

Introduction

Green Resources AS (GRAS) owns and manages a group of forest companies in Mozambique, Tanzania and Uganda. The group operates under the same set of principles and objectives across all its companies. Green Resource AS (GRAS), the majority owner of GRL Tanzania Ltd, acquired Idete, Mapanda and Uchindile Forest Plantations since 1997. The management of this forest plantations is done by one management team following GRAS's principles and objectives.

This revision consolidates the management of all GRL Tanzania plantations for the harmonization of the responsible management. It covers the period 2018-2023 and is based on the "Management Plan for the Forest operations. 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.

Besides the management plan and the business plan which outline the long-term objectives of the company, the company uses the annual plans of operation (APOs) that outline actual implementation of forest operations on a yearly basis. APOs represent a link between the works proposed in the five-year Management Plan and the financial resources determined through the annual budgeting process. Annual reports document the implementation of forest management operations and monitor the progress towards achieving the targets identified in the forest management plan.

Within the management of its plantations, GRL recognizes the requirements of other forestry uses and users. As such, the planning exercise is participatory and employees provide significant input and review during the planning process. Additionally, activities at various stages of planning and operational processes encourage participation from other stakeholders. These opportunities allow organizations or individuals to supply information, identify concerns, comment on proposals and determine to what extent their comments were considered in decisions regarding identified areas of concern. Therefore, a public summary of this management plan should always be made available in English and Swahili safeguarding the confidentiality of some specific information.

This summary should be produced upon request from any interested party and its aim is to briefly inform stakeholders of our activities and plans, so their active involvement and participation can improve GR's planning process.

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Management objectives

GRL' objectives:

- *Maximize returns through the sale of wood products* - GR is planting eucalyptus and pine species to supply raw materials for the production of poles, wood chips, and sawn timber. These products will be sold to domestic and international markets, including southern and east Africa.
- *Be a leading supplier of carbon offsets* - 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.
- *Maintain a strong focus on the environment conservation and social development* - GRL seeks to conserve natural forests and will only plant on land that has been adequately approved for planting, including land that has been abandoned or degraded. GR is 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. Furthermore, GR aspires to contribute to the socio-economic development of local communities through direct investment, employment of local peoples, infrastructure improvement, and collaboration with and promotion of local small businesses.

All GRL operations in Tanzania have been approved by the GoT after a process submitted through the National Investment Centre. After the projects' approval, provisional land user rights were also granted to the companies by the Commissioner of Lands. However, before it 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 Tanzania. The recommendations made by the ESIA's and ESMPs are currently being followed.

Project Overview

Location: Southern Highlands of Tanzania.

Districts: Kilombero District, Morogoro and Mufindi District, Iringa

Landholding: 62,000ha

Total Plantable Area: 24,000ha

Target Products: Poles, Sawn timber, Peeler logs and Firewood

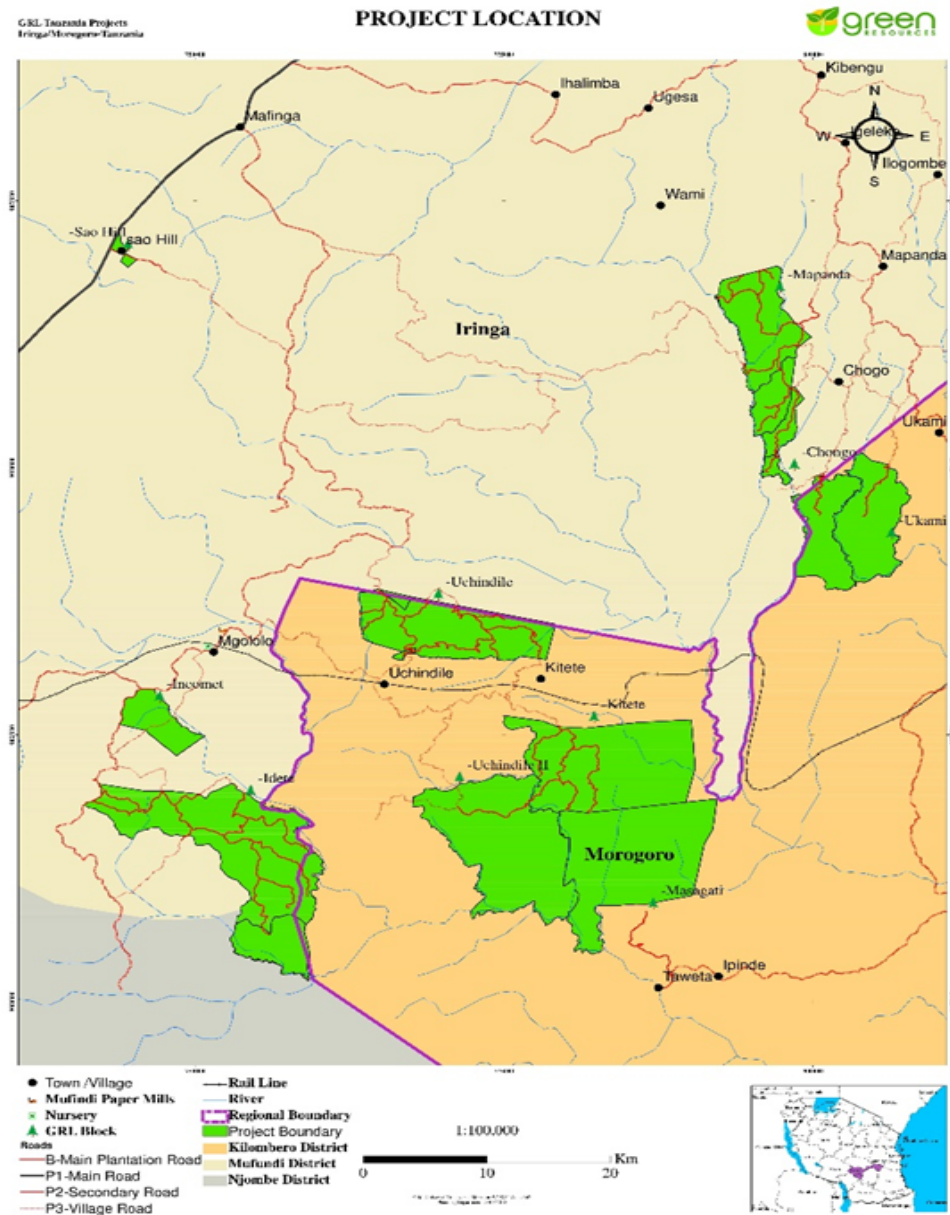


Figure 2: Project location within the Southern Highland & location of villages

Land Use Plan

With the project implementation, the degraded lands will be reforested. Conservation areas such as riverine areas, wetlands and natural forests, Areas of Special Interest (ASI) and other protected areas as defined in national legislations, by FSC or in other applicable standards will be conserved. Awareness of conservation and biodiversity protection will be raised with local communities, including capacity building on issues related to fire reduction and prevention. Additionally, GR will incentivise provide seedling to the communities to start their own forest woodlots, awareness training on conservation

benefits and other income generation activities to replace some of the current unsustainable exploitation activities. Hence, with the implementation of the project activities, it is expected that the land use will change to a mosaic of forest plantations that are intercalated with areas of natural vegetation (woodlands) and plantation areas. 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.

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 GRL plantations the following LULC were identified: grasslands (incl. disturbed wooded grasslands), shrub savanna, miombo woodlands (incl. closed forests, rocky outcrops, riparian woodland), wetlands, water bodies and Riparian Zones (along water courses). Except for Idete plantations which has more forested areas, the predominant land cover in other plantation areas is grasslands & shrublands.

Environmental Assessments

GRL has carried out Environmental and Social Impact Assessments (ESIAs) along with the development of Environmental Management Plans (EMPs) for all the plantation 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 ESIAs 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 operation.

Biodiversity and High Conservation Value zones

The project area is mostly dominated by 4 different ecosystems/vegetation strata namely: (i) woodland, (ii) shrub land/shrub savanna (iii) grassland and (iv) riparian vegetation on the valley bottom and wetlands. The ESIAs 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. The riparian vegetation is 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 Conservation Areas management.

Biodiversity assessments carried out at the plantation operations identified the existing flora & fauna species as well as their conservation status. Nine Rare, Threatened, and Endangered plants (RTE's) were recorded in the three Forest Management Units in the recent survey. No RTE's mammals and birds were observed during the surveys but in the previous survey about 4 bird species were identified as RTE's species. Further fauna and flora biodiversity studies are planned to cover other plantations areas. According to the assessment reports and consultation with expertise it shows that no any significant results that HCV are present in GRL plantations although some few areas of Special Interests (ASIs) such as graves and traditional or religious areas which are of significance to the local communities identified and mapped in the plantations.

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.

Socio-economic description

GRL areas of interest cover 7 villages (Chogo, Mapanda, Ukami, Makungu, Idete, Uchindile and Mapanda) in Kiombero and Mufindi districts. The economy of the villages covered by GRL plantations is characterised by activities of the primary sector, namely agriculture, timber business, livestock and small business practiced by the family sector. 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 areas. Detailed socio-economic assessments were carried out for the plantation areas and results of this studies had provided baseline information about the socio-economic status of the areas as well as support for the community development programme. In terms of infrastructures, the 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. The company will operate in 3 main commercial working circles (WC); one for Pine and two for Eucalyptus.

The expected mean annual increment (MAI) for Pine is 12-18 and 16-24 for Eucalyptus 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 eucalyptus in the second rotation.

Current rotation ages for pine saw logs is 10 – 18 years while that for eucalyptus poles and fire 6 – 12 years. 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 Regime Options

4 pine regimes are currently considered to facilitate the management hence achieve the targeted product for the Saw log Wood Circle. 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 namely: Standard, No Thin, No Thin + and 1 Thin. Going forward the No Thin+, No Thin and 1 Thin regime will be converted to the Standard in the 2nd rotation.

Eucalyptus Regime Options

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

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, *hybrid of carebea & eliotae* and *pinus tecunomani* has so far proven to be the superior species. For the *Euc grandis*, *urograndis* and GU 7&8 are the better ones in terms of growth.

Nursery Operations

GRL has its own nursery with a total capacity of 6,000,000 plants of which 4,000,000 are seedlings & 2,000,000 clones. It's catching water from a nearby river and is connected to the national electricity grid and with a backup generator. The current water point needs improvement to ensure that the water pumped to the nursery is free from sand and other small particles that can cause damage to pumps and clog sprinklers. Backup pump & generator in good working condition needs to be availed during the season when the plants require water on a daily basis. The current system is mechanized utilizing paper pots as cavities for the growing medium which also offers the possibly 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 diseases.

Plantations establishment

To achieve the best possibly 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. As such, 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. An area prepared for planting offers a

60cm effective rooting depth and is free from competition of weeds and other hardy bushes/scrubs and maintained in such way until canopy closure.

Pests and diseases protection

Currently there is very little manifestation of pest and disease in Southern Highlands as well as in the GRL plantations. Both gall wasp (*Leptocybe invasa*) and termites are present but does not have any significant impact of the crop at the moment. To be proactive against termites the euc trays should be dipped in anti-terminate chemical before being sent to field soaking the growing medium. During the first 6 months new euc plantings they need to be closely monitored and if any sign of termite attacks the plants are treated again with chemicals by pouring solution on and around the root plug. Recent *fusarium* has been observed in some pinus patula and could potentially become a big problem both in the commercial plantings. Company is making follow up to ensure that this disease is controlled by involving expertise eg. Tanzania Forest Research Institute (TAFORI)

Plantation harvesting techniques and equipment

Harvesting will be done either as thinning/ stands or as clear-fell. The practise of selective harvesting for poles in Euc stands was common in the past creating stands with overgrown trees of poor form with very little value. This practice is banned in stands not subjected to this practise previously. There will be a combination of standing sales where the harvesting will be responsibly of the buyer and sales at roadside. GRL will not engage in long hauling. Trees are either sold standing or at roadside.

I order to address the steep terrains a cable yarding system should be considered as the clear-fell volumes of pines from own plantations is increasing. Before any harvesting activities takes place planning of extraction routes, areas and temporary depots must be completed. All volumes harvested and extracted are recorded using tally sheets.

The aim should be not having clear felled compts 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 although 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.

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 wood flow projection is simulated using the forest management system (Micro Forest). The system simulates clear fell and thinning volumes from enumeration data, standard regimes and default site index (SI) where enumeration data is not yet available

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

The following areas should be set aside by GRL 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 and birds (miombo woodland).
- ii) **Riverine forests:** characterized by high species diversity
- iii) **Wetlands** which form an important ecological component that regulate the water systems and are also important for the fauna diversity.
- iv) **Grassland:** The dominant vegetation types that 10% should be set aside as the representative that form ecological importance to species

For protection of RTE's the training of local/casual labor will be emphasized and the maintenance of sufficient habitat for populations of RTE's. Areas with high concentration or abundance of rare or endangered species should be set aside and conserved. More ecological assessments will be conducted and if there will be any identified HCV in the area the management prescription will be developed for conservation and protection.

Management of Community and Social Relations

GRL is aware that the success of its plantations is largely dependent on the relation with stakeholders particularly the local communities living in and around its plantation areas as such, these relations will continue to be reinforced the communication plan and grievance management plan by conduct and facilitating of community meetings to discuss and promote awareness on the project implementation and other potential positive and negative effects to ensure that community are happy with the existence of the plantation. Through these plans projects identification and prioritization will be discuss for implementation

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, GRL 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 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.

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 GRL project activities. Therefore, anyone inside or outside GRL, 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.

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 (APO's) 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. 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.

The budgeting process starts with the Plantation Managers (PMs) by filling in an operating budget relative to the planting targets the company has set for the previous year and the coming years. The managers also set the level of productivity for the different work activities taking place in the plantation, and decide which activities are needed in the coming year based on the objectives set in the 5 years Project Management Plan (this management plan). The managers further decide on general assumptions,

such as when the rainy season will occur, when the activities will take place, employee information, community support and what investments are needed.

Plantation Monitoring & Reporting

GRL 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 MicroForest¹ 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. 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. These results will also help to determine the effectiveness of the management prescriptions under

¹ 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.

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, among others: wastes, changes to Land use, biodiversity & conservation status, water quality & quantity, soils, climate, pests and diseases and the spread of exotic plantation species

Community Monitoring

The impacts of GRL projects activities to the local communities will 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

Sao hill offices will serve as headquarters where overall plantation management and planning will be conducted. GRL management will run all aspects of the business and will be overseen by a board of directors. Major departments include Plantations, Planning & Monitoring, ESG, Accounting, Human Resources and Workshop.

GRL will employ workers with the necessary qualifications and experiences for smooth and efficient management of operations. The company will hire local workers where possible but will use personnel and management from parent company 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. The company will also include gender considerations to ensure that there is representation of both men and women in forest management. Competitive salaries will be paid to workers, including other social benefits and professional training.

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 Tanzanian 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 2023. The management plan is liable for revision and amendment depending on prevailing conditions. The General Manager is responsible for the management plan updates.