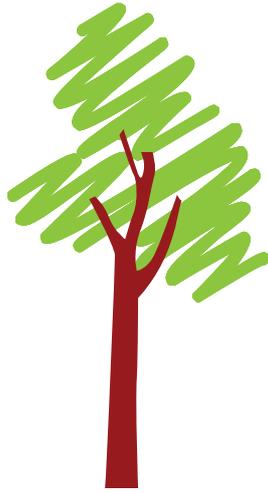


Kilombero Valley Teak Company



Public Summary of the Management Plan

June 2017

1 PUBLIC SUMMARY OF THE MANAGEMENT PLAN

The Forest Management Plan is updated at least every 24 months in order to be an accurate reflection of the company's forest operations.

The General Manager in cooperation with the Chief Forest Manager is responsible to ensure that the Forest Management Plan is up to date at all time.

1.1. Introduction

In 1992 the Commonwealth Development Corporation (CDC) established the Kilombero Valley Teak Company (KVTC), Based on a 99 year lease with the Government of Tanzania. The mandate of the company is to use the development of plantation forestry and timber processing as a means by which to promote sustainable economic, social and environmental development in the Kilombero Valley.

KVTC obtained leasehold rights (1992) to practice forestry on 28,132 ha of land in the Ulanga and Kilombero Districts of Tanzania.. A site for a processing plant was allocated to KVTC in 2008 and construction completed in 2009.

In 2001 the Finnish Fund for Industrial Cooperation Ltd. (Finnfund) purchased a 23% shareholding in KVTC. In 2011 the Africa Sustainable Forestry Fund (managed by Criterion Africa Partners) acquired the 77% shareholding from CDC. Finnfund maintained its 23% shareholding.

KVTC's prime objective is to produce high quality teak timber products from plantations which the Company has established, maintained and harvested on a commercial sustainable basis by the application of current international forestry, environmental, health & safety as well as social standards of practice.

KVTC has committed to comply with the Principles and Criteria of the Forest Stewardship Council (FSC) as well as the International Finance Corporation's performance standards. KVTC has been certified according to ISO14001 and OSHAS18001 as well as FSC Controlled Wood and Chain of Custody standards. Policies and procedures have been implemented by the company to assist management in the implementation and maintenance of the various management systems and principles.

1.2 Forest Resource and characteristics of the area under management and adjacent areas

The Kilombero Valley is bounded by the steep Udzungwa block faulted mountains to the north and the Mahenge range in the south. A steep escarpment rising to 1000m forms a natural northern boundary to the KVTC land area. To the south of the escarpment, the topography is generally of low undulating hills

and ridges formed from schist and gneiss. Between the hills and ridges are low lying flat depressions which follow the drainage lines. Some of the low hills are steep-sided with exposures of bare rock. The undulating hills in the north give way abruptly to the flat Kilombero floodplain which is 10-20km wide. The lower river terraces are covered by a complex of swamps, seasonal waterways and oxbow lakes. South of the floodplains, there are a series of low ridges of wide flat depressions which grade into hills and ridges of the Mahenge Range.

The following vegetation types are found in and around the KVTC land holdings:

- J **The Udzungwa Mountains:** Covered by closed evergreen forest occurring in large blocks which are separated by either woodlands (miombo at lower levels, Protea species at altitude) or by a variety of herb-rich grasslands. Only the miombo woodland (defined below) are found within the Project leased area.
- J **The foothills:** These are dominated by miombo woodland (characterised by species of Brachystegia and Julbernardia), but including patches of closed forest. The broad valleys with impeded drainage will have wet “swamp” grassland. The steeper valleys may have a riverine forest.
- J **The floodplain:** There is a slow gradient of vegetation change from the hill miombo to the swamps, oxbow lagoons and meanders flanking the main channels of the Kilombero River. The woodland miombo loses elements associated with free draining red soils and gains elements such as palm. At lower levels, woody vegetation is associated with termite mounds with a “sea” of tall coarse grasses. Occasional shorter grass areas offer grazing to puku.

The Kilombero Valley, adjacent hills and mountains are rich in wildlife resources and large mammals are abundant. These resources contribute to the national economy through the two game controlled areas demarcated on either side of the Kilombero River and have local importance to the village economies. This land use classification was a mechanism to regulate hunting, but as it does not limit settlement, cultivation or access, it has only marginal conservation value. The floodplain is the most important entity in terms of conservation interest and potential for sustainable utilisation. The woodland fauna has been reduced by growing cultivation pressures, and the mountain fauna is now more restricted in movement due to the railway and cultivation.

The Kilombero Valley's remoteness and proximity to the Selous ecosystem has allowed it to maintain high populations of lion *Panthera leo*, zebra *Equus quagga*, hippopotamus *Hippopotamus amphibius* and Nile crocodile *Crocodilus niloticus* (UDDNR, 1997). The area has also maintained a diverse antelope community, including sable antelope *Hippotragus niger*, waterbuck *Kobus ellipsiprymnus*, buffalo *Syncerus caffer*, bushbuck *Tragelaphus scriptus*, eland *Taurotragus oryx*, Lichtenstein's hartebeest *Alcephalus*

buselaphus lichensteinii, southern reedbuck *Redunca arundinium*, bush duiker *Sylvicapra grimmia* and Harvey's red duiker *Cephalophus harveyii* (East 1998). Furthermore, the valley is estimated to hold over 50,000 puku antelope *Kobus vardoni*, which is a large portion of the remaining world population (East 1998). The future survival of puku in Tanzania and the rest of Africa is therefore closely linked to the status of the Kilombero Valley population.

1.3. Growth Stock and Plantation Establishment

KVTC is mostly involved in the planting of *Tectona Grandis*. All seed used by KVTC is either purchased from the Tanzania Tree Seed Agency (TTSA) or collected from selected KVTC compartments. Stumps are grown for 7 – 9 months in the KVTC nursery before establishment. In 2004 KVTC imported ten clones from Malaysia. These clones were initially planted as trials and the best performing ones are now being produced on production scale.

Stumps or seedlings are manually planted once pitting has been completed. Typically a spacing of 3m x 3m is applied for clonal plantings this is likely to be increased to 3.5m x 3.5m. Planting starts shortly after the first rains in December and continues, depending on the rainy season, until April.

KVTC has implemented a long term tree improvement strategy that combines selection of best performing local material and the importation of clones from a range of native teak growing areas.

KVTC has selected some older, superior compartments where poorer trees have been thinned. Seed are collected from these compartments in addition to provenance trials established with genetic material from Asia. The best trees from these stands and trials are selected and clones produced. Cloned material has been planted in trials and will be monitored over time to identify the specific ones that sought after characteristics.

To date a total area of 8,156ha has been established with teak since the establishment of the company. No new areas are being planted.

1.4. Silviculture Management

Branches are removed to prevent the formation of knots. The pruning regime is based on height growth, where, depending on the stability of the tree, all branches up to the big branches that formed in the previous dry season are removed. Pruning is repeated annually until a height of 7.5 meters.

Teak is a long living pioneer species sensitive and susceptible to weed suppression. As part of the KVTC weed control strategy, a combination of three activities are performed to control weeds: slashing, circle and chemical weeding.

Thinning is performed to aid in the achievement of desired tree growth and size requirements. The actual felling operation is preceded by mark for thinning, which is the selection and marking of poorer trees, i.e. deformed, diseased and suppressed. The distribution of trees in the compartment is also taken into consideration to allow for an even espacement, based on the regime, after thinning.

1.5. Forest Management and Inventory

The production forest consists of the established teak compartments and the natural woodland where several species could be selectively harvested. The areas are broken up into plantations, each of which is regarded as a management unit. KVTC has four such management units, Nakafulu, Mafinji, Narabungo and Ichima. Each management unit is divided into compartments of various sizes according to age and geographical position for teak and species composition and topography for natural woodland.

The non production areas are divided into various sections for management purposes and are defined by parameters such as geographical position, conservation value and species composition.

A systematic sampling method is used for assessing the standing timber resource at a sample rate of 8 % of the total compartment area. The inventory is carried out at age 5 and thereafter at least one year before the next thinning.

The plantation inventory data is captured to and analysed within the Microforest management system based on pre programmed models and parameters. An inventory report is produced for each compartment following automated analysis. The data is then used in harvesting scheduling to estimate the growth and yield which guides the normalisation of age class process.

A program has been developed to undertake a complete survey of all forestry areas within KVTC landholding. A grid of 250 meters by 250 meters (6.25 hectare) is used to produce sample units. Each unit is numbered and trees are identified. On the basis of this identification a further detailed classification of KVTC's forest land will be applied.

The field data from the natural woodland surveys are captured electronically at the office and yield and location maps produced. The resultant information is used together with growth models to predict the sustainable harvest for each species per natural woodland unit.

1.6. Annual Harvest and Rotation Age

The annual allowable cut is determined through the Microforest system by the harvest scheduler. The annual allowable cut is the utilisable volume that can be harvested each year without compromising the

long term sustainable timber supply. This is expressed as cubic metre (m³) per year and takes into consideration the current stands with their unique parameters and management regimes as well as potential future stands. The optimum sustained volume is an indication of business sustainability and maximum volume production.

Not more than 50% of a plantation block and not more than 10% of the total plantation area will be clear-felled within one calendar year. This is done to maintain the mosaic pattern as well as geographic age class distribution of the plantation.

1.7. Harvesting Equipment and Techniques

Machinery requirements form part of the tactical harvest plan which is determined by the medium term harvest plan. Current equipment in use at KVTC are:

- Felling is done by chainsaw (mainly Husqvarna 272XP due to availability for service/parts)
- Skidding / Extraction is done manual, through power-tiller, tractor and trailer combination or with two John Deere Skidder (Model 648H & 548G)
- Loading is done by 3 wheel Bell 225A/125A Loggers
- Hauling is done by 15t trucks operated by contractors

Procedures for harvesting and transport are covered in the "TEAK Harvest and Transport Manual"

1.8. Markets and Utilization

In 2007 the process towards developing a wood processing Industry based on thinning and early volumes from KVTC plantation was started. This process resulted in the decision to construct a fully integrated timber processing plant that could produce a variety of products ranging from rough squares, sawn timber, kiln dried timber as well as value added products such as finger jointed and edge glued products as well as solid products such as flooring and decking. The factory was constructed during 2008 and 2009 and was commissioned in August/September 2009

KVTC chose to maximize the value of its plantations by processing the teak trees in-situ and adding maximum value to the product by producing a mix of rough squares, air dried and kiln dried timber, solid as well as engineered (glued) teak products. All processing activities are performed in the Ulanga District.

1.9. Forest Protection and Environmental Management

KVTC is committed to protect the environment it operates in and will comply with the various standards and management systems it subscribes to. In order to achieve this objective a number of procedures and management practices have been developed

Buffer zones are created for the movement of animals, birds and amphibians to allow movement between larger, protected habitat refuge areas. Any areas that have been converted from natural woodland to teak have undergone a comprehensive pre-felling assessment taking into account biodiversity, wildlife movement, water courses and soil suitability. Local and international specialist have been consulted prior to any conversion took place.

Wildlife is an integral part of the overall biodiversity of the Kilombero Valley. The company maintains a no hunting policy. Anti poaching patrols and game guards are deployed to control poaching. Participating villages assist KVTC in this regard through village patrols which consist of two village members (paid by KVTC) doing daily patrols.

The use of chemicals is controlled and a process of authorisation has to be followed which is contained within the ISO 14001 system. Only chemicals on the company's chemical approved list may be used. All chemicals have to be legally registered within Tanzania and conform to the chemical policy guidelines of the Forest Stewardship Council (FSC).

Biodiversity issues are described in the ISO 14001 system. All operations are rated (in the aspect register) and procedures developed to quantify, manage and measure the company's effects on biodiversity. Annual Environmental Management Programmes (EMP's) are implemented for aspects with the biggest impacts.

KVTC has conducted numerous research studies within all fields related to the management of teak and miombo woodland. Continuous monitoring, following on baseline studies allows the tracking of changes over time. This allows for improved management prescriptions to be implemented and transparent reporting to stakeholders.

1.10. Social Relations and Extension Programs

Currently, the company has a very efficient way of distributing social fund money to villages. Apart from the annual social fund, villages provide services such as security patrols and boundary clearing, which earns additional revenue to be spent for projects in the villages.

KVTC and each neighbouring village also make an annual village contract. In this contract, a bonus scheme rewards villages that prevent uncontrolled wild fires, poaching and illegal logging of both teak and indigenous species.

KVTC has an HIV/AIDS programme involving company employees, contractor employees and associated villages.

1.11. Research and Survey Programs

In order to collect sufficient time series data on the growth of teak for use in the development and calibration of growth and yield models, KVTC has established a comprehensive system of PSP's. PSP are established to cover the range of growing sites and ages present at KVTC. An 11.28 metre circle plot (0.004 of a hectare) is established in the selected area in a compartment; the site should be as homogenous as possible.

Monitoring of the effects of logging and other forest activities are described through the ISO 14001 procedures. All aspects and impacts are regularly evaluated by relevant staff members. These are mitigated through a series of procedures and programmes.

KVTC and an EC (European Commission) funded research project on Indicators and Tools for Restoration and Sustainable Management of Forests in East Africa - I- TOO - entered into a public-private research partnership. The aim of the research is to create day to day management systems for Miombo forests, and to integrate those into the management plans of KVTC.

1.12. Monitoring and measuring

KVTC has adopted a comprehensive monitoring programs focuses on rainfall patterns, stream flow and quality, wildlife movements as well as flora monitoring. The company has identifies Areas of Special Interest that have been assigned with individual management and monitoring programs.

KVTC implements a Chain of Custody (COC) System that allows the company to document the path taken by round log timber and processed material including all the successive stages of processing and distribution. In order to provide recognition for KVTC products and give assurance to clients and stakeholders of the quality and comprehensiveness of the systems put in place by KVTC, the KVTC COC System is certified and compliance verified by third party auditors.

Annual budgets are drafted and performance is being measured against these as well as set standards, work studies, time studies, physical measurements as well as accounting data. The Forest Planning Manager ensures that compartment data are filled and updated to reflect an accurate position versus the company's Annual Plan of Operations

Appendix A – Maps

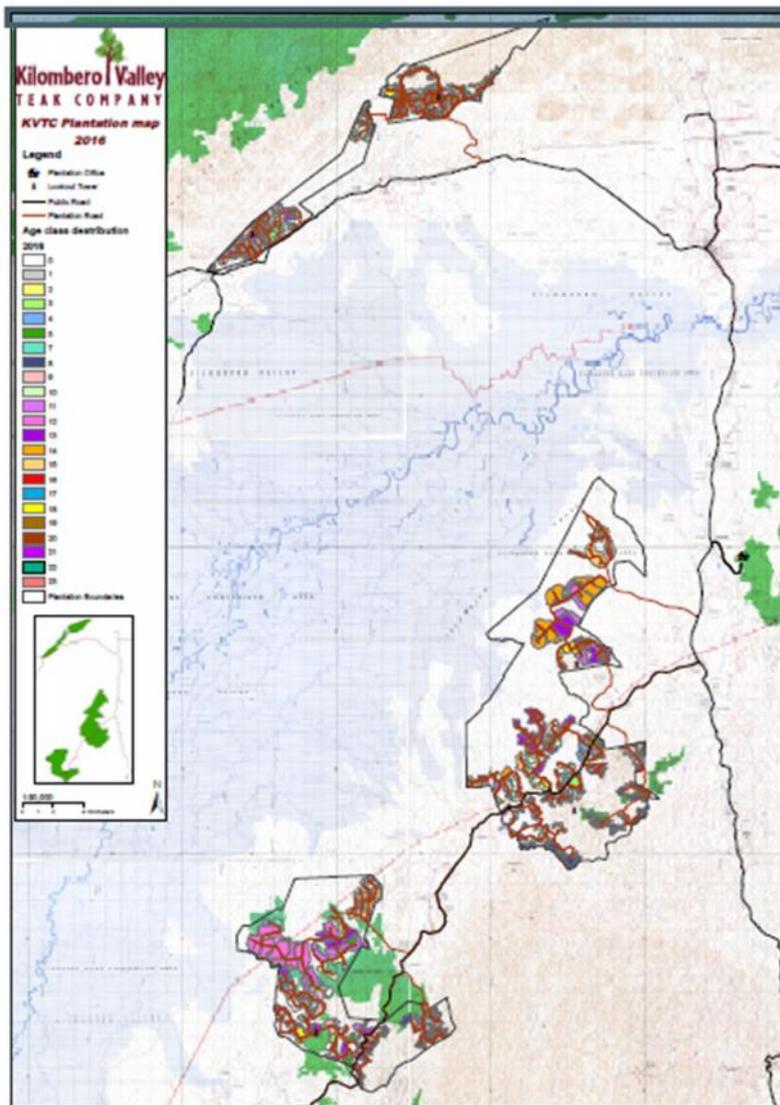


Figure 1: KVTC Landholding

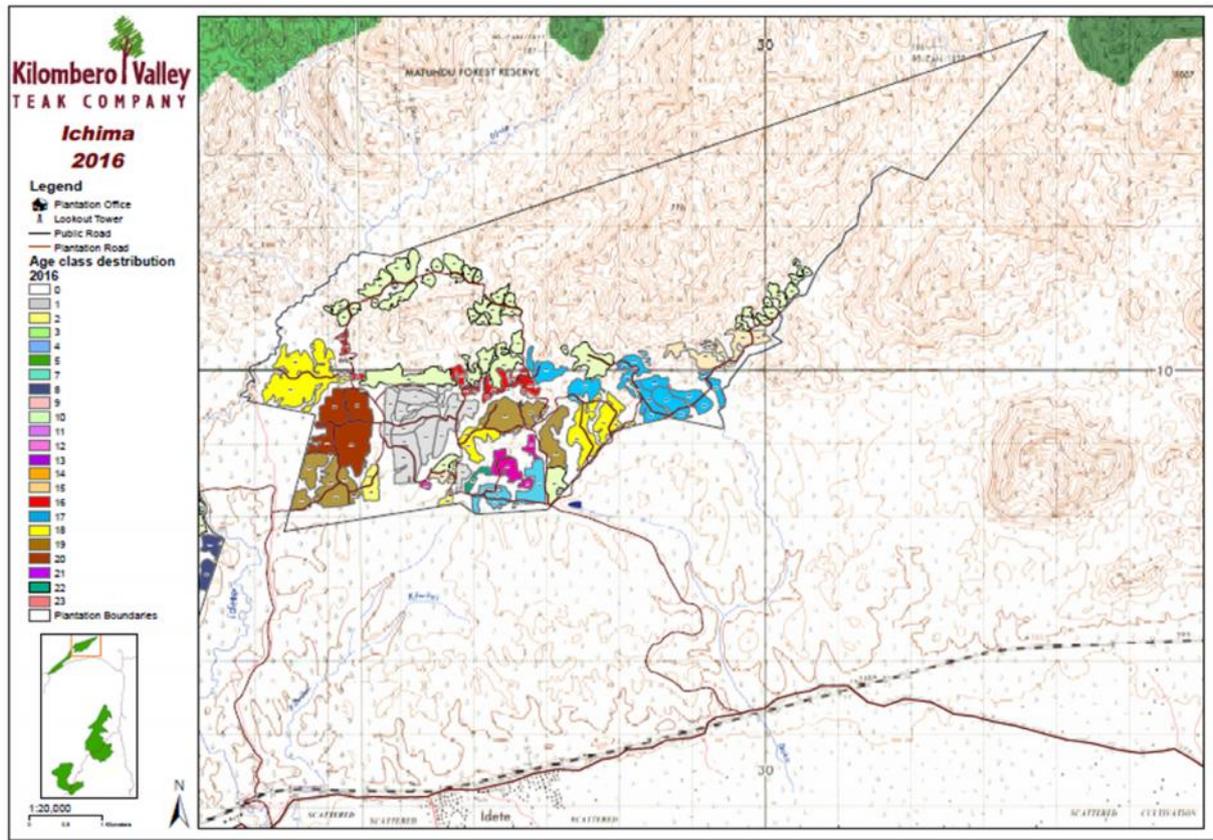


Figure 2: Ichima Plantation (Block A)

Block A

Block A or locally known as Ichima

Title Number: 47490

Land office Number: 157171

Land: Farm No 294 at Idete – Kilombero District

Term: Ninety Nine Years from 1st of January 1994

Size in Hectares: 2636.3 ha

Registered survey plan no: 30103

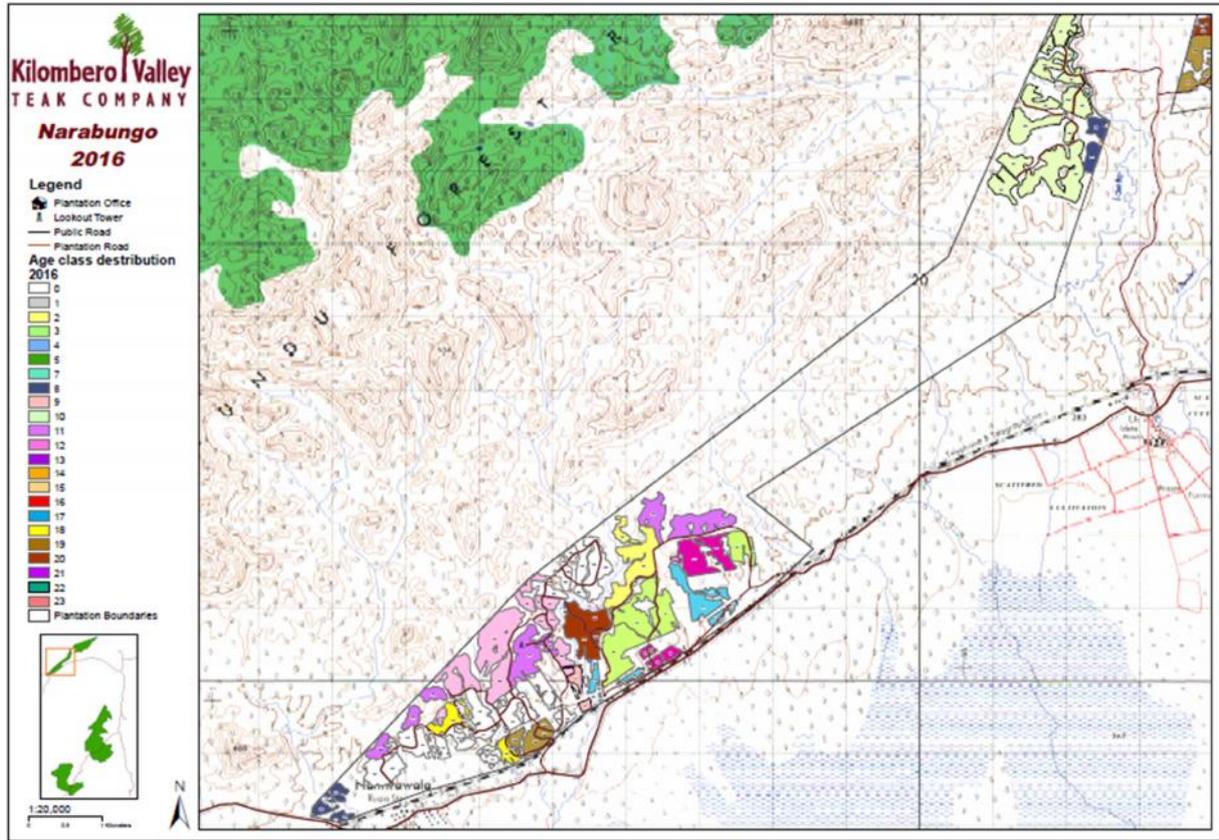


Figure 3: Narabungo Plantation (Block B)

Block B

Block B or locally known as Narabungu

Title Number: 47489

Land office Number: 157170

Land: Farm No 293 at Namawala – Kilombero District

Term: Ninety Nine Years from 1st of January 1994

Size in Hectares: 2111.7 ha

Registered survey plan no: 30103

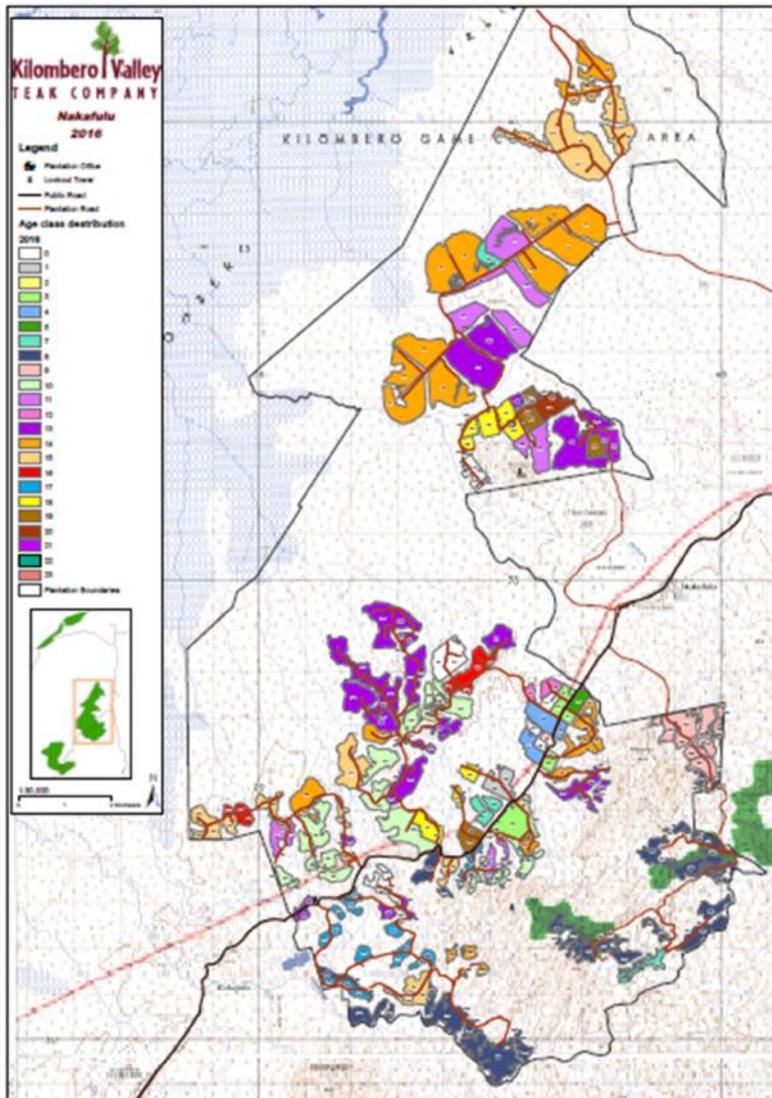


Figure 4: Nakafulu Plantation (Block C)

Block C

Block C or locally known as Nakafulu

Title Number: 47487

Land office Number: 157168

Land: Farm No 283 at Nakafulu – Ulanga District

Term: Ninety Nine Years from 1st of January 1994

Size in Hectares: 15171.1 ha

Registered survey plan no: 30015

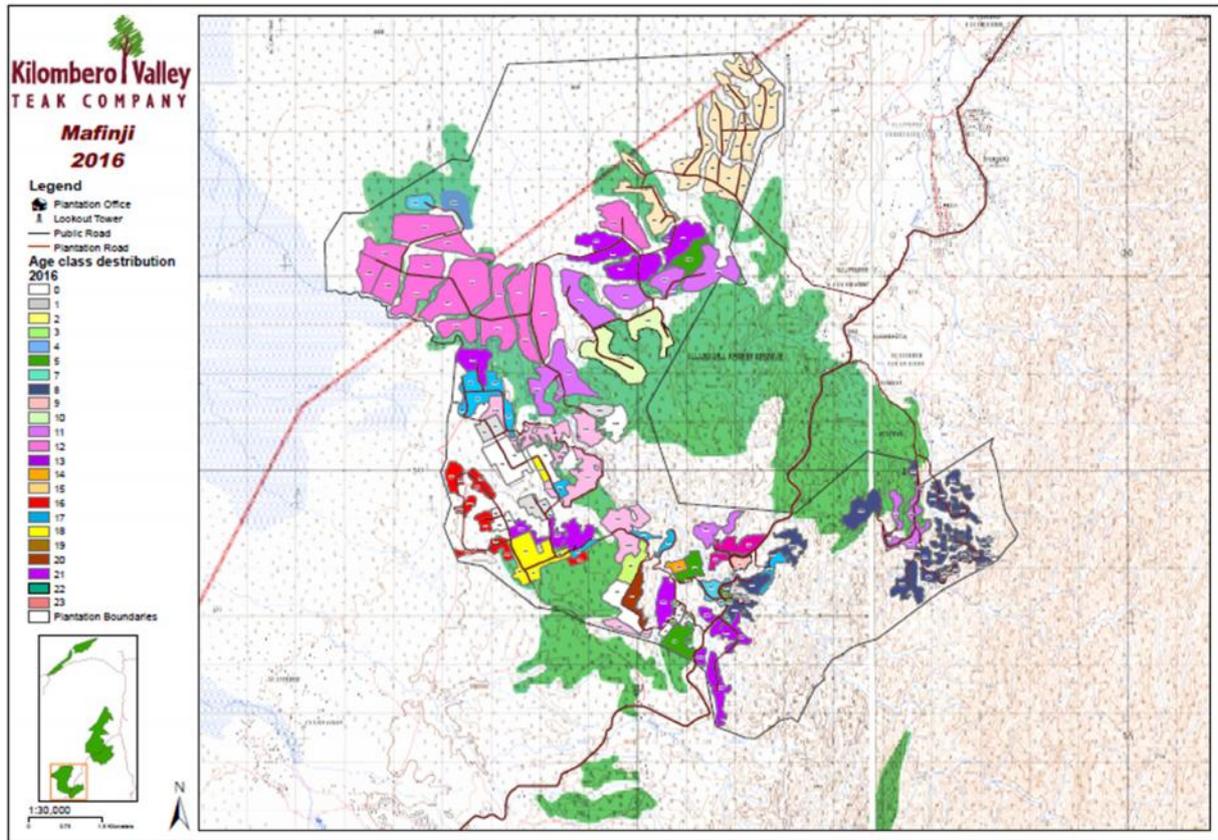


Figure 5: Mafinji Plantation (Block D)

Block D

Block D or locally known as Mafinji

Title Number: 47488

Land office Number: 157169

Land: Farm No 282 at Iragua – Kilombero District

Term Ninety Nine Years from 1st of January 1994

Size in Hectares: 8212.4 ha

Registered survey plan no: 30014