



Vegetation survey in Ipole Wildlife Management Area

Final report



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Front page: *Msilanga* (*Brachystegia* sp.) with new leaf shoots in Ipole WMA, Ugunda Forest Reserve, 16/8/2023

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Abbreviations

ADAP	Association for the Development of Protected Areas
ba	Basal area
DBH	Diameter at Breast Height
DFO	District Forest Officer
FR	Forest Reserve
GIS	Geographic Information System
LNRO	Livelihood and Natural Resources Officer
JUHIWAI	Jumuiya ya Hifadhi ya Wanyamapori Ipole
PCQM	Point-Centered Quarter Method
TAFORI	Tanzania Forestry Research Institute
TANRIC	Tanzania Resource Information Center
TAWA	Tanzania Wildlife Management Authority
TFS	Tanzania Forest Services Agency
VGS	Village Game Scout
WMA	Wildlife Management Area

Abstract

The vegetation survey was carried out between August and October in Ipole Wildlife Management Area (WMA) of Sikonge 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 six transects with an overall length of 37.629 km were outlined in Ipole WMA. In total 142 and 147 sampling points were analysed for larger trees (diameter class ≥ 20 cm) and for smaller trees/shrubs (diameter class < 20 cm), respectively (see Table 1). In total, 482 larger trees and 552 smaller trees/shrubs were recorded.

Julbernardia globiflora (Muva) a characteristic, widespread and often gregarious tree is dominating in many miombo woodlands of Western Tanzania and also in Ipole WMA. *Brachystegia spiciformis*, another typical miombo species, is also very common in Ipole WMA. The understoreys are widely dominated by *Diplorhynchus condylocarpon*. Another very common and small tree is *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 Ipole WMA. It would be interested to analyse the diameter class distribution for other timber species which are now increasingly used as timber but our data are too sparse.

The vegetation surveys from Mlele Beekeeping Zone (Bloesch 2019), Kululu Village Land FR and Rungwa River FR (Bloesch 2022), Mulele Hills FR (Bloesch 2023) resulted in a quite comprehensive plant list including a total of 187 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.

The basal areas determined with PCQM and Bitterlich methods are highly concordant (see Table 2). The standing volume in Ipole WMA oscillates between 34.7 m³/ha at Swangala Isanga and 59.1 m³/ha at Ugunda Ngojwa.

Timber logging and debarking for producing beehives (mainly *Julbernardia globiflora*) are the prevailing human ecosystem disturbance. Intensive grazing by Sukuma pastoralists are an increasing threat for the Miombo woodland ecosystems.

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 VGSs which are not yet trained, members from the Village Natural Resource Committee and from JUHIWAI 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, Mulele Hills FR, and Ipole WMA are a solid base for developing and implementing a carbon project.

1) Introduction

The Association for the Development of Protected Areas (ADAP) is a Swiss non-governmental organisation set up in Geneva in 1997. It supports local community-based natural resource management initiatives in Africa. ADAP assumes that any conservation initiative that does not take into account the needs of the local communities is doomed to failure. ADAP has been supporting projects in Tanzania since 2002 and has a national branch since 2008.

In addition to the Katavi-Ugalla and Rungwa River corridor projects, ADAP launched in 2022 a new project entitled Sustainable development of the Ipole Wildlife Management Area in Sikonge District, Tabora Region. The project supports Jumuiya ya Hifadhi ya Wanyamapori Ipole (JUHIWAI) in the management of the Ipole Wildlife Management Area (WMA) and its resources in close collaboration with the Tanzania Wildlife Management Authority (TAWA), Tanzania Forest Service Agency (TFS), and District Forest Officer (DFO).

The project also provide support to the population of the six villages bordering the WMA so that they can benefit from the natural resources in a sustainable manner. The main areas of intervention are capacity-building, support for the management of the protected area, development of income-generating activities (focussing on honey and wild edible mushrooms) and regional and national networking. The project will end in 2029 including four project phases each of two years. The main source of funding is the Geneva Federation for Cooperation and Development.

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 three vegetation studies for ADAP using the same transect method based on the Point-Centered Quarter Method (PCQM, Mueller-Dombois, & Ellenberg 1974) and the assessment of human disturbances along the transects. The surveyed protected areas include Mulele Beekeeping Zone (Bloesch 2019), Mulele Hills Forest Reserve (FR) within the Katavi-Ugalla Corridor and Rungwa River 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 Ipole WMA including and and its current threats. More specifically, the following parameters were analysed:

- Assess the following forest parameters along transects using the PCQM method (Mueller-Dombois, & Ellenberg 1974, Mitchell 2024):
 - 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 filed mission was conducted from 12 to 27 August 2023 (see mission programme Annexe A). The field team was composed of:

Dr. Urs Bloesch, team leader

Rashidi Kikoti, ADAP livelihood and natural resources officer from Ipole project

Fredy Masanja, District Forest Officer (DFO) at Sikonge district

Francis Florence Mpanda, assistant TFS forest officer at Sikonge district (fieldwork Swangala FR)

Herieth Nyarobi, research officer from TAFORI Kibaha – Morogoro office (few days in Ugunda FR)

Valeria Didas Shirima and Abdala Liingilie, both ADAP LNRO (few days in Ugunda FR)

Aziz Yahaya, ADAP project driver

Alex Bloesch, student apprentice

Later on, the six transects in Ipole WMA were completed by Rashidi Kikoti and Fredy Masanja and their team from 25/09/2023 until 8/10/2023 including data collection and data entry (see Appendix D).

This report presents the state of the vegetation and the human disturbances of Ipole WMA based on the six transects. The former surveys from Mulele Beekeeping Zone (Bloesch 2019), Mulele Hills Forest Reserve (FR) and Rungwa River FR and Kululu Village Land FR (Bloesch 2020, 2022) were 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.

Ipole WMA is located southwest of Sikonge town. The topography is flat to slightly sloping terrain. The altitude ranges from 1090 to 1160 m a.s.l. 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 1100 mm (extrapolated from Inyonga climate diagram from climate-data.org 2022).

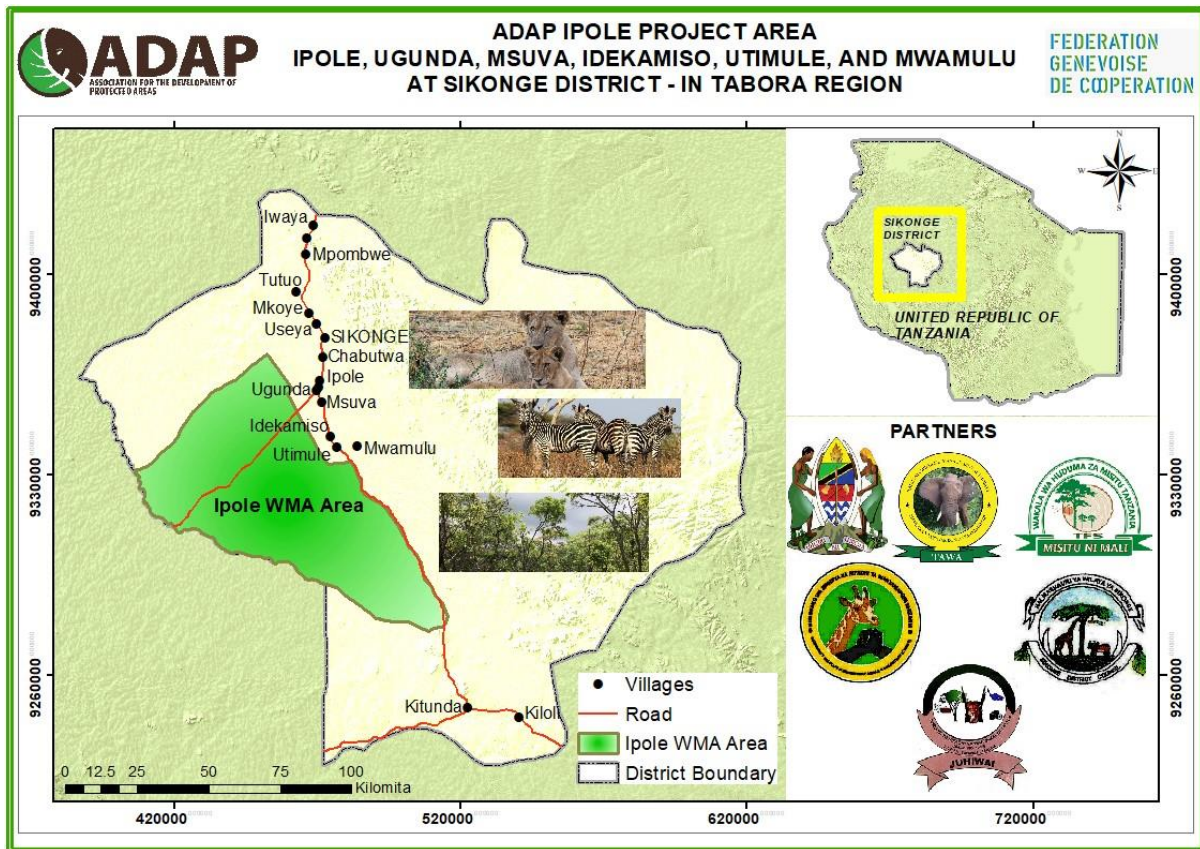


Fig. 1. The Ipole Wildlife Management Area in Sikonge District, Tabora Region.

Ipole WMA covers 2540 km² (see Fig. 1). It is an important ecological corridor between several protected areas and harbors important wildlife populations (buffalo, elephant, lion, leopard, giraffe. Miombo woodlands are the predominating vegetation type in Ipole WMA 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). Extensive Mbugas are especially widespread in Swangala FR.

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). Google earth maps were used to prelocate transects considering access constraints for the field survey. Finally, six transects of 25 (26) sampling points each were outlined (see map in Appendix D) with a total transect length of of 37,629 m (see Fig. 2. and Table 1).

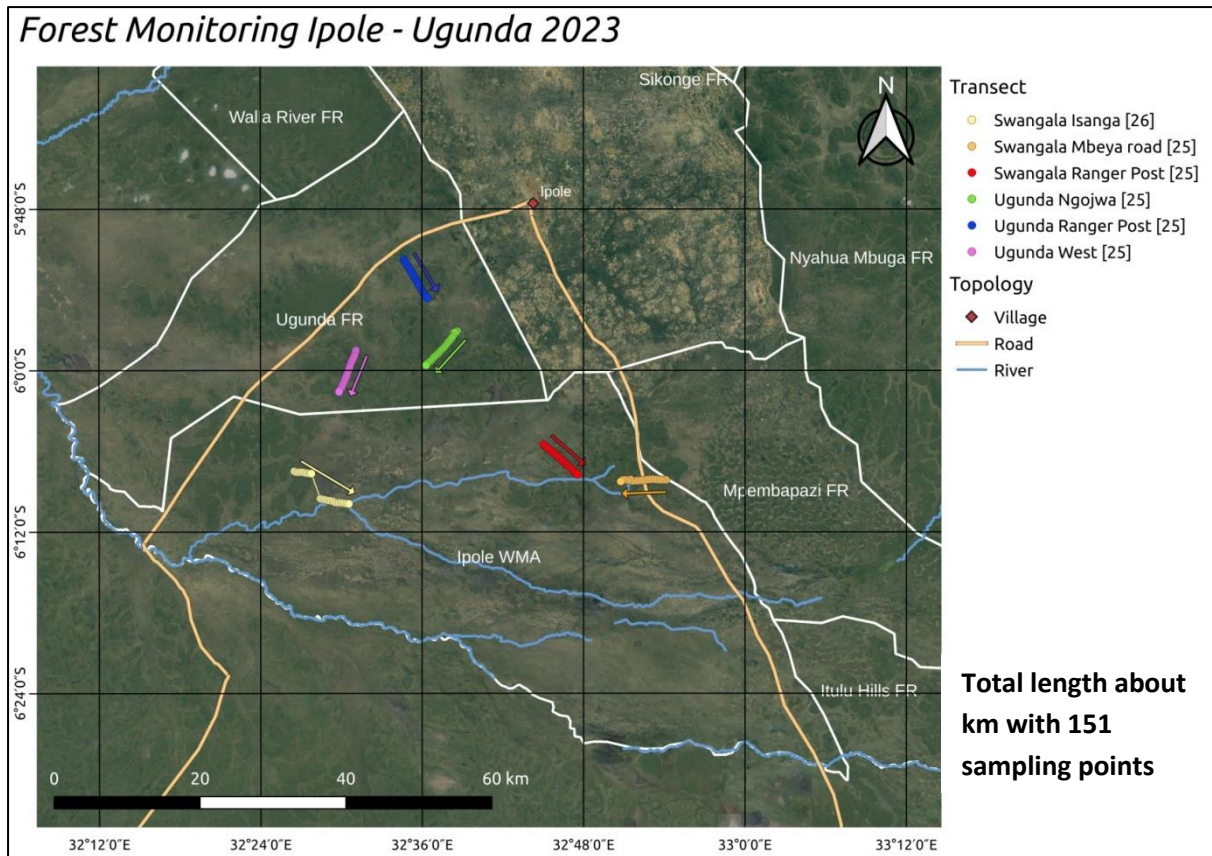


Fig. 2. Location of the six transects in Ipole WMA.

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 2024). 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. 3).

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 \geq 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 (see example in Fig. 4). The data for each sampling point for the six transects from Ipole WMA are given in Appendix B.



Fig. 3. 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 mena 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 area¹ of the surrounding stand was also estimated in a simple but efficient way using the Bitterlich method (1948). The Bitterlich method counts 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.

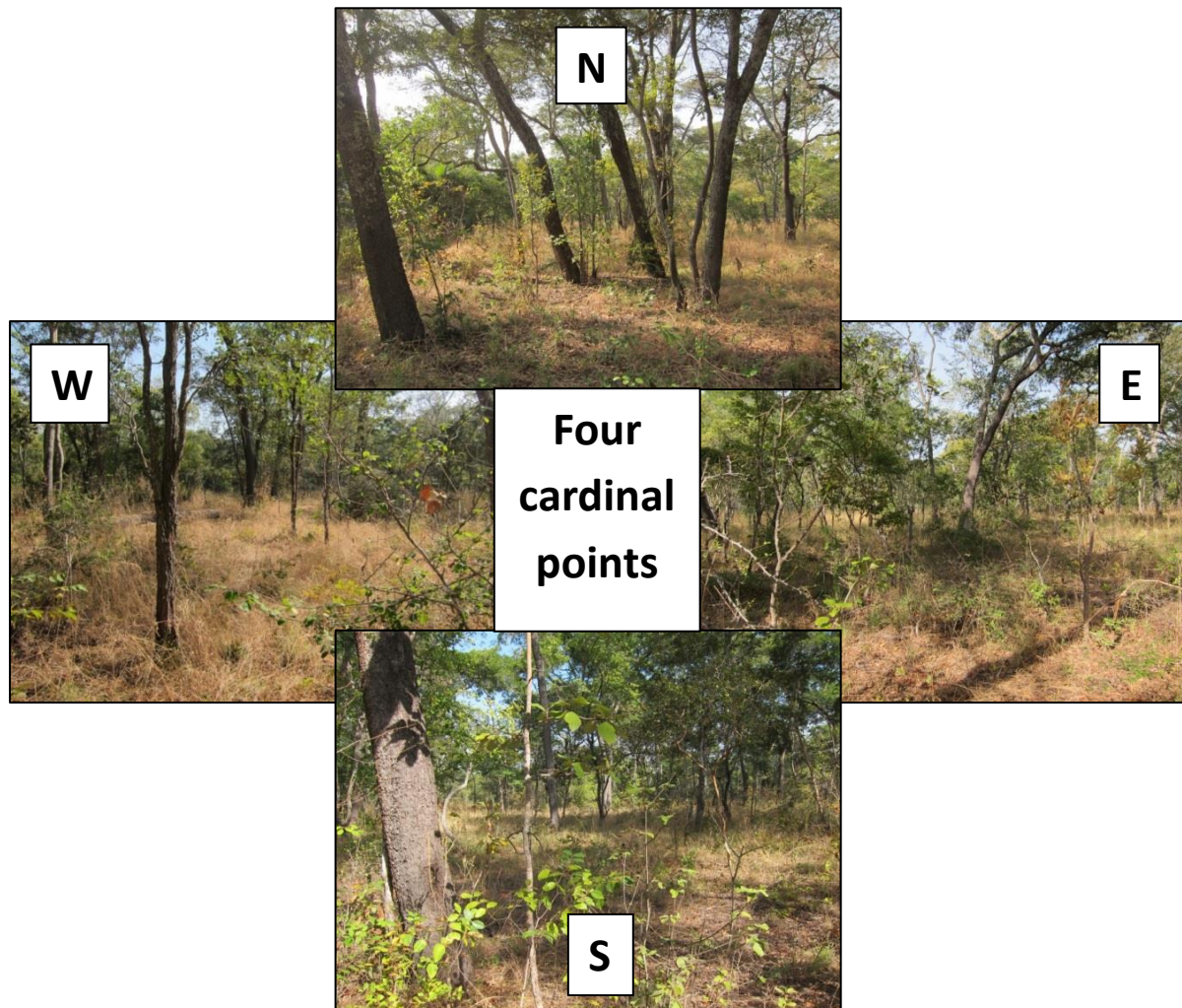


Fig. 4. Visual illustration of the site at the sampling using four photographs from the sampling point in each cardinal direction (photographs from the Mlele Beekeeping Zone survey see Bloesch 2019).

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),

¹ Tree basal area is the cross-sectional area (over the bark) at breast height (1.3 metres above the ground) measured in square meters.

trapping, infrastructures (camps), encroachments, and grazing by cattle. Fire signs were not recorded since most of the miombo woodlands are burnt annually.

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.

3.2 Data analysis

If plants could not be identified in the field with certainty, voucher specimens were collected and later identified. The former plant check list (Bloesch 2023) 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 points with species/total points) x 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 Fig. 2). The last column gives the number of sampling points effectively analysed since some points hit open areas (mbugas).

Table 1: Transect characteristics in Ipole WMA

Transect	Length (m)	Sampling points (N)	Sampling points (N) analysed large/small Ø
Ugunda Ngojwa	6,415	25	25 / 25
Ugunda Ranger post	6,222	25	24 / 24
Ugunda West	6,095	25	24 / 25
Swangala Isanga	6,317	26	23 / 24
Swangala Mbeya road	6,336	25	23 / 25
Swangala Ranger post	6,244	25	23 / 24
Total	37,629	151	142 / 147

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 of Ipole WMA

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)	Standing vol./ha (m ³)	Total standing vol./ha (m ³)
Ugunda Ngojwa Ø ≥ 20cm (25)	83.16	7.09	8.8	16.2 / 14	49.6	59.1
Ugunda Ngojwa Ø < 20cm (25)	388.22	3.17		6	9.5	
Ugunda Ranger post Ø ≥ 20cm (24)	59.02	5.35	6.7	14.9 / 13	34.8	38.3
Ugunda Ranger post Ø < 20cm (24)	164.87	1.18		6	3.5	
Ugunda West Ø ≥ 20cm (24)	93.76	7.91	9.9	15.2 / 13	51.4	57.7
Ugunda West Ø < 20cm (25)	305.05	2.11		6	6.3	
Swangala Isanga Ø ≥ 20cm (23)	54.72	5.43	5.7	14.3 / 12	32.6	34.7
Swangala Isanga Ø < 20cm (24)	115.87	0.70		6	2.1	
Swangala Mbeya road Ø ≥ 20cm (23)	84.07	6.39	9.3	15.6 / 13	41.5	48.2
Swangala Mbeya road Ø < 20cm (25)	299.31	2.24		6	6.7	
Swangala Ranger post Ø ≥ 20cm (23)	94.64	8.06	8.2	14.5 / 12	48.4	51.1
Swangala Ranger post Ø < 20cm (24)	154.96	0.89		6	2.7	

The **absolute frequency** of the first five tree/shrub species for both diameter classes for miombo woodlands from the six transects of Ipole WMA is presented Table 3:

Table 3: Absolute species frequency in miombo woodlands at Ipole WMA

Trees $\varnothing \geq 20\text{cm}$		Trees/shrubs $\varnothing < 20\text{cm}$	
Species	Absolute frequency %	Species	Absolute frequency %
Ugunda FR			
<i>Julbernardia globiflora</i>	44, 29, 63	<i>Diplorhynchus condylocarpon</i>	28, 29, 60
<i>Brachystegia boehmii</i>	44, 21, 38	<i>Combretum zeyheri</i>	40, 8, 32
<i>Brachystegia spiciformis</i>	44, 33, 25	<i>Pseudolachnostylis maproun.</i>	10, 11, 28
<i>Brachystegia glaucescens</i>	4, 29, 21	<i>Pterocarpus angolensis</i>	16, 25, 12
<i>Pseudolachnostylis maproun.</i>	32, 4, 8	<i>Brachystegia spiciformis</i>	32, 8, 4
Swangala FR			
<i>Julbernardia globiflora</i>	30, 48, 83	<i>Diplorhynchus condylocarpon</i>	21, 40, 29
<i>Brachystegia spiciformis</i>	17, 57, 30	<i>Combretum adenogonium</i>	29, 28, 17
<i>Pseudolachnostylis maproun.</i>	30, 26, 30	<i>Pseudolachnostylis maproun.</i>	21, 28, 21
<i>Pericopsis angolensis</i>	13, 26, 22	<i>Pterocarpus angolensis</i>	8, 20, 29
<i>Burkea africana</i>	17, 13, 22	<i>Crossopteryx febrifuga</i>	13, 12, 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 Ipole WMA

Trees $\varnothing \geq 20\text{cm}$		Trees/shrubs $\varnothing < 20\text{cm}$	
Species	Mean Ranking (3 transects)	Species	Mean Ranking (3 transects)
Ugunda FR			
<i>Julbernardia globiflora</i>	1.7	<i>Diplorhynchus condylocarpon</i>	2.0
<i>Brachystegia boehmii</i>	2.0	<i>Brachystegia spiciformis</i>	6.3
<i>Brachystegia spiciformis</i>	2.7	<i>Julbernardia globiflora</i>	7.3
<i>Pericopsis angolensis</i>	5.7	<i>Pseudolachnostylis maproun.</i>	7.7
<i>Brachystegia glaucescens</i> <i>Lannea schimperi</i> <i>Pseudolachnostylis maproun.</i>	8.7	<i>Combretum zeyheri</i>	8.7
Swangala FR			
<i>Julbernardia globiflora</i>	1	<i>Combretum adenogonium</i>	2.7
<i>Brachystegia spiciformis</i>	2.3	<i>Diplorhynchus condylocarpon</i> <i>Pseudolachnostylis maproun.</i>	4.3
<i>Pericopsis angolensis</i>	4.0	<i>Crossopteryx febrifuga</i>	9.0
<i>Pseudolachnostylis maproun.</i>	6.0	<i>Combretum zeyheri</i>	12.0
<i>Burkea africana</i>	7.0		

The diameter distribution of *Pterocarpus angolensis* and *Julbernardia globiflora* is shown in Figures 5 and 6, respectively.

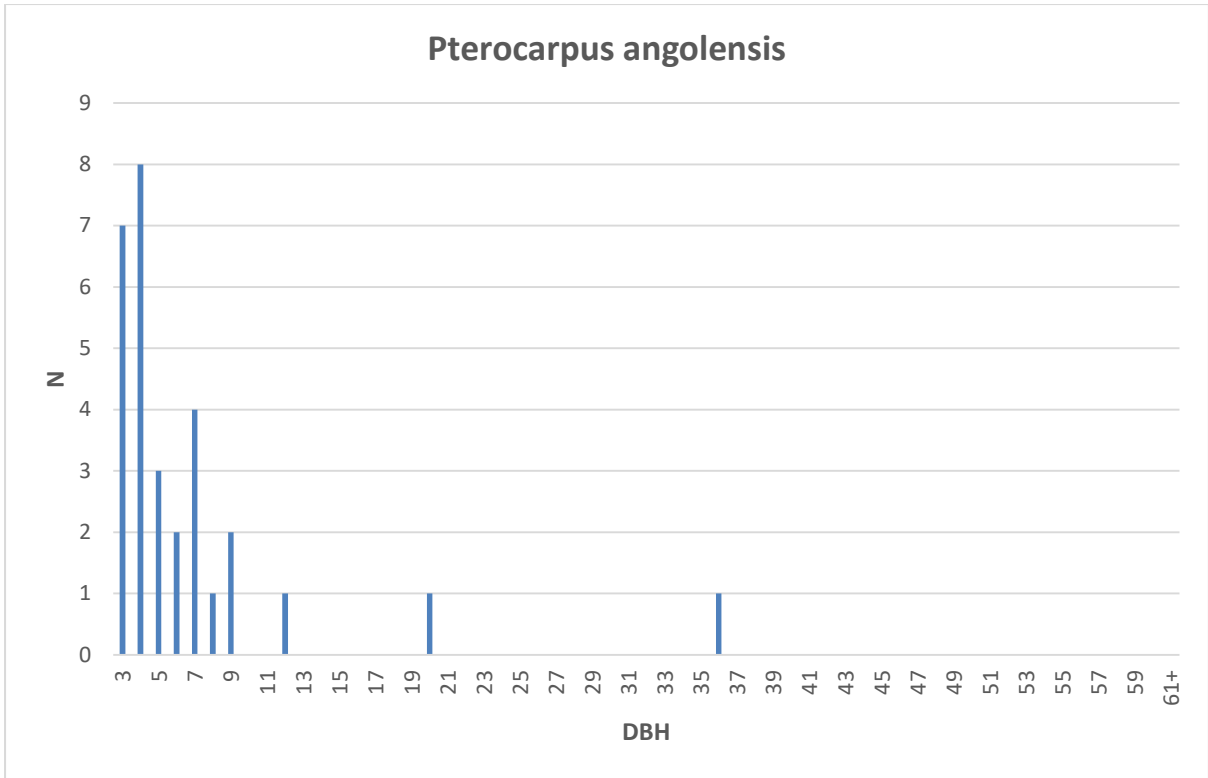


Fig. 5. Diameter distribution of *Pterocarpus angolensis* at Ipole WMA (six transects).

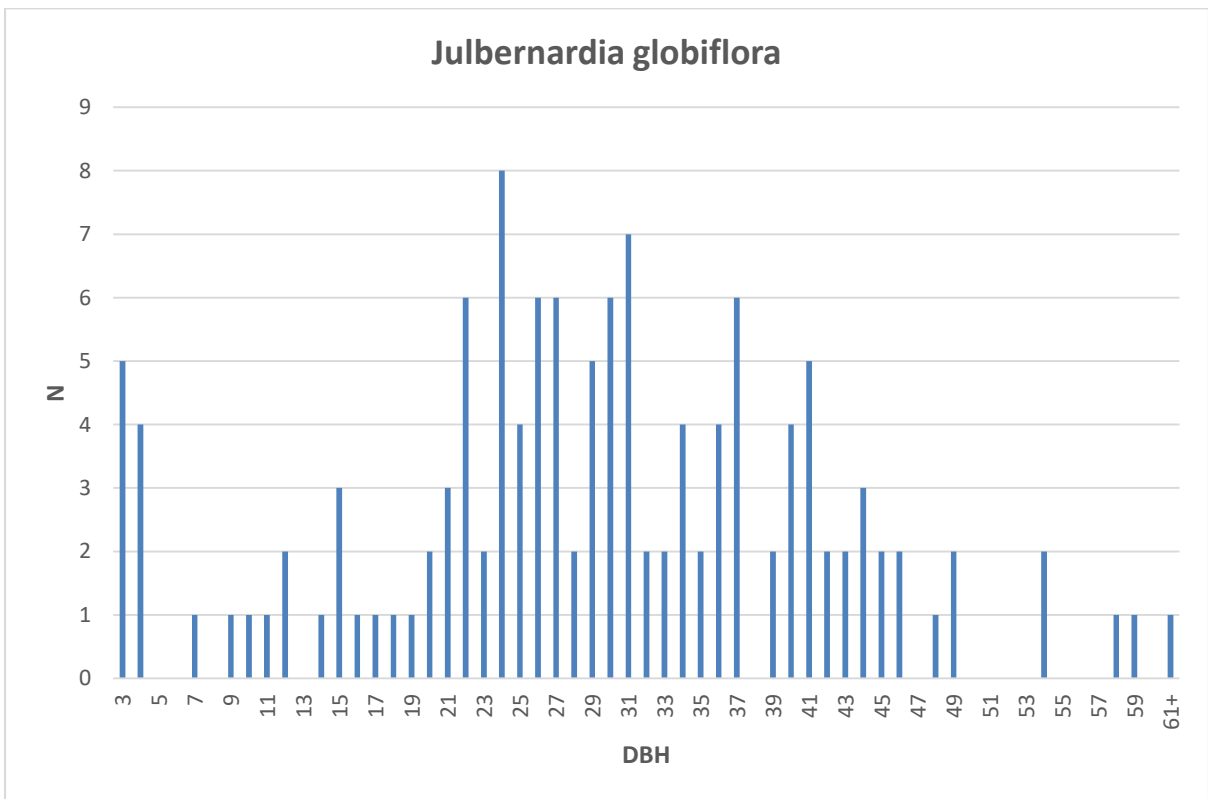


Fig. 6. Diameter distribution of *Julbernardia globiflora* at Ipole WMA (six transects).

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

Table 5: Alpha-diversity of trees/shrubs of miombo woodlands along the six transects

Transect	$\varnothing \geq 20\text{cm}$	$\varnothing < 20\text{cm}$
Ugunda Ngojwa	24	32
Ugunda Ranger post	20	33
Ugunda West	20	37
Swangala Isanga	23	36
Swangala Mbeya road	18	31
Swangala Ranger post	17	31

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 ecosystem disturbances were recorded on a width of 80 m along the transects in Ipole WMA are summarised in Table 6 below (not considering tracks and beehives).

Table 6: Human disturbances along the three transects of Ipole WMA

Type of disturbances	Magnitude (quantity)	Position along the transect
Ugunda FR, Ngojwa		
Timber logging	1 <i>Pterocarpus angol.</i> 2018, \varnothing : 30cm	Point 1+ 80 steps
	1 <i>Azelia quanzensis</i> 2018, \varnothing : 80cm	Point 1+ 130 steps
	1 <i>Pterocarpus angol.</i> 2013, \varnothing : 20cm	Point 1+ 140 steps
	3 <i>Pterocarpus angol.</i> 2018, \varnothing : 40cm	Point 1+ 220 steps
	3 <i>Pterocarpus angolensis</i> cut 2013	Point 2+ 20 steps
	3 <i>Pterocarpus angolensis</i> cut 2018	Point 2+ 120 steps
	3 <i>Pterocarpus angolensis</i> cut 2013	Point 2+ 140 steps
	1 <i>Pterocarpus angolensis</i> cut 2013	Point 2+ 270 steps
	1 <i>Burkea africana</i> cut 2022	Point 3+ 50 steps
	1 <i>Pterocarpus angolensis</i> cut 2013	Point 3+ 260 steps
	1 <i>Pterocarpus angolensis</i> cut 2023	Point 4+ 30 steps
	1 <i>Pterocarpus angolensis</i> cut 2013	Point 4+ 70 steps
	1 <i>Erythrophleum africanum</i> cut 2016	Point 5+ 150 steps
	1 <i>Pterocarpus angolensis</i> cut 2020	Point 5+ 220 steps
	1 <i>Brachystegia spiciformis</i> cut 2020	Point 5+ 230 steps
	1 <i>Pterocarpus angolensis</i> cut 2021	Point 6+ 270 steps
	1 <i>Pterocarpus angolensis</i> cut 2013	Point 7+ 270 steps
	1 <i>Burkea africana</i> cut	Point 9+ 250 steps
	1 <i>Pterocarpus angolensis</i> cut 2013	Point 10+ 60 steps
	1 <i>Pterocarpus angolensis</i> cut 2013	Point 11+ 40 steps
	1 <i>Pterocarpus angolensis</i> cut 2013	Point 12+ 180 steps
	3 <i>Pterocarpus angolensis</i> cut 2013	Point 12+ 240 steps
	1 <i>Pterocarpus angolensis</i> cut 2018	Point 13+ 30 steps
	1 <i>Pterocarpus angolensis</i> cut 2013	Point 14+ 160 steps
	1 <i>Pterocarpus angolensis</i> cut 2013	Point 14+ 190steps
	1 <i>Pterocarpus angolensis</i> cut 2013	Point 14+ 290 steps
	1 <i>Burkea africana</i> cut 2013	Point 15+ 110 steps
	1 <i>Erythrophleum africanum</i> cut 2021	Point 16+ 60 steps
	1 <i>Erythrophleum africanum</i> cut 2019	Point 18+ 140 steps

	1 <i>Burkea africana</i> cut 2018 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Brachystegia boehmii</i> cut 2018 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2020 1 <i>Burkea africana</i> cut 2013	Point 19+ 0 steps Point 19+ 130 steps Point 20+ 200 steps Point 21+ 70 steps Point 22+ 280 steps Point 24+ 70 steps
Tree debarking	1 <i>Julbernardia globiflora</i> 2022 1 <i>Julbernardia globiflora</i> 2022 1 <i>Julbernardia globiflora</i> 2020 1 <i>Julbernardia globiflora</i> 2013 1 <i>Julbernardia globiflora</i> 2022 1 <i>Julbernardia globiflora</i> 2022 1 <i>Julbernardia globiflora</i> 2022 1 <i>Julbernardia globiflora</i> 2022 1 <i>Julbernardia globiflora</i> 2023 1 <i>Julbernardia globiflora</i> 2021 1 <i>Brachystegia boehmii</i> 2023 1 <i>Julbernardia globiflora</i> 2022 1 <i>Brachystegia boehmii</i> 2022 2 <i>Julbernardia globiflora</i> 2022 1 <i>Julbernardia globiflora</i> 2022 1 <i>Julbernardia globiflora</i> 2021 1 <i>Julbernardia globiflora</i> 2022 1 <i>Julbernardia globiflora</i> 2022 1 <i>Julbernardia globiflora</i> 2021 2 <i>Julbernardia globiflora</i> 2019 1 <i>Julbernardia globiflora</i> 2022 1 <i>Julbernardia globiflora</i> 2019	Point 1+ 110 steps Point 1+ 270 steps Point 2+ 20 steps Point 3+ 120 steps Point 9+ 160 steps Point 10+ 210 steps Point 11+ 20 steps Point 11+ 40 steps Point 12+ 210 steps Point 12+ 280 steps Point 13+ 210 steps Point 13+ 270 steps Point 14+ 150 steps Point 14+ 170 steps Point 15+ 40 steps Point 16+ 60 steps Point 17+ 80 steps Point 17+ 100 steps Point 17+ 150 steps Point 18+ 90 steps Point 19+ 70 steps Point 21+ 140 steps
Saw pit	1 saw pit 2018 1 saw pit 2013	Point 1+ 200 steps Point 2+ 170 steps
Ugunda Ranger post		
Timber logging	1 <i>Pterocarpus angol.</i> 2022, Ø: 35 cm 1 <i>Pterocarpus angol.</i> 2019, Ø: 40 cm 1 <i>Azelia quanzensis</i> 2018, Ø: 45cm 2 <i>Pericopsis angol.</i> 2018, Ø: 30cm 1 <i>Terminalia sericea</i> 2018, Ø: 20 cm 1 <i>Pseudolachnostylis mapr.</i> cut 2020 1 <i>Pericopsis angolensis</i> cut 2013 1 <i>Azelia quanzensis</i> cut 2013 1 <i>Azelia quanzensis</i> cut 2013 2 <i>Pterocarpus angolensis</i> cut 2020 1 <i>Lannea schimperi</i> cut 2022 2 <i>Pterocarpus angolensis</i> cut 2020 1 <i>Pterocarpus angolensis</i> cut 2016 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 Tree cut 2022 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Burkea africana</i> cut 2023 1 <i>Pericopsis angolensis</i> cut 2015 1 <i>Pericopsis angolensis</i> cut 2013 3 <i>Pericopsis angolensis</i> cut 2015 1 <i>Burkea africana</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 5 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus tinctorius</i> cut 2017 1 <i>Brachystegia boehmii</i> cut 2020	Point 1 +40 steps Point 2 + 5 steps Point 3 + 50 steps Point 4 + 220 steps Point 4 + 220 steps Point 10 + 25 steps Point 11 + 45 steps Point 13 + 130 steps Point 13 + 230 steps Point 14 + 130 steps Point 14 + 110 steps Point 14 + 65 steps Point 15 + 25 steps Point 15 + 95 steps Point 18+ 65 steps Point 18+ 140 steps Point 18+ 260 steps Point 18+ 295 steps Point 19+ 35 steps Point 20+ 225 steps Point 20+ 225 steps Point 20+ 235 steps Point 20+ 280 steps Point 21+ 15 steps Point 21+ 35 steps Point 21+ 165 steps Point 23+ 125 steps Point 23+ 170 steps
Tree debarking	1 <i>Julbernardia globiflora</i> 2022	Point 1 + 170 steps

	1 <i>Brachystegia spiciformis</i> 2020 1 <i>Brachystegia spiciformis</i> 2020 1 <i>Julbernardia globiflora</i> 2019 1 <i>Brachystegia spiciformis</i> 2022 1 <i>Brachystegia spiciformis</i> 2021 1 <i>Brachystegia glaucescens</i> 2022 2 <i>Brachystegia glaucescens</i> 2022 2 <i>Brachystegia boehmii</i> 2022 1 <i>Julbernardia globiflora</i> 2020 1 <i>Julbernardia globiflora</i> 2020 1 <i>Julbernardia globiflora</i> 2020 2 <i>Julbernardia globiflora</i> 2022 1 <i>Julbernardia globiflora</i> 2020	Point 1 + 205 steps Point 1 + 225 steps Point 2+ 40 steps Point 2+ 90 steps Point 2+ 120 steps Point 8+ 25 steps Point 8+ 190 steps Point 11 + 100 steps Point 14 + 170 steps Point 15 + 110 steps Point 17 + 25 steps Point 18 + 275 steps Point 20 + 145 steps
Pasture mark	1 <i>Brachystegia glauc.</i> marked as Sukuma-land 2022 1 Water pit 2018	Point 6+ 120 steps Point 20+ 10 steps
Saw pit	1 Saw pit 2014	Point 19+ 20 steps
Uganda West		
Timber logging	2 <i>Brachystegia glaucescens</i> cut 2023 1 <i>Pterocarpus angol.</i> 2013, 20 cm 2 <i>Pterocarpus angol.</i> 2013, Ø: 20cm 1 <i>Pterocarpus angolensis</i> cut 2013 2 <i>Pterocarpus angol.</i> 2013, Ø: 20cm 1 <i>Burkea africana</i> 2021, Ø: 40cm 1 <i>Lonchocarpus cap.</i> 2023, Ø: 15 cm 1 <i>Pterocarpus angol.</i> 2013, Ø: 20cm 1 <i>Pterocarpus tinct.</i> 2020, Ø: 30cm 1 <i>Pterocarpus angol.</i> 2013, Ø:20cm 1 <i>Pterocarpus angol.</i> 2013, Ø: 20cm 1 <i>Pterocarpus angol.</i> 2019, Ø: 35cm 1 <i>Pterocarpus angol.</i> 2019, Ø: 20cm 1 <i>Pterocarpus angol.</i> 2020, Ø: 35cm 1 <i>Pterocarpus tinct.</i> 2016, Ø: 35cm 2 <i>Pterocarpus angol.</i> 2013, Ø: 20cm 2 <i>Pterocarpus angol.</i> 2017, Ø: 20cm 1 <i>Pterocarpus angol.</i> 2022, Ø: 25cm 1 <i>Pterocarpus angol.</i> 2017, Ø: 30cm 1 <i>Erythrophleum afric.</i> 2021, Ø: 35cm 1 <i>Pterocarpus angol.</i> 2013, Ø:40cm 1 <i>Pterocarpus angol.</i> 2013, Ø:15cm 1 <i>Erythrophleum afric.</i> 2013, Ø:30cm 1 <i>Albizia antunesiana</i> cut 2017 1 <i>Pterocarpus angolensis</i> cut 2020 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Burkea africana</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2015 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Albizia antunesiana</i> cut 2013 1 <i>Azelia quanzensis</i> cut 2013 3 <i>Pterocarpus angolensis</i> cut 2013 3 <i>Pterocarpus angolensis</i> cut 2018 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2018	Point 2+ 90 steps Point 2+ 265 steps Point 2+ 290 steps Point 3+ 65 steps Point 3+ 85 steps Point 3+ 110 steps Point 3+ 170 steps Point 3+ 200 steps Point 4+ 85 steps Point 4+ 140 steps Point 4+ 260 steps Point 5+ 140 steps Point 6+ 210 steps Point 6+ 220 steps Point 6+ 240 steps Point 8+ 110 steps Point 8+ 190 steps Point 9+ 20 steps Point 9+ 50 steps Point 9+ 90 steps Point 9+ 90 steps Point 9+ 160 steps Point 9+ 300 steps Point 11+ 75 steps Point 12+ 60 steps Point 12+ 130 steps Point 12+ 200 steps Point 12+ 290 steps Point 13+ 30 steps Point 13+ 120 steps Point 13+ 140 steps Point 13+ 200 steps Point 14+ 170 steps Point 14+ 300 steps Point 15+ 20 steps Point 15+ 60 steps Point 15+ 60 steps Point 15+ 270 steps Point 16+ 170 steps Point 16+ 220 steps Point 17+ 80 steps

	1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2018 1 <i>Pterocarpus angolensis</i> cut 2018 1 <i>Pterocarpus angolensis</i> cut 2013	Point 21+ 250 steps Point 22+ 60 steps Point 22+140 steps Point 23+ 50 steps Point 23+ 240 steps Point 23+ 270 steps Point 24+ 279 steps
Tree debarking	1 <i>Julbernardia globiflora</i> 2023 1 <i>Julbernardia globiflora</i> 2023 1 <i>Julbernardia globiflora</i> 2019 1 <i>Julbernardia globiflora</i> 2018 1 <i>Julbernardia globiflora</i> 2018 1 <i>Julbernardia globiflora</i> 2018 1 <i>Julbernardia globiflora</i> 2016 1 <i>Julbernardia globiflora</i> 2015 1 <i>Julbernardia globiflora</i> 2019 1 <i>Julbernardia globiflora</i> 2020 1 <i>Julbernardia globiflora</i> 2021	Point 1+ 250 steps Point 2+ 50 steps Point 5+ 260 steps Point 6+ 50 steps Point 10+ 225 steps Point 10+ 280 steps Point 11+ 250 steps Point 12+ 140 steps Point 17+ 220 steps Point 21+ 20 steps Point 21+ 145 steps
Saw pit	1 saw pit 2017	Point 8+ 290 steps
Honey harvesting	1 <i>Erythrophleum africanum</i> cut 2023 1 <i>Burkea africana</i> cut 2020, Ø: 40cm	Point 2+ 90 steps Point 4+ 20 steps
Swangala Isanga		
Timber logging	1 <i>Pterocarpus angol.</i> 2018, Ø: 40cm 1 <i>Pterocarpus angol.</i> 2018, Ø: 80cm 1 <i>Albizia antunesiana</i> 2018, Ø: 50cm 1 <i>Pterocarpus angol.</i> 2021, Ø: 50 1 <i>Pterocarpus tinctorius</i> cut 2017 3 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 2 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Albizia antunesiana</i> cut 2017 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2021 2 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Burkea Africana</i> cut 2018 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2020 3 <i>Julbernardia globiflora</i> cut 2016 1 <i>Pterocarpus angolensis</i> cut 2020 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2020 2 <i>Pterocarpus angolensis</i> cut 2022 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Combretum adenogonium</i> cut 2016 1 <i>Combretum adenogonium</i> cut 2019 1 <i>Pterocarpus angolensis</i> cut 2016	Point 1+ 40 steps Point 1+ 100 steps Point 1+ 150 steps Point 1+ 290 steps Point 2+ 100 steps Point 2+ 130 steps Point 3+ 40 steps Point 3+ 250 steps Point 4+ 110 steps Point 4+ 300 steps Point 5+ 20 steps Point 5+ 20 steps Point 5+ 50 steps Point 5+ 160 steps Point 5+ 220 steps Point 5+ 290 steps Point 6+ 30 steps Point 6+ 90 steps Point 6+ 120 steps Point 6+ 200 steps Point 6+ 250 steps Point 7+ 100 steps Point 7+ 120 steps Point 7+ 170 steps Point 7+ 200 steps Point 8+ 80steps Point 8+ 90 steps Point 11+ 250 steps Point 12+ 300 steps Point 17+ 270 steps
Tree debarking	1 <i>Julbernardia globiflora</i> 2023 1 <i>Julbernardia globiflora</i> 2022 1 <i>Julbernardia globiflora</i> 2023 1 <i>Julbernardia globiflora</i> 2019 1 <i>Julbernardia globiflora</i> 2020 1 <i>Julbernardia globiflora</i> 2017 1 <i>Julbernardia globiflora</i> 2017 1 <i>Julbernardia globiflora</i> 2021	Point 3+ 140 steps Point 3+ 170 steps Point 3+ 220 steps Point 3+ 280 steps Point 4+ 20 steps Point 4+ 170 steps Point 4+ 290 steps Point 7+ 120 steps

	<p>2 <i>Julbernardia globiflora</i> 2022 1 <i>Brachystegia spiciformis</i> 2022 2 <i>Brachystegia spiciformis</i> 2020 1 <i>Brachystegia spiciformis</i> 2022 1 <i>Brachystegia spiciformis</i> 2021 1 <i>Brachystegia boehmii</i> 2022</p>	<p>Point 7+ 150 steps Point 8+ 240 steps Point 8+ 80 steps Point 9+ 70 steps Point 18+ 100 steps Point 24+ 300 steps</p>
Swangala Mbeya road		
Timber logging	<p>1 <i>Pterocarpus angol.</i> 2018, Ø: 20cm 1 <i>Pterocarpus angol.</i> 2018, Ø: 20cm 1 <i>Burkea Africana</i> 2020, Ø: 60cm 1 <i>Pterocarpus angol.</i> 2018, Ø:40cm 1 <i>Pterocarpus angol.</i> 2023, Ø: 45cm 2 <i>Pterocarpus angol.</i> 2018, Ø:25cm 1 <i>Julbernardia globiflora</i> cut 2018 1 <i>Pterocarpus angol.</i> 2018, Ø:26cm 1 <i>Burkea afrocana</i> cut 2017 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Catunaregam spinosa</i> cut 2020 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013 1 <i>Julbernardia globiflora</i> cut 2022 1 <i>Burkea africana</i> cut 2013 1 <i>Pterocarpus angolensis</i> cut 2013</p>	<p>Point 1+ 50 steps Point 1+ 130 steps Point 2+ 110 steps Point 2+ 150 steps Point 2+ 200 steps Point 2+ 240 steps Point 6+ 120 steps Point 6+ 250 steps Point 12+ 40 steps Point 13+ 30 steps Point 13+ 190 steps Point 13+ 190 steps Point 13+ 290 steps Point 14+ 60 steps Point 16+ 130 steps Point 17+ 260 steps</p>
Tree debarking	<p>1 <i>Julbernardia globiflora</i> 2023 1 <i>Julbernardia globiflora</i> 2023 1 <i>Brachystegia spiciformis</i> 2023 3 <i>Julbernardia globiflora</i> 2023 1 <i>Julbernardia globiflora</i> 2023 1 <i>Julbernardia globiflora</i> 2023 1 <i>Julbernardia globiflora</i> 2023 1 <i>Julbernardia globiflora</i> 2021 1 <i>Julbernardia globiflora</i> 2023 1 <i>Julbernardia globiflora</i> 2022 1 <i>Brachystegia spiciformis</i> 2023 3 <i>Julbernardia globiflora</i> 2023 1 <i>Julbernardia globiflora</i> 2020 1 <i>Julbernardia globiflora</i> 2020 1 <i>Julbernardia globiflora</i> 2020 1 <i>Julbernardia globiflora</i> 2020</p>	<p>Point 5+ 30 steps Point 5+ 60 steps Point 5+ 140 steps Point 5+ 200 steps Point 5+ 250 steps Point 5+ 270 steps Point 6+ 90 steps Point 6+ 250 steps Point 6+ 270 steps Point 7+ 40 steps Point 7+ 170 steps Point 7+ 250 steps Point 23+ 30 steps Point 23+ 90 steps Point 23+ 230 steps Point 23+ 250 steps</p>
Honey harvesting	<p>1 <i>Pericopsis angol.</i> cut 2019, Ø: 70cm 1 <i>Julbernardia globiflora</i> cut 1 <i>Burkea africana</i> cut 2023</p>	<p>Point 1+ 300 steps Point 2+ 0 steps Point 6+ 80 steps</p>
Poaching	1 giraffe bones 1 month	Point 6+ 50 steps
Swangala Ranger post		
Timber logging	<p>1 <i>Pterocarpus angol.</i> 2021, Ø: 40cm 1 <i>Pterocarpus tinct.</i> 2021, Ø: 35cm 1 <i>Pterocarpus tinct.</i> 2021, Ø: 40cm 1 <i>Pterocarpus tinct.</i> 2021, Ø: 40cm 1 <i>Pterocarpus tinct.</i> 2021, Ø: 40cm 1 <i>Pterocarpus tinct.</i> 2021, Ø: 50cm 1 <i>Pterocarpus angol.</i> 2013 1 Msilanga t 2023, Ø: 25cm 1 <i>Pseudolachnostylis m</i> 2023, Ø:15cm 1 <i>Pterocarpus angol.</i> 2018, Ø: 30 cm 1 <i>Pterocarpus angol.</i> 2021, Ø: 25cm 1 <i>Pterocarpus angol.</i> 2018, Ø: 25cm 1 <i>Pterocarpus angol.</i> 2013, Ø: 25cm 1 <i>Pterocarpus angol.</i> 2013, Ø: 25cm 1 <i>Pseudolachnostylis m.</i>2023, Ø:40cm 1 <i>Pterocarpus angol.</i> 2013, Ø: 35cm</p>	<p>Point 1+ 180 steps Point 2+ 40 steps Point 2+ 150 steps Point 2+ 180 steps Point 4+ 90 steps Point 4+ 100 steps Point 7+ 50 steps Point 7+ 100 steps Point 7+ 110 steps Point 7+ 190 steps Point 8+ 25 steps Point 8+ 60 steps Point 8+ 80 steps Point 8+ 210 steps Point 8+ 260 steps Point 9+ 260 steps</p>

Honey	1 <i>Pericopsis angol.</i> cut 2020, Ø: 30cm 1 <i>Julbernardia globiflora</i> cut 2022 1 <i>Burkea africana</i> cut 2018 1 <i>Pericopsis angol.</i> cut 2019 1 <i>Burkea africana</i> cut 2021 1 <i>Pericopsis angolensis</i> cut 2018 1 <i>Julbernardia globiflora</i> cut 2022	Point 2+ 130 steps Point 5+ 240 steps Point 11+ 30 steps Point 11+ 60 steps Point 11+ 280 steps Point 12+ 40 steps Point 12+ 90 steps
Poaching	Digging of 1 hole for hunting aardvark	Point 11+ 100 steps

5) Discussions

Current state of the vegetation

In total 142 and 147 sampling points were analysed for larger trees (diameter class ≥ 20 cm) and for smaller trees/shrubs (diameter class < 20 cm), respectively (see Table 1). In total, 482 larger trees and 552 smaller trees/shrubs were recorded; 86 and 36 quarters with no trees were reported for large and small diameter class, respectively (see Table 7).

Table 7: Quarters with no trees

Transect	N large trees	N small tree	Quarters with no trees (large / small Ø)
Ugunda Ngojwa	89	99	11 / 1
Ugunda Ranger post	77	87	19 / 9
Ugunda West	90	99	6 / 1
Swangala Isanga	66	79	26 / 17
Swangala Mbeya road	78	100	14 / 0
Swangala Ranger post	82	88	10 / 8
Total	482	552	86 / 36

Julbernardia globiflora (Muva) a characteristic, widespread and often gregarious tree is dominating in many miombo woodlands of Western Tanzania (see Bloesch 2019, 2022, 2023) and also in Ipole WMA (see Table 3 and 4). 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 very common in Ipole WMA (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 *Julbernardia globiflora* showing an under-representation of saplings as illustrated in Figures 5. 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 trees do not exist any more (see Fig. 7) is considered as near threatened according to the IUCN Red List. Major cutting of *Pterocarpus angolensis* happened in Ipole WMA around ten years back. Since then, only the few remaining *Pterocarpus angolensis* of smaller diameter (DBH between 20 and 35 cm) were cut (see Fig. 7 below). Fortunately, *Pterocarpus angolensis* is amongst the most abundant tree species of the lower diameter class reflecting its high regeneration capacity.

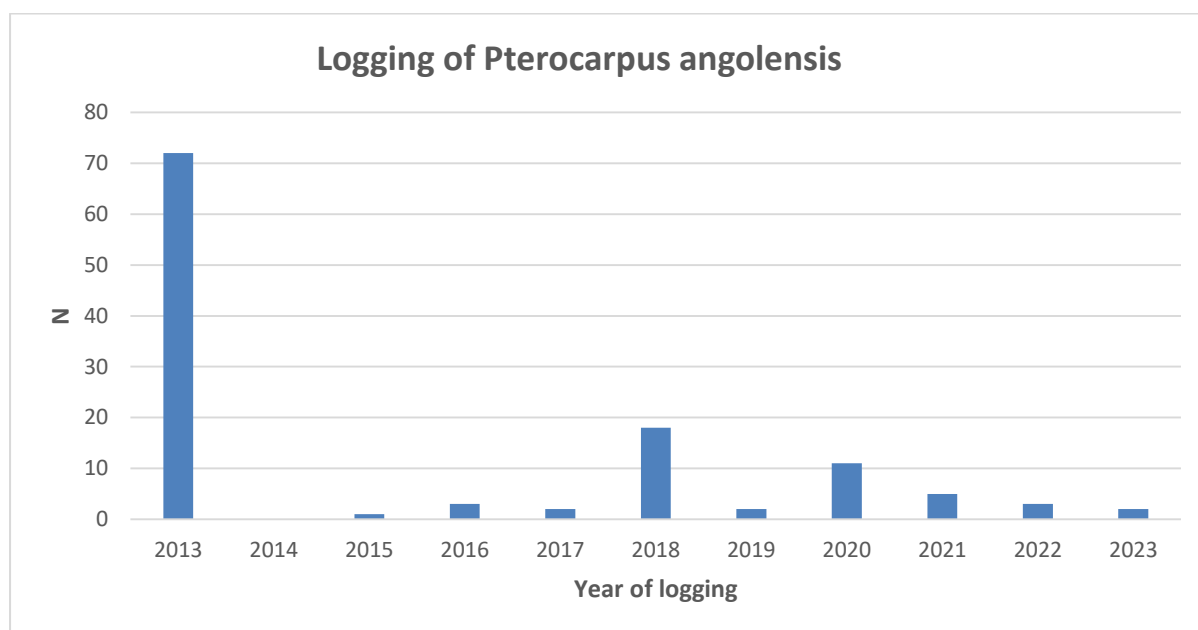


Fig. 7. Logging of *Pterocarpus angolensis*

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 vegetation surveys from Mlele Beekeeping Zone (Bloesch 2019), Kululu Village Land FR and Rungwa River FR (Bloesch 2022), Mulele Hills FR (Bloesch 2023) resulted in a quite comprehensive plant list including a total of 187 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.

The basal areas determined with PCQM and Bitterlich methods are highly concordant (see Table 2). The standing volume in Ipole WMA oscillates between 34.7 m³/ha at Swangala Isanga and 59.1 m³/ha at Ugunda Ngojwa having a dense stand of Miombo woodland as shown in Table 2.

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 ten 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 and debarking for producing beehives (mainly *Julbernardia globiflora*) are the prevailing human ecosystem disturbance (see Table 6). Intensive grazing by Sukuma pastoralists are an increasing threat for the Miombo woodland ecosystems (see Fig. 8).



Fig. 8. Livestock becomes an increasing threat to the Miombo woodland ecosystem.

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, members from the Village Natural Resource Committee and from JUHIWAI 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, Mulele Hills FR, and Ipole WMA 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.

7) Recommendations

The following recommendations are made to ADAP:

- 1) Clarify the official boundaries of Ipole WMA and Ugunda and Swangala FRs.
- 2) 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, 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.
- 3) 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.
- 4) Train all VGS in the transect methodology under the supervision of the livelihood and natural resources officer. An active participation of TFS, DFO, JUHIWAI 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.
- 5) The findings from the four vegetation surveys should be published in scientific article. 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.
- 6) 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.

8) Bibliography

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Appendix A: Mission Programme

Date	Programme
8/8/2023	Evilard – Zurich by train; flight Zurich to Arusha
11/8/2023	Arusha – Tabora by bus
12/8/2023	Briefing TFS Zonal Manager Tabora es Salaam; transfer to Sikonge
13/8/2023	Briefing ADAP country representative/ Ipole Project Manager and JUHIWAI in Ipole
14/8/2023	Reconnaissance in Ipole WMA / Ugunda FR
15-18/8/2023	Transect work in Ipole WMA / Ugunda FR
20/8/2023	Reconnaissance in Ipole WMA / Ugunda FR
21-26/8/2023	Transect work in Ipole WMA / Swangala FR
27/8/2023	Briefing ADAP country representative/ Ipole Project Manager and team; transfer by car to Tabora
28/8/2023	Tabora – Arusha by bus
29-30/8/2023	Flight Arusha – Zurich; Zurich – Evilard by train

Appendix B: Vegetation transects in Ipole WMA

Transect UR: Ugunda Ranger Post

Direction azimuth: 150°

Sampling point 1 (15/8/23):

Coordinates: S -5.86249 / E 32.57742

Slope: 0-1%, slope exposure: 80°

Dominant tree height: 18 m

Basal area (Bitterlich, k=1): 13 m²

Photos: UR1A, UR1B, UR1C, UR1D

Disturbances/notes (1-2): 1 *Pterocarpus angolensis* cut 2022, DBH: 35 cm (40 steps); 1 *Julbernardia globiflora* tree barking 2022 (170 Steps); 1 *Brachystegia spiciformis* tree barking 2020 (205 Steps); 1 *Brachystegia spiciformis* tree barking 2020 (225 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	31	11.30
	<i>Julbernardia globiflora</i>	35	1.60
	<i>Julbernardia globiflora</i>	36	10.30
	<i>Julbernardia globiflora</i>	26	4.50
DBH < 20 cm	<i>Margeritaria discoidea</i>	3	4.30
	<i>Diplorhynchus condylocarpon</i>	16	3.70
	<i>Monotes africanus</i>	9	5.00
	<i>Diplorhynchus condylocarpon</i>	4	5.60

Sampling point 2 (15/8/23):

Coordinates: S S -5,86434/ E 32,57842

Slope: 0-1%, slope exposure: 120°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 17 m²

Photos: UR2A, UR2B, UR2C, UR2D

Disturbances/notes (2-3): 1 *Pterocarpus angolensis* cut 2019, DBH: 40 cm (5 Steps); 1 *Julbernardia globiflora* tree barking 2019 (40 Steps); road crossing (80 Steps); 1 *Brachystegia spiciformis* tree barking 2022 (90 Steps); 1 *Brachystegia spiciformis* tree barking 2021 (120 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	42	17.90
	<i>Julbernardia globiflora</i>	30	5.40
	<i>Julbernardia globiflora</i>	27	4.50
	<i>Julbernardia globiflora</i>	34	3.50
DBH < 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	6	1.80
	<i>Diplorhynchus condylocarpon</i>	6	12.30
	<i>Monotes africanus</i>	8	4.70
	<i>Diplorhynchus condylocarpon</i>	9	3.80

Sampling point 3 (16/8/23):

Coordinates: S -5.86618 / E 32.57961

Slope: 0-1%, slope exposure: 180°

Dominant tree height: 10 m

Basal area (Bitterlich, k=1): 5 m²

Photos: UR3A, UR3B, UR3C, UR3D

Disturbances/notes (3-4): 1 *Azelia quanzensis* cut 2018: DBH: 45cm (50steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Terminalia sericea</i>	25	7.30
	<i>Terminalia sericea</i>	20	18.40
	<i>Vitex kenyensis</i>	25	14.20
DBH < 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	18	17.20
	<i>Pterocarpus angolensis</i>	4	6.60
	<i>Pterocarpus angolensis</i>	9	3.20
	<i>Vitex kenyensis</i>	16	6.10

Sampling point 4 (16/8/23): Mbuge edge

Coordinates: S -5.86807 / E 32.58085

Slope: +/- flat

Dominant tree height:

Basal area (Bitterlich, k=1):

Photos: UR4A, UR4B, UR4C, UR4D

Disturbances/notes (4-5): 2 *Pericopsis angolensis* cut 2018, DBH: 30cm (220 Steps); 1 *Terminalia sericea* cut 2018, DBH: 20 cm (220 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm			
DBH < 20 cm			

Sampling point 5 (16/8/23):

Coordinates: S -5.87003/ E 32.58208

Slope: +/- flat

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 6 m²

Photos: UR5A, UR5B, UR5C, UR5D

Disturbances/notes (5-6):

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia glaucescens</i>	46	11.00
	No tree		
	<i>Lannea schimperi</i>	25	3.60
	<i>Brachystegia glaucescens</i>	44	17.10
DBH < 20 cm	<i>Crossopterix febrifuga</i>	14	5.60
	No tree		
	No tree		
	No tree		

Sampling point 6 (16/8/23):

Coordinates: S -5.87200 / E 32.58334

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 9 m²

Photos: UR6B, UR6C, UR6D (UR6A is missing).

Disturbances/notes (6-7): 1 *Brachystegia glaucescens* marked as Sukuma-land 2022 (120 Steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia glaucescens</i>	32	11.60
	<i>Brachystegia glaucescens</i>	34	6.50
	<i>Brachystegia glaucescens</i>	34	13.70
	<i>Brachystegia glaucescens</i>	28	12.20
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	7	3.80
	<i>Acacia gerrardii</i>	18	4.00
	<i>Diplorhynchus condylocarpon</i>	7	7.10
	<i>Diplorhynchus condylocarpon</i>	10	3.60

Sampling point 7 (16/8/23):

Coordinates: S -5.87397 / E 32.58461

Slope: 0-1%, slope exposure: 150°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 7 m²

Photos: UR7A, UR7B, UR7C, UR7D

Disturbances/notes (7-8): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Msilanga</i>	28	3.90
	<i>Msilanga</i>	39	4.30
	<i>Msilanga</i>	35	15.50
	<i>Brachystegia glaucescens</i>	39	13.10
DBH < 20 cm	<i>Crossopteryx febrifuga</i>	12	15.3
	<i>Terminalia sericea</i>	5	4.60
	<i>Pterocarpus tinctorius</i>	3	5.60
	<i>Msilanga</i>	16	12.20

Sampling point 8 (16/8/23):

Coordinates: S -5.87605 / E 32.58582

Slope: +/- flat

Dominant tree height: 13 m

Basal area (Bitterlich, k=1): 4 m²

Photos: UR8A, UR8B, UR8C, UR8D

Disturbances/notes (8-9): 1 *Brachystegia glaucescens* tree barking 2022 (25 Steps); 2 *Brachystegia glaucescens* tree barking 2022 (190 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Msilanga</i>	24	17.6
	<i>Brachystegia glaucescens</i>	29	17.6
	<i>Msilanga</i>	21	6.20
	<i>Brachystegia glaucescens</i>	49	5.10
DBH < 20 cm	No Tree		
	<i>Crossopteryx febrifuga</i>	14	18.80
	No Tree		
	No Tree		

Sampling point 9 (16/8/23):

Coordinates: S -5.87819 / E 32.58698

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 9 m²

Photos: UR9A, UR9B, UR9C, UR9D

Disturbances/notes (9-10): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia glaucescens</i>	30	5.40
	No tree		
	No tree		
	No tree		
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	3	4.40
	<i>Pterocarpus tinctorius</i>	3	1.60
	<i>Pterocarpus tinctorius</i>	3	3.40
	<i>Combretum fragrans</i>	3	1.70

Sampling point 10 (27/9/23):

Coordinates: S -5.88030/ E 32.58830

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 4.5 m²

Photos:

Disturbances/notes (10-11): 1 *Pseudolachnostylis maprouneifolia* cut 2020 (25 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Combretum adenogonium</i>	22	5.00
	<i>Combretum molle</i>	22	15.00
	No tree		
	<i>Pseudolachnostylis maprouneifolia</i>	26	5.80
DBH < 20 cm	<i>Combretum adenogonium</i>	17	10.70
	<i>Pseudolachnostylis maprouneifolia</i>	8	7.40
	<i>Crossopteryx febrifuga</i>	15	4.50
	<i>Pseudolachnostylis maprouneifolia</i>	10	5.70

Sampling point 11 (27/9/23):

Coordinates: S -5.88233/ E 32.58954

Slope: +/- flat

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 5 m²

Photos:

Disturbances/notes (11-12): 1 *Pericopsis angolensis* cut 2013 (45 Steps); 2 *Brachystegia boehmii* tree barking 2022 (100 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia boehmii</i>	32	10.00
	<i>Diplorhynchus condylocarpon</i>	26	9.20
	<i>Brachystegia boehmii</i>	40	7.90
	No tree		
DBH < 20 cm	<i>Acacia</i> sp.	3	2.50
	<i>Combretum adenogonium</i>	3	1.50
	<i>Pericopsis angolensis</i>	3	4.90
	<i>Combretum zeyheri</i>	4	6.00

Sampling point 12 (27/9/23):

Coordinates: S -5.88449 / E 32.59067

Slope: +/- flat

Dominant tree height: 12 m

Basal area (Bitterlich, k=1): 1 m²

Photos:

Disturbances/notes (12-13): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	No tree		
	<i>Senegalia tanganyikensis</i>	33	12.1
	No tree		
DBH < 20 cm	<i>Senegalia tanganyikensis</i>	17	18.3
	<i>Combretum obovatum</i>	5	16.4
	<i>Lannea humilis</i>	10	8.30
	<i>Combretum obovatum</i>	3	8.60

Sampling point 13 (27/9/23):

Coordinates: S -5.88560 / E 32.59156

Slope: +/- flat

Dominant tree height: 18 m

Basal area (Bitterlich, k=1): 5 m²

Photos:

Disturbances/notes (13-14): 1 *Azelia quanzensis* cut 2013 (130 Steps); 1 *Azelia quanzensis* cut 2013 (230 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No Tree		
	<i>Pericopsis angolensis</i>	35	10.10
	<i>Terminalia sericea</i>	41	12.10
	No Tree		
DBH < 20 cm	<i>Crossopteryx febrifuga</i>	3	2.40
	<i>Pseudolachnostylis maprouneifolia</i>	5	3.60
	<i>Pseudolachnostylis maprouneifolia</i>	4	4.10
	<i>Strychnos cocculoides</i>	4	8.00

Sampling point 14 (27/9/23):

Coordinates: S -5.88835 / E 32.59334.

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 5 m²

Photos:

Disturbances/notes (14-15): 2 *Pterocarpus angolensis* cut 2020 (65 Steps); 1 *Lannea schimperi* cut 2022 (110 Steps); 1 *Julbernardia globiflora* tree barking 2020 (170 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No Tree		
	<i>Terminalia sericea</i>	37	5.40
	<i>Brachystegia spiciformis</i>	43	18.30
	<i>Pterocarpus angolensis</i>	36	4.40
DBH < 20 cm	<i>Pterocarpus angolensis</i>	3	5.30
	<i>Brachystegia boehmii</i>	4	2.90
	<i>Vitex</i> sp.	5	5.70
	<i>Crossopteryx febrifuga</i>	11	5.60

Sampling point 15 (27/9/23):

Coordinates: S -5.89039 / E 32.59433

Slope: 1%, slope exposure: 195°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 7 m²

Photos: 7981, 7982, 7983, 7984

Disturbances/notes (15-16): 1 *Pterocarpus angolensis* cut 2016 (25 Steps); 1 *Pterocarpus angolensis* cut 2013 (95 Steps); 1 *Julbernardia globiflora* tree barking 2020 (110 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	37	10.4
	<i>Pterocarpus angolensis</i>	20	3.30
	<i>Brachystegia spiciformis</i>	45	18.30
	<i>Pterocarpus tinctorius</i>	34	19.50
DBH < 20 cm	<i>Bobgunnia madagascariensis</i>	4	3.10
	<i>Brachystegia spiciformis</i>	5	2.60
	<i>Strychnos cocculoides</i>	3	2.30
	<i>Brachystegia spiciformis</i>	9	5.20

Sampling point 16 (27/9/23):

Coordinates: S -5.89134 / E 32.59489

Slope: 1%, slope exposure: 220°

Dominant tree height: 18 m

Basal area (Bitterlich, k=1): 1 m²

Photos:

Disturbances/notes (16-17): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Diplorhynchus condylocarpon</i>	24	8.10
	<i>Brachystegia spiciformis</i>	32	11.70
	<i>Julbernardia globiflora</i>	31	17.00
DBH < 20 cm	<i>Combretum adenogonium</i>	9	14.30
	<i>Pterocarpus angolensis</i>	4	6.30
	<i>Terminalia sericea</i>	5	4.70
	<i>Piliostigma thonningii</i>	11	6.00

Sampling point 17 (27/9/23):

Coordinates: S -5.89466 / E 32.59647

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 0 m²

Photos:

Disturbances/notes (17-18): 1 *Julbernardia globiflora* tree barking 2020 (25 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Combretum collinum</i>	32	9.60
	<i>Brachystegia boehmii</i>	68	18.00
	<i>Brachystegia spiciformis</i>	30	17.80
	<i>Julbernardia globiflora</i>	20	12.2
DBH < 20 cm	<i>Brachystegia boehmii</i>	6	8.80
	<i>Brachystegia spiciformis</i>	6	5.20
	<i>Brachystegia spiciformis</i>	15	2.50
	<i>Brachystegia spiciformis</i>	7	7.70

Sampling point 18 (27/9/23):

Coordinates: S -5.89473 / E 32.59655

Slope: 1%, slope exposure: 195°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 7 m²

Photos:

Disturbances/notes (18-19): 1 *Pterocarpus angolensis* cut 2013 (65 Steps); 1 Tree cut 2022 (140 Steps); 1 *Pterocarpus angolensis* cut 2013 (260 Steps); 2 *Julbernardia globiflora* tree barking 2022 (275 Steps); 1 *Pterocarpus angolensis* cut 2013 (295 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Philenoptera violacea</i>	21	9.20
	<i>Brachystegia boehmii</i>	58	18.40
	<i>Brachystegia boehmii</i>	22	5.20
	<i>Brachystegia boehmii</i>	24	7.70
DBH < 20 cm	<i>Philenoptera violacea</i>	18	8.70
	<i>Pterocarpus angolensis</i>	6	9.30
	<i>Pseudolachnostylis maprouneifolia</i>	3	5.60
	<i>Pseudolachnostylis maprouneifolia</i>	4	4.10

Sampling point 19 (27/9/23):

Coordinates: S -5.89858 / E 32.59915

Slope: +/- flat

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 6 m²

Photos: -

Disturbances/notes (19-20): 1 Saw pit 2014 (20 Steps); 1 *Burkea africana* cut 2023 (35 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	30	11.10
	<i>Brachystegia spiciformis</i>	43	17.00
	<i>Brachystegia spiciformis</i>	49	7.10
	<i>Julbernardia globiflora</i>	36	9.40
DBH < 20 cm	<i>Rothmannia engleriana</i>	5	10.20
	<i>Diplorhynchus condylocarpon</i>	4	5.10
	<i>Monotes africanus</i>	9	2.60
	<i>Hymenocardia acida</i>	9	4.60

Sampling point 20 (27/9/23):

Coordinates: S -5.90060 / E 32.60018

Slope: +/- flat

Dominant tree height: 8 m

Basal area (Bitterlich, k=1): 3 m²

Photos: -

Disturbances/notes (20-21): 1 Water pit 2018 (10 Steps); 1 *Julbernardia globiflora* tree barking 2020 (145 Steps); 1 *Julbernardia globiflora* tree barking 2020 (170 Steps); 1 *Pericopsis angolensis* cut 2015 (225); 1 *Pericopsis angolensis* cut 2013 (225); 3 *Pericopsis angolensis* cut 2015 (235); 1 *Burkea africana* cut 2013 (280 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Crossopteryx febrifuga</i>	22	7.20
	No tree		
	No tree		
DBH < 20 cm	<i>Terminalia mollis</i>	15	14.10
	<i>Terminalia sericea</i>	9	2.50
	<i>Terminalia mollis</i>	16	11.00
	<i>Terminalia mollis</i>	7	3.00

Sampling point 21 (27/9/23):

Coordinates: S -5.90260 / E 32.60142

Slope: +/- flat

Dominant tree height: 15 m
 Basal area (Bitterlich, k=1): 9 m²
 Photos: -

Disturbances/notes (21-22): 1 *Pterocarpus angolensis* cut 2013 (15 Steps); 1 *Pterocarpus angolensis* cut 2013 (35 Steps); 5 *Pterocarpus angolensis* cut 2013 (165 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	26	13.30
	<i>Julbernardia globiflora</i>	44	17.60
	<i>Julbernardia globiflora</i>	31	7.60
	<i>Julbernardia globiflora</i>	25	4.90
DBH < 20 cm	<i>Pterocarpus angolensis</i>	5	7.90
	<i>Pseudolachnostylis maprouneifolia</i>	7	8.80
	<i>Phyllanthus engleri</i>	3	12.70
	<i>Diplorhynchus condylocarpon</i>	5	11.70

Sampling point 22 (27/9/23):

Coordinates: S -5.90456 / E 32.60270
 Slope: +/- flat

Dominant tree height: 14 m
 Basal area (Bitterlich, k=1): 7.5 m²
 Photos: -

Disturbances/notes (22-23): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	41	19.70
	<i>Brachystegia spiciformis</i>	31	7.10
	<i>Brachystegia spiciformis</i>	38	6.30
	No tree		
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	5	6.30
	<i>Diplorhynchus condylocarpon</i>	13	7.20
	<i>Pterocarpus angolensis</i>	5	3.10
	<i>Julbernardia globiflora</i>	16	2.80

Sampling point 23 (27/9/23):

Coordinates: S -5.90639 / E 32.60411
 Slope: +/- flat

Dominant tree height: 14 m
 Basal area (Bitterlich, k=1): 8.5 m²
 Photos: -

Disturbances/notes (23-24): 1 *Pterocarpus tinctorius* cut 2017 (125 Steps); 1 *Brachystegia boehmii* cut 2020 (170Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Julbernardia globiflora</i>	27	6.40
	<i>Julbernardia globiflora</i>	37	15.70
	<i>Julbernardia globiflora</i>	37	19.70
DBH < 20 cm	<i>Combretum collinum</i>	7	2.90
	<i>Combretum zeyheri</i>	13	7.90
	<i>Combretum collinum</i>	10	10.80
	No tree		

Sampling point 24 (27/9/23):

Coordinates: S -5.90846 / E 32.60538

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 3 m²

Photos: -

Disturbances/notes (24-25):

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia boehmii</i>	42	3.70
	<i>Crossopteryx febrifuga</i>	30	20.00
	<i>Brachystegia boehmii</i>	26	19.70
	<i>Terminalia sericea</i>	23	11.50
DBH < 20 cm	<i>Crossopteryx febrifuga</i>	4	16.60
	No tree		
	No tree		
	<i>Crossopteryx febrifuga</i>	18	15.00

Sampling point 25 (27/9/23):

Coordinates: S -5.91046 / E 32.60661

Slope: +/- flat

Dominant tree height: 18 m

Basal area (Bitterlich, k=1): 11 m²

Photos: -

Disturbances/notes (25):

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Lannea schimperi</i>	37	4.50
	<i>Pericopsis angolensis</i>	35	5.60
	<i>Brachystegia boehmii</i>	31	3.70
	<i>Combretum zeyheri</i>	26	6.80
DBH < 20 cm	<i>Terminalia sericea</i>	9	10.80
	<i>Pseudolachnostylis maprouneifolia</i>	10	15.40
	<i>Lannea schimperi</i>	16	7.60
	<i>Terminalia mollis</i>	18	8.40

25 sampling points**Mean basal area (Bitterlich, k=1): 6.7 m²****Dominant tree height: 14.9 m**

Transect UW: Ugunda west.

Direction azimuth: 200°

Sampling point 1 (17/8/23):

Coordinates: S -5.97558 / E 32.51793

Slope: 1%, slope exposure: 50°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 8 m²

Photos: UW1A, UW1B, UW1C, UW1D

Disturbances/notes (1-2): 1 *Julbernardia globiflora* tree barking 2023 (250 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Brachystegia glaucescens</i>	34	16.20
	<i>Lannea schimperi</i>	27	1.70
	<i>Erythrophleum africanum</i>	24	5.40
DBH < 20 cm	<i>Hymenocardia acida</i>	6	4.70
	<i>Brachystegia glaucescens</i>	6	10.00
	<i>Diplorhynchus condylocarpon</i>	7	7.10
	<i>Brachystegia spiciformis</i>	14	2.70

Sampling point 2 (17/8/23):

Coordinates: S -5.97778 / E 32.51751

Slope: 1%, slope exposure: 50°

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 10.5 m²

Photos: UW2A, UW2B, UW2C, UW2D

Disturbances/notes (2-3): 1 *Julbernardia globiflora* tree barking 2023 (50 Steps); 1 *Erythrophleum africanum* cut for honey 2023 (90 Steps); 2 *Brachystegia glaucescens* cut 2023 (90 Steps); 1 *Pterocarpus angolensis* cut 2013, DBH: 20cm (265 Steps); 2 *Pterocarpus angolensis* cut 2013, DBH: 20cm (290 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	30	3.70
	<i>Combretum collinum</i>	27	7.00
	<i>Burkea africana</i>	45	13.00
	<i>Diplorhynchus condylocarpon</i>	22	2.70
DBH < 20 cm	<i>Combretum zeyheri</i>	7	1.80
	<i>Crossopteryx febrifuga</i>	4	4.10
	<i>Schrebera trichoclada</i>	3	10.80
	<i>Diplorhynchus condylocarpon</i>	5	8.50

Sampling point 3 (17/8/23):

Coordinates: S -5.97988 / E 32.51667

Slope: 0-1%, slope exposure: 20°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 11 m²

Photos: UW3A, UW3B, UW3C, UW3D

Disturbances/notes (3-4): 1 *Pterocarpus angolensis* cut 2013 (65 Steps); 2 *Pterocarpus angolensis* cut 2013, DBH: 20cm (85 Steps); 1 *Burkea africana* cut 2021, DBH: 40cm (110 Steps); 1 *Lonchocarpus capassa* cut 2023: DBH 15 cm (170 steps); 1 *Pterocarpus angolensis* cut 2013, DBH: 20cm (200 Steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	26	2.50
	<i>Brachystegia glaucescens</i>	26	8.40

	<i>Brachystegia glaucescens</i>	29	19.30
	<i>Brachystegia spiciformis</i>	37	4.90
DBH < 20 cm	<i>Combretum psidioides</i>	8	4.70
	<i>Cassipourea mollis</i>	3	8.30
	<i>Schrebera trichoclada</i>	11	5.30
	<i>Diplorhynchus condylocarpon</i>	7	5.00

Sampling point 4 (17/8/23):

Coordinates: S -5.98211/ E 32.51611

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 7.5 m²

Photos: UW4A, UW4B, UW4C, UW4D

Disturbances/notes (4-5): 1 *Burkea africana* cut for honey 2020, DBH: 40cm (20 Steps); 1

Pterocarpus tinctorius cut 2020, DBH: 30cm (85 Steps); 1 *Pterocarpus angolensis* cut 2013, DBH: 20cm (140 Steps); 1 *Pterocarpus angolensis* cut 2013, DBH: 20cm (260 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Burkea africana</i>	23	6.5
	<i>Brachystegia glaucescens</i>	37	10.1
	<i>Julbernardia globiflora</i>	40	7.6
	<i>Julbernardia globiflora</i>	46	15.5
DBH < 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	5	2.50
	<i>Brachystegia glaucescens</i>	3	3.90
	<i>Burkea africana</i>	13	7.80
	<i>Brachystegia glaucescens</i>	4	1.40

Sampling point 5 (17/8/23):

Coordinates: S -5.98416 / E 32.51534

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 10.5 m²

Photos: UW5A, UW5B, UW5C, UW5D

Disturbances/notes (5-6): 1 *Pterocarpus angolensis* cut 2019, DBH: 35cm (140 Steps); 1 *Julbernardia globiflora* tree barking 2019 (260 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	23	1.90
	<i>Brachystegia glaucescens</i>	37	9.70
	<i>Julbernardia globiflora</i>	27	14.00
	<i>Brachystegia glaucescens</i>	27	15.80
DBH < 20 cm	<i>Brachystegia glaucescens</i>	8	2.60
	<i>Diplorhynchus condylocarpon</i>	8	2.10
	<i>Combretum zeyheri</i>	10	3.50
	<i>Schrebera trichoclada</i>	8	5.60

Sampling point 6 (18/8/23):

Coordinates: S -5.98599 / E 32.51431

Slope: 0-1%, slope exposure: 220°

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 16 m²

Photos: UW6A, UW6B, UW6C, UW6D

Disturbances/notes (6-7): 1 *Julbernardia globiflora* tree barking 2018 (50 Steps); 1 *Pterocarpus angolensis* cut 2019, DBH: 20cm (210 Steps); 1 *Pterocarpus angolensis* cut 2020, DBH: 35cm (220 Steps); 1 *Pterocarpus tinctorius* cut 2016, DBH: 35cm (240 Steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia glaucescens</i>	39	6.60
	<i>Pericopsis angolensis</i>	24	5.30
	<i>Brachystegia spiciformis</i>	26	7.80
	<i>Brachystegia glaucescens</i>	27	4.90
DBH < 20 cm	<i>Catunaregam spinosa</i>	9	2.50
	<i>Brachystegia glaucescens</i>	17	7.30
	<i>Brachystegia glaucescens</i>	12	5.30
	<i>Ochna macrocalyx</i>	11	3.00

Sampling point 7 (18/8/23)

Coordinates: -5.98802 / E 32.51340

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 12 m²

Photos: UW7A, UW7B, UW7C, UW7D

Disturbances/notes (7-8): 1 *Julbernardia globiflora* tree barking 2018 (210 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Burkea africana</i>	22	9.50
	<i>Burkea africana</i>	20	3.60
	<i>Julbernardia globiflora</i>	24	8.40
	<i>Julbernardia globiflora</i>	30	8.10
DBH < 20 cm	<i>Erythrophleum africanum</i>	11	2.00
	<i>Xylopia antunesii</i>	5	1.90
	<i>Erythrophleum africanum</i>	7	4.50
	<i>Pterocarpus angolensis</i>	3	5.20

Sampling point 8 (18/8/23):

Coordinates: -5.99002 / E 32.51247

Slope: 0-1%, slope exposure: 290°

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 13 m²

Photos: UW8A, UW8B, UW8C, UW8D

Disturbances/notes (8-9): 2 *Pterocarpus angolensis* cut 2013, DBH: 20cm (110 Steps); 2 *Pterocarpus angolensis* cut 2017, DBH: 20cm (190 Steps); 1 saw pit 2017 (290 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	24	6.30
	<i>Combretum collinum</i>	34	8.20
	<i>Stereospermum kunthianum</i>	26	12.40
	<i>Combretum psidioides</i>	21	2.80
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	10	1.50
	<i>Margeritaria discoidea</i>	5	5.40
	<i>Combretum zeyheri</i>	7	7.70
	<i>Diplorhynchus condylocarpon</i>	4	4.60

Sampling point 9 (18/8/23):

Coordinates: S -5.99207 / E 32.51168

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 12.5 m²

Photos: UW9A, UW9B, UW9C, UW9D

Disturbances/notes (9-10): 1 *Pterocarpus angolensis* cut 2022, DBH: 25cm (20 Steps); 1 *Pterocarpus angolensis* cut 2017, DBH: 30cm (50 Steps); 1 *Erythrophleum africanum* cut 2021, DBH: 35cm (90

Steps); 1 *Pterocarpus angolensis* cut 2013, DBH: 40cm (90 Steps); 1 *Pterocarpus angolensis* cut 2013, DBH: 15cm (160 Steps); 1 *Erythrophleum africanum* cut 2013, DBH: 30cm (300 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Diplorhynchus condylocarpon</i>	33	3.60
	<i>Brachystegia glaucescens</i>	27	7.40
	<i>Msilanga</i>	39	13.10
	<i>Brachystegia glaucescens</i>	27	6.70
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	13	2.90
	<i>Pterocarpus angolensis</i>	3	3.70
	<i>Erythrophleum africanum</i>	19	4.00
	<i>Pseudolachynostylis maprouneifolia</i>	10	9.60

Sampling point 10 (18/8/23):

Coordinates: S -5.99422 / E 32.51102

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): .9 m²

Photos: UW10A, UW10B, UW10C, UW10D

Disturbances/notes (10-11): 1 *Julbernardia globiflora* tree barking 2015 (225 Steps); 1 *Julbernardia globiflora* tree barking 2018 (280 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	27	3.00
	<i>Brachystegia glaucescens</i>	32	9.70
	<i>Brachystegia glaucescens</i>	40	13.50
	<i>Julbernardia globiflora</i>	29	12.10
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	3	2.60
	<i>Strychnos pungens</i>	3	8.90
	<i>Combretum zeyheri</i>	3	6.10
	<i>Diplorhynchus condylocarpon</i>	8	1.50

Sampling point 11 (28/9/23):

Coordinates: S -5.99620 / E 32.51023

Slope: 1%, slope exposure: 110°

Dominant tree height: 18 m

Basal area (Bitterlich, k=1): 9 m²

Photos: -

Disturbances/notes (11-12): 1 *Albizia antunesiana* cut 2017 (75 Steps); 1 *Julbernardia globiflora* tree barking 2016 (250 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Combretum zeyheri</i>	24	7.2
	<i>Pericopsis angolensis</i>	28	12.4
	<i>Brachystegia boehmii</i>	29	8
	<i>Julbernardia globiflora</i>	37	12.1
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	12	8.4
	<i>Diplorhynchus condylocarpon</i>	11	4.8
	<i>Diplorhynchus condylocarpon</i>	11	5.3
	<i>Brachystegia boehmii</i>	20	10.3

Sampling point 12 (28/9/23):

Coordinates: S -5.99845 / E 32.50944

Slope: +/- flat

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 11 m²

Photos: -

Disturbances/notes (12-13): 1 *Pterocarpus angolensis* cut 2020 (60 Steps); 1 *Pterocarpus angolensis* cut 2013 (130 Steps); 1 *Julbernardia globiflora* tree barking 2015 (140 Steps); 1 *Pterocarpus angolensis* cut 2013 (200 Steps); 1 *Pterocarpus angolensis* cut 2013 (290 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Erythrophleum africanum</i>	41	15.40
	<i>Julbernardia globiflora</i>	54	10.80
	No tree		
	<i>Brachystegia spiciformis</i>	44	14.50
DBH < 20 cm	<i>Pterocarpus angolensis</i>	7	1.60
	<i>Cassipourea mollis</i>	14	4.20
	<i>Oldfieldia dactylophylla</i>	16	6.50
	<i>Oldfieldia dactylophylla</i>	11	2.80

Sampling point 13 (28/9/23):

Coordinates: S -6.00073 / E 32.50867

Slope: 1%, slope exposure: 110°

Dominant tree height: 18 m

Basal area (Bitterlich, k=1): 9 m²

Photos: -

Disturbances/notes (13-14): 1 *Pterocarpus angolensis* cut 2013 (30 Steps); 1 *Pterocarpus angolensis* cut 2013 (120 Steps); 1 *Pterocarpus angolensis* cut 2013 (140 Steps); 1 *Burkea africana* cut 2013 (200 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	32	3.20
	<i>Brachystegia spiciformis</i>	50	10.90
	<i>Brachystegia boehmii</i>	54	5.30
	<i>Julbernardia globiflora</i>	41	12.30
DBH < 20 cm	<i>Dichrostachys cinerea</i>	4	6.30
	<i>Strychnos cocculoides</i>	8	10.20
	<i>Pseudolachnostylis maprouneifolia</i>	5	6.50
	<i>Diplorhynchus condylocarpon</i>	9	8.70

Sampling point 14 (28/9/23):

Coordinates: S -6.00299 / E 32.50792

Slope: +/-flat

Dominant tree height: 14m

Basal area (Bitterlich, k=1): 10 m²

Photos: -

Disturbances/notes (14-15): 1 *Pterocarpus angolensis* cut 2015 (170 Steps); 1 *Pterocarpus angolensis* cut 2013 (300 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia boehmii</i>	44	17.20
	<i>Albizia amara</i>	46	7.40
	<i>Julbernardia globiflora</i>	32	19.50
	<i>Julbernardia globiflora</i>	31	9.20
DBH < 20 cm	<i>Ozoroa insignis</i>	9	3.70
	<i>Diplorhynchus condylocarpon</i>	11	9.10
	<i>Combretum molle</i>	11	2.60
	<i>Combretum zeyheri</i>	4	3.60

Sampling point 15 (28/9/23):

Coordinates: S -6.00542 / E 32.50713

Slope: +/-flat

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 12 m²

Photos: -

Disturbances/notes (15-16): 1 *Albizia antunesiana* cut 2013 (20 Steps); 1 *Azelia quanzensis* cut 2013 (60 Steps); 3 *Pterocarpus angolensis* cut 2013 (60 Steps); 3 *Pterocarpus angolensis* cut 2018 (270Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pericopsis angolensis</i>	22	4.40
	<i>Brachystegia boehmii</i>	27	5.70
	<i>Brachystegia boehmii</i>	42	5.00
	<i>Pericopsis angolensis</i>	32	5.70
DBH < 20 cm	<i>Burkea africana</i>	16	3.70
	<i>Diplorhynchus condylocarpon</i>	14	6.60
	<i>Ximenia americana</i>	13	3.40
	<i>Erythrophleum africanum</i>	16	6.30

Sampling point 16 (28/9/23):

Coordinates: S -6.00721 / E 32.50637

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 12 m²

Photos: -

Disturbances/notes (16-17): 1 *Pterocarpus angolensis* cut 2013 (170Steps); 1 *Pterocarpus angolensis* cut 2013 (220 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	26	8.80
	<i>Pseudolachnostylis maprouneifolia</i>	31	10.70
	<i>Julbernardia globiflora</i>	31	16.50
	<i>Brachystegia boehmii</i>	38	9.00
DBH < 20 cm	<i>Strychnos cocculoides</i>	4	2.70
	<i>Xylopia antunesii</i>	5	2.00
	<i>Brachystegia boehmii</i>	5	2.60
	<i>Xylopia antunesii</i>	11	4.80

Sampling point 17 (28/9/23):

Coordinates: S -6.00951 / E 32.50521

Slope: +/- flat

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 5 m²

Photos: -

Disturbances/notes (17-18): 1 *Pterocarpus angolensis* cut 2018 (80Steps); 1 *Julbernardia globiflora* tree barking 2019 (220 Steps);

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Combretum zeyheri</i>	22	17.40
	No tree		
	<i>Brachystegia boehmii</i>	48	7.20
DBH < 20 cm	<i>Lannea schimperi</i>	38	6.50
	<i>Chrysophyllum bangweolense</i>	4	13.40
	<i>Rothmannia engleriana</i>	3	3.70
	<i>Combretum collinum</i>	8	7.20
	<i>Diplorhynchus condylocarpon</i>	11	9.90

Sampling point 18 (28/9/23):

Coordinates: S -6.01173 / E 32.50441

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 2 m²

Photos: -

Disturbances/notes (18-19): –

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Pseudolachnostylis maprouneifolia</i>	32	14.30
	<i>Tamarindus indica</i>	34	19.70
	<i>Pseudolachnostylis maprouneifolia</i>	32	3.30
DBH < 20 cm	No tree		
	<i>Julbernardia globiflora</i>	4	14.10
	<i>Philenoptera violacea</i>	10	4.50
	<i>Combretum zeyeri</i>	15	4.40

Sampling point 19 (28/9/23):

Coordinates: S -6.01403 / E 32.50354

Slope: +/- flat

Dominant tree height: 13 m

Basal area (Bitterlich, k=1): 2 m²

Photos: -

Disturbances/notes (19-20): –

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	No tree		
	<i>Pericopsis angolensis</i>	43	20.00
	<i>Pericopsis angolensis</i>	49	11.00
DBH < 20 cm	<i>Combretum adenogonium</i>	6	12.40
	<i>Terminalia mollis</i>	4	6.30
	<i>Terminalia mollis</i>	4	4.00
	<i>Diplorhynchus condylocarpon</i>	14	12.90

Sampling point 20 (28/9/23):

Coordinates: S -6.01627 / E 32.50261

Slope: +/- flat

Dominant tree height: 12 m

Basal area (Bitterlich, k=1): 0 m²

Photos: -

Disturbances/notes (20-21): –

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>Vachellia drepanolobium</i>	5	9.30
	<i>Vachellia drepanolobium</i>	3	3.80
	<i>Combretum adenogonium</i>	11	9.60
	<i>Diplorhynchus condylocarpon</i>	4	14.10

Sampling point 21 (28/9/23):

Coordinates: S -6.01828 / E 32.50162

Slope: 1%, slope exposure: 20°

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 10.5 m²

Photos: -

Disturbances/notes (21-22): 1 *Pterocarpus angolensis* cut 2013 (250Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Terminalia mollis</i>	22	6.40
	<i>Combretum zeyheri</i>	24	10.80
	<i>Julbernardia globiflora</i>	45	9.20
	<i>Burkea africana</i>	34	18.80
DBH < 20 cm	<i>Combretum zeyheri</i>	3	5.00
	<i>Julbernardia globiflora</i>	4	7.40
	<i>Crossopteryx febrifuga</i>	4	2.20
	<i>Terminalia mollis</i>	19	5.60

Sampling point 22 (28/9/23):

Coordinates: S -6.02045 / E 32.50051

Slope: +/- flat

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 11.5 m²

Photos: -

Disturbances/notes (22-23): 1 *Julbernardia globiflora* tree barking 2020 (20 Steps); 1 *Pterocarpus angolensis* cut 2013 (60 Steps); 1 *Pterocarpus angolensis* cut 2013 (140 Steps); 1 *Julbernardia globiflora* tree barking 2021 (245 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia boehmii</i>	39	11.60
	<i>Brachystegia boehmii</i>	37	4.70
	<i>Brachystegia boehmii</i>	38	6.50
	<i>Brachystegia boehmii</i>	37	20.00
DBH < 20 cm	<i>Diospyros kirkii</i>	6	6.40
	<i>Hymenocardia acida</i>	3	6.80
	<i>Friesodielsia obovata</i>	6	6.80
	<i>Xylopia antunesii</i>	10	13.60

Sampling point 23 (28/9/23):

Coordinates: S -6.02253 / E 32.49955

Slope: +/- flat

Dominant tree height: 26 m

Basal area (Bitterlich, k=1): 9.5 m²

Photos: -

Disturbances/notes (23-24): 1 *Pterocarpus angolensis* cut 2013 (50 Steps); 1 *Pterocarpus angolensis* cut 2018 (240 Steps); 1 *Pterocarpus angolensis* cut 2018 (270 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pericopsis angolensis</i>	24	9.10
	<i>Julbernardia globiflora</i>	26	13.00
	<i>Julbernardia globiflora</i>	31	8.40
	<i>Brachystegia boehmii</i>	34	3.40
DBH < 20 cm	<i>Vangueriopsis lanciflora</i>	4	9.20
	<i>Vitex mombassae</i>	12	1.30
	<i>Strychnos pungens</i>	18	7.10
	<i>Combretum zeyheri</i>	9	9.90

Sampling point 24 (28/9/23):

Coordinates: S -6.02438 / E 32.49830

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 11 m²

Photos: -

Disturbances/notes (24-25): 1 *Pterocarpus angolensis* cut 2013 (290 Steps)

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Combretum molle</i>	23	7.50
	<i>Julbernardia globiflora</i>	22	14.50
	<i>Monotes africanus</i>	23	16.40
	<i>Brachystegia boehmii</i>	20	11.70
DBH < 20 cm	<i>Terminalia mollis</i>	12	6.00
	<i>Julbernardia globiflora</i>	4	2.20
	<i>Diplorhynchus condylocarpon</i>	3	4.00
	<i>Diplorhynchus condylocarpon</i>	13	2.30

Sampling point 25 (28/9/23):

Coordinates: S -6.02643 / E 32.49722

Slope: +/- flat

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 12 m²

Photos: -

Disturbances/notes: -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	21	13.3
	<i>Julbernardia globiflora</i>	26	11.7
	<i>Julbernardia globiflora</i>	22	7.6
	<i>Brachystegia spiciformis</i>	21	2.8
DBH < 20 cm	<i>Julbernardia globiflora</i>	12	2.3
	<i>Cassipourea mollis</i>	7	1.7
	<i>Julbernardia globiflora</i>	12	3.3
	<i>Pseudolachnostylis maprouneifolia</i>	5	4.9

25 sampling points**Mean basal area (Bitterlich, k=1): 9.9 m²****Dominant tree height: 15.2 m**

Transect UN: Ugunda Ngoywa

Starting point 100m from track; UN direction azimuth: 220°

Sampling point 1 (26/8/23):

Coordinates: S -5.95161 / E 32.64336

Slope: 0-1%, slope exposure: 50°

Dominant tree height: 17 m

Basal area (Bitterlich, k=1) : 10 m²

Photos : UN1A, UN1B, UN1C, UN1D

Disturbances/notes (1-2): 1 *Pterocarpus angolensis* cut 2018, DBH: 30cm (80 Steps); 1 *Julbernardia globiflora* tree barking 2022 (110 steps); 1 *Azelia quanzensis* cut 2018, DBH: 80cm (130 Steps); 1 *Pterocarpus angolensis* cut 2013, DBH: 20cm (140 Steps); 1 saw pit 2018 (200 Steps); 3 *Pterocarpus angolensis* cut 2018, DBH: 30-45cm (220 Steps); 1 *Julbernardia globiflora* tree barking 2022 (270 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	29	10.40
	<i>Julbernardia globiflora</i>	29	6.30
	<i>Brachystegia spiciformis</i>	26	4.60
	<i>Pseudolachnostylis maprouneifolia</i>	22	5.00
DBH < 20 cm	<i>Brachystegia spiciformis</i>	19	2.30
	<i>Pseudolachnostylis maprouneifolia</i>	18	8.90
	<i>Ozoroa insignis</i> subsp. <i>reticulata</i>	3	2.80
	<i>Diplorhynchus condylocarpon</i>	16	3.80

Sampling point 2 (26/8/23):

Coordinates: S -5.95331 / E 32.64173

Slope: 0-1%, slope exposure: 120°

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 6.5 m²

Photos : UN2A, UN2B, UN2C, UN2D

Disturbances/notes (2-3): 3 *Pterocarpus angolensis* cut 2013 (20 Steps); 1 *Julbernardia globiflora* tree barking 2020 (20 steps); 3 *Pterocarpus angolensis* cut 2018 (120 Steps); 3 *Pterocarpus angolensis* cut 2013 (140 Steps); 1 saw pit 2013 (170 Steps) 1 *Pterocarpus angolensis* cut 2013 (270 Steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Lannea schimperi</i>	28	4.60
	-		
	<i>Erythrophleum africanum</i>	27	8.40
	<i>Brachystegia glaucescens</i>	24	16.50
DBH < 20 cm	<i>Hymenocardia acida</i>	19	6.60
	<i>Hymenocardia acida</i>	16	1.90
	<i>Oldfieldia dactylophylla</i>	13	9.10
	<i>Ozoroa insignis</i> subsp. <i>reticulata</i>	7	4.30

Sampling point 3 (1/10/23):

Coordinates: S -5.95316 / E 32.64029

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 10 m²

Photos:

Disturbances/notes (3-4): 1 *Burkea africana* tree barking 2022 (50 steps); 1 *Julbernardia globiflora* tree barking 2013 (120 steps); 1 *Pterocarpus angolensis* cut 2013 (260 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Philenoptera violacea</i>	28	8.80
	<i>Brachystegia spiciformis</i>	35	15.70

	<i>Pericopsis angolensis</i>	39	7.00
	<i>Pseudolachnostylis maprouneifolia</i>	23	11.50
DBH < 20 cm	<i>Combretum adenogonium</i>	12	4.50
	<i>Commiphora africana</i>	12	7.60
	<i>Diplorhynchus condylocarpon</i>	11	2.50
	<i>Combretum zeyheri</i>	5	1.10

Sampling point 4 (1/10/23):

Coordinates: S -5.95698 / E 32.63859

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 9 m²

Photos: -

Disturbances/notes (4-5): 1 *Pterocarpus angolensis* cut 2023 (30 steps); 1 *Pterocarpus angolensis* cut 2013 (70 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia boehmii</i>	48	5.20
	<i>Brachystegia boehmii</i>	30	9.30
	<i>Brachystegia spiciformis</i>	30	6.80
	<i>Brachystegia boehmii</i>	41	17.70
DBH < 20 cm	<i>Brachystegia boehmii</i>	8	8.00
	<i>Pterocarpus angolensis</i>	3	5.00
	<i>Ozoroa insignis</i>	8	3.10
	<i>Diplorhynchus condylocarpon</i>	12	2.90

Sampling point 5 (1/10/23):

Coordinates: S -5.95898/ E 32.63731

Slope: +/-flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 9.5 m²

Photos:

Disturbances/notes (5-6): 1 *Erythrophleum africanum* cut 2016 (150 steps); 1 *Pterocarpus angolensis* cut 2020 (220 steps); 1 *Brachystegia spiciformis* cut 2020 (230 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Diplorhynchus condylocarpon</i>	25	3.40
	<i>Brachystegia spiciformis</i>	26	11.80
	No tree		
	<i>Pseudolachnostylis maprouneifolia</i>	36	5.00
DBH < 20 cm	<i>Brachystegia boehmii</i>	5	3.00
	<i>Hexalobus monopetalus</i>	3	3.20
	<i>Julbernardia globiflora</i>	17	1.70
	<i>Julbernardia globiflora</i>	4	3.50

Sampling point 6 (1/10/23):

Coordinates: S -5.96090 / E 32.63586

Slope: +/- flat

Dominant tree height: 18 m

Basal area (Bitterlich, k=1): 14 m²

Photos: -

Disturbances/notes (6-7): 1 *Pterocarpus angolensis* cut 2021 (270 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia boehmii</i>	28	7.70

	<i>Brachystegia spiciformis</i>	23	7.40
	<i>Brachystegia spiciformis</i>	25	6.00
	<i>Brachystegia spiciformis</i>	31	7.40
DBH < 20 cm	<i>Pterocarpus angolensis</i>	12	7.70
	<i>Brachystegia spiciformis</i>	12	6.60
	<i>Brachystegia boehmii</i>	17	9.00
	<i>Combretum collinum</i>	16	4.20

Sampling point 7 (1/10/23):

Coordinates: S -5.96323 / E 32.63397

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 3 m²

Photos:

Disturbances/notes (7-8): 1 *Pterocarpus angolensis* cut 2013 (70 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Borassus aethiopum</i>	49	17.30
	<i>Brachystegia boehmii</i>	29	6.80
	No tree		
	No tree		
DBH < 20 cm	<i>Dichrostachys cinerea</i>	5	13.20
	<i>Terminalia sericea</i>	19	2.00
	<i>Piliostigma thonningii</i>	7	7.00
	<i>sclerocarya birrea</i>	18	4.00

Sampling point 8 (1/10/23):

Coordinates: S -5.96509 / E 32.63246

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 7 m²

Photos:

Disturbances/notes (8-9): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Terminalia sericea</i>	33	8.60
	<i>Brachystegia spiciformis</i>	37	15.30
	<i>Brachystegia boehmii</i>	33	17.00
DBH < 20 cm	<i>Terminalia sericea</i>	6	3.30
	<i>Combretum zeyheri</i>	7	3.50
	<i>Xylopiya antunesii</i>	3	3.80
	<i>Vangueriopsis lanciflora</i>	3	3.80

Sampling point 9 (1/10/23):

Coordinates: S -5.96710 / E 32.63085

Slope: +/- flat

Dominant tree height: 18 m

Basal area (Bitterlich, k=1): 6 m²

Photos:

Disturbances/notes (9-10): 1 *Julbernardia globiflora* cut tree barking 2022 (160 steps); 1 *Burkea africana* cut (250 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia boehmii</i>	32	11.70
	<i>Brachystegia boehmii</i>	27	9.90
	No tree		

	<i>Burkea africana</i>	36	4.40
DBH < 20 cm	<i>Brachystegia spiciformis</i>	15	3.20
	<i>Pterocarpus tinctorius</i>	13	4.50
	<i>Pterocarpus tinctorius</i>	4	3.70
	<i>Catunaregam spinosa</i>	8	4.40

Sampling point 10 (1/10/23):

Coordinates: S -5.96907 / E 32.62950

Slope: Slope: 1%, slope exposure: 220°

Dominant tree height: 19 m

Basal area (Bitterlich, k=1): 11 m²

Photos: -

Disturbances/notes (10-11): 1 *Pterocarpus angolensis* cut 2013 (60 steps); 1 *Julbernardia globiflora* cut tree barking 2022 (210 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	28	5.80
	<i>Lannea schimperi</i>	35	11.30
	<i>Pseudolachnostylis maprouneifolia</i>	35	13.60
	<i>Terminalia sericea</i>	34	6.90
DBH < 20 cm	<i>Brachystegia spiciformis</i>	6	4.50
	<i>Diplorhynchus condylocarpon</i>	6	7.30
	<i>Brachystegia spiciformis</i>	15	5.80
	<i>Monotes africanus</i>	11	2.40

Sampling point 11 (4/10/23):

Coordinates: S -5.97078 / E 32.62792

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 3 m²

Photos: -

Disturbances/notes (11-12): 1 *Julbernardia globiflora* cut tree barking 2022 (22 steps); 1 *Julbernardia globiflora* cut tree barking 2022 (40 steps); 1 *Pterocarpus angolensis* cut 2013 (40 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	24	20.00
	<i>Combretum zeyheri</i>	23	8.90
	<i>Dalbergia melanoxylon</i>	23	13.10
	No tree		
DBH < 20 cm	<i>Brachystegia boehmii</i>	3	6.20
	<i>Combretum zeyheri</i>	3	3.10
	<i>Dalbergia melanoxylon</i>	6	11.90
	<i>Combretum zeyheri</i>	9	10.20

Sampling point 12 (4/10/23):

Coordinates: S -5.97255 / E 32.62621

Slope: +/- falt

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 6 m²

Photos: -

Disturbances/notes (12-13): 1 *Pterocarpus angolensis* cut 2013 (180 steps); 1 *Julbernardia globiflora* tree barking 2023 (210 steps); 3 *Pterocarpus angolensis* cut 2013 (240 steps); 1 *Julbernardia globiflora* tree barking 2021 (280 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	54	11.10
	<i>Pseudolachnostylis maprouneifolia</i>	23	5.60

	<i>Brachystegia sp.</i>	44	5.20
	No tree		
DBH < 20 cm	<i>Burkea africana</i>	3	1.10
	<i>Hymenocardia acida</i>	7	4.10
	<i>Xylopia antunesii</i>	3	2.80
	<i>Xylopia antunesii</i>	3	1.60

Sampling point 13 (4/10/23):

Coordinates: S -5.97419 / E 32.62460

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 8 m²

Photos: -

Disturbances/notes (13-14): 1 *Pterocarpus angolensis* cut 2018 (30steps); 1 *Brachystegia boehmii* tree barking 2023 (210 steps); 1 *Julbernardia globiflora* tree barking 2022 (270 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Strychnos pungens</i>	20	16.00
	<i>Erythrophleum africanum</i>	30	7.90
	<i>Pseudolachnostylis maprouneifolia</i>	21	4.40
	<i>Brachystegia boehmii</i>	31	6.50
DBH < 20 cm	<i>Pterocarpus angolensis</i>	4	5.00
	<i>Pterocarpus angolensis</i>	7	4.00
	<i>Diospyros kirkii</i>	10	7.50
	<i>Combretum zeyheri</i>	8	5.60

Sampling point 14 (4/10/23):

Coordinates: S -5.97579 / E 32.62286

Slope: +/- flat

Dominant tree height: 12 m

Basal area (Bitterlich, k=1): 4 m²

Photos: -

Disturbances/notes (14-15): 1 *Brachystegia boehmii* tree barking 2022 (150 steps); 1 *Pterocarpus angolensis* cut 2013 (160 steps); 2 *Julbernardia globiflora* tree barking 2022 (170 steps); 1 *Pterocarpus angolensis* cut 2013 (190 steps); 1 *Pterocarpus angolensis* cut 2013 (290 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Terminalia sericea</i>	29	16.70
	<i>Brachystegia boehmii</i>	60	15.70
	No tree		
	<i>Brachystegia boehmii</i>	23	17.50
DBH < 20 cm	<i>Combretum zeyheri</i>	9	13.8
	<i>Catunaregam spinosa</i>	18	4.00
	<i>Ozoroa insignis</i>	4	4.00
	No tree		

Sampling point 15 (4/10/23):

Coordinates: S -5.97742 / E 32.62127

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 9 m²

Photos: -

Disturbances/notes (1-2): 1 *Julbernardia globiflora* tree barking 2022 (40 steps); 1 *Burkea africana* cut 2013 (110 Steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Burkea africana</i>	29	11.20

	<i>Pseudolachnostylis maprouneifolia</i>	30	5.00
	No tree		
	<i>Brachystegia boehmii</i>	51	5.40
DBH < 20 cm	<i>Cassipourea mollis</i>	13	3.40
	<i>Strychnos cocculoides</i>	3	3.30
	<i>Pterocarpus angolensis</i>	3	3.10
	<i>Vitex sp.</i>	3	4.60

Sampling point 16 (4/10/23):

Coordinates: S -5.97923 / E 32.61995

Slope: 1%, slope exposure: 40°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 10 m²

Photos: -

Disturbances/notes (2-3): 1 *Erythrophleum africanum* cut 2021 (60 steps); 1 *Julbernardia globiflora* tree barking 2021 (60 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia boehmii</i>	57	6.70
	<i>Brachystegia spiciformis</i>	22	12.80
	<i>Brachystegia spiciformis</i>	21	4.10
	<i>Brachystegia spiciformis</i>	32	7.90
DBH < 20 cm	<i>Brachystegia boehmii</i>	5	2.90
	<i>Crossopteryx febrifuga</i>	10	2.90
	<i>Julbernardia globiflora</i>	10	3.10
	<i>Brachystegia boehmii</i>	5	2.70

Sampling point 17 (4/10/23):

Coordinates: S -5.98064 / E 32.61812

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 7 m²

Photos: -

Disturbances/notes (3-4): 1 *Julbernardia globiflora* tree barking 2022 (80 steps); 1 *Julbernardia globiflora* tree barking 2022 (100 steps); 1 *Julbernardia globiflora* tree barking 2021 (150steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	61	6.00
	<i>Albizia antunesiana</i>	26	11.30
	<i>Monotes africanus</i>	26	5.00
	<i>Erythrophleum africanum</i>	28	11.10
DBH < 20 cm	<i>Julbernardia globiflora</i>	3	3.80
	<i>Monotes africanus</i>	5	2.70
	<i>Brachystegia spiciformis</i>	12	2.40
	<i>Pseudolachnostylis maprouneifolia</i>	12	2.80

Sampling point 18 (4/10/23):

Coordinates: S -5.98221 / E 32.61638

Slope: +/- flat

Dominant tree height: 18 m

Basal area (Bitterlich, k=1): 3 m²

Photos: -

Disturbances/notes (4-5): 2 *Julbernardia globiflora* tree barking 2019 (90 steps); 1 *Erythrophleum africanum* cut 2019 (140 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
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DBH ≥ 20 cm	<i>Cassia abbreviata</i>	22	12.50
	<i>Pericopsis angolensis</i>	32	9.80
	<i>Pericopsis angolensis</i>	31	4.40
	<i>Brachystegia spiciformis</i>	21	15.10
DBH < 20 cm	<i>Julbernardia globiflora</i>	7	4.00
	<i>Brachystegia spiciformis</i>	4	3.30
	<i>Julbernardia globiflora</i>	3	3.40
	<i>Julbernardia globiflora</i>	4	5.50

Sampling point 19 (4/10/23):

Coordinates: S -5.98380 / E 32.61475

Slope: +/-flat

Dominant tree height: 18 m

Basal area (Bitterlich, k=1): 10 m²

Photos: -

Disturbances/notes (5-6): 1 *Burkea africana* cut 2018 (0 steps); 1 *Julbernardia globiflora* tree barking 2022 (70 steps); 1 *Pterocarpus angolensis* cut 2013 (130 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia boehmii</i>	35	5
	<i>Julbernardia globiflora</i>	58	12
	<i>Pterocarpus tinctorius</i>	46	11.8
	<i>Burkea africana</i>	34	8.4
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	11	8.4
	<i>Diplorhynchus condylocarpon</i>	8	7.4
	<i>Diplorhynchus condylocarpon</i>	5	3
	<i>Diplorhynchus condylocarpon</i>	8	5.3

Sampling point 20 (4/10/23):

Coordinates: S -5.98546 / E 32.61313

Slope: 1%, slope exposure: 175°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 9 m²

Photos: -

Disturbances/notes (6-7): 1 *Brachystegia boehmii* cut 2018 (200 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Crossopteryx febrifuga</i>	32	13.60
	<i>Pericopsis angolensis</i>	31	13.40
	<i>Julbernardia globiflora</i>	49	3.90
	<i>Julbernardia globiflora</i>	23	15.00
DBH < 20 cm	<i>Combretum zeyheri</i>	16	12.20
	<i>Pseudolachnostylis maprouneifolia</i>	5	3.20
	<i>Schrebera trichoclada</i>	3	8.20
	<i>Combretum zeyheri</i>	6	4.70

Sampling point 21 (4/10/23):

Coordinates: S -5.98730 / E 32.61166

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 9 m²

Photos: -

Disturbances/notes (7-8): 1 *Pterocarpus angolensis* cut 2013 (70 steps); 1 *Julbernardia globiflora* tree barking 2019 (140 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
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DBH ≥ 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	27	17.80
	<i>Pseudolachnostylis maprouneifolia</i>	23	11.60
	<i>Julbernardia globiflora</i>	43	7.60
	<i>Diplorhynchus condylocarpon</i>	29	14.90
DBH < 20 cm	<i>Combretum zeyheri</i>	4	2.90
	<i>Pterocarpus tinctorius</i>	5	5.50
	<i>Pseudolachnostylis maprouneifolia</i>	17	10.60
	<i>Combretum zeyheri</i>	6	2.90

Sampling point 22 (4/10/23):

Coordinates: S -5.98885 / E 32.60999

Slope: +/- flat

Dominant tree height: 19 m

Basal area (Bitterlich, k=1): 16 m²

Photos: -

Disturbances/notes (8-9): 1 *Pterocarpus angolensis* cut 2020 (280 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	36	5.00
	<i>Julbernardia globiflora</i>	21	6.70
	<i>Cassipourea mollis</i>	20	7.40
	<i>Brachystegia spiciformis</i>	30	7.90
DBH < 20 cm	<i>Dalbergia nitidula</i>	4	6.40
	<i>Diplorhynchus condylocarpon</i>	6	11.20
	<i>Diplorhynchus condylocarpon</i>	3	3.90
	<i>Brachystegia spiciformis</i>	18	4.10

Sampling point 23 (4/10/23):

Coordinates: S -5.99027 / E 32.60814

Slope: +/- flat

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 13 m²

Photos: -

Disturbances/notes (9-10): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	25	10.60
	<i>Combretum molle</i>	31	8.70
	<i>Brachystegia spiciformis</i>	30	4.20
	<i>Brachystegia spiciformis</i>	22	2.70
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	16	9.40
	<i>Combretum molle</i>	19	2.90
	<i>Combretum zeyheri</i>	8	4.60
	<i>Diplorhynchus condylocarpon</i>	11	7.90

Sampling point 24 (4/10/23):

Coordinates: S -5.99188 / E 32.60637

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 17 m²

Photos: -

Disturbances/notes (10-11): 1 *Burkea africana* cut 2013 (70 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	20	4.10

	<i>Julbernardia globiflora</i>	21	7.20
	No tree		
	<i>Julbernardia globiflora</i>	29	8.80
DBH < 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	5	2.90
	<i>Combretum collinum</i>	6	6.60
	<i>Combretum molle</i>	12	4.10
	<i>Combretum zeyheri</i>	7	2.90

Sampling point 25 (4/10/23):

Coordinates: S -5.99371 / E 32.60502

Slope: +/- flat

Dominant tree height: 20 m

Basal area (Bitterlich, k=1): 11 m²

Photos: -

Disturbances/notes (11-12): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia boehmii</i>	46	6.90
	<i>Julbernardia globiflora</i>	22	16.80
	<i>Brachystegia spiciformis</i>	42	15.30
	<i>Lannea schimperi</i>	20	16.40
DBH < 20 cm	<i>Brachystegia spiciformis</i>	19	8.40
	<i>Julbernardia globiflora</i>	15	8.40
	<i>Julbernardia globiflora</i>	15	2.90
	<i>Combretum zeyheri</i>	6	8.50

25 sampling points

Mean basal area (Bitterlich, k=1): 8.8 m²

Dominant tree height: 16.2 m

Transect SI: Swangala Isanga

Starting point 100m from track; SI direction azimuth: 100°

Sampling point 1 (24/8/23):

Coordinates: S -6.12499 / E 32.44193

Slope: +/- flat

Dominant tree height: 13 m

Basal area (Bitterlich, k=1): 7 m²

Photos : SI1A, SI1B, SI1C, SI1D

Disturbances/notes (1-2): 1 *Pterocarpus angolensis* cut 2018, DBH: 40cm (30 steps); 1 *Pterocarpus angolensis* cut 2018, DBH: 80cm (100 steps); 1 *Albizia antunesiana* cut 2018, DBH: 50cm (150 steps); 1 *Pterocarpus angolensis* cut 2021, DBH:50 (290 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	37	12.50
	<i>Julbernardia globiflora</i>	39	7.20
	<i>Pseudolachnostylis maprouneifolia</i>	24	4.10
	<i>Terminalia sericea</i>	36	16.0
DBH < 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	6	2.00
	<i>Combretum fragrans</i>	6	10.80
	<i>Steganotaenia araliacea</i>	3	4.50
	<i>Pterocarpus tinctorius</i>	4	4.40

Sampling point 2 (24/8/23):

Coordinates: S -6.12586 / E 32.44410

Slope: 0-1%, slope exposure: 50°

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 7 m²

Photos : SI2A, SI2B, SI2C, SI2D

Disturbances/notes (2-3): 1 *Pterocarpus tinctorius* cut 2017 (100 steps); 3 *Pterocarpus angolensis* cut 2013 (130 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	34	11.5
	<i>Julbernardia globiflora</i>	42	11.0
	<i>Julbernardia globiflora</i>	26	5.20
	<i>Julbernardia globiflora</i>	32	8.70
DBH < 20 cm	<i>Vangueriopsis lanciflora</i>	3	4.00
	<i>Diplorhynchus condylocarpon</i>	7	10.60
	<i>Xylopia antunesii</i>	3	11.80
	<i>Margaritaria discoidea</i>	3	7.80

Sampling point 3 (25/9/23):

Coordinates: S -6.12597 / E 32.44635

Slope: 1%, slope exposure: 60°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 10.5 m²

Photos: -

Disturbances/notes (3-4): 1 *Pterocarpus angolensis* cut 2013 (40 steps); 1 *Julbernardia globiflora* tree barking 2023 (140 steps); 1 *Julbernardia globiflora* tree barking 2022 (170 steps); 1 *Julbernardia globiflora* tree barking 2022 (220 steps); 2 *Pterocarpus angolensis* cut 2013 (250 steps); 1 *Julbernardia globiflora* tree barking 2019 (280 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	28	2.80
	<i>Julbernardia globiflora</i>	40	10.40
	No tree		

	<i>Julbernardia globiflora</i>	33	15.70
DBH < 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	17	2.80
	<i>Pseudolachnostylis maprouneifolia</i>	18	8.60
	<i>Brachystegia spiciformis</i>	6	11.10
	<i>Burkea africana</i>	16	12.80

Sampling point 4 (25/9/23):

Coordinates: S -6.12603/ E 32.44869

Slope: 1%, slope exposure: 60°

Dominant tree height: 18 m

Basal area (Bitterlich, k=1): 5 m²

Photos: -

Disturbances/notes (4-5): 1 *Julbernardia globiflora* tree barking 2020 (20 steps); 1 *Albizia antunesiana* cut 2017 (110steps); 1 *Julbernardia globiflora* tree barking 2017 (170 steps); 1 *Julbernardia globiflora* tree barking 2017 (290 steps); 1 *Pterocarpus angolensis* cut 2013 (300 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Terminalia sericea</i>	24	13.70
	<i>Crossopteryx febrifuga</i>	23	8.90
	<i>Julbernardia globiflora</i>	37	10.80
	<i>Borassus aethiopum</i>	58	15.60
DBH < 20 cm	<i>Terminalia sericea</i>	9	14.10
	<i>Schrebera trichoclada</i>	4	2.00
	<i>Schrebera trichoclada</i>	4	1.20
	<i>Combretum molle</i>	7	3.60

Sampling point 5 (25/9/23):

Coordinates: S -6.12606 / E 32.45107

Slope: +/-flat

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 8 m²

Photos:

Disturbances/notes (5-6): 1 *Pterocarpus angolensis* cut 2021 (20 steps); 2 *Pterocarpus angolensis* cut 2013 (20 steps); 1 *Pterocarpus angolensis* cut 2013 (50 steps); 1 *Pterocarpus angolensis* cut 2013 (160 steps); 1 *Burkea Africana* cut 2018 (220 steps); 1 *Pterocarpus angolensis* cut 2013 (290 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Burkea africana</i>	20	6.30
	<i>Julbernardia globiflora</i>	29	14.20
	<i>Pseudolachnostylis maprouneifolia</i>	20	15.40
	<i>Julbernardia globiflora</i>	30	12.60
DBH < 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	13	11.10
	<i>Brachystegia spiciformis</i>	7	7.00
	<i>Combretum collinum</i>	4	5.70
	<i>Brachystegia spiciformis</i>	10	3.90

Sampling point 6 (25/9/23):

Coordinates: S -6.12632 / E 32.45338

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 5 m²

Photos: -

Disturbances/notes (6-7): 1 *Pterocarpus angolensis* cut 2013 (30 steps); 1 *Pterocarpus angolensis* cut 2013 (60 steps); 1 *Pterocarpus angolensis* cut 2013 (90 steps); 1 *Pterocarpus angolensis* cut 2020

(120 steps); 3 *Julbernardia globiflora* cut 2016 (200 steps); 1 *Pterocarpus angolensis* cut 2020 (250 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	45	13.40
	<i>Julbernardia globiflora</i>	46	8.00
	No tree		
	<i>Burkea africana</i>	39	17.50
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	7	9.40
	<i>Stereospermum kunthianum</i>	5	7.40
	<i>Brachystegia spiciformis</i>	3	5.80
	<i>Diplorhynchus condylocarpon</i>	3	3.80

Sampling point 7 (25/9/23):

Coordinates: S -6.12685 / E 32.45570

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 9 m²

Photos:

Disturbances/notes (7-8): 1 *Pterocarpus angolensis* cut 2013 (100 steps); 1 *Pterocarpus angolensis* cut 2020 (120 steps); 1 *Julbernardia globiflora* tree barking 2021 (120 steps); 2 *Julbernardia globiflora* tree barking 2022 (150 steps); 2 *Pterocarpus angolensis* cut 2022 (170 steps); 1 *Pterocarpus angolensis* cut 2013 (200 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Burkea africana</i>	36	18.70
	No tree		
	<i>Brachystegia boehmii</i>	20	4.70
	<i>Brachystegia spiciformis</i>	38	7.10
DBH < 20 cm	<i>Pterocarpus angolensis</i>	7	3.80
	<i>Brachystegia spiciformis</i>	8	8.80
	<i>Brachystegia boehmii</i>	14	4.70
	<i>Erythrophleum africanum</i>	8	2.80

Sampling point 8 (25/9/23):

Coordinates: S -6.12731 / E 32.45801

Slope: +/- flat

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 9 m²

Photos: -

Disturbances/notes (8-9): 1 *Brachystegia spiciformis* tree barking 2022 (40 steps); 1 *Pterocarpus angolensis* cut 2013 (80 steps); 2 *Brachystegia spiciformis* tree barking 2020 (80 steps); 1 *Pterocarpus angolensis* cut 2013 (90 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	43	6.20
	<i>Brachystegia spiciformis</i>	32	2.00
	No tree		
	<i>Brachystegia spiciformis</i>	50	2.10
DBH < 20 cm	<i>Pericopsis angolensis</i>	9	3.10
	<i>Pterocarpus angolensis</i>	5	5.10
	<i>Combretum zeyheri</i>	3	8.10
	<i>Diplorhynchus condylocarpon</i>	8	12.90

Sampling point 9 (25/9/23):

Coordinates: S -6.12750 / E 32.46041

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 5 m²

Photos:

Disturbances/notes (9-10): 1 *Brachystegia spiciformis* tree barking 2022 (70 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	24	10.50
	<i>Brachystegia spiciformis</i>	28	12.40
	No tree		
	<i>Pseudolachnostylis maprouneifolia</i>	23	11.80
DBH < 20 cm	<i>Xylopia antunesii</i>	4	3.00
	<i>Vangueriopsis lanciflora</i>	3	5.40
	<i>Albizia antunesiana</i>	6	1.90
	<i>Dichrostachys cinerea</i>	4	2.70

Sampling point 10 (25/9/23): Large Mbuga

Coordinates: S -6.12772 / E 32.46279

Slope: Slope: 1%, slope exposure: 80°

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 1 m²

Photos: -

Disturbances/notes (10-11): Large Mbuga about 3 km

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Berchemia discolor</i>	41	10.00
	<i>Pseudolachnostylis maprouneifolia</i>	24	15.00
	<i>Lannea schimperi</i>	29	14.00
	No tree		
DBH < 20 cm	<i>Diospyros zombensis</i>	5	13.00
	<i>Combretum adenogonium</i>	9	14.50
	<i>Brachystegia boehmii</i>	4	17.90
	No tree		

Sampling point 11 (26/9/23): Large Mbuga, 3.7km away from SI10

Coordinates: S -6.15887 / E 32.47413

Slope: 1%, slope exposure: 80°

Dominant tree height: 8 m

Basal area (Bitterlich, k=1): 3 m²

Photos: -

Disturbances/notes (11-12): 1 *Combretum adenogonium* cut 2016 (250 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Combretum adenogonium</i>	28	6.1
	No tree		
	<i>Combretum adenogonium</i>	24	4.4
DBH < 20 cm	<i>Combretum adenogonium</i>	20	19
	<i>Combretum adenogonium</i>	12	5.2
	No tree		
	<i>Combretum adenogonium</i>	14	4.4
	<i>Combretum adenogonium</i>	16	14.4

Sampling point 12 (26/9/23):

Coordinates: S -6.15939 / E 32.47641

Slope: 1%, slope exposure: 150°

Dominant tree height: 6 m

Basal area (Bitterlich, k=1): 1 m²

Photos: -

Disturbances/notes (12-13): 1 *Combretum adenogonium* cut 2019 (300 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	No tree		
	<i>Philenoptera violacea</i>	23	6.30
DBH < 20 cm	<i>Piliostigma thonningii</i>	7	16.20
	No tree		
	<i>Combretum adenogonium</i>	7	8.10
	<i>Combretum adenogonium</i>	3	4.30

Sampling point 13 (26/9/23):

Coordinates: S -6.15986 / E 32.47868

Slope: +/- flat

Dominant tree height: 8 m

Basal area (Bitterlich, k=1): 2.5 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>Terminalia mollis</i>	23	9.20
DBH < 20 cm	No tree		
	No tree		
	<i>Combretum adenogonium</i>	6	5.50
	No tree		

Sampling point 14 (26/9/23):

Coordinates: S -6.16034 / E 32.48101

Slope: +/- flat

Dominant tree height: 8m

Basal area (Bitterlich, k=1): 1 m²

Photos: -

Disturbances/notes (14-15):

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	No tree		
	<i>Combretum adenogonium</i>	27	17.40
DBH < 20 cm	<i>Combretum adenogonium</i>	16	13.70
	<i>Combretum adenogonium</i>	9	6.20
	<i>Combretum adenogonium</i>	13	7.70
	<i>Combretum adenogonium</i>	4	18.80

Sampling point 15 (26/9/23):

Coordinates: S -6.16101/ E 32.48337

Slope: 1%, slope exposure: 150°
 Dominant tree height: 16 m
 Basal area (Bitterlich, k=1): 7 m²
 Photos: -
 Disturbances/notes (15-16): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pericopsis angolensis</i>	57	15.20
	<i>Terminalia sericea</i>	20	8.70
	<i>Tamarindus indica</i>	77	13.10
	<i>Combretum molle</i>	24	14.50
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	12	3.20
	<i>Vachellia gerrardii</i>	17	4.40
	<i>Diospyros zombensis</i>	14	8.80
	<i>Combretum zeyheri</i>	14	9.10

Sampling point 16 (26/9/23):

Coordinates: S -6.16126 / E 32.48565
 Slope: 1%, slope exposure: 150°
 Dominant tree height: 16 m
 Basal area (Bitterlich, k=1): 4 m²
 Photos: -
 Disturbances/notes (16-17): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Cassia abbreviata</i>	48	11.00
	<i>Combretum adenogonium</i>	28	4.10
	No tree		
	<i>Ziziphus mucronata</i>	20	6.10
DBH < 20 cm	<i>Grewia bicolor</i>	4	10.30
	No tree		
	No tree		
	<i>Grewia bicolor</i>	3	6.00

Sampling point 17 (26/9/23):

Coordinates: S -6.16183 / E 32.48791
 Slope: ?
 Dominant tree height: ?
 Basal area (Bitterlich, k=1): ?
 Photos: -
 Disturbances/notes (17-18): 1 *Pterocarpus angolensis* cut 2016 (270 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Combretum molle</i>	20	9.60
	<i>Crossopteryx febrifuga</i>	33	12.90
	No tree		
	<i>Combretum molle</i>	24	4.90
DBH < 20 cm	<i>Combretum molle</i>	9	10.00
	<i>Combretum zeyheri</i>	17	11.00
	<i>Diplorhynchus condylocarpon</i>	3	6.60
	<i>Combretum zeyheri</i>	8	5.90

Sampling point 18 (26/9/23):

Coordinates: S -6.16225 / E 32.49030
 Slope: +/- flat
 Dominant tree height: 18 m
 Basal area (Bitterlich, k=1): 7.5 m²

Photos: -

Disturbances/notes (18-19): 1 *Brachystegia spiciformis* tree barking 2021 (100 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Burkea africana</i>	56	10.50
	<i>Pseudolachnostylis maprouneifolia</i>	37	2.90
	<i>Pericopsis angolensis</i>	45	7.90
	<i>Diospyros kirkii</i>	20	2.10
DBH < 20 cm	<i>Pericopsis angolensis</i>	11	4.80
	No tree		
	<i>Diospyros kirkii</i>	7	2.00
	<i>Annona senegalensis</i>	6	5.30

Sampling point 19 (26/9/23):

Coordinates: S -6.16343 / E 32.49228

Slope: +/-flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 8 m²

Photos: -

Disturbances/notes (19-20): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	22	12.00
	<i>Catunaregam spinosa</i>	23	7.00
	No tree		
	<i>Brachystegia spiciformis</i>	29	5.00
DBH < 20 cm	<i>Crossopteryx febrifuga</i>	3	5.80
	<i>Brachystegia sp.</i>	10	13.90
	<i>Pseudolachnostylis maprouneifolia</i>	14	5.00
	<i>Combretum adenogonium</i>	12	14.90

Sampling point 20 (26/9/23):

Coordinates: S -6.16384 / E 32.49494

Slope: +/- flat

Dominant tree height: 8 m

Basal area (Bitterlich, k=1): 3 m²

Photos: -

Disturbances/notes (20-21):

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Vachellia gerrardii</i>	22	11.40
	No tree		
	<i>Combretum adenogonium</i>	22	6.60
	No tree		
DBH < 20 cm	<i>Crossopteryx febrifuga</i>	13	4.70
	<i>Combretum adenogonium</i>	4	5.20
	<i>Combretum adenogonium</i>	5	11.90
	<i>Combretum adenogonium</i>	4	4.90

Sampling point 21 (26/9/23): Near river stream (seasonal)

Coordinates: S -6.16389 / E 32.49727

Slope: +/- flat

Dominant tree height: 11 m

Basal area (Bitterlich, k=1): 0 m²

Photos: -

Disturbances/notes (21-22): -

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	No tree		
	<i>Syzygium guineense</i>	13	8.10
	No tree		
	No tree		

Sampling point 22 (26/9/23):

Coordinates: S -6.16407 / E 32.49969

Slope: +/- flat

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 0 m²

Photos: -

Disturbances/notes (22-23): -

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	No tree		
	No tree		
	No tree		
	No tree		

Sampling point 23 (26/9/23): Mbuga

Coordinates: S -6.16422 / E 32.50196

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 2 m²

Photos: -

Disturbances/notes (23-24): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	No tree		
	<i>Albizia petersiana</i>	32	15.40
	No tree		
DBH < 20 cm	No tree		
	No tree		
	<i>Albizia petersiana</i>	7	15.00
	No tree		

Sampling point 24 (26/9/23): Mbuga

Coordinates: S -6.16458 / E 32.50435

Slope: +/- flat

Dominant tree height: 4 m

Basal area (Bitterlich, k=1): 0 m²

Photos: -

Disturbances/notes (24-25): 1 *Brachystegia boehmii* tree barking 2022 (300 step).

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	No tree		
	No tree		
	No tree		
	No tree		

Sampling point 25 (26/9/23):

Coordinates: S -6.16498 / E 32.50669

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 5.5 m²

Photos: -

Disturbances/notes (25-26): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	26	2.90
	<i>Brachystegia boehmii</i>	29	14.30
	<i>Pericopsis angolensis</i>	65	8.50
	<i>Combretum molle</i>	28	4.60
DBH < 20 cm	<i>Hexalobus monopetalus</i>	5	10.70
	<i>Crossopteryx febrifuga</i>	10	10.30
	<i>Annona senegalensis</i>	7	8.70
	<i>Pseudolachnostylis maprouneifolia</i>	5	4.40

Sampling point 26 (26/9/23):

Coordinates: S -6.16518 / E 32.50927

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 2 m²

Photos: -

Disturbances/notes (26): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Commiphora mollis</i>	39	12.90
	<i>Berchemia discolor</i>	70	16
	No tree		
DBH < 20 cm	<i>Lannea humilis</i>	4	4.30
	<i>Combretum obovatum</i>	4	7.50
	No tree		
	No tree		

26 sampling points:

Mean basal area (Bitterlich, k=1): 5.7 m²

Dominant tree height: 14.3 m

Transect SR : Swangala Ranger Post

Starting point 100m from track; SR direction azimuth: 130°

Sampling point 1 (21/8/23):

Coordinates: S -6.09188 / E 32.75038

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 8 m²

Photos: SR1A, SR1B, SR1C, SR1D

Disturbances/notes (1-2): 1 *Brachystegia glaucescens* tree barking 2021 (60 steps); 1 *Pterocarpus angolensis* cut 2021, DBH: 40cm (180 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Pterocarpus tinctorius</i>	36	6.20
	<i>Pterocarpus tinctorius</i>	29	10.60
	No tree		16.0
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	10	12.50
	<i>Terminalia sericea</i>	9	4.50
	<i>Crossopterix febrifuga</i>	7	5.90
	No tree		

Sampling point 2 (21/8/23):

Coordinates: S -6.09334 / E 32.75200

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 7.5 m²

Photos: SR2A, SR2B, SR2C, SR2D

Disturbances/notes (2-3): 1 *Pterocarpus tinctorius* cut 2021, DBH: 35cm (40 steps); 1 *Pericopsis angolensis* cut for honey 2020, DBH: 30cm (130 steps); 1 *Pterocarpus tinctorius* cut 2021, DBH: 40cm (150 steps); 1 *Pterocarpus tinctorius* cut 2021, DBH: 40cm (180 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia glaucescens</i>	27	14.00
	<i>Brachystegia glaucescens</i>	30	8.70
	<i>Brachystegia glaucescens</i>	30	11.80
	No tree		
DBH < 20 cm	<i>Pericopsis angolensis</i>	16	2.60
	<i>Crossopterix febrifuga</i>	4	1.90
	<i>Combretum fragrans</i>	5	7.80
	<i>Combretum fragrans</i>	6	16.30

Sampling point 3 (21/8/23):

Coordinates: S -6.09473 / E 32.75376

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 7 m²

Photos: SR3A, SR3B, SR3C, SR3D

Disturbances/notes (3-4): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia glaucescens</i>	32	8.50
	<i>Brachystegia glaucescens</i>	21	7.50
	<i>Brachystegia glaucescens</i>	34	13.30
	<i>Pericopsis angolensis</i>	35	18.50
DBH < 20 cm	<i>Crossopteryx febrifuga</i>	14	9.50

	<i>Terminalia sericea</i>	5	15.30
	No tree		
	<i>Crossopteryx febrifuga</i>	9	19.70

Sampling point 4 (21/8/23):

Coordinates: S -6.09615/ E 32.75541

Slope: +/- flat

Dominant tree height: 12 m

Basal area (Bitterlich, k=1): 5.5 m²

Photos: SR4A, SR4B, SR4C, SR4D

Disturbances/notes (4-5): 1 *Pterocarpus tinctorius* cut 2021, DBH: 40cm (90 steps); 1 *Pterocarpus tinctorius* cut 2021, DBH: 50cm (100 steps); 1 *Julbernardia globiflora* marked for timber harvesting area 2020 (140 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia glaucescens</i>	31	3.20
	<i>Brachystegia glaucescens</i>	23	4.30
	No tree		
	<i>Brachystegia glaucescens</i>	23	8.10
DBH < 20 cm	<i>Combretum fragrans</i>	4	13.50
	<i>Pericopsis angolensis</i>	17	13.00
	<i>Crossopteryx febrifuga</i>	9	15.10
	<i>Crossopteryx febrifuga</i>	4	15.90

Sampling point 5 (21/8/23):

Coordinates: S -6.09767 / E 32.75718

Slope: +/-flat

Dominant tree height: 12 m

Basal area (Bitterlich, k=1): 1m²

Photos: SR5A, SR5B, SR5C, SR5D

Disturbances/notes (5-6): 1 *Julbernardia globiflora* tree barking 2013 (170 steps); 1 *Julbernardia globiflora* tree barking 2023 (200 steps); 1 *Julbernardia globiflora* cut for honey 2022 (240 steps); 1 *Brachystegia spiciformis* tree barking 2022 (300 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Terminalia sericea</i>	23	12.80
	No tree		
	No tree		
	<i>Combretum molle</i>	20	10.00
DBH < 20 cm	<i>Terminalia sericea</i>	6	11.80
	<i>Combretum fragrans</i>	11	9.00
	<i>Combretum fragrans</i>	5	10.90
	<i>Combretum fragrans</i>	16	3.40

Sampling point 6 (21/8/23):

Coordinates: S -6.09912 / E 32.75906

Slope: 0-1%, slope exposure: 10°

Dominant tree height: 16 (18) m

Basal area (Bitterlich, k=1): 4 m²

Photos: SR6A, SR6B, SR6C, SR6D

Disturbances/notes (6-7): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Brachystegia spiciformis</i>	37	14.50

	<i>Combretum molle</i>	25	13.10
	<i>Pericopsis angolensis</i>	57	9.80
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	10	14.90
	<i>Pterocarpus angolensis</i>	4	15.90
	<i>Combretum molle</i>	8	5.00
	<i>Combretum molle</i>	4	13.20

Sampling point 7 (25/8/23):

Coordinates: S -6.10045 / E 32.76095

Slope: 0-1%, slope exposure: 20°

Dominant tree height: 12 m

Basal area (Bitterlich, k=1): 6.5 m²

Photos: SR7A, SR7B, SR7C, SR7D

Disturbances/notes (7-8): 1 *Pterocarpus angolensis* cut 2013 (50 steps); Waterholes made by the Sukuma (70-200 steps); 1 *Julbernardia globiflora* tree barking 2021 (120 steps); Msilanga cut 2023, DBH: 25cm (100 steps); 1 *Pseudolachnostylis maprouneifolia* cut 2023, DBH: 15cm (110 steps); 5 *Pterocarpus angolensis* cut 2018, DBH: 20-35 cm (190steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	27	4.00
	<i>Lannea schimperi</i>	27	9.20
	<i>Pseudolachnostylis maprouneifolia</i>	23	2.10
	<i>Terminalia mollis</i>	26	6.90
DBH < 20 cm	<i>Brachystegia spiciformis</i>	3	12.70
	No tree		
	No tree		
	<i>Terminalia mollis</i>	8	8.80

Sampling point 8 (25/8/23):

Coordinates: S -6.10220 / E 32.76260

Slope: 0-1%, slope exposure: 20°

Dominant tree height: 18 (20) m

Basal area (Bitterlich, k=1): 11.5 m²

Photos: SR8A, SR8B, SR8C, SR8D

Disturbances/notes (8-9): 1 *Pterocarpus angolensis* cut 2021, DBH: 25cm (40 steps); 1 *Pterocarpus angolensis* cut 2018, DBH: 25cm (60 steps); 1 *Pterocarpus angolensis* cut 2013, DBH: 25cm (80 steps); 1 *Brachystegia glaucescens* tree barking 2023 (200 steps); 1 *Pterocarpus angolensis* cut 2013, DBH: 25cm (210 steps); 1 *Pseudolachnostylis maprouneifolia* cut 2023, DBH: 40cm (260 steps); 1 *Julbernardia globiflora* tree barking 2023 (280 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	25	8.30
	<i>Brachystegia spiciformis</i>	35	10.30
	<i>Combretum zeyheri</i>	21	11.70
	<i>Pseudolachnostylis maprouneifolia</i>	26	4.20
DBH < 20 cm	<i>Pavetta stuhlmannii</i>	3	5.20
	<i>Hexalobus monopetalus</i>	3	5.60
	<i>Diplorhynchus condylocarpon</i>	10	3.50
	<i>Combretum collinum</i>	17	3.60

Sampling point 9 (25/8/23):

Coordinates: S -6.10345 / E 32.76463

Slope: 0-1%, slope exposure: 20°

Dominant tree height: 14.5 m

Basal area (Bitterlich, k=1): 11 m²

Photos: SR9A, SR9B, SR9C, SR9D

Disturbances/notes (9-10): 1 *Pterocarpus angolensis* cut 2013, DBH: 35cm (60 steps); 1 *Brachystegia glaucescens* tree barking 2023 (90 steps); 1 *Pericopsis angolensis* cut 2013, DBH: 35cm (140 steps); 1 *Julbernardia globiflora* tree barking 2023 (190 steps); 1 *Julbernardia globiflora* tree barking 2023 (220 steps); 1 saw pit 2018 (230 steps); 1 *Burkea africana* cut 2021, DBH: 40cm (240 steps); 1 *Pterocarpus angolensis* cut 2018 (250 steps); 1 *Julbernardia globiflora* tree barking 2023 (290 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Cassipourea mollis</i>	20	4.00
	<i>Julbernardia globiflora</i>	24	8.20
	<i>Julbernardia globiflora</i>	34	6.40
	<i>Pericopsis angolensis</i>	36	4.90
DBH < 20 cm	<i>Terminalia sericea</i>	4	7.60
	<i>Combretum collinum</i>	5	5.30
	<i>Combretum zeyheri</i>	6	3.10
	<i>Pterocarpus angolensis</i>	7	4.80

Sampling point 10 (25/8/23):

Coordinates: S -6.10507 / E 32.76633

Slope: 0-1%, slope exposure: 20°

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 9 m²

Photos: SR10A, SR10B, SR10C, SR10D

Disturbances/notes (10-11): 1 *Julbernardia globiflora* tree barking 2023 (10 steps); 1 *Julbernardia globiflora* tree barking 2023 (130 steps); 1 *Pterocarpus angolensis* cut 2016 (180 steps); 1 *Julbernardia globiflora* tree barking 2023 (210 steps); 1 *Julbernardia globiflora* tree barking 2023 (250 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	25	7.70
	<i>Julbernardia globiflora</i>	27	10.50
	<i>Julbernardia globiflora</i>	24	6.90
	<i>Julbernardia globiflora</i>	27	3.90
DBH < 20 cm	<i>Julbernardia globiflora</i>	19	4.90
	<i>Diplorhynchus condylocarpon</i>	6	2.0
	<i>Lannea schimperi</i>	4	5.90
	<i>Diplorhynchus condylocarpon</i>	6	8.30

Sampling point 11 (25/8/23):

Coordinates: S -6.10679 / E 32.76850

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 8 m²

Photos: SR11A, SR11B, SR11C, SR11D

Disturbances/notes (11-12): 1 *Burkea africana* cut for honey 2018 (30 steps); 1 *Pericopsis angolensis* cut for honey 2019 (60 steps); 1 hole for hunting aardvark (100 steps); 1 *Julbernardia globiflora* tree barking 2023 (120 steps); 1 *Julbernardia globiflora* tree barking 2023 (130 steps); 1 *Julbernardia globiflora* tree barking 2023 (250 steps); 1 *Burkea africana* cut 2021, DBH: 45cm (260 steps); 1 *Burkea africana* cut for honey 2021 (280 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	50	3.80
	<i>Julbernardia globiflora</i>	31	16.20
	<i>Julbernardia globiflora</i>	24	12.20
	<i>Julbernardia globiflora</i>	46	11.20
DBH < 20 cm	<i>Burkea africana</i>	12	6.30
	<i>Burkea africana</i>	14	2.10
	<i>Pseudolachnostylis maprouneifolia</i>	7	5.70
	<i>Pericopsis angolensis</i>	19	11.80

Sampling point 12 (25/8/23):

Coordinates: S -6.10831 / E 32.77033

Slope: +/- flat

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 11 m²

Photos: SR12A, SR12B, SR12C, SR12D

Disturbances/notes (12-13): 1 *Julbernardia globiflora* tree barking 2023 (20 steps); 1 *Pericopsis angolensis* cut for honey 2018 (40 steps); 1 *Julbernardia globiflora* cut for honey 2022 (90 steps); 1 *Brachystegia glaucescens* tree barking 2022 (230 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	26	10.10
	<i>Julbernardia globiflora</i>	41	1.90
	<i>Julbernardia globiflora</i>	21	2.60
	<i>Julbernardia globiflora</i>	30	7.10
DBH < 20 cm	<i>Julbernardia globiflora</i>	19	4.20
	<i>Pseudolachnostylis maprouneifolia</i>	5	5.50
	<i>Pterocarpus angolensis</i>	4	8.80
	<i>Stereospermum kunthianum</i>	4	5.50

Sampling point 13 (25/8/23):

Coordinates: S -6.10992 / E 32.77213

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 12 m²

Photos: SR13A, SR13B, SR13C, SR13D

Disturbances/notes (13-14): 1 *Julbernardia globiflora* tree barking 2022 (70 steps); 1 *Julbernardia globiflora* tree barking 2022 (230 steps); 1 *Julbernardia globiflora* tree barking 2022 (270 steps); 1 *Julbernardia globiflora* cut 2022 (280 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	41	6.50
	<i>Brachystegia spiciformis</i>	26	7.50
	<i>Brachystegia spiciformis</i>	32	2.10
	<i>Brachystegia spiciformis</i>	20	11.70
DBH < 20 cm	<i>Julbernardia globiflora</i>	11	7.70
	<i>Diplorhynchus condylocarpon</i>	4	3.40
	<i>Diplorhynchus condylocarpon</i>	3	4.20
	<i>Pterocarpus angolensis</i>	3	3.40

Sampling point 14 (3/10/23):

Coordinates: S -6.11173 / E 32.77361

Slope: +/- flat

Dominant tree height: 14m

Basal area (Bitterlich, k=1): 4 m²

Photos: -

Disturbances/notes (14-15): 1 *Julbernardia globiflora* tree barking 2022 (10 steps); 1 *Julbernardia globiflora* tree barking 2022 (190 steps); 1 *Brachystegia boehmii* cut 2016 (220).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	28	11.50
	<i>Burkea africana</i>	21	11.90
	<i>Julbernardia globiflora</i>	40	16.40
	<i>Pericopsis angolensis</i>	51	10.10
DBH < 20 cm	<i>Ximenia americana</i>	12	11.00
	<i>Pseudolachnostylis maprouneifolia</i>	7	6.20
	<i>Pseudolachnostylis maprouneifolia</i>	8	13.00
	<i>Pseudolachnostylis maprouneifolia</i>	7	10.00

Sampling point 15 (3/10/23):

Coordinates: S -6.11326/ E 32.77543

Slope: +/- flat

Dominant tree height: 12 m

Basal area (Bitterlich, k=1): 9 m²

Photos: -

Disturbances/notes (15-16): 1 *Julbernardia globiflora* tree barking 2022 (10 steps); 1 *Burkea africana* cut 2020 (240 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pericopsis angolensis</i>	39	7.50
	No tree		
	<i>Brachystegia boehmii</i>	26	5.50
	<i>Julbernardia globiflora</i>	31	17.20
DBH < 20 cm	<i>Brachystegia boehmii</i>	3	1.20
	<i>Brachystegia boehmii</i>	8	2.90
	<i>Brachystegia boehmii</i>	3	1.20
	<i>Pseudolachnostylis maprouneifolia</i>	9	2.20

Sampling point 16 (3/10/23):

Coordinates: S -6.11486 / E 32.77707

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 5 m²

Photos: -

Disturbances/notes (16-17): 1 *Pseudolachnostylis maprouneifolia* cut 2020 (100 steps); 1 *Julbernardia globiflora* cut 2019 (130 steps); 1 *Julbernardia globiflora* cut 2021 (150 steps); 1 *Julbernardia globiflora* tree barking 2022 (210 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	45	8.40
	<i>Burkea africana</i>	53	17.60
	<i>Brachystegia spiciformis</i>	57	5.60
	<i>Terminalia sericea</i>	29	16.80
DBH < 20 cm	<i>Hymenocardia acida</i>	5	15.00
	<i>Terminalia sericea</i>	15	8.40
	<i>Combretum zeyheri</i>	8	5.0
	<i>Combretum zeyheri</i>	6	4.60

Sampling point 17 (3/10/23):

Coordinates: S -6.11632 / E 32.77889

Slope: +/- flat

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 12 m²

Photos: -

Disturbances/notes (17-18): 1 *Julbernardia globiflora* tree barking 2022 (100 steps); 3 *Julbernardia globiflora* tree barking 2020 (160 steps); 1 *Pterocarpus angolensis* cut 2013 (160 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Burkea africana</i>	36	5.80
	<i>Julbernardia globiflora</i>	39	6.70
	<i>Pseudolachnostylis maprouneifolia</i>	28	14.70
	<i>Burkea africana</i>	39	15.70
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	5	2.00
	<i>Vangueriopsis lanciflora</i>	3	2.00
	<i>Combretum collinum</i>	8	4.30
	<i>Monotes africanus</i>	3	7.70

Sampling point 18 (3/10/23):

Coordinates: S -6.11781 / E 32.78068

Slope: 1%, slope exposure: 180°

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 10 m²

Photos: -

Disturbances/notes (18-19): 1 *Julbernardia globiflora* tree barking 2022 (120 steps); 1 *Pterocarpus angolensis* cut 2020 (150 steps); 1 *Julbernardia globiflora* tree barking 2021 (210 steps); 1 *Julbernardia globiflora* tree barking 2022 (250 steps); 2 *Julbernardia globiflora* tree barking 2022 (280steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	35	6.50
	<i>Pseudolachnostylis maprouneifolia</i>	39	5.20
	<i>Burkea africana</i>	37	8.20
	<i>Brachystegia spiciformis</i>	46	14.40
DBH < 20 cm	<i>Schrebera trichoclada</i>	10	5.50
	<i>Combretum collinum</i>	4	4.00
	<i>Dichrostachys cinerea</i>	7	4.20
	<i>Combretum collinum</i>	7	4.60

Sampling point 19 (3/10/23):

Coordinates: S -6.11939 / E 32.78237

Slope: 1%, slope exposure: 220°

Dominant tree height: 10 m

Basal area (Bitterlich, k=1): 16 m²

Photos: -

Disturbances/notes (19-20): 1 *Pterocarpus angolensis* cut 2013 (90 steps); 1 *Julbernardia globiflora* tree barking 2021 (120 steps); 1 *Julbernardia globiflora* tree barking 2022 (120 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	25	9.90
	<i>Brachystegia boehmii</i>	21	7.30
	<i>Terminalia sericea</i>	20	10.60
	<i>Pseudolachnostylis maprouneifolia</i>	21	3.30
DBH < 20 cm	<i>Pterocarpus angolensis</i>	4	5.00
	<i>Pterocarpus angolensis</i>	5	4.10
	<i>Brachystegia sp.</i>	5	3.10
	<i>Rothmannia engleriana</i>	4	9.50

Sampling point 20 (3/10/23):

Coordinates: S -6.12105 / E 32.78401

Slope: 1%, slope exposure: 220°

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 11 m²

Photos: -

Disturbances/notes (20-21): 1 *Pterocarpus angolensis* cut 2013 (140 steps); 1 *Pterocarpus angolensis* cut 2013 (220 steps); 1 *Julbernardia globiflora* tree barking 2022 (220 steps); 1 *Afzelia quanzensis* cut 2022 (220 steps); 2 *Pterocarpus angolensis* cut 2013 (290 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	23	8.40
	<i>Brachystegia boehmii</i>	20	2.20
	<i>Brachystegia boehmii</i>	30	6.80
	<i>Brachystegia boehmii</i>	39	4.40
DBH < 20 cm	<i>Terminalia sericea</i>	3	4.40
	<i>Strychnos cocculoides</i>	3	13.80
	<i>Terminalia sericea</i>	7	4.70
	<i>Pterocarpus angolensis</i>	4	3.40

Sampling point 21 (3/10/23):

Coordinates: S -6.12260 / E 32.78580

Slope: +/- flat

Dominant tree height: 18 m

Basal area (Bitterlich, k=1): 10 m²

Photos: -

Disturbances/notes (21-22): 1 saw pit 2013 (10 steps); 1 *Julbernardia globiflora* tree barking 2021 (70 steps); 1 *Julbernardia globiflora* tree barking 2020 (110 steps); 1 *Julbernardia globiflora* tree barking 2020 (190 steps); 1 *Julbernardia globiflora* tree barking 2020 (290 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	44	5.80
	<i>Julbernardia globiflora</i>	36	13.50
	<i>Combretum collinum</i>	36	6.60
	<i>Burkea africana</i>	55	15.50
DBH < 20 cm	<i>Xylopia antunesii</i>	5	6.00
	<i>Diplorhynchus condylocarpon</i>	5	5.50
	<i>Pseudolachnostylis maprouneifolia</i>	5	3.60
	<i>Pterocarpus angolensis</i>	9	5.90

Sampling point 22 (3/10/23):

Coordinates: S -6.12433 / E 32.78742

Slope: 1%, slope exposure: 90°

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 6.5 m²

Photos: -

Disturbances/notes (22-23): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	38	8.50
	<i>Julbernardia globiflora</i>	27	12.00
	<i>Oldfieldia dactylophylla</i>	24	6.20
	<i>Brachystegia boehmii</i>	33	8.40
DBH < 20 cm	<i>Pterocarpus tinctorius</i>	7	5.70
	<i>Ximenia americana</i>	7	6.20
	<i>Ximenia americana</i>	3	2.80

	<i>Combretum collinum</i>	4	3.70
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Sampling point 23 (3/10/23):

Coordinates: S -6.12594 / E 32.78906

Slope: +/- flat

Dominant tree height: 12 m

Basal area (Bitterlich, k=1): 0 m²

Photos: -

Disturbances/notes (23-24): -

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	No tree		
	No tree		
	No tree		
	No tree		

Sampling point 24 (3/10/23):

Coordinates: S -6.12749 / E 32.79086

Slope: +/- flat

Dominant tree height: 10 m

Basal area (Bitterlich, k=1): 2 m²

Photos: -

Disturbances/notes (24-25):

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Combretum adenogonium</i>	27	19.90
	<i>Combretum adenogonium</i>	25	8.00
	No tree		
DBH < 20 cm	No tree		
	No tree		
	<i>Combretum adenogonium</i>	10	14.80
	<i>Combretum adenogonium</i>	13	6.90

Sampling point 25 (3/10/23):

Coordinates: S -6.12900 / E 32.79271

Slope: +/- flat

Dominant tree height: 7 m

Basal area (Bitterlich, k=1): 0 m²

Photos: -

Disturbances/notes (25-26): -

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 adenogonium</i>	6	7.60
	No tree		
	<i>Combretum adenogonium</i>	16	16.60

25 sampling points

Mean basal area (Bitterlich, $k=1$): 8.2 m²

Dominant tree height: 14.5 m

Transect SM : Swangala Mbeya road

SI direction azimuth : 270°

Sampling point 1 (22/8/23):

Coordinates: S -6.13564 / E 32.90194

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 13.5 m²

Photos: SM1A, SM1B, SM1C, SM1D

Disturbances/notes (1-2): 1 *Pterocarpus angolensis* cut 2018, DBH: 20cm (50 steps); 1 *Pterocarpus angolensis* cut 2018, DBH: 20cm (130 steps); 1 *Pericopsis angolensis* cut for honey 2019, DBH: 70cm (300 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Strychnos pungens</i>	21	2.10
	No tree		
	<i>Brachystegia spiciformis</i>	37	12.60
	<i>Julbernardia globiflora</i>	24	8.20
DBH < 20 cm	<i>Strychnos innocua</i>	12	4.70
	<i>Combretum molle</i>	6	3.10
	<i>Erythrophleum africanum</i>	12	2.30
	<i>Combretum molle</i>	15	2.60

Sampling point 2 (23/8/23):

Coordinates: S -6.13560 / E 32.89963

Slope: 0-1%, slope exposure: 240°

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 14 m²

Photos: SM2A, SM2B, SM2C, SM2D

Disturbances/notes (2-3): 1 *Julbernardia globiflora* cut for honey 2023 (0 steps); 1 *Burkea Africana* cut 2020, DBH: 60cm (110 steps); 1 *Pterocarpus angolensis* cut 2018, DBH: 40cm (150 steps); 1 saw pit 2018 (180 steps); 1 *Pterocarpus angolensis* cut 2023, DBH: 45cm (200 steps); 2 *Pterocarpus angolensis* cut 2018, DBH: 25cm (240 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	34	4.10
	<i>Brachystegia spiciformis</i>	24	3.30
	<i>Julbernardia globiflora</i>	22	6.00
	<i>Brachystegia spiciformis</i>	21	4.70
DBH < 20 cm	<i>Pterocarpus angolensis</i>	8	13.70
	<i>Julbernardia globiflora</i>	15	1.70
	<i>Pseudolachnostylis maprouneifolia</i>	12	4.40
	<i>Erythrophleum africanum</i>	16	16.80

Sampling point 3 (23/8/23):

Coordinates: S -6.13559 / E 32.89726

Slope: +/- flat

Dominant tree height: 13 m

Basal area (Bitterlich, k=1): 4.5 m²

Photos: SM3A, SM3B, SM3C, SM3D

Disturbances/notes (3-4): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	24	11.40
	<i>Brachystegia spiciformis</i>	25	14.40
	<i>Erythrophleum africanum</i>	20	3.70
	<i>Erythrophleum africanum</i>	36	14.60

DBH < 20 cm	<i>Combretum zeyheri</i>	5	3.00
	<i>Dichrostachys cinerea</i>	3	5.30
	<i>Pterocarpus angolensis</i>	4	5.90
	<i>Combretum molle</i>	8	12.10

Sampling point 4 (23/8/23):

Coordinates: S -6.13550/ E 32.89501

Slope: +/- flat

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 4.5 m²

Photos: SM4A, SM4B, SM4C, SM4D

Disturbances/notes (4-5): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Erythrophleum africanum</i>	28	14.10
	<i>Brachystegia spiciformis</i>	38	14.00
	No tree		
DBH < 20 cm	<i>Julbernardia globiflora</i>	3	6.90
	<i>Pterocarpus angolensis</i>	6	3.30
	<i>Diplorhynchus condylocarpon</i>	11	8.00
	<i>Pseudolachnostylis maprouneifolia</i>	8	8.60

Sampling point 5 (23/8/23):

Coordinates: S -6.13549 / E 32.89262

Slope: +/-flat

Dominant tree height: 18 m

Basal area (Bitterlich, k=1): 13.5 m²

Photos: SM5A, SM5B, SM5C, SM5D

Disturbances/notes (5-6): 1 *Julbernardia globiflora* tree barking 2023 (30 steps); 1 *Julbernardia globiflora* tree barking 2023 (60 steps); 1 *Brachystegia spiciformis* tree barking 2023 (140 steps); 3 *Julbernardia globiflora* tree barking 2023 (200 steps); 1 *Julbernardia globiflora* tree barking 2023 (250 steps); 1 *Julbernardia globiflora* tree barking 2023 (270 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Combretum zeyheri</i>	21	6.70
	<i>Combretum collinum</i>	28	7.80
	No tree		
	<i>Combretum molle</i>	21	3.20
DBH < 20 cm	<i>Combretum zeyheri</i>	6	7.20
	<i>Brachystegia spiciformis</i>	10	3.60
	<i>Brachystegia spiciformis</i>	13	5.30
	<i>Brachystegia glaucescens</i>	12	5.00

Sampling point 6 (23/8/23):

Coordinates: S -6.13524 / E 32.89030

Slope: +/- flat

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 8.5 m²

Photos: SR6A, SR6B, SR6C, SR6D

Disturbances/notes (6-7): 1 giraffe bones 1 month (50 steps); 1 *Burkea africana* cut for honey 2023 (80 steps); 1 *Julbernardia globiflora* tree barking 2023 (90 steps); 1 *Julbernardia globiflora* cut 2018 (steps); 1 *Julbernardia globiflora* tree barking 2021 (250 steps); 1 *Pterocarpus angolensis* cut 2018, DBH: 26cm (250 steps); 1 *Julbernardia globiflora* tree barking 2023 (270 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Julbernardia globiflora</i>	37	16.50
	<i>Julbernardia globiflora</i>	44	16.30
	<i>Julbernardia globiflora</i>	49	4.80
DBH < 20 cm	<i>Erythrophleum africanum</i>	3	0.80
	<i>Erythrophleum africanum</i>	5	6.00
	<i>Pseudolachnostylis maprouneifolia</i>	4	1.00
	<i>Pterocarpus angolensis</i>	12	2.00

Sampling point 7 (23/8/23):

Coordinates: S -6.13509 / E 32.88798

Slope: +/- flat

Dominant tree height: 18 m

Basal area (Bitterlich, k=1): 9 m²

Photos: SM7A, SM7B, SM7C, SM7D

Disturbances/notes (7-8): 1 *Julbernardia globiflora* tree barking 2022 (40 steps); 1 *Brachystegia spiciformis* tree barking 2023 (170 steps); 3 *Julbernardia globiflora* tree barking 2023 (250 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	48	17.70
	<i>Brachystegia spiciformis</i>	20	9.30
	<i>Brachystegia spiciformis</i>	28	11.20
	<i>Erythrophleum africanum</i>	44	11.80
DBH < 20 cm	<i>Commiphora mosambicensis</i>	8	6.50
	<i>Crossopteryx febrifuga</i>	7	4.20
	<i>Margaritaria discoidea</i>	4	8.60
	<i>Commiphora mosambicensis</i>	5	2.00

Sampling point 8 (23/8/23):

Coordinates: S -6.13490 / E 32.88571

Slope: 0-1%, slope exposure: 250°

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 3 m²

Photos: SM8A, SM8B, SM8C, SM8D

Disturbances/notes (8-9): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	29	19.90
	<i>Combretum molle</i>	23	18.30
	<i>Diospyros kirkii</i>	32	8.10
	<i>Terminalia sericea</i>	22	15.10
DBH < 20 cm	<i>Bauhinia petersiana</i>	4	7.70
	<i>Terminalia sericea</i>	7	8.50
	<i>Terminalia mollis</i>	5	9.30
	<i>Diplorhynchus condylocarpon</i>	18	3.10

Sampling point 9 (2/10/23):

Coordinates: S -6.13504 / E 32.88343

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 5.5 m²

Photos:

Disturbances/notes (9-10): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia boehmii</i>	24	16.70
	<i>Combretum adenogonium</i>	20	5.40
	No tree		
DBH < 20 cm	<i>Terminalia sericea</i>	38	6.10
	<i>Combretum adenogonium</i>	3	4.50
	<i>Terminalia sericea</i>	4	4.70
	<i>Terminalia mollis</i>	12	12.20
	<i>Annona senegalensis</i>	3	5.50

Sampling point 10 (2/10/23):

Coordinates: S -6.13521 / E 32.88114

Slope: ?

Dominant tree height: ?

Basal area (Bitterlich, k=1): ?

Photos:

Disturbances/notes (10-11): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	No tree		
	<i>Crossopteryx febrifuga</i>	30	15.5
	No tree		
DBH < 20 cm	<i>Crossopteryx febrifuga</i>	20	4.5
	<i>Combretum adenogonium</i>	12	4.4
	<i>Combretum adenogonium</i>	4	8
	<i>Combretum adenogonium</i>	14	12.6
	<i>Combretum adenogonium</i>	13	6.5

Sampling point 11 (2/10/23):

Coordinates: S -6.13553 / E 32.87876

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 8 m²

Photos:

Disturbances/notes (11-12): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	33	2.9
	<i>Erythrophleum africanum</i>	30	7.8
	No tree	0	0
	<i>Julbernardia globiflora</i>	22	2.6
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	4	8.2
	<i>Crossopteryx febrifuga</i>	3	2.5
	<i>Monotes africanus</i>	18	1.6
	<i>Crossopteryx febrifuga</i>	4	5.3

Sampling point 12 (2/10/23):

Coordinates: S -6.13577 / E 32.87631

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 10 m²

Photos: ^

Disturbances/notes (12-13): 1 *Burkea africana* cut 2017 (40 steps).

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

	<i>Brachystegia spiciformis</i>	25	7.10
	<i>Julbernardia globiflora</i>	40	16.40
	<i>Burkea africana</i>	21	6.40
DBH < 20 cm	<i>Pterocarpus tinctorius</i>	4	3.70
	<i>Diplorhynchus condylocarpon</i>	8	6.50
	<i>Pseudolachnostylis maprouneifolia</i>	7	3.80
	<i>Hymenocardia acida</i>	7	2.70

Sampling point 13 (2/10/23):

Coordinates: S -6.13619 / E 32.87395

Slope: +/- flat

Dominant tree height: 18 m

Basal area (Bitterlich, k=1): 9 m²

Photos:

Disturbances/notes (13-14): 1 *Pterocarpus angolensis* cut 2013 (30 steps); 1 *Catunaregam spinosa* cut 2020 (90 steps); 1 *Pterocarpus angolensis* cut 2013 (190 steps); 1 *Pterocarpus angolensis* cut 2013 (290 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	22	9.8
	<i>Pericopsis angolensis</i>	23	14.3
	<i>Brachystegia spiciformis</i>	20	6.9
	<i>Julbernardia globiflora</i>	24	2.7
DBH < 20 cm	<i>Julbernardia globiflora</i>	14	3.8
	<i>Burkea africana</i>	17	3.1
	<i>Burkea africana</i>	9	1.6
	<i>Pericopsis angolensis</i>	7	4.1

Sampling point 14 (2/10/23):

Coordinates: S -6.13643 / E 32.87166

Slope: +/- flat

Dominant tree height: 22m

Basal area (Bitterlich, k=1): 13 m²

Photos: -

Disturbances/notes (14-15): 1 *Julbernardia globiflora* cut 2022 (60 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	41	12.30
	No tree		
	<i>Crossopteryx febrifuga</i>	24	4.30
DBH < 20 cm	<i>Brachystegia behmii</i>	5	3.10
	<i>Ozoroa insignis</i>	13	3.20
	<i>Diplorhynchus condylocarpon</i>	9	9.30
	<i>Terminalia sericea</i>	11	8.70

Sampling point 15 (2/10/23):

Coordinates: S -6.13650/ E 32.86921

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 7 m²

Photos: -

Disturbances/notes (15-16): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	25	3.70
	No tree		
	<i>Pericopsis angolensis</i>	20	11.00
	<i>Julbernardia globiflora</i>	59	14.30
DBH < 20 cm	<i>Julbernardia globiflora</i>	3	3.60
	<i>Diplorhynchus condylocarpon</i>	5	3.20
	<i>Diplorhynchus condylocarpon</i>	3	3.40
	<i>Diplorhynchus condylocarpon</i>	3	3.00

Sampling point 16 (2/10/23):

Coordinates: S -6.13680 / E 32.86687

Slope: +/- flat

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 8 m²

Photos: -

Disturbances/notes (16-17): 1 *Burkea africana* cut 2013 (130 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia spiciformis</i>	21	7.10
	<i>Pseudolachnostylis maprouneifolia</i>	29	12.80
	<i>Brachystegia spiciformis</i>	27	11.80
	<i>Burkea africana</i>	65	7.90
DBH < 20 cm	<i>Julbernardia globiflora</i>	9	3.40
	<i>Schrebera trichoclada</i>	4	1.90
	<i>Diplorhynchus condylocarpon</i>	7	6.40
	<i>Julbernardia globiflora</i>	3	1.20

Sampling point 17 (2/10/23):

Coordinates: S -6.13689 / E 32.86456

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 16 m²

Photos: -

Disturbances/notes (17-18): 1 *Pterocarpus angolensis* cut 2013 (260 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pericopsis angolensis</i>	27	8.20
	<i>Julbernardia globiflora</i>	36	3.40
	<i>Julbernardia globiflora</i>	41	6.70
	<i>Erythrophleum africanum</i>	23	4.80
DBH < 20 cm	<i>Diplorhynchus condylocarpon</i>	4	7.90
	<i>Combretum zeyheri</i>	6	6.50
	<i>Combretum molle</i>	4	13.10
	<i>Diplorhynchus condylocarpon</i>	5	14.40

Sampling point 18 (2/10/23):

Coordinates: S -6.13675 / E 32.86199

Slope: +/- flat

Dominant tree height: 16 m

Basal area (Bitterlich, k=1): 12 m²

Photos: -

Disturbances/notes (18-19): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Lannea schimperi</i>	21	2.80
	<i>Pseudolachnostylis maprouneifolia</i>	24	7.90
	<i>Combretum collinum</i>	43	6.40
	<i>Pericopsis angolensis</i>	31	12.90
DBH < 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	14	3.70
	<i>Pterocarpus angolensis</i>	5	7.80
	<i>Pseudolachnostylis maprouneifolia</i>	19	8.60
	<i>Cassipourea mollis</i>	13	2.30

Sampling point 19 (2/10/23):

Coordinates: S -6.13681/ E 32.85958

Slope: +/- flat

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 17 m²

Photos: -

Disturbances/notes (19-20): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia longifolia</i>	21	7.90
	<i>Julbernardia globiflora</i>	33	14.70
	<i>Pseudolachnostylis maprouneifolia</i>	22	10.30
	<i>Brachystegia boehmii</i>	35	9.00
DBH < 20 cm	<i>Erythrophleum africanum</i>	16	4.10
	<i>Erythrophleum africanum</i>	17	1.30
	<i>Erythrophleum africanum</i>	13	6.00
	<i>Erythrophleum africanum</i>	7	1.00

Sampling point 20 (2/10/23):

Coordinates: S -6.1352 / E 32.85727

Slope: +/- flat

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 1 m²

Photos: -

Disturbances/notes (20-21): -

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>Pseudolachnostylis maprouneifolia</i>	3	7.60
	<i>Diospyros kirkii</i>	3	8.20
	<i>Combretum adenogonium</i>	9	7.10
	<i>Combretum adenogonium</i>	3	4.30

Sampling point 21 (2/10/23):

Coordinates: S -6.13605 / E 32.85490

Slope: +/- flat

Dominant tree height: 14 m

Basal area (Bitterlich, k=1): 2 m²

Photos: -

Disturbances/notes (21-22): -

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 adenogonium</i>	11	9.30
	<i>Combretum adenogonium</i>	3	10.00
	<i>Combretum adenogonium</i>	3	14.80
	<i>Combretum adenogonium</i>	15	6.50

Sampling point 22 (2/10/23):

Coordinates: S -6.13591 / E 32.85253

Slope: 1%, slope exposure: 90°

Dominant tree height: 12 m

Basal area (Bitterlich, k=1): 4 m²

Photos: -

Disturbances/notes (22-23): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	21	4.00
	<i>Terminalia sericea</i>	39	5.50
	<i>Terminalia sericea</i>	32	14.20
	No tree		
DBH < 20 cm	<i>Pseudolachnostylis maprouneifolia</i>	8	3.50
	<i>Crossopteryx febrifuga</i>	12	4.10
	<i>Pseudolachnostylis maprouneifolia</i>	15	10.40
	<i>Crossopteryx febrifuga</i>	4	2.60

Sampling point 23 (2/10/23):

Coordinates: S -6.13564 / E 32.85015

Slope: +/- flat

Dominant tree height: 15 m

Basal area (Bitterlich, k=1): 15 m²

Photos: -

Disturbances/notes (23-24): 1 *Julbernardia globiflora* tree barking 2020 (30 steps); 1 *Julbernardia globiflora* tree barking 2020 (90steps); 1 *Julbernardia globiflora* tree barking 2020 (230 steps); 1 *Julbernardia globiflora* tree barking 2020 (250 steps).

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Brachystegia boehmii</i>	20	7.60
	<i>Pseudolachnostylis maprouneifolia</i>	46	15.60
	<i>Burkea africana</i>	47	4.60
	<i>Brachystegia sp.</i>	27	3.90
DBH < 20 cm	<i>Bobgunnia madagascariensis</i>	6	6.30
	<i>Brachystegia boehmii</i>	18	9.00
	<i>Terminalia sericea</i>	8	3.10
	<i>Terminalia sericea</i>	13	6.90

Sampling point 24 (2/10/23):

Coordinates: S -6.13618 / E 32.84789

Slope: 1%, slope exposure: 90°

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 16 m²

Photos: -

Disturbances/notes (24-25):

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Crossopteryx febrifuga</i>	21	8.40
	<i>Julbernardia globiflora</i>	28	5.60
	<i>Pericopsis angolensis</i>	23	10.30
	<i>Brachystegia boehmii</i>	28	11.50
DBH < 20 cm	<i>Combretum molle</i>	12	5.20
	<i>Philenoptera violacea</i>	13	4.50
	<i>Ozoroa insignis</i>	6	2.40
	<i>Diplorhynchus condylocarpon</i>	11	13.00

Sampling point 25 (2/10/23):

Coordinates: S -6.13767 / E 32.84612

Slope: 1%, slope exposure: 180°

Dominant tree height: 17 m

Basal area (Bitterlich, k=1): 10 m²

Photos: -

Disturbances/notes (25-26): -

Diameter class	Nearest species in each quarter	DBH (cm)	Distance (m)
DBH ≥ 20 cm	<i>Julbernardia globiflora</i>	29	7.40
	<i>Pericopsis angolensis</i>	32	7.80
	<i>Julbernardia globiflora</i>	42	18.30
	<i>Cassipourea mollis</i>	20	5.40
DBH < 20 cm	<i>Julbernardia globiflora</i>	18	4.20
	<i>Cassipourea mollis</i>	13	6.20
	<i>Diplorhynchus condylocarpon</i>	11	6.90
	<i>Diplorhynchus condylocarpon</i>	6	6.00

25 sampling points

Mean basal area (Bitterlich, k=1): 9.3 m²

Dominant tree height: 15.6 m

Appendix C: Tree and shrub checklist for Mlele and Sikonge districts (15/4/2024)

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 sieberiana</i> (Vacchellia s.)		
<i>Acacia stuhlmannii</i> (Vacchellia s.)	Nunga?	
<i>Acacia tanganyikensis</i> (Vacchellia t./Senegalia t.)	Mzima?	
<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>	Mtwo	
<i>Balanites aegyptiaca</i>	Mwambangoma	In drier areas
<i>Bauhinia petersiana</i>	Mfundwa mbogo	
<i>Bauhinia thonningii</i>	Mfundwa mbogo	
<i>Berchemia discolor</i>		
<i>Bobgunnia madagascariensis</i>	Kasanda	Timber
<i>Borassus aethiopicum</i>	Sandala	Fruit edible
<i>Brachystegia boehmii</i>	Myombo	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>	Msilanga	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; Myenze (<i>B. boehmii</i> ?)	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	Rusty red to maroon, velvety branch tips; only 1 seed
<i>Cassia abbreviata</i>	Mlundalunda	
<i>Cassia singueana</i>	Mzokazoka	
<i>Cassipourea mollis</i>	Mlugala	
<i>Catunaregam spinosa</i>	Mpongole (Sukuma: Mwochangoko)	
<i>Chrysophyllum bangweolense</i>		
<i>Combretum collinum</i>	Mlandala	
<i>Combretum fragrans (C. adenogonium)</i>	Mlozyaminze / Mluziaminzi	Leaf underside veloutinous
<i>Combretum molle</i>	Mlama	
<i>Combretum obovatum</i>		
<i>Combretum psidioides</i>	Mukukulama	
<i>Combretum torulosa</i>	Mkelenge	Mapili, Rungwa River FR, 23/1/22
<i>Combretum zeyheri</i>	Msana	Shiny leaf surface
<i>Commiphora africana</i>	Mtonto	
<i>Commiphora mollis</i>	Kama mponda	
<i>Commiphora mosambicensis</i>	Mponda	
<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 (Kikonongo) Kafinulampassa (Kinyamwezi)	
<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>	Msinde	
<i>Diospyros mespiliformis</i>	Msinde	Riverine forest; fruit edible
<i>Diospyros zombensis</i>		
<i>Diospyros sp.</i>		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> / <i>Euphorbia dendroides</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 sp.</i>		
<i>Erythrina abyssinica</i>	Kamchicha	
<i>Erythrophleum africanum</i>	Mgandongoye	Bark fibrous when cut (not <i>Burkea a.</i>); 1-5 seeds
<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 sp.</i>		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 sp. ?</i>	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 humilis</i>	Mgugumbuga	
<i>Lannea discolor</i>		Fruit edible
<i>Lannea schimperi</i>	Mgumbu	Fruit edible
<i>Lonchocarpus capassa</i> (<i>Philenoptera violacea</i>)	Mvalevale	
<i>Lonchocarpus eriocalyx</i>		
<i>Margaritaria discoidea</i>	Kisenga	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>Mimosa pigra</i>	Katatula	
<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>	Mtandara	
<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>Phoenix reclinata</i>	Mkindu (Swahili)	Ugunda FR

<i>Phyllanthus engleri</i>	Mng'ongomtandala	
<i>Phyllocosmus lemaireanus</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>	Kankingi	
<i>Rytigynia decussata</i>		
<i>Rytigynia uhligii</i>	Msongwansimba	
<i>Rothmannia engleriana</i>	Mlozilozi, Mukondokondo	Fruit edible
<i>Schrebera trichoclada</i>	Mputika	
<i>Sclerocarya birrea</i>	Mng'ongo	Fruit edible
<i>Securidaca longepedunculata</i>	Mteywe	
<i>Steganotaenia araliacea</i>		
<i>Sterculia africana</i>	Msawala	
<i>Sterculia quinqueloba</i>	Mkungulanga / Msavala / Msawala	
<i>Stereospermum kunthianum</i>	Mwogawami	
<i>Strychnos cocculoides</i>		
<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	Bark network structure
<i>Terminalia mollis</i>	Mfufu (Kikonongo), Mkelenge (Kinyamwezi)	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

Vangueriopsis lanciflora	Mgelelya	Fruit edible
Vitex doniana	Mfulu, Mfululegea	Fruit edible
Vitex fischeri?		
Vitex kenyensis		
Vitex madiensis	Mfululegea	Fruit edible; leaves like sandpaper
Vitex mombassae	Mtalali	Fruit edible
Vitex payos	Mtalali	Fruit edible
Xeroderris stuhlmannii		
Ximenia americana?	Mtundwa	Fruit edible
Ximenia caffra	Kaguvaguva	Fruit edible
Xylopiantunesii	Mshenene	Monanthotaxis discolour?
Zanha africana		
Zanthoxylum chalybeum	Mlungulungu	
Ziziphus mucronata	Kagaole	Fruit edible
	Mgulumwanguku (M24)	
	Mlungwanyama (RT3: 2)	
Total number of species identified with their latin name: 187	Total number of species identified only with their vernacular names: 2	