



Introduction

Green Resource AS (GRAS), the majority owner of Niassa Green Resources (NGR), acquired Florestas do Planalto (FdP) and Chikweti Forests of Niassa (Chikweti), in Niassa province (see background) in 2014. The management of this group of companies is done by one management team following GRAS's principles and objectives.

GRAS has decided to concentrate its future development in parts of the Niassa land holding and exit from its other areas. This revision consolidates the management of all active GRAS Niassa companies (GR) for the harmonization of the responsible management in all GR plantations. It covers the period 2018-2022 and is based on the "Management Plan for the Forest operations - NGR-FMP-V2 Eng of 25 May 2014", previously followed by Niassa Green Resources (NGR).

The company's planning exercise is done through the use of five-year Management Plans. This is an adaptive planning process that enables the management team to learn from the monitoring exercises. As such, management plans can be renewed and constantly updated with new relevant information. Periodic renewal provides the means for reporting progress in management and for reviewing and improving earlier forecasts.

The plan establishes long-term objectives and strategies for the project area and forest management. It also outlines the forest operations essential to meet objectives, while at the same time, minimizing undesirable environmental impacts.

GRAS is aware that the success of its operations depends largely on the participation of all stakeholders. Therefore, there is a need to ensure that all stakeholders in the project areas are fully involved in the project implementation and this can only happen with open communication and sharing of information. Taking this into account, the present summary of the Management Plan was prepared to inform the stakeholders about the activities conducted by NGR to achieve the objectives set for the project. The document provides an insight of the company objectives and operations development. Should you have any doubts, comments or contributions regarding the information contained in this document or even the activities carried out by the company, please do not hesitate to contact us through the following channels:

Name: Niassa Green Resources S.A.

Address: Av. Trabalho, Nr. 36, Lichinga, Niassa, Moçambique

Telephone: +258 27 121272

Fax: +258 27 128011

e-mail: info@greenresources.no

Website: www.greenresources.no

Company Background and History

Green Resources AS (GRAS), owns and manages a group of forest companies that operate in Mozambique, Tanzania and Uganda (**Error! Reference source not found.**). The Green Resources group operates under the same set of principles and objectives across all its companies.

Niassa Green Resources SA (NGR) is a private, profit oriented, vertically integrated, forest products and carbon offset company, that plans to develop a long-term investment with a 50-year horizon in forest plantations in Niassa province, Mozambique. The company resulted from the name change of Malonda Treefarms SA (MTF) in 2009. MTF was legally registered, in 09/07/2007, after the agreement signed in 2006, between Green Resources AS (GRAS) and Malonda Foundation (MF) (20% ownership). As part of this agreement, MF



transferred to GRAS the land use rights (Direito de Uso e Aproveitamento de Terras - DUATs) of 46,120 ha of land in Niassa province and MTF was established to implement the project. Chikweti Forests of Niassa and Florestas do Planalto were acquired by GRAS in 2014. Since then the management of these companies was incorporated under Niassa Green Resources.

Management objectives

GR's objectives for Niassa Forest Project are as follows:

- Maximize returns through the sale of wood products (raw material for the production of poles, wood chips, and sawn timber) from eucalyptus and pine species.
- *Maintain a strong focus on the environment conservation and social* following international standards for sustainable forestry and will pursue certification of its operations under different schemes namely: i) Forest Management and Chain of Custody under the Forest Stewardship Council™ (FSC); ii) ISO 14001 for environmental management systems and iii) OHSAS 18001 for Occupational, Health and Safety management systems.

GR in addition might pursue the sale of carbon credits resulting from the sequestration of carbon dioxide and its contribution to mitigate the impacts of the climate changes. Through its afforestation programme, the company aims at mitigating climate change by reducing greenhouse gases through carbon sequestration. GR will sequester carbon dioxide and seek approval as a CDM project defined by the UNFCCC mechanisms to combat climate change. All carbon offset revenues will be reinvested locally and, at least 10% of revenues will go to community development and environmental protection.

All Green Resources projects' operations in Niassa have been approved by the GoM after a process submitted through APIEX - Agency for Investment and Export Promotion, formerly the CPI – the Investment Promotion Center. After the projects' approval, provisional land user rights (DUATs) were also granted to the companies by the Council of Ministers. However, before the definitive DUAT is issued, the company has to: demarcate all the areas in which it will operate and, prove that it is using the areas in accordance with the approved projects.

Additionally, a full ESIA was implemented and an Environmental license obtained for each of the company operations in Niassa. The recommendations made by the ESIA's and ESMPs are currently being followed.

Project Overview

Location: Lichinga plateau, Niassa Province (Northern of Mozambique).

Districts: Chimbonila, Lago, Lichinga, Malulu, Mussa, Ngauma, Sanga, Mueembe

Landholding: Over 100,000ha (30,600 demarcated)

Total Plantable Area: 60,000ha

Target Products: Poles, sawn timber, wood chips

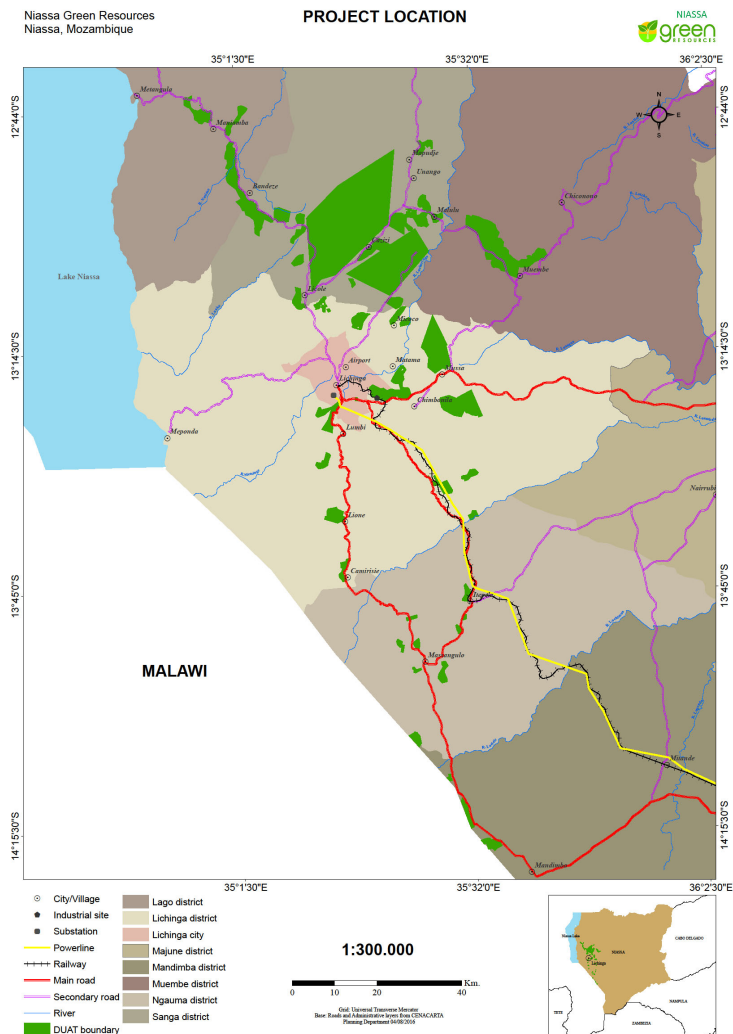


Figure 2: Project location within the Niassa Province & location of communities

Land Use Plan

Trees will be planted on degraded or abandoned land with pine and eucalyptus as the primary species planted. Surveys will be conducted within the acquired areas regarding soils, Areas of Special Interest (ASI), High Conservation Value Forest (HCVF) and other protected areas as defined in national legislations, by FSC or in other applicable standards. A combination of ground truthing and remotes sensing will be employed in these surveys resulting in high-scale land use plans which will act as a guide for developing plantations.

Land Selection Methodology

- Land is likely to qualify for reforestation / afforestation credits under CDM and 80% deforested before 1990
- Minimum acquired area is 1,000ha joined up in clusters of minimum 10,000ha within a 35km radius
- Plantable area should constitute at least 45% of the total area.
- Suitable soils with expected pine MAI of 15+ and Euc 20+
- Mean annual rainfall of more than 1000mm

Description of Resources to be Managed

Land cover and land use assessments (LCLU), are carried out prior to the operations start to identify and map the LULC that exist in the project area. For the Niassa operation areas, the following LULC were identified: grasslands (incl. disturbed wooded grasslands), shrub savanna, miombo woodlands (incl. closed forests, cemetery woodlands, rocky outcrops, riparian woodland), wetlands, Rotational Crop Cultivation Mosaic (agriculture and grassland mosaic), water bodies and Riparian Zones (along water courses). Except for the Lago district which has more forested areas, the predominant land cover in these areas is grasslands & shrublands. To note that there are some areas that are still being used for crops cultivation by local communities.

Environmental Assessments

GR has carried out Environmental and Social Impact Assessments (ESIAs) along with the development of Environmental Management Plans (EMPs) for all the project areas, complying with requirements of the national legislation. The EMPs provide for the monitoring of environmental and socio-economic aspects and will be used as basis for the monitoring of the project implementation with the purpose of recording the project performance and mitigating any potential adverse impacts. Additionally, apart from the ESIs required by law, Site Specific Environmental Impact Assessments (SSEIAs) are also carried out internally, as prescribed in the company Standard Operating Procedure (SOP) for SSEIAs, before commencement of main activities (e.g. mechanical land clearing and bridge construction).

Environmental assessments will include the following aspects:

- **Topography** - to identify sites suitable for commercial afforestation to minimize acceleration of erosion which is the key natural process that may lead to land degradation at the same time ensuring that flood plains, riparian habitats and wetland areas are well protected and not included in the plantable areas.
- **Hydrology** - to ensuring that the quality and quantity of surficial and underground water is not adversely affected following guidelines developed by CES (2013)¹, for some areas.
- **Geology and soils** - to minimize of erosion especially where project-related activities take place in the vicinity of rivers, streams and wetlands.

Biodiversity and High Conservation Value zones

The project area is mostly dominated by 3 different ecosystems/vegetation strata namely: (i) woodland, (ii) shrubland/shrub savanna, and (iii) grassland. The ESIs described grassland and shrubland separately in ecological terms and these are considered suitable for the development of forest plantations as they do not fulfil the forest definition set for the country. Miombo woodland and wetlands are regarded as the most important floral habitats which present the highest species richness and also higher diversity compared with the other habitats and these will be managed according to the SOP for the Identification and Management of Conservation Areas.

More than 300 plant species were identified during floral surveys in 2007, 2008 and 2013. With regards to fauna, a total of 9 amphibians, 11 reptiles, 90 birds were recorded during the assessment by CES in 2013 that focused much in the central part of the project area. No RTE mammals and birds were observed during the surveys but further fauna and biodiversity studies have been planned to cover the whole project area focusing more on the northern and southern parts of the project area. Additionally, the report confirmed that no known amphibians of conservation concern occur in the region but noted that the conservation status of the

¹ CES. 2013. Monitoring and Impact Assessment Programme.

reed frog, *Hyperoliuscf. pictus*, remains unresolved and this could be either an important range extension into the country, or represent an undescribed species.

ESIA 2008 study mentioned the existence of simango monkeys (*Cercopithecus mitis*), a rare species, along Lucheringo river therefore it is possible the occurrence of this specie in project area, although not sited during the survey.

CES faunal and floral surveys in 2013 that predominantly covered the central parts of the project area concluded that no HCVs exist in the surveyed areas although areas of Special Interests (ASIs) such as cemeteries, medicinal plant sites and traditional or religious areas which are of significance to the local communities should be mapped out and protected.

Project Risks

General/broad risk assessments have been carried out as part of the project ESIA's to determine if there were major environmental and social issues that could hinder the project implementation. Additionally, prior to the start of the different project operations, specific risk assessments are carried out internally using the risk assessment procedures developed for the company. These risk assessments help to identify potential risks that may arise from the project implementation in the socio-economic and biophysical environments. For any risk identified, mitigation measures are defined and implemented.

As such, this section describes briefly the assessment of risks that come from outside and may affect the project implementation being them biotic or abiotic.

Tables below summarizes the abiotic (table 1) and biotic (table 2) identified and their probability, severity and mitigation measures.

Table 1: Abiotic Risks

Risk	Probability	Severity if not solved	Mitigation Measures
Plantation related risks			
Land availability	+	+++	Ensure land availability in quantity and quality prior to start of plantation development
Low yield	++	++	Adequate site selection, species/site matching, modern plantation technology and proper plantation maintenance.
Forest fires	+++	+++	Active fire prevention, monitoring and firefighting program

Market related risks	+	++	Definition of forest products and targets markets at early stage
Environmental related risks			
Climate change	++	+++	Ensure early plantings.
Floods	+	+	Ensure plantations are established away from the low lying lands
Droughts	++	++	Choice of drought resistant species and plantings in the right time frame (Dec-March)??

(+) Low; (++) Moderate; (+++) High

Table 2: Biotic Risks

Risk	Probability	Severity if not solved	Mitigation Measures
Biotic risks			
Pests & diseases	+++	+++	Choice of resistant species, Use of diverse species & improve the plants vigour Good silviculture practice Awareness campaigns and trainings Routine plantation monitoring Immediate destruction of infected plant material Adherence to phytosanitary regulations

(+) Low; (++) Moderate; (+++) High

Socio-economic description

GR's areas of interest cover 7 districts and 13 Administrative posts with a total of fifty-eight (58) villages. The economy of the districts is characterised by activities of the primary sector, namely agriculture and small-scale animal breeding mainly goats, sheep and chicken, practiced by the family sector. The economy of these areas is also characterized by informal trade activities, many of them linked to the agricultural activity (e.g. sale of agricultural produce). Besides these there is also forest exploitation, fishing and hunting taking place in some parts of these districts. In terms of infrastructures, the project and adjacent areas are characterised by: inefficient access routes with roads that are difficult to use in the rainy season and low availability and unreliability of electric power.

Project Management

In order to plan the plantations operations a number of regimes will be used that determines the management based mainly on age, specie and desired final product. Pinus and Eucalyptus are the main genus to be planted.

Working Circles/Products

The long-term target for the development of Niassa shown in the table below forms the basis for the development:

Product	Product	Species	Finished product Capacity (M3)	Biomass from industry (m3)	Biomass from forest (m3)	Forest volume (m3)	Productive forest required (Ha)
Biomass producers	Utility poles	Eucalyptus	30 000	1 500	11 025	42 525	2 835
	Plywood	Eucalyptus (& pine)	40 000	60 000	35 000	135 000	9 000
	Saw logs	Pine	120 000	0	30 000	150 000	11 236
	Biomass from thinnings	Eucalyptus & pine	-	-	30 000	30 000	-
	SUM	Eucalyptus & pine	190 000	61 500	106 025	357 525	23 071
Biomass consumers	Firewood	Eucalyptus & pine	-	-	35 000		
	Power Plant	Eucalyptus & pine	5,30 MW	132 525			
						Plus 40% for conservation and expansion	9 228
						Plus 12% for infrastructure	3 876
						Plus 13% as allowance for fires and pest	4 341
						Plus 15% contingency	4 862
						Total required DUAT area	40 516

As a result, working cycles will be geared towards these products. The main drivers will be eucalyptus transmission poles harvested at age 8-10 years and pine saw logs harvested at age 14 - 18. Peeler logs will be extracted from thinning and off-cuts from clear fell. Firewood will also be extracted from thinnings and off-cuts from clear fell. Biomass will be a byproduct mainly from industrial processes.

The expected mean annual increment (MAI) for Pine is 13-18 and 22-28 for Euc during the initial phase of the project. Through research and careful selection of species, clones and improved practices the average MAI is expected to increase by 30% for both pine and eucs by the time the first crop reaches maturity.

The rotation ages are to be considered as an indication when the targeted product can be achieved. The decision of any harvesting activity will also always consider growth rate, wood flow normalization, logistics & quality of the stand.

Regimes

The regime operations should be guiding but not seen as an absolute. The final decision must always be done by recommendations from the forester in field together with management considering several factors such as the stands development, budgeting etc.

Pine Thin Regime Options

4 pine regimes are currently considered to facilitate the management hence achieve the targeted product for the Saw log WC. Currently there is a lot of variation in the pine stands, especially with regards to stocking and MAI in areas mainly established during the start-up phase. Therefore, the stands have been assigned to the different regimes as per criteria below.

Table 4: Regime criteria - Pine

Pine				
Min Age	Max Age	Min TPH	Max TPH	Regime
0	25	0	550	No Thin +

10	>10	850	>850	No thin
0	8	850	> 850	Standard
0	14	550	850	1 thin
14	25	550	850	No thin
8	10	850	1100	Standard
8	10	1111	>1100	No thin

Going forward the No Thin+, No Thin and 1 Thin regime will be converted to the Standard in the 2nd rotation.

Eucalyptus Thin Regimes Options

All Euc stands are being managed for fibre and poles with 2 different regimes, one pure pole regime with 1 thinning and a shorter rotation age with the objective of primary producing poles and a no thin regime generating mainly fibre and some poles at a longer rotation.

The Euc saw log regime will follow the same initial management as the poles regime in order to add flexibility. Currently there are no Euc on the Saw Log regime.

Criteria for Euc regimes:

Table 5: Regime criteria – Eucalyptus

Euc				
Min Age	Max Age	Min TPH	Max TPH	Regime
0	2	900	>900	Euc Pole
2	10	700	>700	Euc Fibre
2	10	500	700	Euc Pole
2	10	0	500	Euc Fibre
0	2	0	900	Euc Fibre
10	>10	0	1600	Euc Fibre

Species Selection

The selection of species for planting considers different criteria's, except from demand, where some of them are: growth, pest/disease resistance & wood characteristics.

In the beginning of the project a broad variety of species were planted and for pines, *maximinoii* & *tecunomani* has so far proven to be the superior species. For the Euc *grandis* & *urograndis* are the better ones in terms of growth.

Nursery Operations

GR has a nursery with a capacity of +- 10,000,000 seedlings. The nursery has its own water supply from a dam and is connected to the national electricity grid and with a backup generator.



The catchment area has to be carefully managed to prevent erosion that can cause sedimentation in the dam. Good relations with the surrounding communities and mechanism that prevent the embellishment of farms or other activities that could cause erosions needs to be put in place.

The current system is mechanized utilizing paper pots as cavities for the growing medium which also offers the possibility of sorting the seedlings individually before sending them out to field.

Good nursery hygiene is of the essence in order to reduce the risk of attacks from pest and disease.

Activities will be done using as basis the Best Operating practices of the Integrated Management System (IMS) developed for the company.

Plantations establishment

In order to achieve the best possible growth and quality of the trees it is critical that the establishment is correct. If a tree gets off to a bad start it will never catch up. Therefore, the aim is to give the seedlings optimal conditions to get to canopy closure as quickly as possible. This is to avoid spending resources on tending, ensuring optimal growth and quickly reducing the risk of fires.

Establishment should be done in such way that eucalyptus get to canopy closure at year 2 and pines in year 3-4 with a +90% survival. If this is not achieved the planting cannot be considered successful. Mechanical operations of deep ripping will be employed to loosen the soil thereby facilitating rapid root development. These operations should not take place once the rain has started due to the risk of soil compaction and erosion.

Pests and diseases protection

At the moment the 3 main pests affecting the plantations are termites, the gall wasp & red gum lerp. Termites are controlled chemically and the plant trays should be dipped in the chemical before planting. Then careful monitoring of the areas the coming months after planting is important and if there are any signs of attacks the plants are treated again with chemicals.

So far, neither Gall Wasp or Red Gum lerp has represented issues but biological control agent such Hymenoptera Eulophidae may have to be introduced if they should become problems.

Plantation harvesting techniques and equipment

Harvesting will be done as either thinning of the growing stands or as clear-fell of the matured. All commercial volumes are stacked at roadside and monitored by guards. The felled volumes inside a compartment are kept to minimum to reduce the risk of theft.

Before any harvesting activities takes place planning of extraction routes, areas and temporary depots must be completed.

Extraction is with either tractors or skidder that should ideally move between the planting lines to reduce the risk of punctures.

All volumes harvested and extracted are recorded on a daily basis using tally sheets.



The aim should be not having clear felled compartments unplanted for more than 2 seasons in order to maximize the utilization of the land on reduce the negative effect of bare land. If they area are not suitable for re-planting they should be permanently removed from the landholding.

Thinning & Clear felling

The thinning and clear felling will be done motor manually using chainsaws. For extraction of the logs tractors with proper back plate mounted winches will be used. The tractors can move in the stands between the planting lines all thought great care is necessary not to damage the remaining trees.

Moving with machinery in the stand during the wet months is highly discouraged due to the risk of soil compaction, erosion and damage to the very shallow lateral roots, especially of the eucalyptus. If there is a need to extract thinning volumes during wet conditions, it should be on site sites with soils less prone to the negative effect described and winching should be done from road to the furthest extend possibly.

Full tree lengths of pine will be extracted in the thinning and stacked and cross cut at roadside. Euc intended for light poles will be extracted to roadside in full length, debarked and then left to dry for 4-6 weeks before being transported to industrial site for processing. Firewood of both Pine and Euc are cut to length in field and stacked with observation to access for collection.

Care should be taken not to open to large clear felled areas which causes bare land negative effect such as erosion. Clear-felled connected areas with the same characteristics (slope, soils etc.) should not exceed 50ha.

Annual allowable cut

The annual allowable cut (AAC) is set by the company taking into account the mean annual increment (MAI) for the respective specie, area and regime. The current average growth rate for Euc and Pine at technical rotation ages is +- 250,000 m³ per year.

High Conservation Value forests & protection of rare, threatened and endangered species

Different Land Use/Land Cover (LULC) were identified in GR project sites namely: agriculture, grassland, open bush, wetlands, natural forests, bare soils and other areas. The predominant coverage is open bush and grassland mainly as a result of human interference. Closed forests are not extensive or common in the area except in Lago district where small areas of these were identified.

The following are areas may be set aside by GR for conservation purposes which will be managed according to the established standard procedures.

- i) **Natural Forests** which offer habitats for a wide range of animals have been previously cleared for agriculture, collection of firewood and building materials and charcoal production. Their conservation is of have paramount significance as they are the only existing remnants of the originally existing vegetation.
- ii) **Riverine forests** are a subcategory of the miombo woodlands, characterized by high species diversity, including trees, epiphytes, lianas, and shrubs and are considered important in biological terms.
- iii) **Wetlands/dambos** which form an important ecological components on the Niassa plateau, regulate the water systems and are also important for the fauna diversity.

More ecological assessments will be conducted to assess the existence of the RTE species within the project area. If these are identified, they will be treated as HCVs, thus they will be managed under the procedure for the management of HCVs. However, as no formal fauna surveys have been carried out for GR project areas, it is important that this is carried out before any management measure is defined for the areas with native vegetation. Furthermore, if an area is found to be particularly rich in fauna, management measures will be designed to ensure the project activities do not impact negatively on these fauna species.

Management of Community and Social Relations

GR is aware that the success of its projects is largely dependent on the relation with stakeholders particularly the local communities living in and around its project areas as such, these relations will continue to be reinforced through meetings, gatherings and discussions.

To ensure engagement of communities on all project operation, GR facilitated establishment of community management committee that integrate elements from different settlements or villages surrounding the plantation areas.

In line with the legal requirements, consultation processes started before the project implementation as part of the land acquisition and environmental licensing processes. apart from the legally prescribed consultation processes, GR is making efforts to ensure that existing stakeholders within the project areas are fully informed and engaged in the project implementation.

A good participation requires open communication and share of information. Therefore, GR has created its own mechanism (Procedure 1 from the SOPs) for consultation and information dissemination to local communities and other stakeholders. The procedure determines the need for regular communication with the stakeholders aiming at: i) ensuring a wider participation in the project implementation, ii) finding consensual solutions to perceived problems, iii) enhancing fire protection programmes and, iv) improved workforce availability for achieving the set targets.

Furthermore, communities will also be involved in company conservation efforts and this will start with the meetings organized to raise the communities' awareness regarding forestry, environment conservation (e.g. protection of flora and fauna against fire, soil and water conservation practices).

Complaints, Grievance and Conflict Resolution Mechanisms

Concerns and disputes may arise during the implementation of project activities. Stakeholders are free to complain and contribute to the success of GR project activities. Therefore, anyone inside or outside GR, can disagree and make objection actions on documents, activities undertaken by the company, the certification process and even on the forest management operations. According to this procedure there are different ways in which objections, disputes, claims and/or complaints can be submitted to the company management including the writing of letters to the manager of the plantation or the use of complaints box that should be made available in the project areas.

At the local communities, there are mechanisms for conflict resolution; The Ndunas are responsible to solve family conflicts and depending on the severity of the cases, there is a community court that together with the Ndunas is responsible for this task within the communities.



Research and Development

The success of the forest plantation projects is largely dependent on the knowledge of species, their growth rates, performance and management techniques to maximize future returns. Therefore, Research and Development (R&D) Programmes are being developed and implemented in collaboration with the relevant organizations and research institutions. Research will focus on tree improvement, Species-site matching, fertilization, chemical usage and soil content.

The results of the R&D program will be serve to increase the use of good forestry practices, information dissemination and the promotion of activities geared to the mitigation of greenhouse gases.

Forest Management System and Data Management

Correct use of and fully implemented management system will form the base for all reporting and record keeping. The forest management system is Micro Forest (MF), which is integrated with the HR (VIP) and financial (X3) management systems.

Strict control of all system data is to ensure a centralized structure for data captured from field observations and a minimum of 2 levels of control in each process.

Annual Plan of Operations (APO) and Budgeting

Annual Plans of Operation (AOP) describing the jobs to be accomplished during the financial year and the estimated costs will be prepared. APOs, prepared by Plantation managers, represent a link between the work proposed in the 5 year Management Plan and financial resources determined through the annual budgeting process.

The forest management system allows for planning, budgeting & phasing based on activities, norms and resource cost. The planning and costing can be done down to compartment level but is summarized on plantation (cost center) or activity.

In the initial phase of the budgeting and APO process all planned work for the coming year is done on activity level using established budget norms and resources.

The preliminary APO will assist finance in budget process and should be done 2-4 months before the new financial year.

Reporting on APO progress and actuals Vs. budget is done on a monthly basis using MF standard that are summarized from plantation level up to country level depending on the end user.

Data Management and BAV Areas

Areas that are part of the Biological Asset Value (BAV) calculation are all managed in the forest management system and the total qualifying areas is issued at the end of calendar year and financial year. The data is used as official until the next release. Areas always refer to the latest release and are not issued on ad-hoc basis. BAV areas are signed off by planning manager.

Financial planning and budgeting

The long term business plan for the Company forms the basis for the annual budget and becomes a framework for each operating unit including for the individual operations and plantations. The annual budget process then becomes an iterative process top-down and bottom-up. The annual budget once approved is then translated into work plans in Microforest (MF). There is a provision to revise the budget by management in case major deviations occur.

Plantation Monitoring & Reporting

GR has put in place a system for monitoring and reporting the project activities. The system will assist the management team in evaluating operations and performance as well as suggest any needed adjustments. Information of the monitoring exercises and management activities will be stored in MicroForest² and includes compartment based inventory, maps, modeling, planning, scheduling, operations and logistics. This software will be the support tool for monitoring and evaluating operations.

An overall annual monitoring report, covering a 12-month period between July and June will be issued every year comprising all aspects of the management. A summary of the monitoring results is also prepared and made available upon request by interested stakeholders.

The monitoring of plantation establishment and development (maintenance, growth and performance) is conducted, by the planning department, using as the basis the guidelines for forest inventories which describe the methods, frequency and procedures for the plantations monitoring. The monitoring information on plantation development is stored in MF.

Different parameters will be covered in the plantation monitoring exercises namely: establishment (e.g. spacing, net planted area, ploughing and pitting regimes), maintenance (e.g. survival rates, weeding, pruning, thinning, fire and diseases) and growth, leakage (e.g. Grazing, fuelwood, conversion of cropland), biodiversity (e.g. species composition), environment (e.g. soils and water quality) and biodiversity features and social impacts. Plantation performance is mainly monitored through efficiency (nr of workers employed to complete a task: man-days per hectare), growth of trees (Tree height, DBH, silvicultural rating, intensity of the sampling, Merchantable (Standing) volume) and Costs, productivity, and efficiency of forest management. Sampling plots both permanent (PSP) and temporary (TSP) serve to obtain a sampling of forest growth. These are done all over the plantation to get a full picture of the growth of the trees.

At the end of each month a sample of the previous months reported work is verified by the inventory team to ensure the correctness of the data being captured in MF.

Environmental Monitoring and Evaluation

The monitoring of Environmental and biodiversity conditions as well as the assessment of plantation impacts is carried out as outlined in the ESMPs and the monitoring procedures and guidelines that were prepared taking into account the requirements of the certification standards that the company adheres to (e.g. FSC™, CCBA, CDM, ISO 9001 & 14001 & OHSAS 18001).

² Currently Microforest only stores part of the monitoring information therefore, some information is being filed and stored as hardcopies in the office and summary reports produced from them.

Local knowledge and participation in the monitoring work is important and must not be underestimated. The outcome or results of the various monitoring exercises will be analysed and reports prepared for use by the management to respond to changing environmental conditions raised in the monitoring reports.

The results from the monitoring will be used to determine the effectiveness of the management prescriptions under implementation and to identify the areas where improvement measures should be considered and adjust the company operations accordingly. Summaries of these monitoring reports will be made available for relevant stakeholders upon request.

Parameters to be monitored include are listed in table below:

Table 6: The different environment monitoring activities that may take place in plantation operations, the monitoring data to be captured and the department responsible for its implementation

Parameter	Issues to be monitored	Responsible
Wastes	<ul style="list-style-type: none"> Wastes management (types, quantities of wastes generated per class & their disposal incl. recycling & re-use) 	Plantation
LULC	<ul style="list-style-type: none"> Area under various uses incl. different forest types, roads, infrastructure, recreation, protection, etc. Areas felled and volumes harvested 	Environment
Biodiversity & conservation status	<ul style="list-style-type: none"> Changes in vegetation & Natural Forests (habitat quality, areas changed/converted to other uses) Wetlands HCVs: maintenance of natural patterns of distribution and abundance of species, disturbance to natural evolutionary and ecological processes, fragmentation of areas (maps of areas and corridors), and set aside core areas for strict protection RTE species: number of species recorded, records of nesting sites and feeding areas observed, Conservation areas: size of areas set aside (ha, %), Ecological functions and values: forest regeneration and succession, genetic, species and ecosystem diversity, Natural cycles that affect the productivity of the forest ecosystem, distribution and status of plant communities; Spread of invasive species, soil erosion, Water quality, Conservation status of native floral and faunal assemblages, species and their habitats; buffer zones, Records of wild animals (mammals) culled. 	ESG - Environment/ plantation
Water (supply and conservation status)	<ul style="list-style-type: none"> Quality (physical and chemical parameters) Quantity (flows) Effluents generated 	Environment
Soils	<ul style="list-style-type: none"> Types, condition, susceptibility to degradation from operations & nutrients Impacts from operations (erosion, compaction, fertility, oil and chemical spills) 	Planning
Climate	<ul style="list-style-type: none"> Temperature Rainfall Winds 	Planning

Parameter	Issues to be monitored	Responsible
GHG emissions & carbon footprint	<ul style="list-style-type: none"> Quantity of fossil fuels (Diesel and gasoline) and lubricants/oils consumed Synthetic & organic fertilizer consumption 	Admin/ Accounts
Emissions	<ul style="list-style-type: none"> Air Noise 	ESG
Pest and diseases	<ul style="list-style-type: none"> Nr of outbreaks Natural areas affected Control measures implemented (chemical types and quantity, areas applied to, trainings provided, equipment provided, biological controls applied, control measures impacts/efficacy, incidents/emergency situations that occurred) 	Planning/ Plantation
Leakage**	<ul style="list-style-type: none"> Displacement of livestock/Grazing activities (incl. grazing habits & control measures implemented) Displacement of agriculture activities (conversion of land to crop land & compensations paid) Collection of fuelwood (charcoal and firewood) and other Natural forest resources 	ESG/Community Officers
NTFPs usage records	<ul style="list-style-type: none"> Licenses or permits issued, Rates of harvesting, yields. 	Plantation/Environment
Spread of exotic plantation species	<ul style="list-style-type: none"> Unwanted natural regeneration of plantation species, Areas affected, Hectares cleared from invasive. 	ESG - Environment/Plantation

**Only in areas covered by carbon projects

Monitoring of items particularly related to the carbon projects such as the Leakage monitoring, is carried out based on recommendations from the Project design documents and applicable methodologies. Additionally, some of the data collected is used for the estimation of the GHG emissions and the company carbon footprint in line with the approved procedures.

Community Monitoring

The impacts of GR projects activities to the local communities will also be monitored and the recommendations from the EMP to avoid or mitigate negative impacts will be adhered to by the company. The results of the socio-economic assessments will be used to set up the baseline scenario that will be used to monitor changes that occur at the community level.

Organization structure and human resources

GR management will aim to employ skilled workers and workers from the local communities and train them as required to attain the necessary qualifications. The company will also include gender considerations to ensure that there is representation of both men and women in forest management.

GR management will run all aspects of the business and will be overseen by a board of directors. Major departments headquartered in Lichinga include, Plantation (nursery & plantation operations incl. silviculture, pest & disease and fire control), Industrial (poles treatment, harvesting, workshops and commercial/sales) Planning & Monitoring, ESG (Environmental & Social, Occupational Health), Finance & Accountant and Human Resources. A Corporate Affairs Office headed by a CA Officer is located in Maputo.

The plantation operations will be developed in five districts namely: Lichinga, Chimbonila Sanga, Lago, and Muembe. Lichinga will serve as headquarters where overall plantation management and planning will be conducted.

GR will hire local workers where possible but will use personnel and management from parent company Green Resources where necessary. Skilled personnel will transfer knowledge and skills to local workers through formal training, on-the-job learning, and apprenticeships. The company will prepare centrally training programme, for a five-year period.

Incentives

Competitive salaries above national minimum will be paid to workers. Other social benefits, health care and professional training will be provided. These benefits are highlighted in the Company Handbook. During the period covered in this plan, the project will build residential and office accommodation for its permanent employees, near the planting areas for smooth implementation of its operations. Electricity and water supply will also be provided. Some campsites (dormitories) will be established in the forest for the planters and those involved in fire protection. The budget for the buildings, solar electricity, and water supply is reflected in the capital expenditure and the overall budget.

Law Enforcement

Education and extension programmes and seminars will be conducted during the project that the communities around and plantation workers are aware of their limitations and rights with regard to the plantations in according to the Mozambican Law. The seminars will also be used as tools to educate people on different issues pertaining to plantation activities such as fire protection and environmental conservation and, where necessary, legal actions will be taken against violators.

Management Plan Updates

The management plan is valid for 5 years, starting from January 2018 to Jun 2022. The management plan is liable for revision and amendment depending on prevailing conditions. The General Manager is responsible for the management plan updates.