



Vegetation survey in Mulele Hills Forest Reserve 2021 Katavi-Ugalla Corridor

Final report



Front page: *Brachystegia microphylla* stand, outlook towards western lowland, near Iloba waterfall, 6/7/2021

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Abbreviations

ADAP	Association for the Development of Protected Areas
ba	Basal area
BKZ	Beekeeping Zone
DBH	Diameter at Breast Height
DFO	District Forest Officer
FR	Forest Reserve
GIS	Geographic Information System
JFM	Joint Forest Management
PCQM	Point-Centered Quarter Method
TANRIC	Tanzania Resource Information Center
TFS	Tanzania Forest Services Agency
VGS	Village Game Scout

Abstract

The vegetation survey was carried out in July and November 2021 in Mulele Hills Forest Reserve of Mlele District in Western Tanzania. The objective of the survey was to assess the current state of the vegetation and its current threats to establish a baseline for the management and monitoring of the area.

A transect method based on the Point-Centered Quarter Method (PCQM), a plotless method, was applied for the assessment of a) tree/shrub species richness and density at stand level and b) diameter class distribution, absolute frequency, basal area and dominance at species level. In addition, the human disturbances were recorded along the transects.

In total three transects with an overall length of 22.777 km were outlined in Mulele Hills Forest Reserve including western lowland, plateau, and eastern lowland (Mulele Beekeeping Zone was surveyed in 2018, see Bloesch 2019). In total 86 sampling points were analysed including 291 trees of the larger diameter class (≥ 20 cm) and 334 trees/shrubs of the lower diameter class (< 20 cm) considering quarters with no trees.

Julbernardia globiflora a characteristic, widespread and often dominating species of many miombo woodlands, is also very abundant on the plateau and the eastern lowlands of Mulele Hills FR. On the other hand, *Julbernardia globiflora* is quasi absent in the open and extensively flooded western lowlands. *Brachystegia spiciformis*, another typical miombo species, is also in Mulele Hills FR a common tree of the upper layer. Another abundant species in both layers is *Erythrophleum africanum*.

The understoreys are widely dominated by *Diplorhynchus condylocarpon* followed by *Pseudolachnostylis maprouneifolia*. The low abundance of saplings in general is probably typical for miombo trees where natural regeneration is poor and sparsely because of poor seedling survival during establishment mainly due to recurrent fires and browsing.

Pterocarpus angolensis produces one of the best timbers in East Africa and due to overexploitation mature stems become very rare and is considered as near threatened according to the IUCN Red List. Fortunately, *Pterocarpus angolensis* is amongst the most abundant tree species of the lower diameter class in Mulele Hills FR. It would be interesting to analyse the diameter class distribution for other timber species which are now increasingly used as timber but our data are too sparse.

The alpha-diversity for trees and shrubs assessed for Mulele Hills FR is with 46 and 70 species in the larger and lower size diameter class, respectively, considerably higher than in Kululu Village Land FR (27/47) and Rungwa River FR (29/40). This high biodiversity for Mulele Hills FR is probably due to the diverse landscapes assessed by the three transects.

The vegetation surveys from Mlele Beekeeping Zone, Kululu Village Land FR and Rungwa River FR and this survey from Mulele Hills FR resulted in a quite comprehensive plant list including a total of 175 trees/shrubs identified with their scientific and vernacular names. This plant list will be very useful for any future forest management in the area, the elaboration of a vegetation map, and for the assessment of the importance of the non-timber forest products for the livelihoods of the adjacent local communities.

Tree density in both diameter classes is significantly lower in the extensively flooded western lowlands. Consequently the total standing volume is with 69.9 m³ and 64.4 m³ on the plateau and eastern lowland, respectively, about twice as high as in the western lowlands. The

dense woodlands on the plateau and eastern lowland of Mulele Hills FR have the highest standing volume of all surveyed protected areas.

Timber logging is the prevailing human ecosystem disturbance. Debarking of *Julbernardia globiflora* for producing beehives is still very common in the eastern woodlands close to Inyonga.

Detailed vegetation maps showing the different vegetation types and land use in the project areas would be a very useful for management and monitoring purposes. Such maps would also allow the spatial stratification of the project area with well-defined units which could supports other studies in future.

New team members were trained on-the-spot and have now a good understanding of the different steps of the methodology. For future vegetation transect surveys it is suggested to associate Village Game Scouts (VGS) who are not yet trained and members from the Village Natural Resoure Committee to explain them the importance of baseline data and regular monitoring of the state of the forest for management purposes. The human disturbances should be recorded every two years by the VGSs along the same transects to monitor the threats for the miombo ecosystems.

The comprehensive vegetation data (especially standing volume) of the miombo woodlands of Kululu Village Land FR, Rungwa River FR and Mulele Hills FR are a solid base for developing and implementing a carbon project.

1) Introduction

The Association for the Development of Protected Areas (ADAP) is implementing the projects entitled *Community forest management of the Rungwa respectively Katavi-Ugalla corridor* in Tabora and Katavi regions in western Tanzania. The projects aim to support and accompany villages bordering Rungwa River and Mulele Hills Forest Reserves (FRs) in establishing a Joint Forest Management (JFM) for the protected areas with the Tanzania Forest Service Agency (TFS). More recently, ADAP started a third project entitled *Sustainable Management of the Ipole Wildlife Management Area* in Sikonge District, Tabora region.

The projects aim to ensure the conservation of the ecological corridors (Ushoroba) by closely involving the local communities in the forest management through forest protection and patrol. In return for these efforts, the participating villages receive a range of concrete benefits, such as rights to harvest forest products, share revenue from forest harvesting, retain fines as well as confiscated materials/produce, and use of local water sources (Forestry and Beekeeping Division 2007, 2013).

Sustainable community-based forest management will improve the livelihoods of the locals through the development of income generating activities such as beekeeping and promoting and selling of wild edible mushrooms thereby inciting the local population for the conservation of the miombo ecosystems.

Knowing the current state and threats of a forest ecosystem (baseline) is a prerequisite for any sustainable management. So far, Adansonia-Consulting carried out two vegetation studies for ADAP using the transect method including the Point-Centered Quarter Method (PCQM) and the assessment of human disturbances along the transects. The first survey was carried out in in Mlele Beekeeping Zone (BKZ) covering 850 km² within Mulele Hills FR of the Katavi-Ugalla Corridor (Bloesch 2019), while the second was conducted in Rungwa River Forest Reserve (FR) and Kululu Village Land FR of the Rungwa Corridor (Bloesch 2020, 2022).

For this third survey, Adansonia-Consulting was mandated with the following tasks:

Assess the current state (baseline) of the vegetation of the Mulele Hills FR (outside the BKZ) and its current threats:

- Assess the following forest parameters along transects using the PCQM method (Mueller-Dombois, & Ellenberg 1974, Mitchell 2007):
 - Tree/shrub species richness at stand level;
 - Tree/shrub density at stand level;
 - For each tree species its diameter class diameter distribution;
 - Absolute frequency of each tree species;
 - Basal area and dominance of each tree species.
- Record all human ecosystem disturbances along the transects.

The consultancy was conducted from 27 June to 14 July 2021 in Tanzania (see mission programme Annexe A). The field team was composed of:

Dr. Urs Bloesch, team leader;
Matana Levi, ADAP livelihood and natural resources officer from Rungwa Corridor project;
Fredy Masanja, District Forest Officer (DFO) Sikonge district;
Paulo Rugola Benedicto, TFS forest officer Mlele District;
Emmanuel Safari, TFS forest officer Mlele District;
Bernard Lyamba, VGS from Mgombe;

Feleciano Futakamba, VGS from Kaulolo;
Yahya Ally, ADAP project driver;
Alex Bloesch, student apprentice.

Later on, the three transects in Mulele Hills FR were completed by Fredy Masanja and his team (8 to 10 November 2021) to obtain finally 30 sampling points for each transect (see Appendix D).

Moreover, a joint forest inventory workshop was organised by ADAP-TFS in Tabora on 30 June 2021 (see Fig. 1) which allowed to discuss the transect methodology applied by ADAP and the inventory methodology used by TFS. The ADAP transect methodology was demonstrated in the field at Pugu Simbo FR (see Fig. 2).



Fig. 1. Joint ADAP-TFS workshop in Tabora (photograph Louise Serrat).



Fig. 2. Demonstration of Bitterlich methodology at Pugu Simbo FR (photograph Louise Serrat).

In addition, ADAP informed TFS during the workshop about the development of a new value chain for wild mushrooms promoting both, the own consumption and the selling of quality mushrooms. Local communities nearby protected areas were trained for appropriate mushroom picking, transport, and preservation techniques. Market studies confirmed the high demand for quality mushrooms. The participants appreciated the common workshop.

This report presents the state of the vegetation and the human disturbances of Mulele Hills FR based on the three transects. Former surveys from the BKZ (Bloesch 2019) and the Rungwa Corridor (Bloesch 2022) will be considered in the discussion chapter.

2) Study area

Miombo woodland is the dominating vegetation type of unimodal rainfall areas in southeastern Africa (Smith & Allen 2004) and is also the most extensive vegetation type in Tanzania (Shirima et al. 2014). The extensive area of miombo woodlands plays an important role as carbon source and sink at global level. Miombo woodlands are frequently burnt and characterized by a distinct and often continuous grass layer and open to closed tree canopy.

Miombo woodlands have a low soil nutrient content, are well drained, highly leached, acidic and low in organic matter (Frost 1996). The timber and non-timber products from the

miombo woodlands are essential for the livelihoods of millions of people living inside and outside the miombo woodlands (Campbell 1996, Malaisse 1997).

Miombo woodlands are dominated by the genera *Brachystegia* and *Julbernardia* with *Brachystegia spiciformis* and *Julbernardia globiflora* as the most common tree species (Frost 1996, Campbell 1996). Usually a floristically rich “wetter miombo” of the higher rainfall areas (>1000 mm per annum) is distinguished from floristically more poor “drier miombo” (<1000 mm per annum) based on differences in climate conditions.

Mulele Hills FR was gazetted in 1953 (TFS 2014) and is located in the west of Inyonga township surrounded by a dense network of protected areas in Katavi Region (see Fig. 3). The altitude ranges from 1200 to 1500 m a.s.l. along the escarpment which crosses the protected area from northwest to southeast.

The miombo type of the study area is transitional between “drier” and “wetter” miombo with an average annual rainfall estimated to oscillate between about 1000 mm in the lowland and about 1200 mm on the mountain range (extrapolated from Inyonga climate diagram from climate-data.org 2022).

Since several years ADAP has supported a community-based management in the Beekeeping Zone (BKZ) within Mulele Hills FR to address the alarming degradation of the miombo ecosystems caused by deforestation and poaching mainly. With the new project *Co-management of the Katavi – Ugalla corridor forests* in Mlele district, ADAP has extended its support to the entire area of Mulele Hills FR of 2,350 km² (area calculated with GIS). The Katavi-Ugalla corridor project focus on Mulele Hills FR and eight bordering villages including Utende, Mgombe, Kanoge, Wachawaseme, Mtakuja, Kaulolo, Nsenkwa, Masigo (see Fig. 3). This survey will complement the vegetation study from Mlele BKZ (Bloesch 2019).

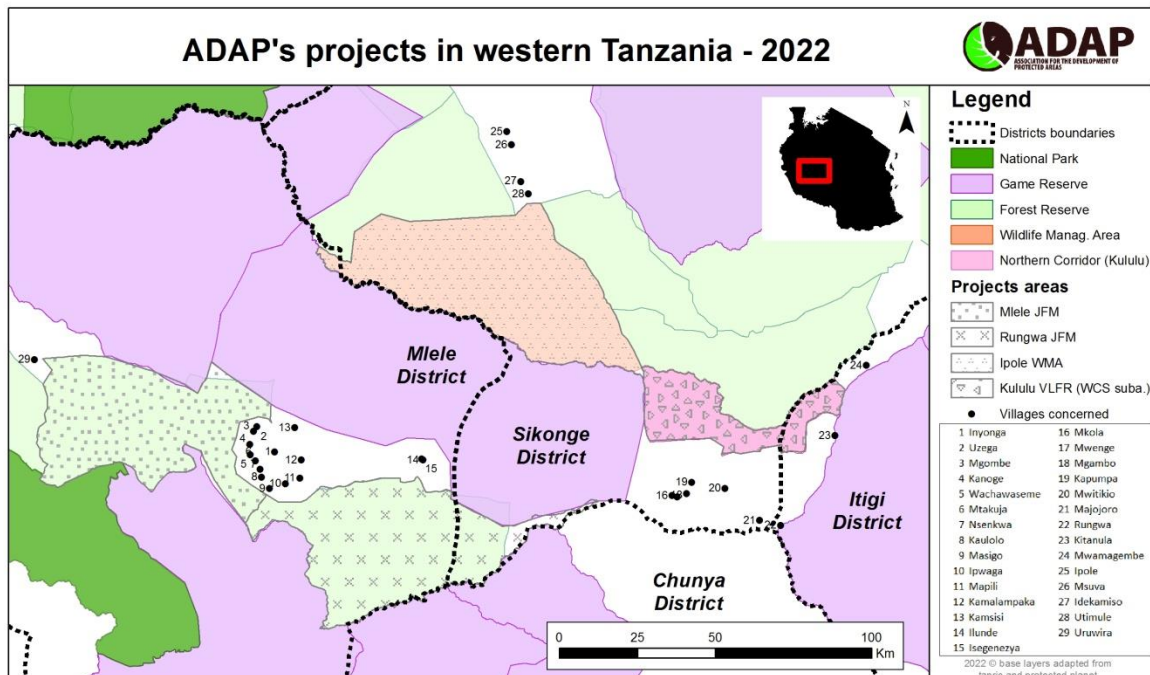


Fig. 3. ADAP Project areas in Western Tanzania.

Miombo woodlands are the predominating vegetation type in Mulele Hills FR covering more than 80% (estimated from the land use map from the Tanzania Resource Information Center, TANRIC) interspersed with many mbugas (open grasslands usually flooded during the rainy season). The seasonally waterlogged mbugas are mainly covered with grasslands and occasionally a few trees and shrubs may occur (wooded grasslands). Narrow riverine forests occur along the permanent and seasonal streams and some evergreen forest patches exist on deeper soils in depressions (south of Ngaramira area and at Masigo according to Kayombo et al. 2013).

3) Methods

3.1 Data collection

The state of vegetation and their human disturbances were assessed focussing on miombo woodlands thereby excluding larger grasslands (mbugas). The land use map from TANRIC and google earth was used to prelocate transects considering access constraints for the field survey. Finally, three transects of 30 sampling points each were outlined (see map in Appendix D) with a total transect length of 22.777 km (see Table 1).

Current state of the vegetation

Along transects a plotless method, the Point-Centered Quarter Method (PCQM), was used to assess the state of the vegetation (Mueller-Dombois, & Ellenberg 1974, Mitchell 2007). Four quarters were established at the sampling point through a right angled cross formed by two lines (sticks laid out on the ground). One line was the transect while the other running perpendicular to the transect direction through the sampling point. The distance to the mid-point at DBH of the nearest tree for two different diameter classes (see below) from the sampling point was measured in each quarter (see Fig. 4).

If a quarter had no tree within a distance of 20 m then we noted *no tree*. The interval between two sampling points has been set systematically at 300 steps measured always by the same person to avoid bias. Whenever encountered a mbuga we skipped the points in open vegetation until we reached again miombo vegetation or in the case of an extensive mbuga we relocated the transect at a parallel distance of hundred meters (if necessary adding further 50 steps, i.e. 150 steps, 200 steps...). The same principle was applied if the sampling point hit a major disturbance such as a large termite mound.

We used a handheld Garmin GPS to record the coordinates of each sampling point. All tree/shrub species and their diameter at breast height (DBH) were recorded separately for two size categories: larger trees (DBH \geq 20 cm) and smaller trees/shrubs (3 cm \leq DBH < 20 cm) using a diameter tape measure (Richter, Germany). If a multi-stem tree was recorded in the larger diameter size class, then its stems falling under the lower diameter size class were not considered.

The heights of the dominant trees were estimated visually (ocular estimation) using a levelling rod of 2 m height as a reference at the base of a tree trunk. Slope and slope exposure were determined with a Büchi compass (P3252). Each direction of the cross marking the four quarters was systematically photographed from the sampling point (Canon powershot S95 / Xiaomi Mi 10) resulting in 208 photos taken during the first vegetation

survey¹ (see example in Fig. 5). The data for each sampling point for the three transects from Mulele Hills FR are given in Appendix B.



Fig. 4. PCQM method: Distance to the mid-point of the nearest tree from the sampling point in each quarter is measured recording tree species and diameter (photograph from Mlele BKZ survey, see Bloesch 2019).

The PCQM method allowed assessing the following forest parameters (Mueller-Dombois & Ellenberg 1974):

- Tree/shrub species richness at stand level;
- Tree/shrub density (from mean distance) at stand level;
- For each tree species its diameter class diameter distribution;
- Absolute frequency (as the occurrence of a species at the sampling points) of each tree species;
- Basal area (ba) and dominance for each species.

For comparison, the tree basal area² of the surrounding stand was also estimated in a simple but efficient way using the Bitterlich method (1948). The Bitterlich method counts

¹ All photos from the second survey conducted by Fredy Masanja have yet to be added to the database.

² Tree basal area is the cross-sectional area (over the bark) at breast height (1.3 metres above the ground) measured in square meters.

trees (shrubs) in an open circle around the sampling point using an angle-gauge. Therefore, a wooden stick of 50 cm length with a fixed small metal sheet with four angular widths at its end was used. Only trees (shrubs) stems having a DBH larger than the smallest angular width (appropriate angular width for miombo woodlands) with a counting factor of $k = 1$ were included in the count.

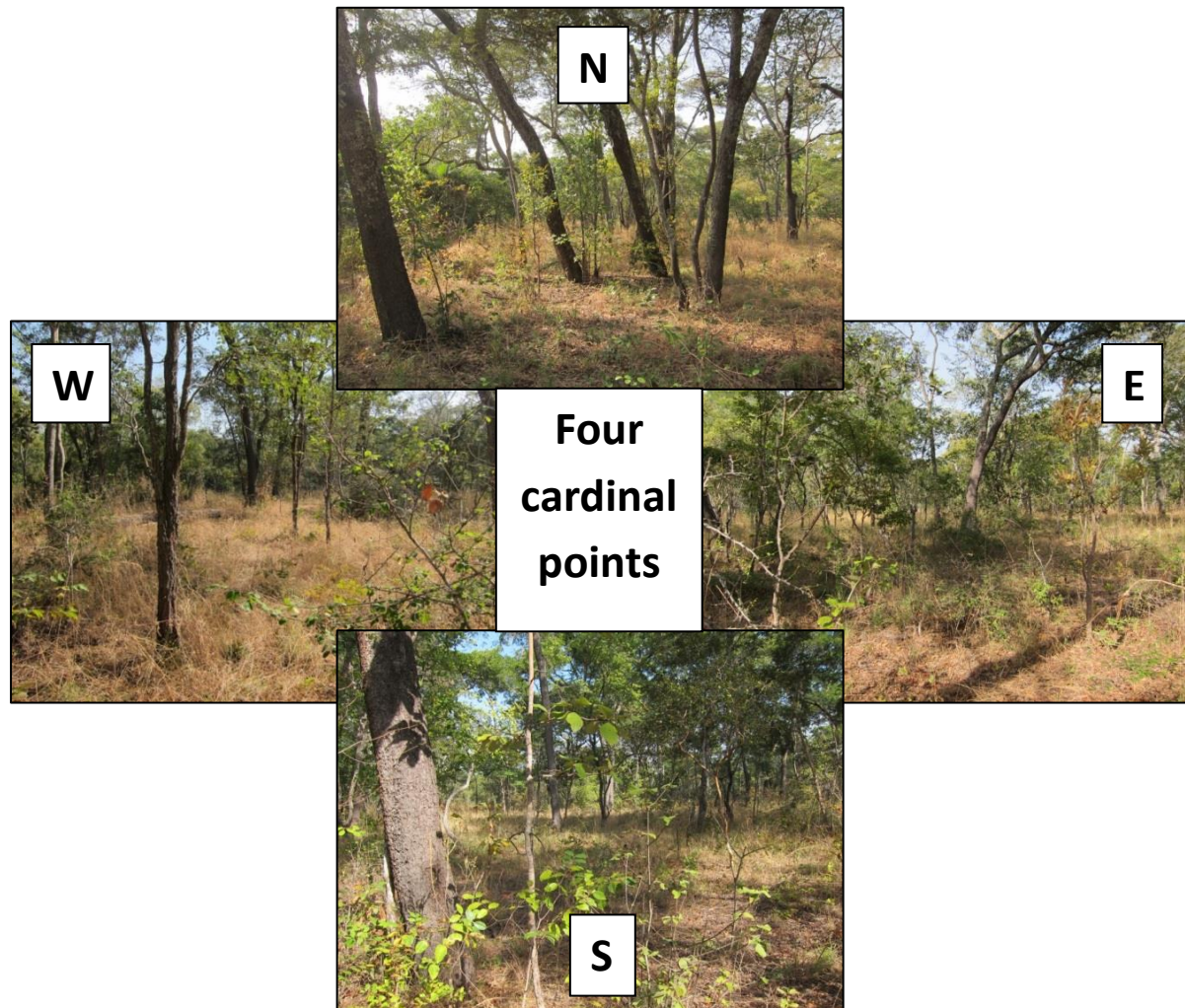


Fig. 5. Visual illustration of the site at the sampling using four photographs from the sampling point in each cardinal direction (photographs from the Mlele Beekeeping Zone survey see Bloesch 2019).

Human ecosystem disturbances

All human disturbances were recorded by two persons walking opposite and parallel to the transect keeping a distance of 20 m from the transect. Each person recorded all disturbances on his side covering a sampling width of 40 m (20 meters each on his left and right along the walking direction) resulting in a total sampling width (belt transect) of 80 m. Disturbances could include logging (saw pits, stumps), Debarking (for beehives, ropes), trapping, infrastructures (camps), encroachments, and grazing by cattle. Fire signs were not recorded since most of the miombo woodlands are burnt annually.

3.2 Data analysis

If plants could not be identified in the field with certainty, voucher specimens were collected and later identified with the support of Frank Mbago, the botanist in charge from the herbarium of the University of Dar es Salaam. The former plant check list (Bloesch 2022) has been added by the new species found during this vegetation survey (see Appendix C).

Calculation of forest parameters

Please note that sampling points in open areas (mbugas) were not considered in the analysis of miombo woodland vegetation (see Table 1).

Species richness: alpha-diversity, i.e. number of species in a given community.

Tree density: area / D^2

where D is the mean distance for all trees recorded.

The tree density/ha was corrected for transects having quarters with no tree using the correction factor (CF) from Warde & Petranka (1981). CF is defined as a function of total number of vacant quarters / total number of quarters.

Basal area: $d^2\pi / 4$

where d is the DBH.

Absolute frequency i.e., the occurrence of a species at the sampling points was calculated as follows:

$(N \text{ points with species} / \text{total points}) \times 100$

Species dominance: mean ba x number of species per ha.

4) Results

4.1 Vegetation data

Length and number of sampling points per transect are given in Table 1 below (see also map in Appendix D). The last column gives the number of sampling points effectively analysed since some points hit open areas (mbugas).

Table 1: Transect characteristics in Mulele Hills FR

Transect	Length (m)	Sampling points (N)	Sampling points (N) analysed
Western lowland ML	7602	30	28
Mulele plateau M	7583	30	29
Eastern lowland MI/MJ	7592	30	29
Total	22,777	90	86

The forest parameters determined by the PCQM for both diameter size classes of all transects are given in Table 2 below including tree/shrub density and mean basal area (PCQM and Bitterlich). The mean tree height is derived from the estimated dominant tree

height observed in the field. The standing volume was calculated as product from mean basal area determined by PCQM, mean tree height and a mean conservative tree coefficient of 0.5.

Table 2: Forest parameters for Mulele Hills FR

Location / diameter class (N° points)	Tree/shrub density/ha	Mean basal area/ha PCQM (m ²)	Mean basal area/ha Bitterlich(m ²)	Dominant / mean tree height (m)	Estimated standing vol./ha (m ³)
Mulele Plateau M Ø ≥ 20cm (29)	90.97	9.32	12.86	15.1 / 13	60.6
Mulele Plateau M Ø < 20cm (29)	498.26	3.10		6	9.3
Mulele Lowland West ML Ø ≥ 20cm (28)	49.12	5.07	10.80	14.3 / 12	30.4
Mulele Lowland West ML Ø < 20cm (28)	187.11	1.30		6	3.9
Mulele Lowland East MI/J Ø ≥ 20cm (29)	107.40	9.40	13.98	15.6 / 13	61.1
Mulele Lowland East MI/J Ø < 20cm (29)	512.17	1.03		6	3.1

The standing volume of western lowland is with 30 m³/ha about half of the stands on Mulele plateau and the eastern lowlands (see Table 2).

The **absolute frequency** of the first five tree/shrub species for both diameter classes for miombo woodlands from the three transects of Mulele Hills FR is presented Table 3:

Table 3: Absolute species frequency in miombo woodlands of Mulele Hills FR

Trees Ø ≥ 20cm		Trees/shrubs Ø < 20cm	
Species	Absolute frequency %	Species	Absolute frequency %
<i>Isoberlina angolensis / tomentosa</i>	3, 50, 28	<i>Diplorhynchus condylocarpon</i>	41, 61, 24
<i>Julbernardia globiflora</i>	48, 4, 28	<i>Erythrophleum africanum</i>	10, 11, 45
<i>Pseudolachnostylis maproun.</i>	3, 32, 31	<i>Pseudolachnostylis maproun.</i>	10, 11, 28
<i>Brachystegia spiciformis / Erythrophleum africanum</i>	28, 11, 17 17, 18, 21	<i>Terminalia sericea</i>	-, 25, 21
		<i>Pterocarpus angolensis</i>	17, 7, 17

The **dominance** values (product of mean basal area and species number per ha) for the first five tree/shrub species for both diameter classes is presented in Table 4 below. Only species occurring in at least two transects were considered. Species not present in one transect got assigned a value one higher than the total number of species.

Table 4: Species dominance in miombo woodlands at Mulele Hills FR

Trees $\varnothing \geq 20\text{cm}$		Trees/shrubs $\varnothing < 20\text{cm}$	
Species	Mean Ranking (3 transects)	Species	Mean Ranking (3 transects)
<i>Julbernardia globiflora</i>	3.0	<i>Diplorhynchus condylocarpon</i>	1.3
<i>Erythrophleum africanum</i>	6.7	<i>Pterocarpus angolensis</i>	6.7
<i>Brachystegia spiciformis</i>	8.0	<i>Erythrophleum africanum</i>	8.3
<i>Pseudolachnostylis maproun.</i>	8.7	<i>Pseudolachnostylis maprou.</i>	10.0
<i>Pericopsis angolensis</i>	10.0	<i>Hymenocardia acida</i>	13.3

The diameter distribution of *Pterocarpus angolensis* and *Julbernardia globiflora* is shown in Figures 6 and 7, respectively.

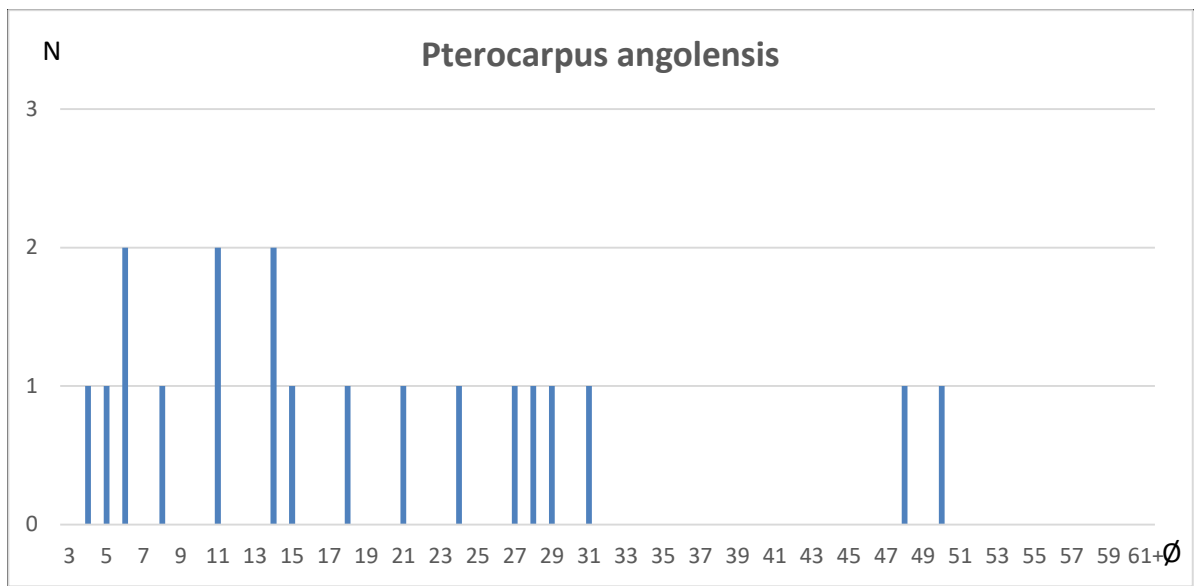


Fig. 6. Diameter distribution of *Pterocarpus angolensis* at Mulele Hills for three transects.

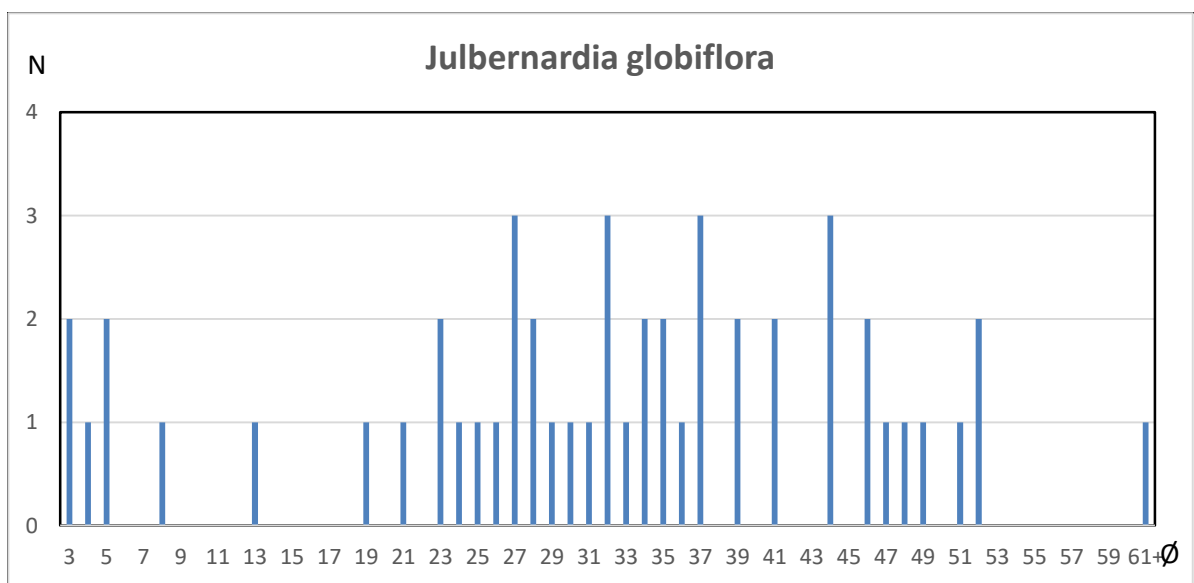


Fig. 7. Diameter distribution of *Julbernardia globiflora* at Mulele Hills for three transects.

The α -diversity for trees and shrubs of miombo woodlands along the three transects is shown in Table 5 below:

Table 5: Alpha-diversity of trees and shrubs of miombo woodlands along the three transects

Transect	$\varnothing \geq 20\text{cm}$	$\varnothing < 20\text{cm}$
Plateau M	27	39
Western lowland ML	27	29
Eastern lowland MI/J	25	40
Total α-diversity	46	70

The checklist for Mlele and Sikonge districts now includes a total of 175 identified trees/shrubs with their scientific and vernacular names and an additional three species only identified with their vernacular names (see Appendix C).

4.2 Human ecosystem disturbances

All human disturbances recorded on a width of 80 m along the transects in Mulele Hills FR are summarised in Table 6 below (not considering tracks and beehives).

Table 6: Human disturbances along the three transects of Mulele Hills Forest Reserve

Type of disturbances	Magnitude (quantity)	Position along the transect
Plateau M		
Timber logging	1 <i>Pterocarpus angolensis</i> cut 2021, BDH: 40 cm 2 <i>Monotes africanus /katangensis</i> cut for allowing the felling of Mninga 1 <i>Pterocarpus angolensis</i> (10 years) 5 <i>Pterocarpus angolensis</i> freshly cut and several old <i>Pterocarpus angolensis</i> logs (5 years) 4 <i>Pterocarpus angolensis</i> (5 years) 1 <i>Pterocarpus angolensis</i> (5 years) 4 <i>Pterocarpus tinctorius</i> (5 years) 1 saw pit 2 <i>Pterocarpus tinctorius</i> (5 years) Tree cutting	Point 1 +140 steps Point 4 +120 steps Point 4 +140 steps Point 4 +220 steps Point 5 +30 steps Point 5 +150 steps Point 5 +280 steps Point 8 +200 steps Point 23 +270 steps
Tree debarking	Tree debarking	Point 23 +270 steps
Ropes	10 sticks of <i>Julbernardia globiflora</i> cut 2021 for ropes	Point 13 +70 steps
Lowland West ML		
Timber logging	Tree cutting (10 years) Tree cutting (5 years) Tree cutting 2021 Tree cutting 2021 Tree cutting 2021 Tree cutting 2020 Tree cutting and 1 sawpit	Point 11 +298 steps Point 22 +111 steps Point 22 +270 steps Point 23 +142 steps Point 25 +2 steps Point 25 +249 steps Point 28 +152 steps
Tree debarking	Tree debarking 2021	Point 22 +270 steps
Lowland East MI/J		
Timber logging	1 <i>Pterocarpus angolensis</i> (1 year)	Point 1 +105 steps

	1 <i>Pterocarpus angolensis</i> 2021 1 <i>Pterocarpus angolensis</i> (3 years) 1 <i>Pterocarpus angolensis</i> and 1 <i>Afzelia quanzensis</i> cut 2021 1 <i>Isoberlinia tomentosa</i> (2 years) 1 <i>Pterocarpus angolensis</i> half-cut 2021 1 <i>Pterocarpus angolensis</i> 2021 2 <i>Isoberlinia tomentosa</i> 2020 1 <i>Pterocarpus angolensis</i> (3-5 yrs) 1 <i>Afzelia quanzensis</i> 2020 (3 years) 1 <i>Pterocarpus angolensis</i> >5 years) 1 <i>Pterocarpus angolensis</i> (dead wood) cut 2021 Tree cutting (2 years) 1 sawpit 2020 Tree cutting 2021 Tree cutting 2021 1 sawpit 2021 Tree cutting 2021 Tree cutting 2020 Tree cutting 2021 Tree cutting (5 years) Tree cutting (6 years)	Point 1 +190 steps Point 2 +230 steps Point 3 +280 steps Point 4 +50 steps Point 5 +210 steps Point 5 +260 steps Point 10 +60 steps Point 10 +120 steps Point 10 +190 steps Point 13 +100 steps Point MJ1 +100 steps Point MJ5 +35 steps Point MJ5 +250 steps Point MJ5 +295 steps Point MJ6 +9 steps Point MJ6 +31 steps Point MJ6 +260 steps Point MJ7 +220 steps Point MJ7 +280 steps Point MJ10 +225 steps Point MJ15 +15 steps
Tree debarking	1 <i>Julbernardia globiflora</i> 2021 1 <i>Julbernardia globiflora</i> 2021 2 <i>Julbernardia globiflora</i> 2021 1 <i>Julbernardia globiflora</i> 2020 1 <i>Julbernardia globiflora</i> 2020 1 <i>Julbernardia globiflora</i> 2021 1 <i>Julbernardia globiflora</i> 1 <i>Julbernardia globiflora</i> (3 years) 1 <i>Julbernardia globiflora</i>	Point 1 +220 steps Point 2 +20 steps Point 2 +100 steps Point 2 +160 steps Point 2 +250 steps Point 3 +210 steps Point 3 +280 steps Point 5 +240 steps Point 12 +290 steps
Building constructions	Camp 2020	Point MJ8 +20 steps

5) Discussions

Current state of the vegetation

In total 86 sampling points were analysed (see Table 1) including 291 trees of the larger diameter class (≥ 20 cm) and 334 trees/shrubs of the lower diameter class (< 20 cm) considering quarters with no trees (see Table 7).

Table 7: Quarters with no trees

Transect	N quarters with no trees diameter class (≥ 20 cm)	N quarters with no trees diameter class (< 20 cm)
M	13	0
ML	27	8
MI/J	13	2
Total	53	10

Julbernardia globiflora (Muva) a characteristic, widespread and often gregarious tree is dominating in many miombo woodlands including Mlele Beekeeping Zone (Bloesch 2022)

and Kululu Village Land FR and Rungwa River FR (Bloesch 2022). In Mulele Hills FR, Muva is also very abundant on the plateau and the eastern lowlands (see Table 3 and 4). On the hand, *Julbernardia globiflora* is quasi absent in the open and extensively flooded western lowlands. Debarking for making beehives out of the bark is still a serious threat for this species (see chapter human ecosystem disturbances below).

Brachystegia spiciformis, another typical miombo species, is also in Mulele Hills FR a common tree of the upper layer (see Table 3 and 4). This species is increasingly searched for timber since sawable dimensions of traditional timber species like *Pterocarpus angolensis* are becoming very rare. Another abundant species in both layers is *Erythrophleum africanum* (see Table 3 and 4).

The understoreys are widely dominated by *Diplorhynchus condylocarpon* which is easily recognised by the abundant milky latex in its branches. Another very common and small tree is *Pseudolachnostylis maprouneifolia* (see Table 3 and 4).

The genus *Brachystegia* includes now 14 species for the surveyed protected areas (see plant list in Appendix C). However, the identification challenges for several species persist since *Brachystegia* species are thought to hybridise easily with other species from the same genus (Smith & Allen 2004).

Typically, tree diameter distributions of natural forest form a reverse J-shaped or negative exponential curve. This is not the case for *Pterocarpus angolensis* and *Julbernardia globiflora* showing an under-representation of saplings as illustrated in Figures 6 and 7 what is also in line with their diameter distribution from Kululu Village Land FR and Rungwa River FR (Bloesch 2022). Nevertheless, *Pterocarpus angolensis* is amongst the most abundant tree species of the lower diameter class in Mulele Hills FR.

The low abundance of saplings in general is probably typical for miombo woodlands where recurrent fires and browsing suppress the growth of natural regeneration as has been shown for *Pterocarpus angolensis* by Mojeremane & Lumbile (2016). *Pterocarpus angolensis* produces one of the best timbers in East Africa and due to overexploitation mature stems become very rare and is considered as near threatened according to the IUCN Red List. It would be interesting to analyse the diameter class distribution for other timber species which are now increasingly used as timber but our data are too sparse.

The alpha-diversity for trees and shrubs assessed for Mulele Hills FR is with 46 and 70 species in the larger and lower diameter class, respectively, considerably higher than in Kululu Village Land FR (27/47) and Rungwa River FR (29/40). This high biodiversity for Mulele Hills FR is probably due to the diverse landscapes assessed by the three transects.

The vegetation surveys from Mlele Beekeeping Zone (Bloesch 2019), Kululu Village Land FR and Rungwa River FR (Bloesch 2022) and this survey from Mlele Hills FR resulted in a quite comprehensive plant list including a total of 175 trees/shrubs identified with their scientific and vernacular names. Three species could only identified with their vernacular names (see Appendix C). This plant list will be very useful for any future forest management in the area, the elaboration of a vegetation map, and for the assessment of the importance of the non-timber forest products for the livelihoods of the adjacent local communities.

In addition to the identification of some *Brachystegia* species (see above), the species listed in Table 8 below were so far only identified with their vernacular names.

Table 8: Trees/shrubs to be identified with their scientific names

Vernacular name	Scientific name to be identified/confirmed
Kapondolampassa	<i>Dalbergia boehmii</i>
Mdaa (Msubata)	<i>Euclea schimperii</i>
Kama mponda	<i>Commiphora mollis</i>
Mumwaga	<i>Ochna longipes</i>
Mshenene	<i>Xylopiya antunesii</i>
Kama mgunga	<i>Entada abyssinica</i>
Mpilipili	<i>Albizia vesicular</i> / <i>A. antunesiana</i>
Kama mkoma	<i>Grewia</i> sp.
Mgulumwanguku	?
Mlungwanyama	?
Mtandara	?

Moreover, the species identification of the genus *Ochna*, *Monotes africanus* versus *M. katangensis* and *Isobertinia tomentosa* versus *I. angolensis* need confirmation at Herbarium of the University of Dar es Salaam.

The basal areas determined with PCQM and Bitterlich methods are highly concordant for the plateau transect (see Table 2) what is in line with the transects from Kululu Village Land FR and Rungwa River FR. For the two lowland transects at Mulele Hills FR, the basal area determined by Bitterlich was considerably higher than the values obtain with the PCQM.

Tree density in both diameter classes is significantly lower in the extensively flooded western lowlands. Consequently the total standing volume is with 69.9 m³ and 64.4 m³ on the plateau and eastern lowland, respectively, about twice as high as in the western lowlands. The dense woodlands on the plateau and eastern lowland of Mulele Hills FR have the highest standing volume of all surveyed protected areas.

The extrapolation of the mean forest parameters per hectare to the entire area of each protected areas is not possible since vegetation maps are missing. Detailed vegetation maps showing the different vegetation types and land use in the project areas would be a very useful for management and monitoring purposes. Such maps would also allow the spatial stratification of the project area with well-defined units which could supports other studies in future. For this purpose, the recorded georeferenced vegetation data and photographs could be used for the ground truthing of the digital analysis of the satellite images.

About six to eight sampling points along a transect can be surveyed if access is not a major constraint. The necessary equipment for the transect survey consist of 20m-tape measure, diameter tape measure, compass, camera, GPS and the Bitterlich instrument (metal sheet fixed on a wooden stick of 50 cm length).

Human ecosystem disturbances

Timber logging is the prevailing human ecosystem disturbance. Debarking of *Julbernardia globiflora* for producing beehives is still very common in the eastern woodlands close to Inyonga.

During the rainy season a tall and dense grass layer may hide disturbances along the belt transect. Therefore, it is fundamental to assess disturbances during the dry season where the view is much clearer.

6) Conclusions

The applied transect methodology allows to assess vegetation and disturbances data at once. The plotless PCQM method has the advantage in that it does not require laying out plot boundaries what saves considerable time. It is quite simple to apply but needs an experienced team leader for the proper location of the transect or its relocation in case the transect hits an open area or a major disturbance (e.g. large termitaria) for getting representative data. An additional three to four persons are required, each of them was assigned a specific task. At least one person should have profound knowledge of tree and shrub species (scientific and/or vernacular names).

New team members were trained on-the-spot and have now a good understanding of the different steps of the methodology. For future vegetation transect surveys it is suggested to associate VGSs which are not yet trained and members from the Village Natural Resource Committee to explain them the importance of baseline data and regular monitoring of the state of the forest for management purposes. The human disturbances should be recorded every two years by the VGSs along each transect to monitor the threats for the miombo ecosystems.

The comprehensive vegetation data (especially standing volume) of the miombo woodlands of Kululu Village Land FR, Rungwa River FR and Mulele Hills FR are a solid base for developing and implementing a carbon project.

Vegetation maps are highly needed for the extrapolation of the mean forest parameters per hectare to the entire area of the protected areas and for facilitating management purposes. Since we assume that many human disturbances have been overlooked during the second survey of Kululu Village Land FR and Rungwa River FR in the wet season, the concerned sections of the transects have to be reassessed during the dry season for having reliable data for the planned scientific article on the current state of the miombo woodlands within Rungwa and Katavi – Ugalla corridors.

7) Recommendations

The following recommendations are made to ADAP:

- 1) Instruct the VGS's to collect fresh plant samples (including photographs) for pressing and drying the specimen from not yet scientifically identified species including Kapondolampassa, Mdaa (Msubata), Kama mponda, Mumwaga, Mshenene, Kama mgunga, Mpilipili, Kama mkoma, Mlungwanyama, Mtandara, and Mgulumwanguku. The collected specimen stored in a local herbarium could then be identified with the support of the Herbarium of the University of Dar es Salaam.
- 2) Additional fertile sampling material from *Brachystegia* species such as flowers and fruits are needed for proper identification the different species from this genus. The consultation of the reference herbarium for East Africa at Kew Botanical Garden in London or Meise Botanic Garden in Belgium could help in the exact identification of this difficult genus and other not yet identified species.
- 3) Train all VGS in the transect methodology under the supervision of the livelihood and natural resources officer. An active participation of TFS, DFO and Village Natural Resource Committee is highly recommended. The human disturbances should be recorded every two years by the VGSs along each transect to monitor the threats for the miombo ecosystems.

- 4) Apply for a research permit for publishing the findings from the three vegetation surveys. The focus of the article should be on the presentation of the transect methodology based on the PCQM and its high potential for rapidly monitoring and evaluating the state of the vegetation and the human ecosystem disturbances.
- 5) Design a concept for elaborating a vegetation map for Mlele and Sikonge districts including TFS and DFOs. The comprehensive data set and the photographs from the sampling points of all surveys could be used as ground truth for elaborating the map. This study could be conducted jointly by Swiss and Tanzanian BSc/MSc students and should be budgeted for the next project phase.
- 6) Reassess the human disturbances in Kululu Village Land FR and Rungwa River FR in the dry season since the second survey has been realised during the rainy season in January / February 2021 (Bloesch 2022). We assume that many human disturbances could not be detected at that time due to dense vegetation and in particular high grasses. We expect a workload of one day per transect (five transects, only one, RT1, was fully surveyed in the dry season).

8) Bibliography

- Bitterlich, W. (1948) Die Winkelzählprobe. Allg. Forst- und Holzwirtschaft. Ztg. 59, 4-5.
- Bloesch, U. (2019) Vegetation survey of Mlele Beekeeping Zone in 2018. ADAP, Geneva.
- Bloesch, U. (2020) Vegetation survey in Rungwa Corridor 2020. Preliminary report. ADAP, Geneva.
- Bloesch, U. (2022) Vegetation surveys in Rungwa Corridor 2020 / 2021. Final report. ADAP, Geneva.
- Campbell, B. (ed.) (1996) The miombo in transition: woodlands and welfare in Africa. CIFOR, Bogor, Indonesia.
- Climate-data.org (2022, 2 January) Climate Inyonga. Retrieved from <https://en.climate-data.org/africa/tanzania/katavi/inyonga-496992/#climate-graph>
- Frost, P. G. H. (1996) The ecology of miombo woodlands. In B. Campbell (Ed.), *The Miombo in transition: Woodlands and welfare in Africa* (pp. 11–57). Bogor, Indonesia: CIFOR.
- Forestry and Beekeeping Division (2007) Community based forest management guidelines. Ministry of Natural Resources and Tourism, Dar es Salaam.
- Forestry and Beekeeping Division (2013) Joint Forest Management Guidelines. Ministry of Natural Resources and Tourism, Dar es Salaam.
- Kayombo, C.J., Mpinga, I. & Natai, H. (2013) Melliferous Status and Activities Endangering Tree Species. Composition and Diversity Survey of Mlele Bee Keeping Zone [Mbkz], in Mlele District, Katavi Region-Tanzania. Consultancy carried out by the Forestry Training Institute-Olmotonyi, Arusha-Tanzania.
- Malaisse, F. (1997) Se nourrir en forêt claire africaine. Approche écologique et nutritionnelle. Centre Technique de Coopération Agricole et Rurale, Wageningen / Les presses agronomiques de Gembloux.
- Mitchell, K. (2007, November 2) Quantitative Analysis by the Point-Centered Quarter Method. Retrieved from <http://people.hws.edu/mitchell/PCQM.pdf>.

Mojeremane, W. & Lumbile, A.U. (2016) A Review of *Pterocarpus angolensis* DC. (Mukwa) an important and threatened timber species of the Miombo woodlands. *Research Journal of Forestry*: 10(1): 8-14.

Mueller-Dombois, D. & Ellenberg, H. (1974) *Aims and methods of vegetation ecology*. John Wiley & Sons, New York, London, Sydney and Toronto.

Shirima, D.D., Totland, O., Munishi, P.K.T. & Moe, S.R. (2014) Relationships between tree species richness, evenness and aboveground carbon storage in montane forests and miombo woodlands of Tanzania. *Basic and Applied Ecology*, 16, 239–249.

Smith, P. & Allen, Q. (2004) *Field guide to the trees and shrubs of the Miombo woodlands*. Royal Botanic Gardens, Kew.

TFS (2014) *Forest Harvesting Plan for Mulele Forest Reserve*. Mlele District – Katavi Region. Five Years Plan for 2014/2015-2018/2019. Zonal Manager TFS Western Zone Office, Ministry of Natural Resources and Tourism, Tabora.

Warde, W. & Petranka, J.W. (1981) A correction factor table for missing point-center quarter data. *Ecology*. 62(2): 491-494.

Appendix A: Mission Programme

Date	Programme
26/6/2021	Train trip from Evilard to Zurich
27/6/2021	Flight Zurich – Amsterdam – Dar es Salaam
28/6/2021	Dar es Salaam
29/6/2021	Flight Dar es Salaam – Tabora; preparation TFS workshop
30/6/2021	TFS Workshop in Tabora and demonstration of PCQM at Puge Simbo FR
1/7/2021	Travelling by car Tabora – Inyonga; briefing project team; preparation field survey
2/7/2021	Briefings immigration service and TFS Mlele District; travelling by car to the Ranger Training Center at Mulele Hills FR (campsite)
3-5/7/2021	Transect M near Ranger Training Center
6/7/2021	Riverine forest at Iloba waterfall near Ranger Training Center; transect ML (lowland)
7/7/2021	Transect ML (lowland); travelling back to Inyonga
8-11/7/2021	Transect MI (eastern part of Mulele Hills FR); travelling by car Inyonga – Tabora
12/7/2021	Debriefing TFS with Thomas Wambura (acting TFS zonal manager western Tanzania); discussion with Valentine Msusa former TFS zonal manager western Tanzania
13/7/2021	Flight Tabora – Dar es Salaam
14/7/2021	Flight Dar es Salaam – Amsterdam
15/7/2021	Flight Dar es Salaam – Amsterdam – Zurich; train trip from Zurich to Evilard

Appendix B: Vegetation transects in Mulele Hills Forest Reserve

Transect M: Mulele Plateau near Training Center

Starting point about 100 m north of the road; direction azimuth: 0°/360°

Sampling point 1 (3/7/21):

Coordinates: S 6.67329 / E 31.62073

Slope: 1-2%, slope exposure: 250°

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 10.5 m²

Photos: 7922, 7923, 7924, 7925

Disturbances/notes (1-2): 1 *Pterocarpus angolensis* cut 2021, BDH: 40 cm; 2 *Monotes africanus* / *katangensis* were cut for allowing the felling of Mninga (140 steps); foot path (192 steps)

Diameter class	Nearest species in the each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Lannea schimperi</i>	36	12.00
	<i>Julbernardia globiflora</i>	51	7.90
	<i>Pterocarpus angolensis</i>	48	3.40
DBH < 20 cm	<i>Oldfieldia dactylophylla</i>	14	7.45
	<i>Diplorhynchus condylocarpon</i>	10	6.90
	<i>Diplorhynchus condylocarpon</i>	13	5.50
	<i>Lonchocarpus capassa</i>	6	8.00

Sampling point 2 (3/7/21):

Coordinates: S 6.67096 / E 31.62040

Slope: 1-2%, slope exposure: 240°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 14 m²

Photos: 7930, 7931, 7932, 7933

Disturbances/notes (2-3): Beehive (8 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Sclerocarya birrea</i>	59	7.80
	<i>Brachystegia spiciformis</i>	26	6.35
	<i>Brachystegia spiciformis</i>	22	4.50
DBH < 20 cm	<i>Brachystegia stipulata</i>	11	1.50
	<i>Dichrostachys cinerea</i>	11	4.80
	<i>Dichrostachys cinerea</i>	6	2.60
	<i>Rhus longipes</i>	6	1.45

Sampling point 3 (3/7/21):

Coordinates: S 6.66863 / E 31.62019

Slope: +/- 1%

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 12.5 m²

Photos: 7934, 7935, 7936, 7937

Disturbances/notes (3-4): track (35 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	20	6.15
	<i>Brachystegia spiciformis</i>	20	6.05
	<i>Brachystegia spiciformis</i>	20	10.70
	<i>Stereospermum kunthianum</i>	23	3.15
DBH < 20 cm	<i>Hexalobus monopetalus</i>	6	5.70

	<i>Brachystegia spiciformis</i>	10	6.60
	<i>Brachystegia glaucescens</i>	8	3.40
	<i>Diplorhynchus condylocarpon</i>	13	3.40

Sampling point 4 (3/7/21):

Coordinates: S 6.66617 / E 31.62023

Slope: +/- flat, slope exposure: 250°

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 16 m²

Photos: 7938, 7939, 7940, 7941

Disturbances/notes (4-5): 1 *Pterocarpus angolensis* cut (10 years), 1 beehive (120 steps); 5

Pterocarpus angolensis freshly cut and several old *Pterocarpus angolensis* logs (5 years) (140 steps);

4 *Pterocarpus angolensis* cut (5 years) (220 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	37	4.70
	<i>Combretum collinum</i>	23	5.45
	<i>Pericopsis angolensis</i>	81	17.40
	<i>Julbernardia globiflora</i>	62	6.15
DBH < 20 cm	<i>Strychnos spinosa</i>	3	2.80
	<i>Combretum zeyheri</i>	10	4.30
	<i>Diplorhynchus condylocarpon</i>	8	2.70
	<i>Diplorhynchus condylocarpon</i>	8	1.90

Sampling point 5 (3/7/21):

Coordinates: S 6.66338 / E 31.62018

Slope: - 1%, slope exposure: 240°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 13 m²

Photos: 7945, 7946, 7947, 7948

Disturbances/notes (5-6): 2 m from track; 1 *Pterocarpus angolensis* cut (5 years) (30 steps); 4

Pterocarpus tinctorius cut (5 years) (150 steps); saw pit (280 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	28	12.30
	<i>Pericopsis angolensis</i>	39	3.70
	<i>Pericopsis angolensis</i>	26	5.95
	<i>Julbernardia globiflora</i>	33	14.70
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	13	17.50
	<i>Anisophyllea boehmii</i>	14	9.85
	<i>Pericopsis angolensis</i>	18	5.90
	<i>Uapaca kirkiana</i>	5	17.30

Sampling point 6 (3/7/21):

Coordinates: S 6.66073 / E 31.62014

Slope: 0-1%, slope exposure: 180°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 14.5 m²

Photos: 7949, 7950, 7951, 7952

Disturbances/notes (6-7): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Monotes africanus / katangensis</i>	37	8.20
	<i>Monotes africanus / katangensis</i>	28	7.30
	<i>Brachystegia spiciformis</i>	39	10.80

DBH < 20 cm	<i>Brachystegia stipulata</i>	4	1.20
	<i>Uapaca kirkiana</i>	17	2.50
	<i>Brachystegia stipulata</i>	8	1.20
	<i>Pterocarpus angolensis</i>	8	7.60

Sampling point 7 (4/7/21):

Coordinates: S 6.65827 / E 31.62028

Slope: 0-1%, slope exposure: 200°

Dominant tree height: 14 (16) m

Basal area (Bitterlich, k=1): 15.5 m²

Photos: 7953, 7954, 7955, 7956

Disturbances/notes (7-8): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pterocarpus angolensis</i>	27	2.70
	<i>Uapaca kirkiana</i>	29	7.40
	<i>Uapaca kirkiana</i>	26	9.80
	<i>Monotes africanus / katangensis</i>	27	16.90
DBH < 20 cm	<i>Julbernardia globiflora</i>	8	2.75
	<i>Brachystegia longifolia</i>	18	4.40
	<i>Uapaca kirkiana</i>	8	0.80
	<i>Uapaca kirkiana</i>	11	1.20

Sampling point 8 (4/7/21):

Coordinates: S 6.65586 / E 31.62022

Slope: 0-1%, slope exposure: 200°

Dominant tree height: 16 (18) m

Basal area (Bitterlich, k=1): 11.5 m²

Photos: 7957, 7958, 7959, 7960

Disturbances/notes (8-9): 2 *Pterocarpus tinctorius* cut (5 years) (200 steps);

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Anisophyllea boehmii</i>	34	14.95
	<i>Monotes africanus / katangensis</i>	31	3.20
	<i>Julbernardia globiflora</i>	37	19.90
	<i>Parinari curatellifolia</i>	49	1.60
DBH < 20 cm	<i>Brachystegia spiciformis</i>	6	0.60
	<i>Vitex doniana</i>	4	1.20
	<i>Erythrophleum africanum</i>	9	3.95
	<i>Cassipourea mollis</i>	4	10.05

Sampling point 9 (4/7/21):

Coordinates: S 6.65345 / E 31.62018

Slope: +/- flat

Dominant tree height: 12 (17) m

Basal area (Bitterlich, k=1): 5.5 m²

Photos: 7961, 7962, 7963, 7964

Disturbances/notes (9-10): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Pterocarpus angolensis</i>	24	4.80
	<i>Brachystegia floribunda</i>	44	6.80
	<i>Parinari curatellifolia</i>	42	17.60
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	6	3.00
	<i>Uapaca kirkiana</i>	17	7.30

	<i>Phyllocosmus leimareanus</i>	5	4.70
	<i>Parinari curatellifolia</i>	5	7.70

Sampling point 10 (4/7/21):

Coordinates: S 6.65112 / E 31.62024

Slope: 0-1%, slope exposure: 250°

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 12 m²

Photos: 7965, 7966, 7967, 7968

Disturbances/notes (10-11): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Borassus aethiopum</i>	40	10.95
	No tree		
	<i>Brachystegia floribunda</i>	62	20.00
	<i>Brachystegia longifolia</i>	35	5.50
DBH < 20 cm	<i>Brachystegia floribunda</i>	5	1.60
	<i>Julbernardia globiflora</i>	5	1.75
	<i>Julbernardia globiflora</i>	5	2.45
	<i>Julbernardia globiflora</i>	3	2.70

Sampling point 11 (4/7/21):

Coordinates: S 6.64891 / E 31.62013

Slope: 0-1%, slope exposure: 360°

Dominant tree height: 18 m

Basal area (Bitterlich, k=1): 15 m²

Photos: 7969, 7970, 7971, 7972

Disturbances/notes (11-12): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	26	3.80
	<i>Brachystegia floribunda</i>	49	7.60
	<i>Brachystegia floribunda</i>	36	8.65
	<i>Brachystegia floribunda</i>	31	3.00
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	9	7.90
	<i>Dalbergia nitidula</i>	10	4.25
	<i>Diplorhynchus condylocarpon</i>	8	14.75
	<i>Diplorhynchus condylocarpon</i>	7	4.70

Sampling point 12 (5/7/21):

Coordinates: S 6.64638 / E 31.62024

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 13 m²

Photos: 7973, 7974, 7975, 7976

Disturbances/notes (12-13): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	44	10.30
	<i>Brachystegia floribunda</i>	70	14.80
	<i>Julbernardia globiflora</i>	31	13.75
	<i>Brachystegia floribunda</i>	30	17.80
DBH < 20 cm	<i>Brachystegia glaucecens</i>	6	1.10
	<i>Pterocarpus angolensis</i>	11	2.85
	<i>Pterocarpus angolensis</i>	14	4.80
	<i>Cassipourea mollis</i>	4	6.50

Sampling point 13 (5/7/21):

Coordinates: S 6.64375 / E 31.62025

Slope: 0-1%, slope exposure: 330°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 12.5 m²

Photos: 7977, 7978, 7979, 7980

Disturbances/notes (13-14): around 10 sticks of *Julbernardia globiflora* cut 2021 for ropes; beehives hanging in the trees (70 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	47	9.10
	<i>Brachystegia floribunda</i>	43	17.10
	<i>Julbernardia globiflora</i>	32	16.15
	<i>Julbernardia globiflora</i>	36	13.70
DBH < 20 cm	<i>Parinari curatellifolia</i>	3	17.95
	<i>Combretum molle</i>	7	1.95
	<i>Brachystegia glaucescens</i>	4	2.65
	<i>Markhamia obtusifolia</i>	6	4.70

Sampling point 14 (5/7/21):

Coordinates: S 6.64025 / E 31.62047

Disturbances/notes: Mbuga, not surveyed

Sampling point 15 (5/7/21):

Coordinates: S 6.64011 / E 31.61919; parallel location of the transect at 100m?

Slope: 1%, slope exposure: 340°

Dominant tree height: 13.5 m

Basal area (Bitterlich, k=1): 18 m²

Photos: 7981, 7982, 7983, 7984

Disturbances/notes (15-16):

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Phyllocosmus leimareanus</i>	24	1.95
	<i>Pericopsis angolensis</i>	41	14.00
	<i>Pericopsis angolensis</i>	32	9.55
	<i>Phyllocosmus leimareanus</i>	24	5.35
DBH < 20 cm	<i>Phyllocosmus leimareanus</i>	9	2.05
	<i>Hymenocardia acida</i>	6	7.25
	<i>Hymenocardia acida</i>	10	3.05
	<i>Cassipourea mollis</i>	9	2.30

Sampling point 16 (5/7/21):

Coordinates: S 6.63747 / E 31.61904

Slope: 1%, slope exposure: 290°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 19 m²

Photos: 7985, 7986, 7987, 7988

Disturbances/notes (16-17): Sampling point on the edge of mbuga

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia longifolia</i>	24	10.20
	<i>Brachystegia longifolia</i>	62	19.95
	No tree		
	<i>Brachystegia longifolia</i>	20	6.30

DBH < 20 cm	<i>Brachystegia longifolia</i>	6	1.50
	<i>Parinari curatellifolia</i>	5	0.75
	<i>Parinari curatellifolia</i>	9	2.00
	<i>Maprounea africana</i>	11	1.80

Sampling point 17 (5/7/21):

Coordinates: S 6.63493 / E 31.61847

Slope: 2-4%, slope exposure: 200°

Dominant tree height: 12 m

Basal area (Bitterlich, k=1): 9.5 m²

Photos: 7989, 7990, 7991, 7992

Disturbances/notes (17-18): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	24	4.45
	<i>Julbernardia globiflora</i>	28	7.55
	<i>Pterocarpus angolensis</i>	29	15.60
	<i>Strychnos pungens</i>	27	19.15
DBH < 20 cm	<i>Oldfieldia dactylophylla</i>	4	1.75
	<i>Oldfieldia dactylophylla</i>	5	4.05
	<i>Schrebera trichoclada</i>	7	2.95
	<i>Pterocarpus angolensis</i>	15	4.85

Sampling point 18 (5/7/21):

Coordinates: S 6.63245 / E 31.61861

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 16 m²

Photos: 7995, 7996, 7997, 7998

Disturbances/notes (18-19): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Uapaca kirkiana</i>	49	12.05
	<i>Julbernardia globiflora</i>	32	2.60
	<i>Julbernardia globiflora</i>	39	9.05
	<i>Julbernardia globiflora</i>	36	1.60
DBH < 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	9	4.35
	<i>Vitex madiensis</i>	7	7.45
	<i>Vitex doniana</i>	8	6.80
	<i>Hexalobus monopetalus</i>	4	1.85

Sampling point 19 (Point 19 – 30 surveyed by Fred Masanja, 8/11/21):

Coordinates: S 6.63009 / E 31.61851

Slope: 0-1%, slope exposure: 270°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 11 m²

Photos: -

Disturbances/notes (19-20): track (246 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Diplorhynchus condylocarpon</i>	38	12.8
	<i>Brachystegia spiciformis</i>	48	1.3
	<i>Julbernardia globiflora</i>	29	7.8
	<i>Erythrophleum africanum</i>	26	9.1
DBH < 20 cm	<i>Erythrophleum africanum</i>	12	5.4
	<i>Pseudolachnostylis maprouneifolia</i>	5	2.5

	<i>Hymenocardia acida</i>	3	6.3
	<i>Pseudolachnostylis maprouneifolia</i>	3	5.9

Sampling point 20 (8/11/21):

Coordinates: S 6.62776 / E 31.61873

Slope: 1%; slope exposure: 360°

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 7 m²

Photos: -

Disturbances/notes (20-21):

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia manga</i>	26	10.9
	No tree		
	No tree		
	<i>Brachystegia manga</i>	28	5.2
DBH < 20 cm	<i>Brachystegia manga</i>	10	5.4
	<i>Brachystegia manga</i>	10	1.6
	<i>Uapaka kirkiana</i>	11	3.6
	<i>Uapaka kirkiana</i>	13	8.9

Sampling point 21 (8/11/21):

Coordinates: S 6.62547 / E 031.61867

Slope: 1%, slope exposure: 270°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 8 m²

Photos: -

Disturbances/notes (21-22): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Azelia quanzensis</i>	33	2.2
	<i>Phyllocosmus leimareanus</i>	26	4.8
	<i>Brachystegia manga</i>	52	13.7
	<i>Julbernardia globiflora</i>	27	12.1
DBH < 20 cm	<i>Margaritaria discoidea</i>	5	4.1
	<i>Erythrophleum africanum</i>	5	3.3
	<i>Diplorhynchus condylocarpon</i>	8	3.7
	<i>Hymenocardia acida</i>	5	3.2

Sampling point 22 (8/11/21):

Coordinates: S 6.62318 / E 31.61884

Slope: 0-1%, slope exposure: 180°

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 14 m²

Photos: -

Disturbances/notes (22-23): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	23	7.1
	<i>Isobertinia angolensis</i>	27	16.9
	<i>Vitex doniana</i>	38	9.4
	<i>Julbernardia globiflora</i>	32	9.7
DBH < 20 cm	<i>Julbernardia globiflora</i>	13	5.1
	<i>Julbernardia globiflora</i>	19	3
	<i>Brachystegia manga</i>	19	3.6
	<i>Brachystegia manga</i>	4	3.9

Sampling point 23 (8/11/21):

Coordinates: S 6.62082 / E 31.61872

Slope: 1%, slope exposure: 270°

Dominant tree height: 13 m

Basal area (Bitterlich, k=1): 14 m²

Photos: -

Disturbances/notes (23-24): tree cutting and debarking (270 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Monotes africanum</i> / <i>katangensis</i>	33	12.9
	<i>Monotes africanum</i> / <i>katangensis</i>	28	11.6
	<i>Julbernardia globiflora</i>	37	7.8
	<i>Monotes africanum</i> / <i>katangensis</i>	48	8.1
DBH < 20 cm	<i>Hexalobus monopetalus</i>	4	1.8
	<i>Diplorhynchus condylocarpon</i>	4	3.9
	<i>Diplorhynchus condylocarpon</i>	10	1.5
	<i>Hexalobus monopetalus</i>	13	7.8

Sampling point 24 (8/11/21):

Coordinates: S 6.61840 / E 31.61864

Slope: 1%, slope exposure: 270°

Dominant tree height: 13 m

Basal area (Bitterlich, k=1): 14 m²

Photos: -

Disturbances/notes (24-25): beehive (130 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pterocarpus tinctorius</i>	39	15.5
	No tree		
	<i>Pseudolachnostylis maprouneifolia</i>	22	5.4
	<i>Brachystegia spiciformis</i>	21	4
DBH < 20 cm	<i>Mgulumwanguku</i>	5	3
	<i>Diplorhynchus condylocarpon</i>	3	1.3
	<i>Diplorhynchus condylocarpon</i>	4	3.9
	<i>Margaritaria discoidea</i>	3	2.1

Sampling point 25 (8/11/21):

Coordinates: S 6.61616 / E 31.61879

Slope: 0-1%, slope exposure: 270°

Dominant tree height: 13 m

Basal area (Bitterlich, k=1): 14 m²

Photos: -

Disturbances/notes (25-26): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Combretum collinum</i>	28	4.2
	<i>Erythrophleum africanum</i>	28	3.4
	No tree		
DBH < 20 cm	<i>Erythrophleum africanum</i>	31	12.5
	<i>Xylopia antunesii</i>	12	1.7
	<i>Hymenocardia acida</i>	10	6
	<i>Dracaena reflexa</i>	8	3.2
	<i>Diplorhynchus condylocarpon</i>	4	2.9

Sampling point 26 (8/11/21):

Coordinates: S 6.61391 / E 31.61879

Slope: 0-1%, slope exposure: 270°
 Dominant tree height: 14 m
 Basal area (Bitterlich, k=1): 13 m²
 Photos: -
 Disturbances/notes (26-27): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	33	15.1
	<i>Erythrophleum africanum</i>	28	3.9
	<i>Erythrophleum africanum</i>	47	13.2
	<i>Brachystegia spiciformis</i>	21	6.6
DBH < 20 cm	<i>Brachystegia spiciformis</i>	4	5.3
	<i>Brachystegia spiciformis</i>	8	2.9
	<i>Xylopia antunesii</i>	8	4.2
	<i>Brachystegia spiciformis</i>	15	4.3

Sampling point 27 (8/11/21):

Coordinates: S 6.61169 / E 31.61899
 Slope: 1%, slope exposure: 180°
 Dominant tree height: 14 m
 Basal area (Bitterlich, k=1): 13 m²
 Photos: -
 Disturbances/notes (27-28): Beehives (150 steps); beehives (170 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Erythrophleum africanum</i>	22	8.2
	<i>Lansea schimperi</i>	34	5.1
	<i>Lansea schimperi</i>	25	15.4
	<i>Phyllocosmus leimareanus</i>	41	10.2
DBH < 20 cm	<i>Albizia antunesiana</i>	5	1.6
	<i>Brachystegia spiciformis</i>	6	1.7
	<i>Brachystegia spiciformis</i>	5	4.3
	<i>Hexalobus monopetalus</i>	3	6.4

Sampling point 28 (8/11/21):

Coordinates: S 6.60946 / E 31.61904
 Slope: 0-1%, slope exposure: 360°
 Dominant tree height: 15 m
 Basal area (Bitterlich, k=1): 13 m²
 Photos: -
 Disturbances/notes (28-29): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Erythrophleum africanum</i>	24	6.7
	<i>Hexalobus monopetalus</i>	31	13.8
	No tree		
	No tree		
DBH < 20 cm	<i>Rothmannia engleriana</i>	3	4.5
	<i>Combretum collinum</i>	7	3.1
	<i>Diplorhynchus condylocarpon</i>	7	1.3
	<i>Diplorhynchus condylocarpon</i>	14	7.5

Sampling point 29 (8/11/21):

Coordinates: S 6.60719 / E 31.61930
 Slope: 0-1%, slope exposure: 270°
 Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 14 m²

Photos: -

Disturbances/notes (29-30): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Azelia quanzensis</i>	27	5.5
	<i>Brachystegia spiciformis</i>	22	4.8
	<i>Burkea africana</i>	25	4.9
	<i>Brachystegia spiciformis</i>	20	2.5
DBH < 20 cm	<i>Cassipourea mollis</i>	10	6
	<i>Brachystegia manga</i>	14	8.6
	<i>Brachystegia spiciformis</i>	7	8
	<i>Hexalobus monopetalus</i>	5	3.4

Sampling point 30 (8/11/21):

Coordinates: S 6.60496 / E 31.61936

Slope: 1%, slope exposure: 360°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 10 m²

Photos: -

Disturbances/notes: -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	43	9.1
	No tree		
	<i>Julbernardia globiflora</i>	27	13.9
	<i>Julbernardia globiflora</i>	51	15.2
DBH < 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	3	6.5
	<i>Diprorhynchus condylocarpon</i>	5	4.7
	<i>Rothmannia engleriana</i>	8	6.9
	<i>Oldfieldia dactylophylla</i>	5	3.1

29 sampling points:

Mean basal area (Bitterlich, k=1): 12.86 m²

Dominant tree height: 15.1 m

Transect ML: Western lowland

Direction azimuth: 0°/360°

Sampling point 1 (6/7/21):

Coordinates: S 6.78637 / E 31.49858

Slope: 0-1%, slope exposure: 200°

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 17 m²

Photos: 8026, 8027, 8028, 8029

Disturbances/notes (1-2): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Isoberlinia tomentosa</i>	50	2.95
	<i>Isoberlinia tomentosa</i>	23	7.85
	<i>Pseudolachnostylis maprouneifolia</i>	27	6.70
	<i>Lannea schimperii</i>	25	4.80
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	4	0.90
	<i>Brachystegia boehmii</i>	6	7.90
	<i>Combretum molle</i>	16	2.35
	<i>Annona senegalensis</i>	7	9.95

Sampling point 2 (6/7/21):

Coordinates: S 6.78381 / E 31.49874

Slope: 0-1%, slope exposure: 45°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 13 m²

Photos: 8030, 8031, 8032, 8033

Disturbances/notes (2-3): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia glaberrima</i>	30	12.00
	No tree		
	<i>Pterocarpus angolensis</i>	50	3.70
	<i>Brachystegia spiciformis</i>	32	7.80
DBH < 20 cm	<i>Lonchocarpus eriocalyx</i>	3	7.00
	<i>Pseudolachnostylis maprouneifolia</i>	4	7.25
	<i>Annona senegalensis</i>	14	4.90
	<i>Pseudolachnostylis maprouneifolia</i>	17	2.40

Sampling point 3 (7/7/21):

Coordinates: S 6.78125 / E 31.49846

Slope: 1-2%, slope exposure: 360°

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 15.5 m²

Photos: -

Disturbances/notes: -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	23	10.85
	No tree		
	<i>Brachystegia glaberrima</i>	24	5.85
	<i>Erythrophleum africanum</i>	30	15.60
DBH < 20 cm	<i>Brachystegia glaberrima</i>	5	2.20
	<i>Brachystegia glaberrima</i>	12	4.75
	<i>Brachystegia glaberrima</i>	4	3.65
	<i>Brachystegia glaberrima</i>	14	4.55

Sampling point 4 (7/7/21):

Coordinates: S 6.77880 / E 31.49835

Slope: 0-1%, slope exposure: 360°

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 9 m²

Photos: 8041, 8042, 8043, 8044

Disturbances/notes: -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Erythrophleum africanum</i>	31	14.10
	<i>Isobertia tomentosa</i>	48	15.00
	<i>Pseudolachnostylis maprouneifolia</i>	33	18.55
	<i>Lannea schimperi</i>	26	8.00
DBH < 20 cm	<i>Terminalia sericea</i>	14	1.80
	<i>Brachystegia glaberrima</i>	6	1.85
	<i>Combretum molle</i>	8	2.75
	<i>Diplorhynchus condylocarpon</i>	14	7.30

Sampling point 5 (7/7/21):

Coordinates: S 6.77609 / E 31.49830

Slope: 0-1%, slope exposure: 360°

Dominant tree height: 12 (15) m

Basal area (Bitterlich, k=1): 7 m²

Photos: 8045, 8046, 8047, 8048

Disturbances/notes (5-6): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Lannea schimperi</i>	28	10.40
	<i>Erythrophleum africanum</i>	29	16.95
	<i>Brachystegia longifolia</i>	51	5.80
DBH < 20 cm	<i>Monanthotaxis discolor</i>	4	0.85
	<i>Erythrophleum africanum</i>	4	6.00
	<i>Maprounea africana</i>	7	3.35
	<i>Diplorhynchus condylocarpon</i>	3	5.10

Sampling point 6 (7/7/21):

Coordinates: S 6.77360 / E 31.49849

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 9 m²

Photos: 8049, 8050, 8051, 8052

Disturbances/notes (6-7): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	35	6.95
	<i>Cassia abbreviata</i>	29	12.00
	<i>Isobertia angolensis</i>	40	13.35
	<i>Combretum molle</i>	23	7.20
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	10	9.00
	<i>Combretum molle</i>	9	8.10
	<i>Terminalia sericea</i>	14	15.40
	No tree		

Sampling point 7 (Point 7 – 30 surveyed by Fred Masanja, 9/11/21?):

Coordinates: S 6.77126 / E 31.49799

Slope: 0-1%, slope exposure: 280°
 Dominant tree height: 13 m
 Basal area (Bitterlich, k=1): 7 m²
 Photos: -
 Disturbances/notes (7-8): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Isoberlinia tomentosa</i>	55	10.6
	<i>Combretum fragrans</i>	33	17.3
	<i>Isoberlinia angolensis</i>	23	12
	No tree		
DBH < 20 cm	<i>Isoberlinia angolensis</i>	16	9.8
	No tree		
	No tree		
	<i>Terminalia sericea</i>	10	5.8

Sampling point 8 (9/11/21?):

Coordinates: S 6.76885 / E 31.49799
 Slope: 0-1%, slope exposure: 270°
 Dominant tree height: 11 m
 Basal area (Bitterlich, k=1): 3 m²
 Photos: -
 Disturbances/notes (8-9): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Combretum fragrans</i>	24	6.3
	No tree		
	<i>Combretum fragrans</i>	32	5.4
DBH < 20 cm	<i>Combretum fragrans</i>	4	18.6
	<i>Combretum fragrans</i>	6	17.9
	<i>Combretum molle</i>	4	14.5
	<i>Combretum fragrans</i>	3	4.3

Sampling point 9 (9/11/21?):

Coordinates: S 6.76633 / E 31.49818
 Slope: 0-1%, slope exposure: 290°
 Dominant tree height: 14 m
 Basal area (Bitterlich, k=1): 8 m²
 Photos: -
 Disturbances/notes (9-10): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	No tree		
	<i>Terminalia sericea</i>	34	9.6
	<i>Combretum fragrans</i>	23	16.8
DBH < 20 cm	<i>Combretum fragrans</i>	8	6.7
	No tree		
	<i>Combretum fragrans</i>	8	18.6
	<i>Terminalia sericea</i>	15	6.0

Sampling point 10 (9/11/21?):

Coordinates: S 6.76398 / E 31.49866
 Slope: 1%, slope exposure: 280°
 Dominant tree height: 13 m

Basal area (Bitterlich, k=1): .5 m²

Photos: -

Disturbances/notes (10-11): –

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	No tree		
	<i>Terminalia mollis</i>	26	5.0
	<i>Isobertinia angolensis</i>	34	6.7
DBH < 20 cm	<i>Terminalia mollis</i>	8	10.5
	No tree		
	<i>Isobertinia angolensis</i>	3	5.2
	<i>Terminalia mollis</i>	14	10.0

Sampling point 11 (9/11/21?):

Coordinates: S 6.76154 / E 31.49870

Slope: 0-1%, slope exposure: 270°

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 15 m²

Photos: -

Disturbances/notes (11-12): tree cutting (10 years) (298 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Brachystegia manga</i>	27	15.3
	<i>Piliostigma thonningii</i>	24	2.7
	<i>Brachystegia manga</i>	27	8.7
DBH < 20 cm	<i>Diprorhynchus condylocarpon</i>	15	4.7
	<i>Brachystegia wangermeeana</i>	4	5.6
	<i>Combretum fragrans</i>	14	6.7
	<i>Pterocarpus angolensis</i>	4	5.1

Sampling point 12 (9/11/21?):

Coordinates: S 6.75924 / E 31.49822

Slope: 0-1%, slope exposure: 260°

Dominant tree height: 12 m

Basal area (Bitterlich, k=1): 18 m²

Photos: -

Disturbances/notes (12-13): –

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	40	15.2
	<i>Brachystegia manga</i>	24	15.0
	<i>Diospyros kirkii</i>	35	13.9
	<i>Ficus stuhlmannii</i>	26	6.0
DBH < 20 cm	<i>Brachystegia wangermeeana</i>	9	4.9
	<i>Annona senegalensis</i>	9	3.7
	<i>Brachystegia wangermeeana</i>	9	5.4
	<i>Diprorhynchus condylocarpon</i>	7	3.9

Sampling point 13 (9/11/21?):

Coordinates: S 6.75693 / E 31.49872

Slope: 0-1%, slope exposure: 280°

Dominant tree height: 12 m

Basal area (Bitterlich, k=1): 14 m²

Photos: -

Disturbances/notes (13-14): –

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	No tree		
	<i>Pseudolachnostylis maprouneifolia</i>	25	9.5
	<i>Brachystegia manga</i>	21	10.3
DBH < 20 cm	<i>Brachystegia wangermeeana</i>	9	2.7
	<i>Brachystegia wangermeeana</i>	16	3.3
	<i>Brachystegia wangermeeana</i>	10	3.0
	<i>Lonchocarpus capassa</i>	10	12.3

Sampling point 14 (9/11/21?):

Coordinates: S 6.75469 / E 31.49846

Slope: 0-1%, slope exposure: 180°

Dominant tree height: 13m

Basal area (Bitterlich, k=1): 9 m²

Photos: -

Disturbances/notes (14-15): –

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Diplorhynchus condylocarpon</i>	52	15.4
	No tree		
	No tree		
	<i>Bobgunnia madagascariensis</i>	21	8.5
DBH < 20 cm	<i>Brachystegia wangermeeana</i>	7	5.7
	<i>Diplorhynchus condylocarpon</i>	13	9.0
	<i>Pterocarpus angolensis</i>	11	9.2
	<i>Hymenocardia acida</i>	6	19.9

Sampling point 15 (9/11/21?):

Coordinates: S 6.75238 / E 31.49874

Slope: 0-1%, slope exposure: 290°

Dominant tree height: 13 m

Basal area (Bitterlich, k=1): 17 m²

Photos: -

Disturbances/notes (15-16): –

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Pseudolachnostylis maprouneifolia</i>	39	10.1
	<i>Pterocarpus angolensis</i>	31	4.6
	<i>Lannea schimperi</i>	32	18.6
DBH < 20 cm	<i>Brachystegia wangermeeana</i>	9	1
	<i>Brachystegia wangermeeana</i>	11	1
	<i>Pericopsis angolensis</i>	10	4.6
	<i>Diplorhynchus condylocarpon</i>	7	4.6

Sampling point 16 (9/11/21?):

Coordinates: S 6.75015 / E 31.49916

Slope: 1%, slope exposure: 260°

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 13 m²

Photos: -

Disturbances/notes (16-17): –

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Isoberlinia angolensis</i>	46	15.2
	<i>Isoberlinia angolensis</i>	47	4.9
	<i>Pseudolachynostylis maprouneifolia</i>	25	18.3
	<i>Lannea schimperi</i>	24	6.5
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	6	1.8
	<i>Combretum fragrans</i>	9	1.8
	<i>Annona senegalensis</i>	9	9.7
	<i>Diplorhynchus condylocarpon</i>	19	7.4

Sampling point 17 (9/11/21?):

Coordinates: S 6.74788 / E 31.49931

Slope: 1%, slope exposure: 360°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 10 m²

Photos: -

Disturbances/notes (17-18): –

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Acacia sieberiana</i>	30	15.6
	<i>Combretum fragrans</i>	24	16.8
	<i>Acacia tortilis</i>	24	11.5
DBH < 20 cm	<i>Acacia xanthophloea</i>	9	4.8
	No tree		
	No tree		
	<i>Combretum fragrans</i>	5	10.8

Sampling point 18 (9/11/21?):

Coordinates: S 6.74527 / E 31.49876

Slope: 1%, slope exposure: 180°

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 8 m²

Photos: -

Disturbances/notes (18-19): –

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia manga</i>	35	14.5
	<i>Isoberlinia angolensis</i>	23	13.8
	<i>Brachystegia manga</i>	27	18.7
	<i>Isoberlinia angolensis</i>	23	16.8
DBH < 20 cm	<i>Annona senegalensis</i>	14	4.2
	<i>Isoberlinia angolensis</i>	9	7.7
	<i>Isoberlinia angolensis</i>	4	12.1
	<i>Burkea africana</i>	3	3.9

Sampling point 19 (9/11/21?):

Coordinates: S 6.74300 / E 31.49859

Slope: 1%, slope exposure: 180°

Dominant tree height: 13 m

Basal area (Bitterlich, k=1): 7 m²

Photos: -

Disturbances/notes (19-20): –

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Isoberlinia angolensis</i>	23	8.9

	<i>Brachystegia spiciformis</i>	28	13.4
	<i>Isoberlinia angolensis</i>	69	10
	No tree		
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	12	4.5
	<i>Isoberlinia angolensis</i>	18	3.4
	<i>Brachystegia wangermeeana</i>	7	10.2
	<i>Diplorhynchus condylocarpon</i>	4	14

Sampling point 20 (9/11/21?):

Coordinates: S 6.74076 / E 31.49858

Slope: 1%, slope exposure: 180°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 8 m²

Photos: -

Disturbances/notes (20-21): –

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Isoberlinia angolensis</i>	26	18.8
	<i>Brachystegia manga</i>	74	17.4
	<i>Hexalobus monopetalus</i>	42	10.6
	<i>Isoberlinia angolensis</i>	44	10.8
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	13	16.9
	<i>Pseudolachnostylis maprouneifolia</i>	18	19.9
	<i>Hexalobus monopetalus</i>	19	8.5
	<i>Annona senegalensis</i>	7	9.8

Sampling point 21 (9/11/21?):

Coordinates: S 6.73839 / E 31.49889

Slope: 1%, slope exposure: 180°

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 14 m²

Photos: -

Disturbances/notes (21-22): Track (123 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Isoberlinia sp. (angolensis?)</i>	51	2.9
	<i>Brachystegia boehmii</i>	93	10.4
	<i>Erythrophleum africanum</i>	55	14.3
	<i>Pseudolachnostylis maprouneifolia</i>	30	9.3
DBH < 20 cm	<i>Dichrostachys cinerea</i>	4	7.5
	<i>Albizia versicolor</i>	10	9.3
	<i>Erythrophleum africanum</i>	8	9
	<i>Diplorhynchus condylocarpon</i>	9	2.8

Sampling point 22 (9/11/21?):

Coordinates: S 6.73608 / E 31.49899

Slope: 1%, slope exposure: 180°

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 15 m²

Photos: -

Disturbances/notes (22-23): tree cutting and debarking 2021 (270 steps); tree cutting (5 years) (111 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Hexalobus monopetalus</i>	33	11.9

	No tree		
	<i>Isoberlinia angolensis</i>	37	8.1
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	10	6.8
	<i>Diplorhynchus condylocarpon</i>	4	4.7
	<i>Annona senegalensis</i>	10	2.6
	<i>Bridelia cathartica</i>	8	6.4

Sampling point 23 (9/11/21?):

Coordinates: S 6.73375 / E 31.49907; near hill

Slope: 3%, slope exposure: 180°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 13 m²

Photos: -

Disturbances/notes (23-24): Tree cutting 2021 (142 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Lonchocarpus capassa</i>	32	11.3
	<i>Isoberlinia sp. (angolensis?)</i>	38	12.5
	<i>Isoberlinia sp. (angolensis?)</i>	51	12.5
	<i>Terminalia sericea</i>	23	6.6
DBH < 20 cm	<i>Dombeya rotundifolia</i>	4	2.7
	<i>Terminalia sericea</i>	12	6.6
	<i>Diplorhynchus condylocarpon</i>	3	5.5
	<i>Diplorhynchus condylocarpon</i>	3	1.8

Sampling point 24 (9/11/21?):

Coordinates: S 6.73150 / E 31.49912

Slope: 3%, slope exposure: 280°

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 15 m²

Photos: -

Disturbances/notes (24-25): –

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Isoberlinia sp. (angolensis?)</i>	37	9.5
	<i>Isoberlinia sp. (angolensis?)</i>	36	14.4
	<i>Isoberlinia sp. (angolensis?)</i>	34	5.2
	No tree		
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	7	7.5
	<i>Pseudolachnostylis maprouneifolia</i>	3	6.7
	<i>Terminalia sericea</i>	5	4.2
	<i>Diplorhynchus condylocarpon</i>	7	4.9

Sampling point 25 (9/11/21?): Mbuga not considered!

Coordinates: S 6.72904 / E 31.49925

Slope: 3%, slope exposure: 270°

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 4 m²

Photos: -

Disturbances/notes (25-26): Tree cutting 2021 (2 steps); tree cutting 2020 (249 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	No tree		
	No tree		
	No tree		

DBH < 20 cm	<i>Combretum zehyeri</i>	4	4.2
	<i>Diplorhynchus condylocarpon</i>	15	1.7
	<i>Isoberlinia sp. (angolensis?)</i>	4	3.4
	<i>Terminalia sericea</i>	9	4.5

Sampling point 26 (9/11/21?):

Coordinates: S 6.72688 / E 31.49930

Slope: 3%, slope exposure: 290°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 5 m²

Photos: -

Disturbances/notes (26-27): –

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Combretum molle</i>	25	8.6
	<i>Pericopsis angolensis</i>	30	16
	No tree		
	No tree		
DBH < 20 cm	<i>Brachystegia bussei</i>	7	7
	<i>Diplorhynchus condylocarpon</i>	4	5.1
	<i>Terminalia sericea</i>	3	2.2
	<i>Annona senegalensis</i>	5	12.4

Sampling point 27 (9/11/21?):

Coordinates: S 6.72465 / E 31.49925

Slope: 1%, slope exposure: 360°

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 10 m²

Photos: -

Disturbances/notes (27-28): –

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	30	9.8
	<i>Combretum molle</i>	22	5.6
	No tree		
	<i>Isoberlinia sp. (angolensis?)</i>	22	14.6
DBH < 20 cm	<i>Isoberlinia sp. (angolensis?)</i>	3	12.6
	<i>Isoberlinia sp. (angolensis?)</i>	10	2.5
	<i>Strychnos innocua</i>	3	3.2
	<i>Isoberlinia sp. (angolensis?)</i>	3	4.6

Sampling point 28 (9/11/21?): Mbuga not considered!

Coordinates: S 6.72231 / E 31.49946

Slope: 1-2%, slope exposure: 300°

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 4 m²

Photos: -

Disturbances/notes (28-29): Tree cutting and sawpit 2021 (152 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	No tree		
	No tree		
	No tree		
DBH < 20 cm	<i>Terminalia sericea</i>	19	10.5
	<i>Diplorhynchus condylocarpon</i>	5	9.1

	<i>Annona senegalensis</i>	7	5.3
	<i>Diplorhynchus condylocarpon</i>	4	7.9

Sampling point 29 (9/11/21?):

Coordinates: S 6.72017 / E 31.49958

Slope: 1%, slope exposure: 270°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 11 m²

Photos: -

Disturbances/notes (29-30): –

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	41	17.9
	<i>Strychnos potatorum</i>	23	13.5
	No tree		
DBH < 20 cm	<i>Julbernardia globiflora</i>	46	10.4
	<i>Isoberlinia</i> sp.	10	5.2
	<i>Erythrophleum africanum</i>	5	3
	<i>Maprounea africana</i>	5	5.5
	<i>Crossopteryx febrifuga</i>	5	5.5

Sampling point 30 (9/11/21?):

Coordinates: S 6.71784 / E 31.49978

Slope: 1%, slope exposure: 270°

Dominant tree height: 13 m

Basal area (Bitterlich, k=1): 7 m²

Photos: -

Disturbances/notes: –

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Erythrophleum africanum</i>	32	6.3
	<i>Erythrophleum africanum</i>	30	7.8
	No tree		
DBH < 20 cm	No tree		
	<i>Diplorhynchus condylocarpon</i>	4	9.3
	<i>Diplorhynchus condylocarpon</i>	6	5.9
	<i>Diplorhynchus condylocarpon</i>	15	4.3
	No tree		

28 sampling points:

Mean basal area (Bitterlich, k=1): 10.80 m²

Dominant tree height: 14.3 m

Transect MI/J: Eastern lowland

Starting point 100m from track; MI direction azimuth: 320° (MJ opposite direction, i.e. 140°)

Sampling point MI 1 (8/7/21):

Coordinates: S 6.81799 / E 31.92757

Slope: 1%, slope exposure: 120°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 11 m²

Photos: MI 1A-D

Disturbances/notes (1-2): 1 *Pterocarpus angolensis* cut (1 year) (105 steps); 1 *Pterocarpus angolensis* cut 2021 (190 steps); 1 *Julbernardia globiflora* debarking 2021 (220 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Crossopterix febrifuga</i>	25	3.70
	<i>Pseudolachnostylis maprouneifolia</i>	34	1.90
	<i>Diplorhynchus condylocarpon</i>	22	13.05
	<i>Erythrophleum africanum</i>	32	5.45
DBH < 20 cm	<i>Holarrhena pubescens</i>	11	6.10
	<i>Azelia quanzensis</i>	3	3.20
	<i>Holarrhena pubescens</i>	3	4.80
	<i>Erythrophleum africanum</i>	3	2.80

Sampling point MI 2 (8/7/21):

Coordinates: S 6.81580 / E 31.92644

Slope: 1-2%, slope exposure: 360°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 15 m²

Photos: MI 2A-D

Disturbances/notes (2-3): 1 *Julbernardia globiflora* debarking 2021 (20 steps); 2 *Julbernardia globiflora* debarking 2021 (100 steps); 1 *Julbernardia globiflora* debarking 2020 (160 steps); 1 *Pterocarpus angolensis* cut (3 years) (230 steps); 1 *Julbernardia globiflora* debarking 2020 (250 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	40	9.80
	<i>Terminalia sericea</i>	26	5.40
	<i>Julbernardia globiflora</i>	40	6.15
	<i>Combretum collinum</i>	35	16.10
DBH < 20 cm	<i>Vitex mombassae</i>	8	4.95
	<i>Holarrhena pubescens</i>	4	4.25
	<i>Flueggea virosa</i>	3	3.85
	<i>Erythrophleum africanum</i>	9	3.20

Sampling point MI 3 (8/7/21):

Coordinates: S 6.81398 / E 31.92496

Slope: 1-2%, slope exposure: 20°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 17 m²

Photos: MI 3A-D

Disturbances/notes (3-4): 1 *Julbernardia globiflora* debarking 2021 (210 steps); 1 *Pterocarpus angolensis* and 1 *Azelia quanzensis* cut 2021, 1 *Julbernardia globiflora* debarking 2021 (280 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Diplorhynchus condylocarpon</i>	33	8.30
	<i>Julbernardia globiflora</i>	28	2.90
	<i>Lannea schimperi</i>	22	2.80
	<i>Julbernardia globiflora</i>	23	7.95

DBH < 20 cm	<i>Parinari curatellifolia</i>	4	4.00
	<i>Kigelia africana</i>	7	2.20
	<i>Parinari curatellifolia</i>	18	2.70
	<i>Erythrophleum africanum</i>	12	3.50

Sampling point MI 4 (9/7/21):

Coordinates: S 6.81197 / E 31.92368

Slope: 1-2%, slope exposure: 20°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 15 m²

Photos: MI 4A-D

Disturbances/notes (4-5): 1 *Isoberlinia tomentosa* cut (2 years) (50 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	25	3.80
	<i>Erythrophleum africanum</i>	21	11.80
	<i>Brachystegia spiciformis</i>	23	7.80
	<i>Julbernardia globiflora</i>	39	3.80
DBH < 20 cm	<i>Erythrophleum africanum</i>	13	11.20
	<i>Crossopterix febrifuga</i>	16	3.15
	<i>Erythrophleum africanum</i>	7	5.20
	<i>Pterocarpus angolensis</i>	6	2.45

Sampling point MI 5 (9/7/21):

Coordinates: S 6.81000 / E 31.92208

Slope: 1%, slope exposure: 360°

Dominant tree height: 16 (18) m

Basal area (Bitterlich, k=1): 18 m²

Photos: MI 5A-D

Disturbances/notes (5-6): 1 *Pterocarpus angolensis* half-cut 2021 (210 steps); 1 *Julbernardia globiflora* debarking (3 years) (240 steps); 1 *Pterocarpus angolensis* cut 2021 (260 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	51	7.40
	<i>Diplorhynchus condylocarpon</i>	21	2.50
	<i>Pterocarpus angolensis</i>	21	3.70
	<i>Brachystegia boehmii</i>	48	9.35
DBH < 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	13	2.10
	<i>Diplorhynchus condylocarpon</i>	10	2.40
	<i>Pterocarpus angolensis</i>	18	3.75
	<i>Bridelia atroviridis</i>	5	2.25

Sampling point MI 6 (9/7/21):

Coordinates: S 6.80833 / E 31.92036

Slope: 1-2%, slope exposure: 360°

Dominant tree height: 18 m

Basal area (Bitterlich, k=1): 17 m²

Photos: MI 6A-D

Disturbances/notes (6-7): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	21	2.50
	<i>Pterocarpus tinctorius</i>	39	13.30
	<i>Diospyros kirkii</i>	20	7.00
	<i>Pericopsis angolensis</i>	29	10.15

DBH < 20 cm	<i>Crossopterix febrifuga</i>	3	2.55
	<i>Terminalia sericea</i>	13	3.00
	<i>Crossopterix febrifuga</i>	5	8.45
	<i>Combretum fragrans</i>	17	5.80

Sampling point MI 7 (9/7/21):

Coordinates: S 6.80667 / E 31.91872

Slope: 1-2%, slope exposure: 360°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 16 m²

Photos: MI 7A-D

Disturbances/notes (7-8): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Strychnos pungens</i>	31	7.40
	<i>Brachystegia spiciformis</i>	22	2.15
	<i>Brachystegia boehmii</i>	21	4.25
	No tree		
DBH < 20 cm	<i>Brachystegia stipulata?</i>	9	3.60
	<i>Pericopsis angolensis</i>	6	6.05
	<i>Brachystegia stipulata?</i>	6	1.45
	<i>Brachystegia stipulata?</i>	3	3.30

Sampling point MI 8 (10/7/21): Mbuga not considered

Coordinates: S 6.80472 / E 31.91728

Slope: +/- flat

Dominant tree height: 5 (8) m

Basal area (Bitterlich, k=1): 1 m²

Photos: MI 8A-D

Disturbances/notes (8-9): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	No tree		
	No tree		
	No tree		
DBH < 20 cm	<i>Terminalia mollis</i>	10	16.30
	<i>Combretum fragrans</i>	7	3.85
	<i>Combretum fragrans</i>	5	6.00
	<i>Combretum fragrans</i>	6	6.55

Sampling point MI 9 (10/7/21): Mbuga edge

Coordinates: S 6.80282 / E 31.91602

Slope: 0-1%, slope exposure: 140°

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 2 m²

Photos: MI 9A-D

Disturbances/notes (9-10): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia boehmii</i>	38	9.00
	<i>Diplorhynchus condylocarpon</i>	20	18.15
	No tree		
	No tree		
DBH < 20 cm	<i>Flueggea virosa</i>	4	7.10

	<i>Pseudolachnostylis maprouneifolia</i>	5	5.65
	<i>Terminalia sericea</i>	4	12.90
	<i>Pterocarpus angolensis</i>	14	9.60

Sampling point MI 10 (9/7/21): Near mbuga edge

Coordinates: S 6.80090 / E 31.91475

Slope: Slope: +/- flat

Dominant tree height: 13 m

Basal area (Bitterlich, k=1): 8 m²

Photos: MI 10A-D

Disturbances/notes (10-11): 2 *Isoberlinia tomentosa* cut 2020 (60 steps); 1 *Pterocarpus angolensis* cut (3-5 years) (120 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	No tree		
	<i>Isoberlinia tomentosa</i>	49	3.40
	<i>Isoberlinia tomentosa</i>	30	3.90
DBH < 20 cm	<i>Combretum fragrans</i>	4	3.40
	<i>Combretum fragrans</i>	5	6.45
	<i>Combretum fragrans</i>	7	3.70
	No tree		

Sampling point MI 11 (10/7/21):

Coordinates: S 6.79910 / E 31.91342

Slope: 1%, slope exposure: 100°

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 18 m²

Photos: MI 11A-D

Disturbances/notes (11-12): 1 *Azelia quanzensis* cut 2020 (3 years) (190 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	34	10.10
	<i>Julbernardia globiflora</i>	35	10.20
	<i>Erythrophleum africanum</i>	22	2.80
	<i>Combretum collinum</i>	29	3.70
DBH < 20 cm	<i>Flueggea virosa</i>	4	3.75
	<i>Diplorhynchus condylocarpon</i>	4	1.30
	<i>Julbernardia globiflora</i>	4	3.65
	<i>Diplorhynchus condylocarpon</i>	4	1.15

Sampling point MI 12 (10/7/21):

Coordinates: S 6.79721 / E 31.91230

Slope: 1%, slope exposure: 30°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 16.5 m²

Photos: MI 12A-D

Disturbances/notes (12-13): 1 *Julbernardia globiflora* debarking (290 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Monotes africanus / katangensis</i>	28	16.00
	<i>Erythrophleum africanum</i>	21	8.65
	<i>Brachystegia glaucescens</i>	23	6.30
	<i>Erythrophleum africanum</i>	21	4.40
DBH < 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	10	7.40
	<i>Cassipourea mollis</i>	11	4.30

	<i>Parinari curatellifolia</i>	12	7.60
	<i>Crossopterix febrifuga</i>	14	3.35

Sampling point MI 13 (10/7/21):

Coordinates: S 6.79529 / E 31.91098

Slope: 0-1%, slope exposure: 360°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 13 m²

Photos: MI 13A-D

Disturbances/notes (13-14): 1 *Pterocarpus angolensis* cut (>5 years) (100 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia glaucescens</i>	21	8.80
	<i>Strychnos innocua</i>	23	7.00
	<i>Diplorhynchus condylocarpon</i>	28	11.60
	<i>Julbernardia globiflora</i>	30	16.00
DBH < 20 cm	<i>Pterocarpus angolensis</i>	5	3.05
	<i>Dichrostachys cinerea</i>	5	2.40
	<i>Julbernardia globiflora</i>	3	2.20
	<i>Brachystegia spiciformis</i>	4	1.55

Sampling point MI14 (10/7/21):

Coordinates: S 6.79341 / E 31.90953

Slope: 1-2%, slope exposure: 360°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 15.5 m²

Photos: MI 14A-D

Disturbances/notes (14-15): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Brachystegia boehmii</i>	78	7.10
	<i>Erythrophleum africanum</i>	22	6.20
	<i>Lannea schimperi</i>	30	9.20
DBH < 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	8	1.45
	<i>Dichrostachys cinerea</i>	4	5.25
	<i>Diplorhynchus condylocarpon</i>	7	1.30
	<i>Pseudolachnostylis maprouneifolia</i>	4	3.20

Sampling point MJ 1 (11/7/21): MJ Opposite direction MI1, i.e. 140°; road S 6.81860 / E 31.92810

Coordinates: S 6.81944 / E 31.92843

Slope: 1-2%, slope exposure: 70°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 14.5 m²

Photos: MJ 1A-D

Disturbances/notes (1-2): 1 *Pterocarpus angolensis* (dead wood) cut 2021 (100 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	35	7.40
	<i>Pseudolachnostylis maprouneifolia</i>	28	9.20
	<i>Diplorhynchus condylocarpon</i>	32	12.25
	<i>Isobertia tomentosa</i>	21	9.00
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	17	6.10
	<i>Ochna macrocalyx</i>	3	3.75
	<i>Lannea schimperi</i>	11	3.15
	<i>Terminalia sericea</i>	5	1.50

Sampling point MJ 2 (11/7/21):

Coordinates: S 6.82176 / E 31.92916

Slope: 1-2%, slope exposure: 50°

Dominant tree height: 18 m

Basal area (Bitterlich, k=1): 11 m²

Photos: MJ 2A-D

Disturbances/notes (2-3): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia longifolia</i>	37	2.10
	<i>Brachystegia longifolia</i>	49	10.35
	No tree		
	<i>Brachystegia longifolia</i>	34	7.25
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	6	10.50
	<i>Diplorhynchus condylocarpon</i>	13	12.15
	<i>Erythrophleum africanum</i>	6	12.05
	<i>Strychnos pungens</i>	15	10.20

Sampling point MJ 3 (11/7/21):

Coordinates: S 6.82416 / E 31.92959

Slope: 1-2%, slope exposure: 360°

Dominant tree height: 18 m

Basal area (Bitterlich, k=1): 13 m²

Photos: MJ 3A-D

Disturbances/notes (3-4): Foot path (50 steps); foot path (265 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Isobertinia tomentosa</i>	22	8.70
	<i>Brachystegia longifolia</i>	33	10.00
	<i>Pseudolachnostylis maprouneifolia</i>	23	8.30
	<i>Brachystegia longifolia</i>	37	18.80
DBH < 20 cm	<i>Brachystegia glaucescens</i>	6	1.00
	<i>Erythrophleum africanum</i>	8	3.00
	<i>Strychnos spinosa</i>	3	2.00
	<i>Erythrophleum africanum</i>	4	1.40

Sampling point MJ 4 (11/7/21):

Coordinates: S 6.82654 / E 31.92999

Slope: 1-2%, slope exposure: 50°

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 9 m²

Photos: MJ 4A-D

Disturbances/notes (4-5): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Erythrophleum africanum</i>	20	3.80
	No tree		
	<i>Isobertinia tomentosa</i>	35	8.30
	<i>Erythrophleum africanum</i>	25	16.90
DBH < 20 cm	<i>Dalbergia nitidula</i>	5	3.20
	<i>Brachystegia longifolia</i>	6	2.90
	<i>Bobgunnia madagascariensis</i>	4	3.40
	<i>Isobertinia tomentosa</i>	3	2.80

Sampling point MJ5 (Point MJ5 – MJ16 surveyed by Fred Masanja, 10/11/21?):

Coordinates: S 6.82687 / E 31.92939

Slope: 1%, slope exposure: 80°

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 15 m²

Photos: -

Disturbances/notes (5-6): Tree cutting (2 years) (35 steps); sawpit 2020 (250 steps); tree cutting 2021 (295 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Terminalia sericea</i>	38	9.7
	<i>Pseudolachnostylis maprouneifolia</i>	21	15.5
	<i>Brachyategia manga</i>	29	4.1
DBH < 20 cm	<i>Maytenus senegalensis</i>	4	2.1
	<i>Flacourtia indica</i>	3	1.5
	<i>Brachystegia manga</i>	3	1.5
	<i>Pterocarpus angolensis</i>	6	2.4

Sampling point MJ6 (10/11/21?):

Coordinates: S 6.83138 / E 31.92963

Slope: 1%, slope exposure: 60°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 11 m²

Photos: -

Disturbances/notes (6-7): Tree cutting 2021 (9 steps); sawpit 2021 (31 steps); tree cutting 2021 (260 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia manga</i>	31	7.2
	<i>Isobertinia angolensis (tomentosa)?</i>	44	18.1
	<i>Isobertinia angolensis (tomentosa)?</i>	28	11.4
	No tree		
DBH < 20 cm	<i>Erythrophleum africanum</i>	8	4.5
	<i>Diprorhynchus condylocarpon</i>	7	3.5
	<i>Hymenocardia acida</i>	13	4.5
	<i>Pseudolachnostylis maprouneifolia</i>	4	2.4

Sampling point MJ7 (10/11/21?):

Coordinates: S 6.83357 / E 31.92906

Slope: 1%, slope exposure: 70°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 17 m²

Photos: -

Disturbances/notes (7-8): Tree cutting 2020 (220 steps); tree cutting 2021 (280 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Isobertinia angolensis (tomentosa)?</i>	39	10
	<i>Burkea africana</i>	30	8.9
	<i>Lannea schimperi</i>	24	7.3
	<i>Sclerocarya birrea</i>	31	4.3
DBH < 20 cm	<i>Brachystegia manga</i>	4	3
	<i>Terminalia sericea</i>	13	1
	<i>Erythrophleum africanum</i>	6	1.9
	<i>Hymenocardia acida</i>	7	1.7

Sampling point MJ8 (10/11/21?):

Coordinates: S 6.83597 / E 31.92938

Slope: 0-1%, slope exposure: 80°

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 18 m²

Photos: -

Disturbances/notes (8-9): Camp 2020 (20 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Parinari curatellifolia</i>	39	8.2
	<i>Brachystegia manga</i>	25	10
	<i>Pseudolachnostylis maprouneifolia</i>	37	15.7
	<i>Brachystegia manga</i>	56	3.4
DBH < 20 cm	<i>Maprounea africana</i>	5	1.9
	<i>Bobgunnia madagascariensis</i>	5	1.7
	<i>Maprounea africana</i>	10	2.7
	<i>Strychnos spinosa</i>	3	1.6

Sampling point MJ9 (10/11/21?):

Coordinates: S 6.83826 / E 31.92886

Slope: 1-2%, slope exposure: 80°

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 15 m²

Photos: -

Disturbances/notes (9-10): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia boehmii</i>	72	7.3
	No tree		
	No tree		
	<i>Brachystegia boehmii</i>	57	10.6
DBH < 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	4	3.6
	<i>Pseudolachnostylis maprouneifolia</i>	4	6.7
	<i>Pseudolachnostylis maprouneifolia</i>	5	5.2
	<i>Crossopteryx febrifuga</i>	3	1.7

Sampling point MJ10 (10/11/21?):

Coordinates: S 6.84083 / E 31.92852

Slope: 0-1%, slope exposure: 100°

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 17 m²

Photos: -

Disturbances/notes (10-11): Tree cutting (5 years) (225 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	32	13.7
	<i>Brachystegi boehmii</i>	24	5.8
	<i>Brachystegi boehmii</i>	37	5
	<i>Brachystegi boehmii</i>	55	6.9
DBH < 20 cm	<i>Erythrophleum africanum</i>	4	12.6
	<i>Pseudolachnostylis maprouneifolia</i>	6	6.7
	<i>Diplorhynchus condylocarpon</i>	11	4.9
	<i>Terminalia mollis</i>	4	11.7

Sampling point MJ11 (10/11/21?):

Coordinates: S 6.84314 / E 31.92918

Slope: 0-1%, slope exposure: 100°

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 18 m²

Photos: -

Disturbances/notes (11-12): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia manga</i>	32	10.3
	<i>Brachystegia boehmii</i>	33	3.2
	<i>Brachystegia boehmii</i>	34	13.5
	<i>Brachystegia boehmii</i>	23	6.9
DBH < 20 cm	<i>Pseudolachynostylis maprouneifolia</i>	5	3.8
	<i>Phyllocosmus leimareanus</i>	3	2.6
	<i>Schrebera trichoclada</i>	3	19.6
	<i>Bobgunnia madagascariensis</i>	12	3.2

Sampling point MJ12 (10/11/21?):

Coordinates: S 6.84635 / E 31.92980

Slope: 1%, slope exposure: 220°

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 11 m²

Photos: -

Disturbances/notes (12-13): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pericopsis angolensis</i>	24	4.5
	<i>Pseudolachynostylis maprouneifolia</i>	26	11.5
	<i>Brachystegia manga</i>	26	16.9
	<i>Pericopsis angolensis</i>	41	3.8
DBH < 20 cm	<i>Uapaca kirkiana</i>	11	4.2
	<i>Brachystegia boehmii</i>	3	2.8
	No tree		
	<i>Terminalia mollis</i>	5	3.7

Sampling point MJ13 (10/11/21?):

Coordinates: S 6.84828 / E 31.93037

Slope: 0-1%, slope exposure: 140°

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 12 m²

Photos: -

Disturbances/notes (13-14): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	44	13.2
	<i>Julbernardia globiflora</i>	34	7.2
	<i>Julbernardia globiflora</i>	27	5.5
	<i>Parinari curatellifolia</i>	41	9.1
DBH < 20 cm	<i>Erythrophleum africanum</i>	4	2
	<i>Strychnos pungens</i>	4	3.9
	<i>Terminalia sericea</i>	11	2.9
	<i>Erythrophleum africanum</i>	11	2.8

Sampling point MJ14 (10/11/21?):

Coordinates: S 6.85068 / E 31.93058

Slope: 1%, slope exposure: 230°

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 10m²

Photos: -

Disturbances/notes (14-15): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	21	8.3
	<i>Brachystegia boehmii</i>	25	10.6
	<i>Julbernardia globiflora</i>	47	7.5
	<i>Pericopsis angolensis</i>	41	9.6
DBH < 20 cm	<i>Brachystegia boehmii</i>	5	5.3
	<i>Oldfieldia dactylophylla</i>	5	4.9
	<i>Strychnos pungens</i>	17	5.7
	<i>Erythrophleum africanum</i>	7	4.1

Sampling point MJ15 (10/11/21?):

Coordinates: S 6.85296 / E 31.93000

Slope: 1%, slope exposure: 140°

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 13 m²

Photos: -

Disturbances/notes (15-16): Tree cutting (6 years) (15 steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	30	17.4
	<i>Isobertia angolensis (tomentosa)?</i>	24	6.8
	<i>Oldfieldia dactylophylla</i>	27	10.8
	<i>Brachystegia manga</i>	48	5.8
DBH < 20 cm	<i>Hymenocardia acida</i>	3	6.8
	<i>Terminalia sericea</i>	5	3.1
	<i>Erythrophleum africanum</i>	5	3.6
	<i>Dichrostachys cinerea</i>	4	4.4

Sampling point MJ16 (10/11/21?):

Coordinates: S 6.85530 / E 31.92931

Slope: 1%, slope exposure: 80°

Dominant tree height: 12 m

Basal area (Bitterlich, k=1): 19 m²

Photos: -

Disturbances/notes: -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	20	4.9
	<i>Isobertia angolensis (tomentosa)?</i>	25	11.6
	No tree		
	<i>Pterocarpus angolensis</i>	28	11.6
DBH < 20 cm	<i>Brachystegia manga</i>	11	5.7
	<i>Erythrophleum africanum</i>	5	2.3
	<i>Erythrophleum africanum</i>	4	5.2
	<i>Erythrophleum africanum</i>	5	3.8

29 sampling points:

Mean basal area (Bitterlich, k=1): 13.98 m²

Dominant tree height: 15.6 m

Appendix C: Tree and shrub checklist for Mlele and Sikonge districts (12/5/2023)

Scientific name	Kikonongo / Kinyamwezi	Uses, ecology, other characteristics
<i>Acacia drepanolobium</i> (Vacchellia d.)		
<i>Acacia gerrardii</i> (Vacchellia g.)	Ulula	
<i>Acacia nilotica</i> (Vacchellia n.)		
<i>Acacia polyacantha</i> (Vacchellia p.)	Muwombwe	
<i>Acacia stuhlmannii</i> (Vacchellia s.)	Nunga?	
<i>Acacia tanganyikensis</i> (Vacchellia t.)	Mzima?	
<i>Acacia sieberiana</i> (Vacchellia s.)		
<i>Acacia tortilis</i> (Vacchellia t.)		
<i>Acacia xanthophloea</i> (Vacchellia x.)		
<i>Azania quanzensis</i>	Mkola	Timber
<i>Albizia amara</i>	Mpogolo,	Leaflets straight
<i>Albizia antunesiana</i>	Mpilipili	Timber
<i>Albizia glaberrima</i>		
<i>Albizia grandibracteata</i>		
<i>Albizia gummifera</i>		
<i>Albizia harveyi</i>	Mpogolo, Mkologomgoe	Leaflets sickle-shaped
<i>Albizia versicolor</i>	Masako, Mpilipili	
<i>Anisophyllea boehmii</i>	Msindwi	
<i>Anisophyllea pomifera</i> ?		No hairy leaves
<i>Annona senegalensis</i>	Mfilafila	Fruit edible
<i>Antidesma membranaceum</i>	Msekela	Fruit edible
<i>Antidesma venosum</i>	Msekela	Fruit edible
<i>Azanza garckeana</i>	Mtowo	
<i>Bauhinia petersiana</i>	Mfundwa mbogo	
<i>Bauhinia thonningii</i>	Mfundwa mbogo	
<i>Bobgunnia madagascariensis</i>	Kasanda	Timber
<i>Borassus aethiopum</i>	Sandala	Fruit edible
<i>Brachystegia boehmii</i>		Slashed bark reddish; large tree trunk
<i>Brachystegia bussei</i>	Mkongolo	Tall tree on rocky hillsides; slashed bark reddish
<i>Brachystegia floribunda</i>	Myusa/Musa dume	Slashed bark reddish
<i>Brachystegia glaberrima</i>	Msilanga	Initially identified mistakenly as <i>Brachystegia utilis/floribunda</i> ; slashed bark reddish

<i>Brachystegia glaucescens</i>	Myombo	Slashed bark reddish
<i>Brachystegia longifolia</i>	Msilanga	Slashed bark reddish
<i>Brachystegia manga</i>		Recorded by Fredy Masanja; slashed bark reddish
<i>Brachystegia microphylla</i>	Mkongolo	Slashed bark reddish
<i>Brachystegia spiciformis</i>	Mtundu / Umtundu	Timber; slashed bark reddish
<i>Brachystegia stipulata</i>	Msilanga	Slashed bark reddish
<i>Brachystegia cf. stipulata</i>	Myusa/Musa jike	High tree (18m); bark for beehives; slashed bark reddish
<i>Brachystegia taxifolia</i>	Kapepe	slashed bark reddish
<i>Brachystegia utilis</i>	Msilanga	Slashed bark reddish
<i>Brachystegia wangermeeana</i>		Fred western lowland; slashed bark reddish
<i>Bridelia atroviridis</i>		
<i>Bridelia cathartica</i>		
<i>Bridelia duvigneaudii</i>		
<i>Bridelia scleroneura</i>		
<i>Burkea africana</i>	Mgandosinsi	
<i>Cassia abbreviata</i>	Mlundalunda	
<i>Cassia singueana</i>	Mzokazoka	
<i>Cassipourea mollis</i>	Mlugala	
<i>Catunaregam spinosa</i>	Mpongole	
<i>Chrysophyllum bangweolense</i>		
<i>Combretum collinum</i>	Mlandala	
<i>Combretum fragrans (C. adenogonium)</i>	Mlozaminze / Mluziaminzi	Leaf underside veloutinous
<i>Combretum molle</i>	Mlama	
<i>Combretum zeyheri</i>	Msana	Shiny leaf surface
<i>Commiphora africana</i>	Mponda	
<i>Commiphora mollis</i>	Kama mponda	
<i>Commiphora mosambicensis</i>		
<i>Craibia brevicaudata</i>		Riverine Forest, Iloba waterfall near Training Centre Mulele Hills FR
<i>Crossopteryx febrifuga</i>	Msanza	
<i>Dalbergia boehmii</i>	Kapondolampassa	
<i>Dalbergia melanoxylon</i>	Mgembe (Swahili Mpingo)	Ebony, carving
<i>Dalbergia nitidula</i>	Kapondalampassa	
<i>Deinbollia borbonica</i>		Riverine Forest, Iloba waterfall near Training Centre Mulele Hills FR
<i>Dichrostachys cinerea</i>	Kasunzulu	
<i>Diospyros cornii</i>	Mnumbulu	

<i>Diospyros kirkii</i>		
<i>Diospyros mespiliformis</i>	Msinde	Riverine forest; fruit edible
<i>Diospyros</i> sp.		Riverine Forest, waterfall Iloba River near Training Centre Mulele Hills FR
<i>Diplorhynchus condylocarpon</i>	Msonga	
<i>Dombeya rotundifolia</i>	Mlalila	
<i>Dracaena reflexa</i>	Kapupwa	Roots used as remedy for snake bites
<i>Ekebergia capensis</i>	Mtuzya	
<i>Elaeodendron schweinfurthianum</i>		
<i>Entada abyssinica</i>	Mfutwamvula / Kamchicha / Kama mgunga	
<i>Eriosema</i> sp.		
<i>Erythrina abyssinica</i>	Kamchicha	
<i>Erythrophleum africanum</i>	Mgandongoye	
<i>Euclea schimperi</i> ?	Mdaa / Msubata	
<i>Euphorbia candelabrum</i>	Mlangale	Drier areas
<i>Euphorbia dendroides</i>		
<i>Euphorbia matabelensis</i>	Kiponda	
<i>Faidherbia albida</i>		
<i>Ficus</i> sp.		Riverine Forest, Iloba waterfall, near Training Centre Mulele Hills FR
<i>Ficus glumosa</i>		
<i>Ficus stuhlmannii</i>		Medium sized strangler (ML12)
<i>Flacourtia indica</i>	Msungu, Msingira	Fruit edible
<i>Flueggea virosa</i>	Kisenga	Syn.: <i>Securinega virosa</i> ; fruit edible
<i>Friesodielsia obovata</i>	Msalansi	Fruit edible
<i>Garcinia huillensis</i>	Myeye	Fruit edible
<i>Grewia bicolor</i>	Mkoma	Fruit edible
<i>Grewia</i> sp. ?	Kama mkoma	
<i>Hexalobus monopetalus</i>	Mkuwa	Fruit edible
<i>Holarrhena pubescens</i>	Msongalukuga	Syn.: <i>H. febrifuga</i>
<i>Hymenocardia acida</i>	Kapala, Msanza	
<i>Isoberlinia angolensis</i>	Mnembela	
<i>Isoberlinia tomentosa</i>		
<i>Julbernardia globiflora</i>	Muva	Bark for beehives; slashed bark yellowish
<i>Kigelia africana</i>	Mdungwa	
<i>Lannea schimperi</i>	Mgumbu, Mgugumbuga?	Fruit edible
<i>Lannea discolor</i>		Fruit edible

<i>Lonchocarpus capassa</i> (Philenoptera violacea)	Mvalevale	
<i>Lonchocarpus eriocalyx</i>		
<i>Margaritaria discoidea</i>		Syn. <i>Phyllanthus discoideus</i>
<i>Manilkara mochisia</i>	Mkonze	Riverine forest; fruit edible
<i>Maprounea africana</i>		Fruit edible
<i>Maranthes floribunda</i>	Mwasha	
<i>Markhamia obtusifolia</i>	Mpapa	
<i>Maytenus senegalensis</i>	Mwesia	
<i>Memecylon flavovirens</i>	Mseweye	Fruit edible
<i>Monanthes discolor</i>	Mshenene	
<i>Monotes africanus</i>	Mkokote	
<i>Monotes katangensis</i>	Mukokoti	
<i>Multidentia crassa</i>	Mukukumba	Fruit edible
<i>Mundulea sericea</i>		
<i>Mystroxydon aethiopicum</i>	Kasela	
<i>Ochna afzelii</i> ssp. <i>afzelii</i>		
<i>Ochna inermis</i>		
<i>Ochna longipes</i>	Mumwaga, Mnyege	Syn.: <i>O. holstii</i>
<i>Ochna macrocalyx</i>	Mwaga	
<i>Ochna oxyphylla</i>		
<i>Olax obtusifolia</i>	Mtundwa	
<i>Oldfieldia dactylophylla</i>	Mliwamfwengi	Fruit edible
<i>Ozoroa insignis</i> subsp. <i>reticulata</i>	Mkalakala (Swahili: Mwembepoli)	
<i>Parinari curatellifolia</i>	Mbula/Mhula	Fruit edible
<i>Pavetta stuhlmannii</i>		
<i>Pericopsis angolensis</i>	Mbanga	Timber
<i>Phyllanthus engleri</i>	Mng'ongomtandala	
<i>Phyllocosmus leimareanus</i>	Msonifya	
<i>Pleurostyliia africana</i>		
<i>Premna</i> sp.		
<i>Protea madiensis</i>		
<i>Pseudolachnostylis maprouneifolia</i>	Mtungulu	
<i>Psorospermum febrifugum</i>	Mvivi	Fruit edible
<i>Psychotria eminiiana</i>		
<i>Pterocarpus angolensis</i>	Mninga	Timber
<i>Pterocarpus tinctorius</i>	Mkulungu	Timber
<i>Rhus longipes</i>	Msilanswagalo	

<i>Rhus vulgaris</i>	Kankiningi	
<i>Rytigynia decussata</i>		
<i>Rytigynia uhligii</i>	Msongwansimba	
<i>Rothmannia engleriana</i>	Mlozirozi, Mukondokondo	Fruit edible
<i>Schrebera trichoclada</i>	Mputika	
<i>Sclerocarya birrea</i>	Mng'ongo	Fruit edible
<i>Securidaca longepedunculata</i>	Mteywe	
<i>Sterculia africana</i>	Msawala	
<i>Sterculia quinqueloba</i>	Mkungulanga / Msavala / Msawala	
<i>Stereospermum kunthianum</i>	Mwogawami	
<i>Strychnos innocua</i>	Mkulwa	Fruit edible
<i>Strychnos potatorum</i>	Mnyekenyeke, Mgwegwe	
<i>Strychnos pungens</i>	Mkome?	Fruit edible
<i>Strychnos spinosa</i>	Katonga, Mwaye	Fruit edible
<i>Syzygium guineense</i> subsp. <i>guineense</i>	Kashamongo	Riverine forest; fruit edible
<i>Tapiphyllum discolor</i>		
<i>Tamarindus indica</i>	Msisi (Swahili: Mkwaju)	Fruit edible (juice)
<i>Terminalia sericea</i> (T. <i>kaiseriana</i>)	Kazima	
<i>Terminalia mollis</i>	Mfufu	Very large leaves
<i>Terminalia torulosa</i>	Mkelenge	Reddish seeds
<i>Trichilia emetica</i>	Mkalya	
<i>Uapaca kirkiana</i>	Mkusu	Fruit edible
<i>Uapaca nitida</i>	Mkokofinyo	Fruit edible
<i>Vangueria madagascariensis</i>	Mgelelya	Fruit edible
<i>Vangueriopsis lanciflora</i>	Mgelelya	Fruit edible
<i>Vitex doniana</i>	Mfulu, Mfululegea	Fruit edible
<i>Vitex fischeri</i> ?		
<i>Vitex madiensis</i>	Mfululegea	Fruit edible; leaves like sandpaper
<i>Vitex mombassae</i>	Mtalali	Fruit edible
<i>Vitex payos</i>	Mtalali	Fruit edible
<i>Xeroderris stuhlmannii</i>		
<i>Ximenia americana</i> ?	Mtundwa	Fruit edible
<i>Ximenia caffra</i>	Kaguvaguva	Fruit edible
<i>Xylopiia antunesii</i>	Mshenene	Monanthotaxis discolour?
<i>Zanha africana</i>		
<i>Zanthoxylum chalybeum</i>	Mlungulungu	
<i>Ziziphus mucronata</i>	Kagaole	Fruit edible

	Mgulumwanguku (M24)	
	Mlungwanyama (RT3: 2)	
	Mtandara (RT3: 2)	
Total number of species identified with their latin name: 175	Total number of species identified only with their vernacular names: 3	

Appendix D: Location of the three transects in Mulele Hills Forest Reserve

