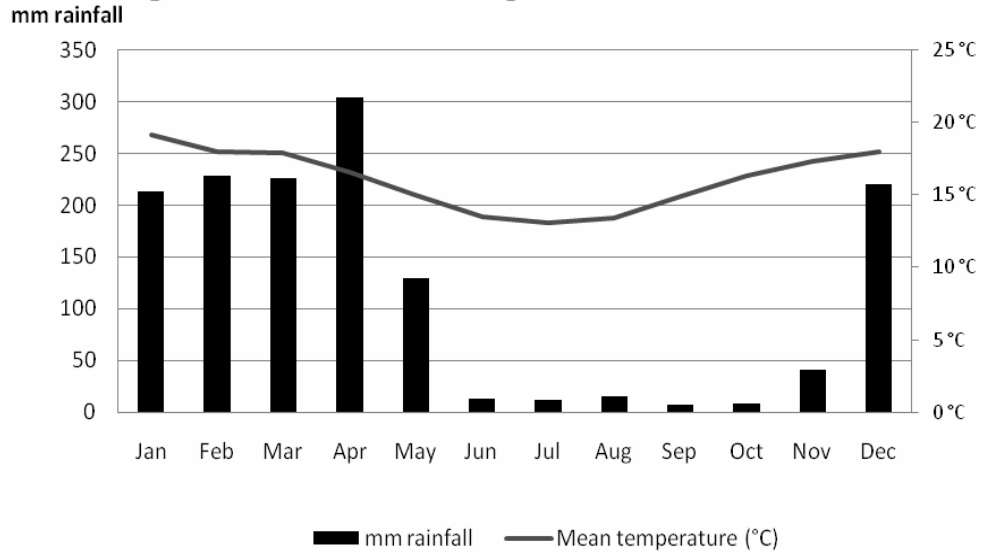
which are robust in terms of adaptability and will be tolerant to changes in temperature and precipitation. Increased risk of fire and droughts are not expected in the “with project” scenario as all employees are experienced and trained to prevent risks and its minimization. The plantations are located 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 species 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 a long dry season of 2-3 years<sup>17</sup>. Hence, the potential to resist non-permanent drought at maturity is high, while the chance of permanent drought under the present climate change impact trend is unlikely in the next 20 years.

Taking into consideration the few years the IFP has been established – the limited precipitation and temperature data are not sufficient to note any long term changes in trends at this time. However, precipitation and temperature data exists from GRL sister projects located in the southern highlands which is in the same region as the IFP. The topography and geography for the sister projects are similar to each other so it is assumed that ranges in temperatures and precipitation are more or less the same. Thus, averages of all the measures from these projects are done and illustrated below in figure CL1. The data is given as averages for each month during the whole period of 2002-2009 on the GRL plantations in the southern highlands. GRL staff has collected the data on a day-to-day basis during monitoring activities.

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<sup>17</sup> The Commercial Timbers of Tanzania, J. M. Bryce, revised edition of 1999.

## Meteorological Data: Southern Highlands of Tanzania



Source: GRI weather data 2002 - 2009

**Figure CL1: Annual mean rainfall and temperatures throughout the period 2002-2009.**

It is anticipated that the species being planted will be able to tolerate the range of predicted changes anticipated by the IPCC due to wide genetic base. Vulnerability to climate change is normally reduced by restoring the area to its natural vegetation cover. In the case of the project, the area is naturally forested, in contrast to the degraded grassland state it is found in at the projects inception. Arguably restoring the area to forest will make it more resilient in the face of climate change as it will reduce runoff, increase infiltration, recharge streams and natural ponds and reduce wild fires.

### **CL5. Carbon Benefits Withheld from Regulatory Markets (optional)**

**CL5.1 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.**

The project plan to sell all the carbon credits into the compliance market.

## **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.**

Socio-economic data was collected using Participatory Rural Appraisals (PRA). PRA's was used as a tool to assess, characterize and better understand the rural communities of the project and assess the impact that the project will have on local communities. Local communities are very poor, with most living below the poverty line at the start of the project. The project put forward a plan to build a concrete community partnership and have developed a community support programme. Detailed socio economic surveys applying participatory methods are planned for once every three years.

PRA is a way to facilitate community development with an emphasis on participation. PRA includes meetings, interviews, discussions and field surveys. Such a technique was used to obtain information in the study area and issues of environmental and livelihood concerns that were raised by the stakeholders were noted. A chosen sample of teachers, village leaders, women's groups, youth groups, villagers and subsistence farmers were involved.

The community has been closely involved since the projects inception when the project participants were applying for land. The project followed land acquisition procedures as guided by the Government of Tanzania under the Ministry of Lands and Human Settlements and the Land Act. Land applications to the village were discussed in meetings with the village assembly. The project has carried out extensive stakeholder consultation, 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.

The Company has supported development programs to the surrounding communities since 1999.

**Table CM 1: Short summary of GRL community support.**

<b>Area of improvement</b>	<b>Activity/support/Benefit by GRL</b>
<b>Education</b>	- Provided materials for building nursery/primary/secondary schools and teacher's houses since 2003
<b>Health status</b>	- Medical equipment - Building of dispensaries - Training on diseases (malaria, HIV etc.)
<b>Housing</b>	- Better economic conditions for villagers have impacted their housing; building bricks, furniture etc.
<b>Women</b>	- Improved the female status by employment
<b>Infrastructure</b>	- Improved accessibility by bridges and road constructions/improvements
<b>Environment</b>	- Soil moisture conservation - Training on pests and diseases, and environmental awareness - Provide seedlings for free (since 2001)
<b>Poverty alleviation</b>	- 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

Moreover, the project plans to share 10% of the carbon credit with the local communities, and has an agreement in place with the villages of Idete and Makungu to this effect.

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 stakeholder consultation, which has shaped the projects design, and has followed FSC guidelines in relation to procedures. The company has consulted a wide range of stakeholders at local, regional and national level. The stakeholders' views, opinions and concerns shall be considered during planning, implementation throughout project lifetime.

**Table CM 2: List of consulted stakeholder`s**

<b>Local and regional</b>
Village Executive Officer - Idete
Ward Executive Officer – Makungu, Mafinga
Member of Parliament (MP), Mufindi - Mr. Joseph Mungai
Mufindi District Commissioner
District Executive Director - Mufindi
District Council Chairman - Mufindi
Prevention of Corruption Bureau - Mufindi
Sao Hill Forest Project (SHFP)
Water Quality Office - Iringa
Mufindi District Council (MDC)
Planning and Development Department
Agriculture and Livestock Development Department
Community Development Department - Mr. Emanueli Mzava
District Natural Resources and Tourism
Health Department - Mafinga
Land Administration and Management - Mafinga
Water Department - Mafinga
<b>National</b>
Tanzania Forest Conservation Group (TFCG)
National Environmental Management Council (NEMC)
Environmental Association of Tanzania (ENATA)
Sokoine University of Agriculture (SUA) - Faculty of Forestry and Nature Conservation
University College of Lands and Architectural Studies (UCLAS)
Community Development Training Institute – (CDTI Tengeru)
Ministry of Land and Urban Development
Land Department
Ministry Of Natural Resources and Tourism
Forestry and Beekeeping Division
Tanzania Association of Foresters (TAF)
Tanzania Tree Seed Agency (TTSA)
Institutions (social, financial and research)
Rungemba Community Development Training Institute (CDTI)
Changarawe Secondary School - Mr Samuel Kihama
Ihefu Primary School - Head Teacher
Makungu primary school
National Social Security Fund (NSSF)
Tanzania Plantation Workers Union (TPWU)
National Microfinance Bank (NMB)
Mufindi Community Bank (MUCOBA)
Mufindi Tea Company Ltd (MTC)
Brooke Bond Tanzania Ltd (Bbt)
BP Petrol Station Company
Dembe Enterprises - Construction Equipments Supplier
Tanzania Electric Supply Company (TANESCO)
Tanzania Zambia Railway Authority (TAZARA)
Tanganyika Wattle Company (TANWAT)
<b>NGO`s and development programs/projects</b>

Mufindi Environmental Trust (MUET)
Aids Prevention Committee (APPC – Mgololo)
Community Development Trust Fund of Tanzania (CDTF)
Micro Entrepreneurship and Vocational Trainings
Mufindi Education Trust, (MET) - Chairman Mr. Alfred Mgao
Tanzania Agricultural Society Organization (TASO)
District Road Development Program (DRDP)
Malaria Control and Expanded Program on Immunizations
Women Development Fund (MDF)

**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.**

The company has had frequent 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. Idete Forest Project has collected comments from a diversity of stakeholders. Stakeholders’ representative includes; teachers, village leaders, priests, woman groups, youth groups and villagers household.

Comments from stakeholders in Idete Forest project, PRA conducted in December 2008:

- Stakeholder’s expressed that the company has provided seedlings thus villagers have planted their own woodlots and are undertaking environmental protection.
- Environmental education is provided; conservation, FSC and CDM
- Participants insisted on fire protection training to all villagers so that both villagers and GLR employees could cooperate effectively when there is a fire incident.
- Company initiatives in conservation of forest resources
- Contribution in road maintenance; ease communication between surrounding villages
- Improved the provision of health services

Furthermore, the project is planning meetings with potential stakeholders once every three month. During this event, the project participants update the stakeholders on the project and discuss and issues the stakeholders may have. These meetings include representatives from throughout the district where the project is located.

A formal complaints process is open to persons working for GRL, or the general public. Complaints, disputes and contentions must be submitted in writing to the attention of the Managing Director, either at the reception of the company or put in to complaint boxes at the plantation projects which are delivered to the head office by the plantation managers and emptied monthly. See below in section CM.1.3 for company handling with concerns from stakeholders.

**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, 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 either submitted in writing to the attention of the Managing Director, at the reception of the company, by mail or put into a complaint boxes at the plantation projects that are delivered to the head office by the plantation managers and emptied monthly. 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. 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 I 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 to result from the project. In the EIA/SEIA from 2008 the assessors called attention to different areas where the project potentially could have a negative impact,. For each of the issues that have been identified mitigation measures have been laid out (see section CM 2.2 below). The comments from stakeholders are given in section H.2, of the CDM PDD, and resolution/mitigation measures are given in section H.3, of the CDM PDD.

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

**Table CM3: Socio-economic areas with possibility of being negatively affected by the project and mitigation measures adopted by GRL to prevent this**

Possibly exposed areas	Mitigation measure/Provision by GRL
<b>Social- and health services</b>	<ul style="list-style-type: none"> <li>- Well-equipped health facilities are now in close vicinity to the villages</li> <li>- water sources are monitored on a frequent basis</li> <li>- employment opportunities which increase village economies</li> <li>- education/counseling on communicable diseases etc.</li> </ul>
<b>Land use change</b>	<ul style="list-style-type: none"> <li>- The project promoter has chosen land in the villages where there is adequate land for expansion for the villagers in several years to come</li> <li>-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</li> <li>- The project will offer alternative source of income by</li> </ul>

	providing employment and other income generating activities.
<b>Resettlement and compensation</b>	<ul style="list-style-type: none"> <li>- GRL followed local customs and legal procedures when claiming the land</li> <li>- 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</li> <li>- Stakeholder comment will be sought throughout the duration of the project at regular intervals</li> </ul>
<b>Employment gains</b>	<ul style="list-style-type: none"> <li>- Migration will be prevented by offering employment opportunities to those who are residents in the project surrounding villages</li> <li>- GRL shall assist local village governments in imposing strict development control to avoid unplanned settlements</li> <li>- the forest project will facilitate in education opportunities in order to get more skilled people for permanent employment</li> </ul>
<b>Conflict over shared resources</b>	<ul style="list-style-type: none"> <li>- If necessary GRL will assist the villages in establishing bore holes to avoid interference with pastoralist and domestic use</li> <li>- frequent monitoring of the water source to prevent and measure contamination is addressed in the monitoring report</li> </ul>
<b>Infrastructure</b>	<ul style="list-style-type: none"> <li>- GRL will construct roads and bridges where necessary; to prevent traffic accidents and ease access to adjacent villages</li> <li>-employ licensed drivers for their operations</li> </ul>
<b>Cultural sites</b>	<ul style="list-style-type: none"> <li>- Non removal of the graves: the graves have been demarcated and mapped and protected for ritual ceremonies by local people</li> <li>- Villagers shall be granted with permission to perform their ritual activities</li> </ul>
<b>Unattended Forest Cover</b>	<ul style="list-style-type: none"> <li>- Retain key personnel to attend and patrol the forests to avoid the forests being hideout for criminal and endanger the public</li> </ul>

**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.**

All negative impacts – offsite and within project boundary – will be mitigated. However, no severe negative offsite impacts are anticipated. The company and external consultants expects community benefits through employment, restoration of the environment and conservation by encouraging communities to establish woodlots, and education campaigns on different aspects

of forestry and environment.

### **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.**

Please, also refer annex 4 in the CDM PDD for detailed information on the community monitoring.

Green Resources has developed a community monitoring survey that will be administered every 3 years. Variables to be monitored include poverty level, infrastructure, food security, housing, education and health services and behaviour. The study shall involve representative groups within the community, from the poorest of the poor to those in better standing in the community. The major objective of monitoring communities is to monitor the impact of the project on community livelihoods and well-being. For a draft of the community monitoring plan please see annex x.

### **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 targeted at a wide range of groups. The following methods are applied for internal and external capacity building of local communities:

#### **1. Workshops and Lectures**

Lectures are carried out once per year during the plantation celebration party by various field specialists (depending on workers suggestions and achieved skills). Workshops are carried out with stakeholders from the whole district every three months (this will change due to comments from FSC that requires a majority of local stakeholders, NGOs and CBOs to participate in these workshops).

#### **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**

Various field specialists from the District and beyond (depending on workers suggestions and identified areas to build capacity further) carry out talks annually during the plantation celebration party. In addition to the mentioned above, the villagers are also gaining knowledge around environmental protection (conservation, FSC, CDM etc), woodlot technique management, recognize tree diseases and invasive species etc, and transmissible diseases as HIV and syphilis.

<b>CM.4.2 Explain how the capacity building is targeted to a wide range of groups, not just elites:</b>
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The company has a comprehensive education campaign that covers a wide range of people including teachers, village leaders, woman groups, youth groups, local workers and subsistence farmers. This campaign intends to educate the communities in conserving their environment, avoid or use the RTE's and sometimes covers health issues in which communities are informed on diseases and precautions to prevent the spread of disease. Considering this, it can be observed that not only a certain class of people are represented but the community as a whole (see also section G.8.4 in this PDD).

The company has put together a 5-year training program (annex II). The training is organized and centralized by GRL for its plantation projects. The individual project makes recommendations for its training needs. The 5-year plan is liable for review on an annual basis to update it depending in current 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 technologies. 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.

<b>CM.4.3 Explain how the capacity building is targeted to women to increase their participation:</b>
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The project strives to give equal opportunities to men and women. The company, by law, mentions the role of women in the project; women are encouraged to participate in decision-making and implementation of various activities. In this sense, the company is gender sensitive. Any support given to the communities shall benefit both men and women.

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

The capacity building is aimed to improve villagers' skills such that they will be better qualified to participate in all levels of the project and possess the appropriate skill level for all levels of forestry operations from nursery, silvicultural, infrastructure and construction etc.

**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:**

The project has already taken into account local customs. In the early stages of project development, both teams from GRL and external consultancy agencies went to the field to contact local communities and identify their conservation and sustainable development needs. The company have incorporate local customs and norms in establishing rules for the use and management of the IFP.

The projects will assist adjacent local village governments in imposing strict development controls 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.**

As discussed earlier, the Idete Forest Project signed an agreement to say that local villagers would be given priority for employment opportunities at the Idete Forest Project. The project aims to give both men and women equal opportunities in employment.

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

All workers are made aware of their rights and obligations in their contracts as required by law. The project complies with international rules and standards on workers' rights. Situations and occupations that pose a substantial risk to worker safety have been assessed and have been

communicated to the staff involved as well as the safety measures that should be taken.

With regards to employment, the Forest Plantation manager shall be required to comply with the rules and regulations stipulated in the project participants' Health and Safety Code of Practice and some ratified ILO<sup>18</sup> Conventions in the following areas:

- Sanitary considerations in shelters
- Protective gears as specified for the different activities
- Training of workers and staff on occupational health and safety precautions.

By laws and regulations will be developed to ensure the communities around and plantations workers are aware of their limitations and rights with regard to the plantations.

The company is committed to meet local and regional legal requirements. Wages shall be paid based on the Tanzania Labour Law and on time. Tanzania Plantation and Agricultural Worker's Association (TPAWU) is an association for which all plantation employees are members. The organization is operating under Tanzanian rules, giving guidance on worker's rights and safety at the work site. The leadership for this organization informs their members of their rights and any changes to their constitution. Given the project is certified against FSC Principles and Criteria, the project participants believe that workers' rights are properly attended to as addressed under principle 4 of the FSC standards "community relations and workers rights".

Extension programmes and seminars shall be used as tools to educate people on different issues pertaining to plantation activities such as fire protection, no grazing on the project lands, protection of flora and fauna against fire, soil and water conservation practices etc. For dissemination of information, bulletins, newsletters, posters and booklets shall be prepared and distributed. Educational programmes shall include training to local communities to enable them to undertake seed collection, raise their own seedlings and establish their woodlots (indigenous and exotic species) as well as agro forestry practices. 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.

<b>CM.5.4 Comprehensively assess situations and occupations that pose a substantial risk to worker safety</b>
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<sup>18</sup> International Labour Organization

Major risks that could arise from the implementation of this project are related to potential forestry and forest management activities, the use of machinery and equipment, and the other related activities that are part of the process of implementing the project. However, procedures have been put in place to avoid such risks to workers.

Risks associated with plantation operations (site preparation, planting, silvicultural activities, fertilizer application, thinning, disease control, harvesting as well as road construction work and natural hazards (such as snakes and other venomous/dangerous animals), on site accidents and chemical poisoning. Weed control shall not involve application of banned chemicals and therefore human contact with poisonous chemicals is not anticipated. In case the need for the use of chemicals arises, these shall be properly transported, stored and used following chemical use guidelines. Workers shall be provided with personal protective equipment while performing field operations to minimize such risks.

The project has so far been providing personal protective equipment like fire fighting equipment, masks, boots, groves, and raincoats, helmets, working gear, fire beaters, radio communication and bicycles. Whenever necessary, appropriate training will be offered to people involved in such activities, including all safety procedures and the use of protective gear. Workers are clearly informed on the likely risks through the Environmental Management System (EMS) and Occupational Health Services (OHS) trainings. Workers shall be properly trained before undertaking any field operations.

## **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:**

The ecological study<sup>19</sup> identified four ecological zones; the valley bottom wetlands and riparian areas, natural grasslands, wooded grasslands and miombo woodlands. The field study employed a cluster-sampling methodology in which clusters were determined based on vegetation types and sampling plots established systematically within each cluster at a sampling intensity of

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<sup>19</sup> Ecological survey conducted by Dr. Munishi et al. (November 2008).

0.01%. At each sampling point, information on all flora and fauna species and wildlife was collected. This information included observations on signs that can indicate wildlife presence such as droppings, nests, animal tracks/burrows, carcass or other animal remnants. Plant identification was done using both botanic names and vernacular names using local plant identifiers. For plant species that could not be identified in the field voucher specimens were collected for further identification in the National Herbarium in Arusha.

Out of the four ecological zones that were identified during this study, natural grassland covers the largest part, about 85% of total area. The natural grassland is found on the higher elevations whilst in the valley bottoms the other three vegetation types predominate. The tree-planting program shall consider the ecological association between these zones and out of this land cover strata only grasslands shall be planted with the exotic trees. The grasslands, prior to the project development, were exposed to fires and their biodiversity composition is low and would continue to worsen with successive fire regimes in the “without” project scenario. All plantings shall be carried out at a 60 meters<sup>20</sup> distance from the valley bottoms, riverine forests and wetlands, and enriched with indigenous planting. Any cluster of trees that is found within the planting area shall be demarcated, and a buffer of 30 meters shall be left to enhance their natural regeneration.

Under the “without project” scenario, the grassland area shall be in threat of human and seasonal fires, which implies loss of biodiversity and habitat for local flora and fauna as well as environmental services. This loss also directly affects the conservation of the soil and disturbance of ecological processes. The ecological study identified rare, threatened and endangered species (RTEs) meaning that the area is rich in biodiversity. These species will need areas where they avoid being extinct, and that are suitable for them to live.

The “with project” scenario assumes that the resources required to guarantee conservation and sustainable development are available. RTE’s such as native forest, valleys, water bodies and wildlife will be protected and thus promote great benefits in terms of biodiversity conservation compared to the baseline scenario. In addition to these benefits, the project has established a system for biodiversity monitoring given in the monitoring plan (see CDM PDD). Education campaigns shall be carried out to the communities to improve awareness of such species. Wherever natural vegetation is observed, no planting shall be done and areas shall be left undisturbed. No exotic tree species shall be planted in areas other than on the grassland and so

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<sup>20</sup> Environmental Management Act No 20, 2004 and Environmental Audit Regulations 2005

for this reason natural tree growth shall not be disturbed. Neither fertilizers nor chemical shall be applied and water quality shall regularly be examined to ensure existence of aquatic life.

Results from monitoring of sample plots, corridors and conservation zones have showed an increase in the natural undergrowth because of project implementation. Hence, the project assumes that the best way to gather information and help with the prevention and identification of impacts on biodiversity and on the livelihoods of the communities is by monitoring biodiversity on a regular basis. By taking the necessary mitigation measures and by putting aside conservation areas the project expects to cause net positive impacts on the biodiversity.

**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 planted exotic species are obtained from high quality stock generated from genetically superior quality well adapted to the prevailing site conditions and broadened within and between species to ensure sustainability of the plantations against pests, diseases and climatic fluctuations. The project are planting pine and eucalyptus spp which are both exotic. Eucalyptus spp are known to set deep roots that without sustainable management will deplete water resources. In the long term without any mitigation measures, this would also have a huge impact on wildlife and habitat. So, to prevent any negatively changes in soil and water resources, GRL have, following recommendatios from the National and Environmental Management Council (NEMC), established buffer zones at a distance of 60 meters from all water courses. The company is also practicing forestry operations with the aim to meet the criteria of Forest Stewardship Council (FSC) certification.

**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.**

Some areas have been identified as containing high concentrations of biodiversity and species of special interest such as the Blue Swallow. A number of plant species known to be threatened or endangered have been identified, and will together with river valleys and sites of high concentration of remnants of miombo trees and shrubs species will be left intact for

conservation purposes. The threatened species at national/local level that also appear in the IUCN Red List is given in table G4 of this PDD. These were identified by the ecological study and mapped. The project participants aim to conserve them, as also documented earlier in this PDD.

Management plans for the rare, endangered and threaten species will be adhered to in accordance with the recommendations of the ecological survey that has been carried out to preserve and enhance their long-term survival.

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

The species to be planted mainly include *Pinus patula*, *P. elliotii*, *Eucalyptus calmadulensis*, *Eucalyptus saligna* and *E. grandis*. A few indigenous species are also being planted for trial/research purposes such as *Kaya anthotheca*, and a few exotic fruit trees though none has yet proved successful and had strong growth. The carbon benefit of these trees will not be included in the CER estimates. The species have been screened against the global database of invasive species and are not invasive in Tanzania. Water conserving species such as *Bridelia* and *Syzygium* spp, shall be planted in the buffer zones.

**Table B1: Species to be planted in the project area**

Species	Type	Uses
<i>Pinus patula</i>	Exotic softwood	Timber
<i>Pinus elliotii</i>	Exotic softwood	Timber
<i>Eucalyptus saligna</i>	Exotic hardwood	Poles
<i>Eucalyptus Camadulensis</i>	Exotic hardwood	Poles
<i>Eucalyptus grandis</i>	Exotic hardwood	Poles
<i>Grevelea robusta</i>	Exotic hardwood	Firewood, timber, posts, windbreak, restoration and water conserving
<i>Bridelia spp</i>	Indigenous hardwood	Water conserving, ecological restoration
<i>Syzygium spp</i>	Indigenous hardwood	Water conserving, ecological restoration
<i>Avocado, oranges etc</i>	Exotic	Fruits

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

No genetically modified organisms will be used in this project and as such, no carbon credits shall be claimed from these species. The seedling production shall not involve seed culture, but rather direct sowing on the ground and the project shall ensure seeds for planting are from known seed sources.

**B2. Offsite Biodiversity Impacts**

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

The project does not anticipate any negative offsite biodiversity impacts as a result of the project activities. In section B 2.2. the potential negative impacts are listed, and how the project will mitigate them.

See section G.2.4 in this PDD for supplementary information.

**B.2.2 Describe how the project plans to mitigate these negative offsite biodiversity impacts:**

**Table B2: Possible negative offsite biodiversity impacts:**

<b>Impact</b>	<b>Mitigation measure</b>
<b><u>Disturbed habitat and wildlife:</u></b> Implementation of the project will bring a burden on the ecosystem, threatening the survival of rare species known for conserving water, sources of fire-wood, fruits, poles and sanctuary for wildlife.	The riverine and valley vegetation should be left intact to offer refuge to wildlife, to improve biodiversity and protect the areas from erosion. The vegetation will also protect the rivers and streams. Areas rich in biodiversity to be left undisturbed. Careful planning the road profile to leave as much biodiversity resources undisturbed as possible.
<b><u>Air pollution:</u></b> Increased traffic and use of motor vehicles will increase air pollution and the occurrence of dust which may cause health issues (respiratory problems and allergies) on a constant long term large scale scenario.	Limit the amount of vehicles on a day to day basis. Put vehicles on service on a frequent basis (worn out tires suspend more particulate matter).

In sum – a number of measures have been put in place to enhance offsite biodiversity – most notably restoring degraded woodlands in buffer zones through the planting of indigenous trees and protecting these areas. Fire shall be reduced in the conservation areas directly adjacent to the planting area which will lead to regeneration of the natural vegetation overtime.

**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:**

The project does not anticipate any unmitigated offsite biodiversity impacts.

**B3. Biodiversity Impact Monitoring**

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

An initial environmental impact assessment study was carried out to determine impacts on the biodiversity before the project was rolled out. Subsequent biodiversity studies have been done through both ecological and botanical surveys. The ecological and botanical surveys assess species abundance, diversity, landscape connectivity and biodiversity at risk of being negatively impacted by the project activities. Biodiversity monitoring is planned to keep track of these attributes. Permanent sample plots (PSP) have been installed in the planted areas, in the buffer zones and in the conservation areas (where biodiversity is abundant) to easily monitor the biodiversity. Monitoring of their growth/increase is usually done by measuring tree diameter and emerging natural undergrowth. Through ecological and botanical studies, research on species distribution, landscape connectivity and their habitats is done. The area of planting shall be free from natural forest, valley bottoms, riverine and rivers etc to ensure that these habitats are protected and conserved.

The biodiversity shall be monitored to ensure that any negative impacts are addressed. Monitoring variables shall include species abundance and diversity, landscape connectivity, forest fragmentation, and habitat area. The monitoring plan has been approved by the National Environmental Management Council (NEMC), a statutory body of the Government responsible for all environmental matters in the country. For any amendments to the monitoring plan, the project participants will seek approval from NEMC.

Please refer the monitoring plan, annex 4 in the CDM PDD for monitoring parameters and frequency.

#### **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 (*Pinus patula*, *pinus elliotii*, *Eucalyptus saligna*, *Eucalyptus camadulensis*, and *Eucalyptus grandis*) was mainly based on their adaptability to the land, and the strong knowledge of plantation and silvicultural practises for these species. Unfortunately, there is little success of growing native species in plantations in the Southern Highlands of Tanzania. The project has done trial plots at the neighbouring projects of Uchindile and Mapanda, with native species, with very poor growth, such as *Khaya anthotheca*, *Spathodea campanulata*, *Pordocarpus angolensis*, *Acacia melanoxylon*, *Khaya nyasica*, *Melicia excelsa*, *Cordia Africana* and *Albizia schimperiana*. Green Resources continues to do trials with native species in its plantations in the Southern Highland, as it is very keen to develop and improve forestry knowledge for successful cultivation of these species. To date however little success have shown in achieving successful cultivation and growth of native species in the region. Green Resources is also working closely with Sokoine University of Agriculture and Tanzania Tree Seed Agency who are doing research into growth of native species. The area in which the project is implemented contains poor soil and the currently growing native species is very low. Eucalyptus and Pine are the only species that currently, there is sufficient silvicultural knowledge of to grow successfully.

#### **B5. Water and Soil Resource Enhancement (optional)**

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

Water and soil restoration is expected through planting native species in the buffer zones. The project shall create conservation areas that have a high biodiversity. Furthermore, a monitoring program shall be carried out on water and soil resources to assess any negative impacts that might be resulted from the project activities and addressed. GRL is planting water-conserving species and fruit trees in valley bottoms beyond the recommended buffer zone, for enhancing biodiversity, carbon sequestration and food production. All remaining areas will be protected

and remain as control areas for monitoring vegetation change and for safeguarding some of the native grass land that may contain endemic or rare species. Project activities that are likely to enhance the soil and water resources:

- Setting aside a buffer zone of 60 metres is recommended by NEMC to avoid interference of the exotic species with water resources, thus avoid depletion of the status quo.
- Indigenous water conserving tree species shall be planted in the buffer zones
- Planting of indigenous trees as well as leaving a natural vegetation buffer shall maintain the moisture content of the wetlands allowing repository site for other species like birds.
- Establishment of community woodlots
- Establishment of preventive fire regimes
- Grazing control

**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:**

The project is not expected to cause negative impacts to these resources because the water courses are left undisturbed by creation of sufficient buffer zones. However, 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 such as falling leaves, twigs, bark and fallen fruits can be used as a soil moisture enhancer as it prevents evaporation of moisture from the ground.

Soil and water samples analysed for their chemical composition (at Sokoine University of Agriculture and Iringa Water Office) have not shown any changes in salinity and composition of soil, soil fertility or soil pH in comparison to the baseline scenario (reports exist and are available upon request or during validation/verification).

Roots increase the permeability of soil, increasing the absorption and infiltration of water. Forests also contribute to terrestrial evaporation and regulate the humidity of the soil through transpiration. As discussed under B.1.1, in the baseline scenario the area will continue being exposed to anthropogenic caused and seasonal fires, which would lead to continued degradation of the area, including soil resources. It is assumed that through the projects implementation that, the number of fires will diminish substantially and so soil fertility over time will improve.