



Mnyera Forest and Carbon Project, Tanzania



Project Idea Note (PIN)

November, 2009

Project Overview

The project is reforesting degraded grassland in the Southern Highlands of Tanzania. The project proposes to achieve certification under the Clean Development Mechanism (CDM) in the Afforestation/Reforestation (A/R) Project Category. The project will apply approved CDM A/R methodology 5, version 3 *“Afforestation and reforestation project activities implemented for industrial and/or commercial uses”*.

The project will take place at three discrete locations all within a close proximity in the Southern Highlands. Green Resources is still in the application process for the acquisition of the land title. The land acquisition in Tanzania is a bottom-up process that starts at the local village level and proceeds through district and then national level channels before final issuance of title is granted. Green Resources has already received approval from local communities. It is anticipated in total the CDM project area will cover 12,250 ha of land. When the land lease is issued it will be a 99-year renewable lease.

Green Resources will plant species of the genera *Pinus* and *Eucalyptus*; the dominant species will be *Pinus patula* and *Eucalyptus saligna*. In the baseline scenario, the land would remain as degraded grassland, which has over a period of many years been degraded as a result of regular fire regimes forcing the natural miombo woodland back to the more moist gullies and valley bottoms. The grasslands have remained in a steady state for several decades. Areas where the natural woodland remains will be kept as natural woodland and buffer zones between them and the reforestation will be put in place to ensure biodiversity protection. The conservation areas will help to preserve the natural hydrology and promote the protection of biodiversity and wildlife in the area. No carbon benefits will be sought by the company for the protection of these conservation areas. The exotic species proposed to be planted will be done on a rotation that allows a permanent sink of carbon to be established as well as sustainable harvesting. Green Resources plans on carrying on with sustainable forestry and harvesting at the project sites over the long-term. The harvested wood will be used to provide high-quality value-added products to local markets such as utility poles, furniture and sawn timber. An added benefit of this is that it will reduce deforestation pressure for timber from the native forest as it provides an alternative

sustainable source of timber. The plantation will follow best practice in forest establishment, management techniques, stakeholder consultation and environmental protection and ultimately aim to achieve certification under the Forest Stewardship Council (FSC) and the Climate, Community and Biodiversity Alliance (CCBA).

The project will sequester an estimated 3,800,000 tCO₂ equivalents over 20 years.

Basic Information

Project name: Mnyera Reforestation Project (MFP) in Tanzania

PIN Submission Date:

November, 2009

Company data

Company:

Name: Green Resources AS (GRAS)

Address: Strandveie 35, 1366 Lysaker, Norway

Website URL: www.greenresources.no

No. of Employees: 1480 employees of which 365 are permanent staff and 1165 casuals

Registration number Professional or Trade Register + City: Org. no 975 879 968 NO

Date of registration: 26-08-1995

Company's core business: Reforestation, carbon offset, forest products and renewable energy

Contact person:

Name: Jenny Henman

Title: Ms

Job title: Carbon Certification Manager

Telephone number: +44 2072501416

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E-mail: jenny.henman@greenresources.no

Project Participant(s) / partner(s):

Company:

Name: Green Resources Ltd, Tanzania (GRL)

Address: Mwalimu House, P.O Box 4730 Dar Es Salaam, Tanzania

Website URL: www.greenresources.no

No. of Employees: 102 regular employees

Registration number Professional or Trade Register + City: 42081, Dar Es Salaam

Date of registration: September 4, 2001

Company's core business: Carbon credit and forestation projects

Contact person:

Name: Moses S. Ngegba

Title: Dr

Job title: CDM Manager

Telephone number: +255754678351

E-mail: ms_ngegba@yahoo.com / moses.ngegba@greenresources.no

Company's core business

Green Resources is a plantation, carbon offset, forest products and renewable energy company. The Company was established in 1995 and is a private, profit oriented Norwegian company with 60 shareholders. It employs about 3,000 people in total and has invested more than NOK 300 million in plantations and industries in Eastern and Southern Africa with a strong local organisation. Green Resources has activities in Tanzania, Uganda and Mozambique.

The Company is Africa's leading afforestation company and has established 14,200 ha of forest plantations and over 610,000 ha land under process for future planting and

conservation. This is probably more new trees than any other private company has planted in Africa during the last 10 years. Green Resources is growing trees to generate carbon offsets, to manufacture wood products and for the generation of bio-energy.

Green Resources carbon offset projects include; afforestation, biofuel and renewable electricity projects. It is a leader in forestry derived greenhouse gas emission reductions, and received the first verified carbon credits in 2000. All Green Resources carbon offset revenues will be reinvested in new carbon offset activities or be used for community development.

Green Resources industrial operation, Sao Hill Industries, is East Africa's largest sawmill and one of the largest treated pole producers, it also has carpentry and joinery plants. It has several sales branches throughout Tanzania.

Green Resources strategy is based on sustainable development of the areas where it is operating. It wants to become the favoured African employer within the industry. The company believes that afforestation is the most efficient way of developing the social and economic conditions for people in rural areas. Green Resources aims to be the preferred partner for local communities in these areas.

Green Resources aims to follow the best international environmental standards. It conserves the natural forest and other valuable habitats. Green Resources only harvests plantation forest and plants ten new trees for every one tree that it harvests. In addition, it only plants on grassland or degraded forestland. It focuses on a wide variety of species, including; pine, eucalyptus, teak, measopsis and various indigenous trees.

Project Characteristics

Scale of Project

The proposed CDM project is an A/R CDM project activity (reforestation) using approved methodology AR-AM0005, Version 4. The title of the approved methodology is: *“Afforestation and reforestation project activities implemented for industrial and/or commercial uses”*

Brief Description

Present Situation at Project Site

The proposed afforestation/reforestation CDM project activity is for three separate areas in total equalling approximately 12,250 ha of CDM eligible plantable land located in the southern part of Tanzania in the districts of Kilombero, Morogoro Region and Mufindi, Iringa Region. All these lands are within a close proximity of the Southern Highlands where Green Resources operates and owns plantations. The total land area that will be allocated to Green Resources Limited is for 24,500 ha with planting activities possible on approximately 12,250 ha with the rest being conserved. The land is categorised as fire driven savannah grasslands. During project development the project activity boundary shall be surveyed and mapped to ensure riparian buffer zones and area of natural habitat are conserved. The project site altitude is between 1,100 and 1,535 metres above sea level.

The land from within and beyond the project boundary area is characterised by an undulating terrain with slopes in the range of 3 - 60%. The vast proportion of the land areas under the proposed CDM A/R activity are composed of savannah like vegetation types with few scattered trees and shrubs of Miombo species. The vegetation ranges from grassland to riverine vegetation at the hill tops and the valleys respectively. The lands have been exposed to excessive annual fires and therefore top soils are poor in humus content and prone to erosion. Mudslides are common in steep slopes. The soils are nearly uniform, derived mainly from granite rock, deeply weathered and consisting of a mixture of red and yellow clay loams with dark humic top soils.

Project objectives

1. To sequester CO₂ through tree planting in degraded grassland areas, generating efficient emission reductions in greenhouse gases (GHG) that can be measured, monitored and verified. The project participants shall demonstrate that carbon sequestration from forest plantations is a viable instrument to encourage private investment in the forestry sector especially on grassland and/or degraded lands.
2. To establish and manage forest plantations that would contribute to satisfying the growing demand for quality wood products from a sustainable forestry. The project will seek third party certification under the Forest Stewardship Council (FSC).
3. To promote environmental conservation, through soil conservation, protection of water sources and enhancement of biodiversity by protecting the existing indigenous flora and fauna, and where appropriate carry out enrichment planting with indigenous species. The project will seek third party certification under the Climate, Community and Biodiversity Alliance (CCBA) Standards.
4. To facilitate socio-economic development of the local communities through:
 - creation of employment opportunities directly and indirectly
 - promotion of village tree planting on community land by offering free seedlings
 - generation of income through the sale of carbon credits:
 - a. 10% of which will be used for community development projects as would be decided by the villages like supporting infrastructure development including construction of roads, bridges, schools, hospitals, etc
 - b. the remaining full amount of carbon credit income will be reinvested in East Africa

Proposed Activities

The main activity under Mnyera is to change the land use/cover from grassland to managed forest plantations through reforestation and plantation management, covering an area of approximately 12,250 ha. The plantable land will be divided approximately 50-50 with pine and eucalyptus species. About 5% of the plantable area is to be planted with indigenous hardwood tree species. The current operational planting plan is to establish the plantations by 2018.

Major species to be planted, and use:

Species	Type	Uses
<i>Pinus patula</i>	Exotic softwood	Timber
<i>Eucalyptus saligna</i>	Exotic hardwood	Poles
<i>Eucalyptus grandis</i>	Exotic hardwood	Poles
<i>Eucalyptus camadulensis</i>	Exotic hardwood	Poles

In beginning of 2009 a trial plantation of 60 ha of with *Pinus patula* was established in Kitete area. The pine is currently planted at 2,5 x 2,5 m spacing with two thinnings of 50% stems anticipated at age 8 and about 38% at age 13. Pruning is foreseen to produce high quality sawlogs at the end of rotation (age 21). The expected yield is 350 m³/ha/a.

The eucalyptus species will be planted at 3 x 2.5 m spacing. Two thinning operations are predicted at year 4 and 7 with stems removal of about 45% and 33% respectively. At the end of the rotation (age 12) the wood volume expected to be harvested is 190 m³/ha/a.

Other activities within project boundary shall include:

- establishment of trial of indigenous tree species and exotic hardwoods (approx. 5% of the total plantable area)
- monitoring/conservation of wetlands, water sources and areas of special importance for biodiversity.

- trialing of agro forestry, including inclusion of cattle grazing within the plantations and conservation/buffer areas.

GRL shall work closely with the neighboring villages around the Mnyera FP. GRL is committed to reinvest 10% of the carbon revenues of the entire project into improving the infrastructure in the surrounding villages, such as schools, dispensaries, water-supply, roads, etc. as chosen by the villagers.

Applied Technology

GRL utilises the latest available technology during all aspects of project development. Specific silvicultural technologies are tested through trial periods, with those found to be most efficient continuing to be employed during forest establishment and development, plantation monitoring and verification.

Global positioning systems (GPS) and global information systems (GIS) are utilised for the assessment of land eligibility. These techniques will be used for verification and continued monitoring of the proposed A/R CDM project activity. A combination of satellite imagery and field observations are going to be used for the stratification of ecosystem types, and intensive field work and sampling combined with laboratory analysis for the determination of baselines and project scenarios.

Furthermore, within the proposed A/R CDM project activity, modern plantation technologies available for forest management and the latest silvicultural practices will be used. In addition to the requirements laid out under the CDM, the approved methodology and associate monitoring plans, the following standards will be adhered to, and certification sought, where appropriate:

1. Government Technical Note on Silvicultural Practices issued by the Ministry of Natural Resources and Tourism of Tanzania
2. Procedures and Work instructions for forest plantations
3. Forest Management Plans
4. Forest Stewardship Council's Principles and Criteria (FSC)

5. Any requirement under the CDM
6. Annual Budgets
7. Plantation Unit Tasks
8. Environmental and Socio-Economic Impact Assessment reports
9. Monitoring Plans in line with the approved methodology
10. ISO 9001 and 14001 approaches will be introduced corporate wide as an instrument for the efficient management of all environmental aspects and quality assurance

The project participants shall rely on its own in house trained staff and professionals, as well as collaboration with local and regional forestry department/agencies, institute and local NGOs in providing technical consultation and guidance, including training courses, quality control checks and technical inputs. It shall also seek advice from local, national, and international forestry and sustainable forest management (SFM) experts where required.

Greenhouse Gas (GHG) Emission Reduction (ER)

The estimated average annual and total anthropogenic removals by sinks during the crediting period of 20 years is estimated to be about 190,000 and 3,800,000 tCO₂ equivalents respectively.

Methodology

State if the methodology is approved:

- The methodology is approved.
- Title: Afforestation and reforestation project activities implemented for industrial and commercial uses
- Reference number: AR-AM0005
- Version: 4

Justification of the choice of methodology, and why it is applicable to the project activity:

- The project site is largely covered by degraded grassland vegetation with pockets of trees and shrubs
- Soils are of low to medium fertility due to low soil organic matter resulting from frequent burning of vegetation making it unsuitable for profitable agriculture.
- The reforestation activity is undertaken to meet commercial and industrial needs and sequester carbon.
- The natural tree/shrub vegetation has little or no chance of regeneration due to lack of seed sources as existing trees are sparse and because the area is subject to frequent fires.
- Soil drainage and disturbances (apart from wild fires) are minimal, thus non-CO₂ GHG emission are likely to be insignificant.
- GIS will be used to monitor, validate and verify carbon sequestration.

Baseline scenario

Method of identifying and description of the baseline scenario

The approved baseline and monitoring methodology AR-AM0005 version 4 is applied to this proposed AR CDM project, “Afforestation and reforestation project activities implemented for industrial and commercial uses”. The following steps are followed in selecting the baseline scenario:

1. Demonstration of the most likely land use at the time the project start:

It is evident from existing documentations that the most likely land use at the start of project is unmanaged grassland.

2. Assessment of national and sector policies and legislation:

Ensure that there are no existing plans to change the land use of the project area.

3. Assessment of demand and supply of wood resources for industrial and commercial purposes:

Show that demand would increase over supply due to the fast depleting natural sources and the slow growing planted sources due to unattractiveness of investment in forestry in Tanzania.

4. Assessment of land-use practices and the prevailing land uses in the project region:

Participatory Rural Appraisal (PRA) reports and other related documentations demonstrate that the land under Mnyera was unmanaged grassland on 31st December, 1989, which is unlikely to change in the near future in the absence of the proposed AR-CDM project. In the vicinity of the project the land is under the same land use as the project lands, i.e., degraded miombo woodland with patches of subsistence agriculture and limited livestock.

5. Identification of plausible and credible land use alternatives:

The plausible land use alternatives are a) grassland, b) small-scale A/R and c) large scale A/R. The first two are most likely as they bear little or no financial implication. On the other hand, the high initial investment cost and perceived high market risks and short term economic unattractiveness of private investment in forestry generally in Tanzania make large scale afforestation/reforestation very unlikely as plausible and credible land use alternative.

6. Identification of the most likely land-use:

From foregone arguments in paragraphs 4 and 5 above, continuing as unmanaged grassland within project boundary is the most likely land use alternative. This is mainly due to investment barriers for large scale investment and technological barriers including lack of good quality planting materials and techniques for small scale investment in afforestation and reforestation.

Description of the baseline scenario:

Since no natural regeneration of trees can be identified within the project activity boundary, the sum of net carbon stock change in biomass carbon pools of all strata in the plantable

area shall continue to be in steady state. Baseline changes for the project lifetime are assumed to be constant for the project lifetime.

Additionality

Key assumptions and rationale for demonstrating additionality

- Investment barriers: It is only with the increased return facilitated through carbon revenues that the project could attract equity investment. The risk of investing in forestry in Africa is perceived as high, and the return profile for forestry projects without carbon revenues is too low to attract commercial investors. The inclusion of carbon as a revenue stream makes projects viable as it not only increases the rate of return, but also the short and medium term cash flow of the project as certified emission reductions are generated from the fifth year of the project, whilst timber revenues would not flow until the seventh year at the earliest.

Emission reductions

Key input and assumptions in determining ex-ante calculations of expected emission reductions (including justification)

Key inputs:

- Maps of plantable area and planting configuration
- Use of biomass expansion factors for eucalyptus and pine to convert from commercial volume, to total biomass and carbon

Assumptions in determining ex-ante calculations

- No displacement of activities within the project boundary
- Village afforestation is enhanced and supported
- Greenhouse gas in the baseline/without project scenario remains in a steady state
- No leakage outside the project boundary as a result of the A/R CDM activities

- Soil disturbance is minimal

Methodological choices (equations and chosen parameters if available)

- The project uses the approved methodology AR-AM0005, which recommends estimating changes in carbon stock in the living biomass of unmanaged grasslands for above and below ground biomass carbon pools based on land use categories identified in the baseline scenario.
- Baseline emissions due to site preparation i.e. removal of vegetation

Estimated Amount of GHG Abated (CER/ERU)

Table 1: Estimated Amount of GHG Abated (CER/ERU)

Year	Estimation of actual net GHG removals by sinks (tonnes of CO ₂ e)	Estimation of baseline net GHG removals by sinks (tonnes of CO ₂ e)	Estimation of leakage (tCO ₂ e)	Estimation of net anthropogenic GHG removals by sinks (tonnes of CO ₂ e)
2009	0	93	0	-93
2010	0	1,246	0	-1,246
2011	0	1,542	0	-1,542
2012	0	1,869	0	-1,869
2013	90,953	1,869	0	89,084
2014	179,543	2,492	0	177,050
2015	224,204	2,492	0	221,712
2016	313,638	2,492	0	311,146
2017	442,484	2,492	0	439,992
2018	480,232	0	0	480,232
2019	515,331	0	0	515,331
2020	599,003	0	0	599,003
2021	689,280	0	0	689,280
2022	557,350	0	0	557,350
2023	171,374	0	0	171,374
2024	97,492	0	0	97,492
2025	-86,711	0	0	-86,711
2026	-185,060	0	0	-185,060
2027	-165,386	0	0	-165,386
2028	-109,853	0	0	-109,853
Average over crediting period (2009-2028) (tCO ₂ e)	190,694	829	0	189,864
Total for crediting period (2009-2028) (tCO ₂ e)	3,813,874	16,590	0	3,797,285

Expected Schedule

Schedule (expected or documented) of Pre-Investment Procedure (Project related)

Environmental Impact Assessment

- To be completed in 2010

Social Impact Assessment

- To be completed in 2010

Stakeholder Consultation

- GRL is already in discussions with the local communities, and so far they have committed 24,500 ha of land at three separate project locations. The land title application is at different levels for the 24,500 ha.

Schedule (expected or documented) of CDM/JI Related Pre-Investment Procedure (change as necessary, indicate expected timeline and present status)

Project Design Document (PDD)

- Work will commence the during 2010 subject to funding

Validation

- The project aims to go into CDM validation by the forth quarter of 2010

Host Country Approval Procedure (project approval, approval as CDM/JI, etc.)

Designated National Authority (DNA)

- The DNA is the Division of Environment, Vice President Office, Tanzania

P.O.BOX 5380 IBS Building, Dar es Salaam, Tanzania

Mr Richard Muyungi , Asst Director

Phone 255-22211-3983

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Implementation

Start of Planting

- Trial planting started in January 2009

Start of Operation

- Trial planting started in January 2009

Start of Crediting Period

- January 2009

Environmental impacts and impact on local stakeholders

Environmental Impacts

Please describe potential negative environmental impacts, and mitigation measures if applicable (e.g. through an environmental impact analyses).

- Change of land cover type from grassland to plantation forest of exotic species may change the natural habitat of some wildlife species. Mitigation measure will be the conservation and protection of the remaining pockets of woodland, wetlands, streams and river banks.
- Nutrient export through forest harvesting would lead to soil nutrient depletion in the system potentially threatening the sustainability of forest plantation. This may be mitigated through minimum site disturbance and retention of litter and foliar biomass on site during harvesting and land preparation.
- Accidental forest fires may result in air pollution, release of greenhouse gases, and exposure of soil surface to erosion and soil degradation. This may be minimised or avoided by creating good fire prevention belt and establishing effective fire fighting systems, which is already in place.
- The forest plantation of monoculture stands serve as breeding and spreading points for pests and disease causing agents. The use of different tree species and

compartmentalization and blocking system of plantation will limit the spread of diseases and pests.

- The establishment of forest plantation would necessitate the use of pesticides and herbicides to control certain pests and diseases that might endanger other flora, fauna and human species. Care will be taken to use only recommended and possibly selective chemicals to control diseases and pests in plantation. To further reduce the risks of human exposure, the strict use of appropriate gears by plantation workers dealing in dangerous substances will be enforced. Also workers will be given appropriate trainings for handling dangerous chemicals and equipments.
- The presence of forest plantation will regulate the uncontrolled exploitation of forest resources in the natural ecosystems within project boundary, thereby enhancing the build-up of biodiversity and ensure overall environment conservation.

Expected impact on local stakeholders / stakeholders comments

from public comment period

- The project will promote development activities for the local communities through direct or indirect support of projects such as construction of schools, dispensaries, bridges, roads, etc.
- The project will create employment opportunities for the local population and qualified nationals.
- Income from salaries and wages will contribute to improving the living standard of the local population
- Create economic gain to local companies dealing in goods and services pertaining to the project activities
- Revenue boosting for the host country through various taxes, levies and royalties
- Increase in the number of economic activities such as vendors and providers of various services to workers in the project

Finance

Investment

The investment costs for the 12,250 ha project are about USD 2 million in initial equipment and infra-structure investments, more than USD 1,000 per ha planted forest, in addition to annual maintenance costs, or a total close to USD 20 million.

Source of Finance

The investment will be financed by a mixture of equity from Green Resources, loans and revenues from carbon credits.

CER/ERU Price per metric tonne of CO₂-equivalents

No buyer or price have been agreed on