



Vascular plants at the Kafa Biosphere Reserve

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Highlights

- Although there are data for a transitional bamboo-montane forest at Boka, this is the first quantitative study of the vegetation in the Kafa BR bamboo forests, along with the wetland and riverine forest patches.
- In total, 154 vascular plant species were recorded.
- Seven endemic species were recorded: *Aframomum corrorima*, *Bothriocline schimperi*, *Clematis longicaudata*, *Erythrina brucei*, *Millettia ferruginea*, *Tiliacora troupinii*, *Vepris dainellii*.
- 16 species are endangered or threatened: *Bothriocline schimperi* (LC), *Dracaena afromontana* (LC), *Erythrina brucei* (LC), *Ficus ovata* (LC), *Millettia ferruginea* (LC), *Parochetus communis* (LC), *Phaulopsis imbricata* (LC), *Vepris dainellii* (LC), *Canthium oligocarpum* (NT), *Coffea arabica* (VU), *Maytenus arbutifolia* (VU), *Ocotea kenyensis* (VU), *Pavetta abyssinica* (VU), *Prunus africana* (VU), *Tiliacora troupinii* (VU), *Cyathea manniana* (NT).
- The Afromontane forests are more species-diverse than the bamboo forest and wetlands. The latter, however, display high heterogeneity of habitats, thus increasing overall diversity.
- The floodplain forests and wetlands feature a higher diversity of plant species than Afromontane Participatory Forest Management (PFM) sites. Therefore, establishing core zones in the wetlands/ floodplain forests would be advisable. More research is needed in this still poorly investigated habitat to extend species lists and investigate potential threats.
- The natural Afromontane forests show higher species diversity than the PFM Afromontane forests, as well as being home to considerably more species with high IVI values than the PFM sites. PFM techniques seem to decrease the natural regeneration of trees, resulting in a very low rate of species turnover.
- *Coffea arabica*, *Phoenix reclinata* and *Dracaena afromontana* are the flagship species.
- *Cyathea manniana*, *Dracaena afromontana* and *Hippocratea africana* are indicator species for primary montane forests susceptible to disturbances.
- *Pavetta abyssinica* and *Phoenix reclinata* are indicator species for floodplain forest and wetland forest patches.
- There is an urgent need for further investigation of other areas omitted from this assessment. For example, the western part of the reserve (Gesha and Bitá areas) has complex patches of high-land wetlands which certainly differ both structurally and compositionally from the investigated wetlands. The potential for discovering species new to science here is very high. Similarly, a huge, well-conserved patch of montane forest in the extreme northwest (Saylem) warrants detailed floristic study. At the other extreme, there is a lack of quantitative studies of the alpine vegetation northeast from Bonga (Adiyo), so more efforts are required in this area.
- Given the extreme importance of wetlands in Kafa, it is vital to typify their functions, processes, biochemistry and composition to aid further investigation. Some wetlands could be even nominated as Ramsar sites once sufficient information is available.
- Our results show that montane PFM sites exhibit lower diversity than the surrounding natural montane forests; therefore, there is an urgent need to investigate the vegetation (composition, diversity and ecology) at a spatial scale over time at both sites.

1. Introduction

Kafa BR is home to the last surviving moist evergreen montane forests in Ethiopia, which form part of the Eastern Afromontane Biodiversity Hotspot (Mittermeier et al. 2004). The wild coffee tree, *Coffea arabica*, is indigenous to the understorey of Kafa's natural montane forest, and in some areas is harvested wild without management. In other areas, wild coffee is harvested in forest fragments where farmers cut and thin out parts of the upper canopy and annually slash the forest understorey on Participatory Forest Management (PFM) sites. This form of forest maintenance is believed to be sustainable for the natural forest vegetation in terms of structural vegetation. However, the degradation in PFM sites still needs to be evaluated, as understorey slashing hampers regeneration. In recent decades, human pressure on forest resources in Ethiopia has increased, destroying a significant part of Ethiopia's forest resources.

Large swaths of Kafa's forest resources are already dwindling due to deforestation for timber extraction, conversion to agricultural land and the establishment of plantations. This ongoing trend threatens both the genetic resources of the wild coffee tree but also the remarkable floristic diversity of the area in general. A study found higher species richness in PFM sites where wild coffee is collected and vegetation is cut and slashed. This can be explained by the fact that ruderal herbs, climbers and pioneer species are adapted to regeneration in disturbed habitats. In contrast, typical forest species requiring shade and humidity, mainly tree species, have declined in both number and abundance (Denich & Schmitt 2006). Typical climax vegetation species, including some Afromontane endemics, have considerably decreased, including *Elaeodendron buchananii*, *Pouteria adolfi-friederici*, *Prunus africana*, *Macaranga capensis*, *Ilex mitis* and *Olea welwitschii*. In contrast, pioneer species such as *Croton macrostachyus*, *Millettia ferruginea* and *Albizia gummifera* dominate the disturbed PFM forest (Aerts et al. 2011). Tree ferns (*Cyathea manniana*) and the Rubiaceae *Psychotria orophila* are also less abundant in disturbed areas and are therefore mainly found in natural forests (Schmitt et al. 2009).

The few existing vegetation studies (Aerts et al. 2011; Denich & Schmitt 2006; Gobeze et al. 2009; Schmitt et al. 2009; Tadesse et al. 2014a, 2014b) have mainly concentrated on the PFM sites with *Coffea arabica* (see Figure 3) in the undergrowth and therefore on disturbed habitats. These studies conclude that anthropogenic interference has homogenised the natural vegetation. Therefore, we sought to study the differences in species composition in different habitats, both disturbed and undisturbed habitats such as primary forests in the core zone of the biosphere reserve.

A dense bamboo forest (Figures 4 and 5) with very low species diversity can be found at a height of between 2400 and 3050 m a.s.l. in Bonga, but not in Boginda. It is dominated by bamboo (*Arundinaria alpina*), but species like *Hagenia abyssinica* (Figure 7) and *Schefflera volkensii* (Figure 8) are also found within the bamboo stands at high elevations (Nune 2008). This type of vegetation has no shrub layer. Bamboo is commonly used by local communities to construct houses and make utensils (Chernet 2008). A literature review of Kafa studies clearly shows that wetlands are regularly cited as being important habitats, but no further studies were conducted there.

In fact, few comprehensive floristic studies have been conducted in the area. A rapid biodiversity assessment was carried out in the Kafa Zone (EWNHS 2008a) with special emphasis on the Mankira, Saja and Boka forests. Based on an initial and detailed landscape characterization using Landsat Thematic Mapper (TM) satellite images, the study first classified the main units of analysis into land use/land cover classes. The plant inventory was carried out in verified vegetation types at each forest in Saja, Mankira and Boka. This assessment focused mainly on forested areas, employing a measure of presence/absence along with qualitative methods, and considering woody plants above 5 cm diameter at breast height, herbs/lianas and ferns. We recorded 244 plant species from 77 families throughout the three forest sites. Of the 244 recorded species, 26.6% were trees, 27.9% were shrubs, 8.6% were climbers, 27.5% were herbs, 2.9% were epiphytes and 1.2% were grasses. The most abundant species in the Saja forest are *Oxanthus speciosus*, *Dracaena fragrans* and *Macaranga capensis*. The most abundant species in the Mankira forest are *Dracaena fragrans*, *Coffea arabica* and *Chionanthus mildbraedii*. In the Boka forest, bamboo (*Arundinaria alpina*) and *Schefflera volkensii* are dominant, with some understorey shrubs and herbs (EWNHS 2008a).

In 2008, on behalf of GIZ, NABU and GEO, the EWNHS published the report "Baseline Survey on Land Use & Socio Economic, Flora and Fauna Biodiversity Status of Bonga, Mankira and Boginda Forests in Kafa Zone" (2008b). Although this study classified seven major uses of land, the floristic inventories mainly focused on forested areas. Using transects and quadrates as sampling methods, the assessment recorded about 92 tree/shrub/liana species with a diameter of more than 10 cm at breast height across the three study sites. The Bonga area was the richest site with 70 species, followed by Boginda with 54 species and Mankira with 46 species. Bonga forest has the highest density of trees with a diameter of more than 10 cm followed by Boginda forest and Mankira forest (Nune 2008). The

floristic composition of three sampled sites shows high heterogeneity of habitats. This is revealed by the lack of species shared by all three forest sites, indicating that each forest has a heterogeneous species composition. The most prevalent species are *Croton macrostachyus* in Mankira and *Millettia ferruginea* in Bonga and Boginda Forest. No single tree or shrub species was found in every sample plot across all three study sites, despite being separated by only a few kilometres (Nune 2008). These results highlight the high diversity of habitats in the Kafa BR. This study also found heavy exploitation of *Cordia africana*, *Pouteria adolfi-friederici* and *Prunus africana*, which are reported as endangered species.

Various individual studies are also relevant here, for example the floristic surveys conducted by Schmitt et al. (2006) in areas near Bonga and the technical report on the diversity of woody species in Boginda Forest, conducted by the Forest Genetic Resources Conservation Project, a consortium formed by the GIZ and the Institute of Biodiversity Conservation and Research (IBCR) (GIZ 2011). Among them are at least 25 plant species which are endemic to Ethiopia, including *Erythrina brucei*, *Millettia ferruginea* (Figure 6), *Solanecio gigas*, *Hagenia abyssinica* (Figure 7), *Vepris dainellii* (Figure 9) and species such as *Milicia excelsa*, *Podocarpus falcatus* and *Prunus africana*, which are endangered according to the IUCN Red List and Ethiopia's and Eritrea's Red List, respectively.

According to the Institute of Biodiversity Conservation (2005) there are five main habitat types in Kafa Zone:

a) Sub-Afroalpine habitat: This habitat occurs at altitudes higher than 3200 m a.s.l. and covers only 0.3% of the total area of the Zone. This habitat is under severe threat due to agricultural expansion. Indigenous tree species such as *Hagenia abyssinica* are under high pressure.

b) Evergreen montane forest and grassland complex: This complex habitat occurs between an altitude of 1900 to 3300 m a.s.l. and cover 52.1% of the total area. It covers much of the highlands situated within the proposed buffer area of the BR. This habitat is generally highly populated and is also under pressure due to cereal-based agriculture.

c) Moist evergreen montane forest: The habitat occurs between 1500 and 2600 m a.s.l. and covers 26.1% of the total area of the BR. This type of forest is of global conservation significance due to the occurrence of wild *Coffea arabica* L. (Rubiaceae). In addition to deforestation for cereal-based agriculture, timber extraction is cause for great concern.

d) *Combretum-Terminalia* woodland: The IBC has probably mistakenly classified some areas of the Kafa BR as *Combretum-Terminalia* woodland, namely the coffee PFM sites in the Awurada Valley (Figure 12) and the bamboo forest. Figure 1 shows the mistaken classification (light green). Figure 2 shows the corrected habitat types in the BR as part of a land use/land cover map (Dresen 2014).

e) Wetlands: A complex system of wetland habitats occurs between 900 and 2600 m a.s.l. and covers 6.6% of the BR. These sensitive ecosystems are crucial for satisfying the basic human needs of the local communities (e.g., by providing materials for building shelter, grazing cattle, etc.). It is therefore also under intense development pressure.

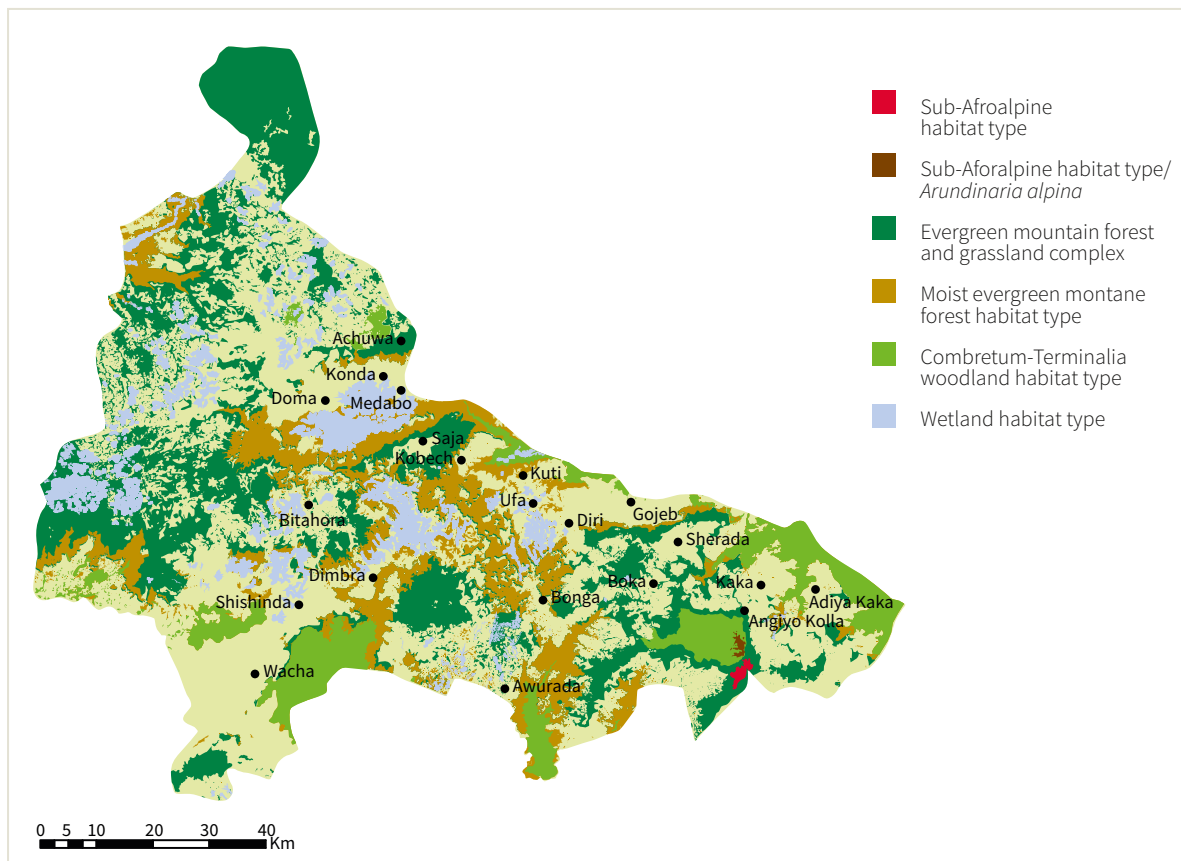


Figure 1: Habitat types in the Kafa BR according to the classification by the Institute of Biodiversity Conservation (IBC 2005), adapted by Elisabeth Dresen (2014)

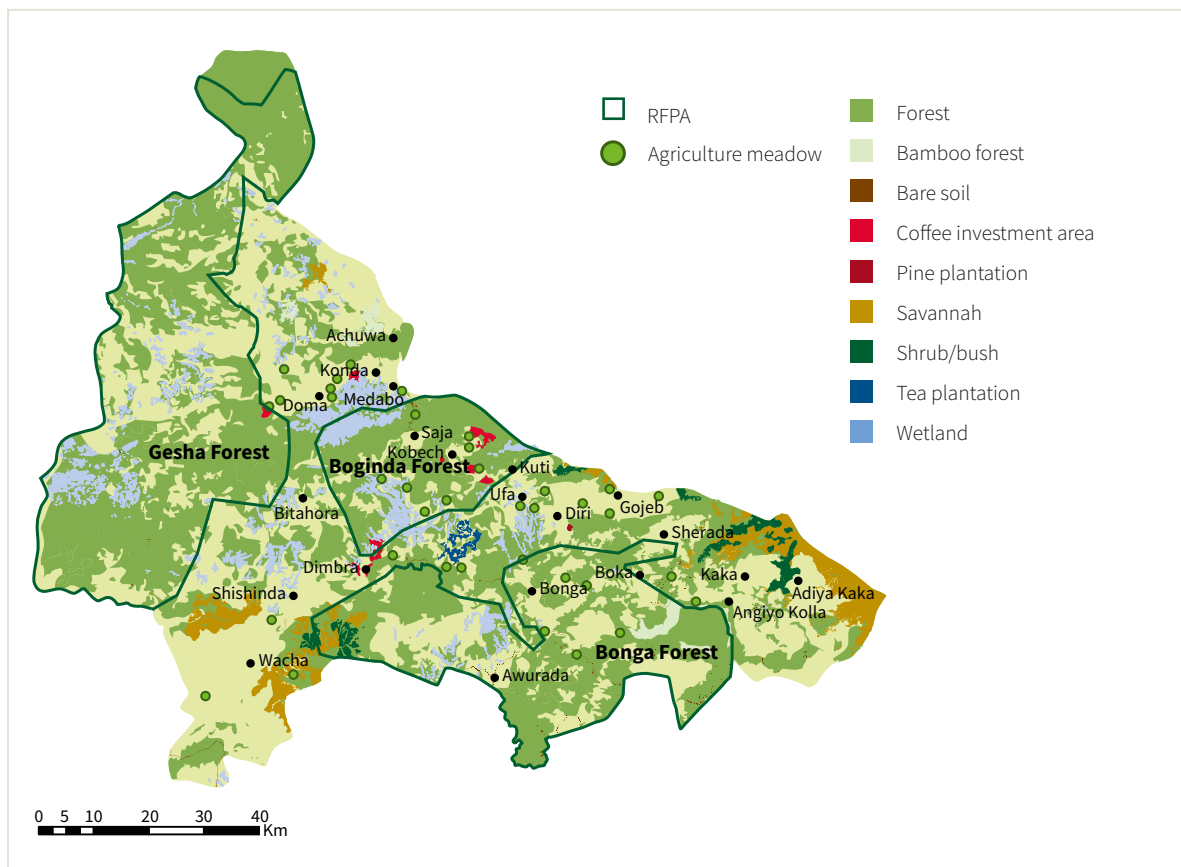


Figure 2: Regional Forest Priority Areas according to Million & Leykun (2001) (red lines) projected on land use and land cover at the Kafa BR. It shows the corrected habitat classifications for the bamboo forests, adapted by Elisabeth Dresen (2014)

2. Materials and Methods

2.1 Study area

The study areas were mostly core zones of the BR located around Bonga and the Gojeb Wetland, which is located approximately 80 km away from Bonga. The study included the following habitats: bamboo forests (BA), montane forests (Boka Forest (BK), Komba Forest (KO), Boginda Forest (BO), Awurada Valley (AW) (Figure 13)), wetlands (Alemgono (AG), Shoriri (SHO), Gojeb (GO-wet)) and river/floodplain forests (Gojeb River (GO-riv), Awurada Valley/Gummi River (AW)) (see Table 1).

2.1.1. Sites

We visited the Regional Forest Priority Areas within the Kafa BR proposed by Million & Leykun (2001), which were first created when the National Forest Priority Area was established in the 1980s. The authors suggest three priority areas in the Kafa zone: Bonga, Boginda and Gesha Forests. Following the main criteria for selecting sampling sites, we have assigned the Bonga and Boginda Forests high priority and the Gesha Forest medium to low priority. Due to time constraints, we only assessed the Bonga and Boginda Forests.

Table 1: Study areas in Bonga and Boginda

Area	Site	Code	Habitat	Alt.	Lat.	Long.
BONGA	Bamboo Forests	BA	Bamboo forests dominated by <i>Arundunaria alpina</i>	2700	07°14'10.8"	36°28'03.8"
BONGA	Komba Forests	KO	Montane forests	1900	07°18'10"	36°03'50"
BONGA	Boka Forests	BK	Montane forests	2500	07°17'51.6"	36°22'28.1"
BONGA	Awurada Valley (Gummi River, PFM sites)	AW	Montane forests/ riverine vegetation	1550	07°05'18.0"	36°13'05.9"
BONGA	Alemgono	AG	Wetland	1700	07°21'27.2"	36°14'18.1"
BONGA	Shoriri	SHO	Wetland	1630	07°21'34.2"	36°12'24.4"
BOGINDA	Gojeb Wetland	GO-wet	Wetland	1600	07°33'13.6"	36°02'99.4"
BOGINDA	Gojeb River	GO-riv	River/floodplain forests	1550	07°37'04.5"	36°03'10.5"
BOGINDA	Boginda Forests	BO	Montane forests	2100	07°30'01.1"	36°05'29.8"
BONGA	Keja Araba (PFM sites)	KE-AB	Montane forests	1850	07°16'39.8"	36°10'10.2"
BONGA	Beta Chega (PFM sites)	BE-CH	Montane forests	2100	07°17'54.7"	36°05'46.9"

Boginda and Bonga

Ecologically important areas – nearly intact forests

Bamboo forests

This extensive and unique vegetation within the BR occurs at altitudes between 2400 and 3050 m a.s.l. and is characterised by bamboo undergrowth, either in pure stands or in mixture with trees, including *Hagenia abyssinica* (Figure 7), *Myrsine melanophloeos* and *Hypericum revolutum* (Bekele 2003). A very large and unique patch of bamboo forest is located in the Woreda Adiyo, in the eastern part of the reserve.

Montane forests

See description of the main habitats in the BR. The following woredas were selected: Decha, Tello, Gimbo and Chena (Bonga Forest) and Gawata (Boginda Forest).

Wetlands

Based on NABU's pilot projects wetland sites, three sites were selected: Alemgono, Gojeb (see Figure 14) and

Shoriri Wetlands. Constantly low air pressure and high precipitation rates (2000 mm annually) over an area of 26,832 ha have led to highly diverse wetlands, which have not been sufficiently studied. According to the Kafa Wetland Strategy (EthioWetlands and Natural Resources Association 2008), the wetlands include river margins, peatlands, riparian zones, extensive floodplains and alluvial plains, marshes/swamps and forest wetlands. They function as moisture and carbon reservoirs, and are an important part of supraregional river basins (for the Gojeb/Omo, Baro-Akobo Rivers and others).

2.1.2 PFM sites

The first PFM sites were established in the Kafa Zone in 2002. PFM is a forest management concept that uses particular techniques and processes in combination with state forest departments and local communities. PFM attaches particular relevance to local community education and their key role as forest managers. Thus, local knowledge and participation are crucial to

the successful management and sustainability of PFM sites. To date, Kafa has approximately 15,000 hectares of PFM sites distributed mainly across montane forests in the Gawata, Decha and Gimbo woredas, with about 12,000 members (Dresen 2011). These areas cover the main biosphere reserve zones.

Our floristic assessments sampled the Ufa PFM site, which covers 1208.03 hectares and has 602 members. The site is located in Decha woreda and provides a transition to the floodplain area formed by the Gummi River. We also sampled the Keja-Araba and Beta Chega PFM sites. The former has 1,474.20 hectares and 620 members, and there is no data for the latter site.

2.2 Sampling methods

As we knew very little about the studied area and were working to a limited timeframe, we used a simple random sampling strategy. In most habitats, established 10x100 m (1000 m²) transects. Longer transects were not possible due to topographical limitations. The distances between transects varied: the smallest gap was 300 metres, but most were separated by more than 500 meters. In the very dense bamboo forest we used square plots (20x20 m). We sampled the major habitats in the Kafa BR. We established 16 transects in montane forests, covering 14000 m² (BO, 6000 m²; BK, 2000 m²; KO, 6000 m²). We set up five transects in montane forest PFM sites (5000 m²: AW, 3000 m² (Figure 12); KE-AB, 1000 m²; BE-CH 1000 m²). In floodplains/riverine forests we conducted nine transects (9000 m²: SHO, 3000 m²; GO-riv, 4000 m²). In the wetlands we performed one transect (see Figure 14) (GO-wet, 1000 m²), while we set up nine transects in bamboo forests (BA, 3600 m²).

We measured the major vascular groups such as trees, shrubs and lianas. Any species with a diameter at

breast height (DBH) equal to or above 2.5 cm occurring in the transect/plot counted as an individual and was therefore recorded (Figure 16). DBH was measured using metric tapes. The heights of all individuals in the transect/plot were measured using a clinometer and by estimation. In each transect/plot, some dominant herb species were also recorded to complement the species list. Unfortunately, our timeframe was too limited for a complete herb layer inventory. Local and scientific species names were recorded and specimens were collected. Unknown species were herbarised (Figure 15) and either identified in the evenings with the help of the different editions of the flora of Ethiopia and Eritrea (Edwards et al. 1995, 1997, 2000; Hedberg et al. 1989, 2003, 2006) or were sent to the national herbarium at Addis Ababa University for identification. We also recorded general site information (site name, kebele, woreda, coordinates, altitude, habitat type, topography, reserve zone).

2.3 Data analysis

Plant species were identified with the flora of Ethiopia and Eritrea (Edwards et al. 1995, 1997, 2000; Hedberg et al. 1989, 2003, 2006) in the field and at the national herbarium at Addis Ababa University.

The floristic composition was evaluated by using the species Importance Value Index (IVI) (Curtis & McIntosh 1951), which summarises relative species density, dominance and frequency. Large numbers of small trees or unequal distributions of individual plants and species per plot do not affect the IVI. Species richness and various alpha-diversity coefficients were calculated for each plot and transect. Most of these, such as the Simpson and Shannon indices, have been widely used in tropical montane habitats. All data was entered into Excel and analysed in Excel and PAST (Hammer et al. 2001).

3. Results and Discussion

Overall, we assessed 30 1,000 m² transect and nine 400 m² plots with a total area of 3.3 ha. We recorded 154 plant species from 114 genera and 61 families. Of the 154 recorded plant species, 129 species were woody,

of which 20 were climbers, 39 shrubs and 70 trees. We also collected 25 herbaceous species (18 herbs, five grasses, one fern) that were dominant in the understorey (see Table 4).

Table 2: Diversity indices for the different sampling sites

	Bamboo	PFM sites			Montane forest			Floodplain forest			Wetland
	BA	AW	BE-CH	KE-AB	KO	BK	BO	GO-riv	SHO	AG	GO-wet
Number of plots	9	3	1	1	6	2	6	4	3	3	1
Size (ha)	0.36	0.3	0.1	0.1	0.6	0.2	0.6	0.4	0.3	0.3	0.1
Species richness	6	24	27	14	60	27	72	50	33	32	21
Individuals in total	7,777	1,440	960	480	768	710	1,338	992	816	797	810
Dominance_D	0.99	0.32	0.09	0.24	0.06	0.07	0.05	0.14	0.09	0.17	0.16
Simpson_1-D	0.01	0.68	0.91	0.76	0.94	0.92	0.95	0.86	0.91	0.83	0.84
Shannon_H	0.04	1.91	2.8	1.94	3.24	2.82	3.47	2.77	2.74	2.27	2.31

The Simpson_1-D index measures species diversity within a community. The diversity is highest in Boka (BK), Boginda (BO) and Komba (KO) Forests (see Table 2), while the diversity is very low in the bamboo (BA) forest. The Simpson index is the complement of the dominance index, Dominance_D. The very high Dominance_D value for the bamboo forest (close to 1) shows that diversity is considerably low. The inverse is true for the three montane forests Boka (BK), Boginda (BO) and Komba (KO). The Shannon_H index shows a similar trend. Shannon's index accounts for both abundance and evenness of species. Again, the montane forests at Boka, Boginda and Komba show the highest values.

Our results show that diversity and evenness are much higher in undisturbed habitats (primary rainforest) than disturbed habitats (PFM sites) and the wetland and floodplain habitats. The lowest diversity is exhibited in the very dense bamboo forest, as it is mainly dominated by a single species: bamboo (*Arundinaria alpina*). The primary rainforest is not only home to a greater number of species, but the individuals in the community are distributed more equally among these species.

Interestingly, diversity indices are also high in the wetlands (Alemgono (AG), Shoriri (SHO), Gojeb (GO-wet, Go-riv)). The Simpson and Shannon indices are both higher in the wetlands and floodplain forests than in the montane forest and PFM sites in Awurada (AW) and Keja Araba (KE-AB). This supports the hypothesis that PFM sites are degrading. The high diversity of plant species in the wetlands shows that it is worth establishing core zones there.

To assess the relative dominance of species in our forest communities, we calculated an Importance Value

Index (IVI). We calculated the overall IVI across all transects/plots (see Table 3) and a separate IVI for each site (see Table 3) to reflect different habitat types. The IVI is an essential tool for comparing the ecological significance of species within a habitat (Lamprecht 1989).

To generate an IVI ranking, all woody species registered were grouped into five IVI classes based on their total IVI values (Table 3). Species in the fifth IVI class (lowest IVI values) need high conservation efforts, while those in the first IVI class (highest IVI values) are considered stable. Based on this ranking, the following species were assigned the highest priority for conservation efforts: The climbers *Asparagus africanus*, *Clematis longicaudata*, *Ipomoea tenuirostris*, *Peponium vogelii*, *Tacazzea conferta*, *Oncinotis tenuiloba* and *Periploca linearifolia*, the shrubs *Myrsine africana*, *Piper umbellatum*, *Rumex abyssinicus*, *Lantana trifolia*, *Ocimum urticifolium*, *Ocimum lamiifolium*, *Clerodendrum myricoides*, *Triumfetta brachyceras* and *Rhamnus prinoides* and the tree *Diospyros abyssinica* (Table 5).

Species with the highest IVI are generally abundant, frequent and dominant in the forest (Curtis & McIntosh 1951). The following species received the highest IVI and hence require less conservation effort: *Arundinaria alpina*, *Olea welwitschii*, *Schefflera volkensii*, *Millettia ferruginea* (see Figure 6), *Phoenix reclinata*, *Croton macrostachyus*, *Syzygium guineense* subsp. *afro-montanum*, *Coffea arabica*, *Schefflera abyssinica*, *Ficus sur*, *Elaeodendron buchananii*, *Vepris dainellii*, *Chionanthus mildbraedii*, *Sapium ellipticum*, *Dracaena steudneri*, *Ficus ovata*, *Mimusops kummel*, *Macaranga capensis*, *Trilepisium madagascariensis*, *Galiniera saxifraga*, *Ocotea kenyensis*, *Ilex mitis*, *Bersama abyssinica*, *Allophylus abyssinicus*, *Pouteria adolfi-friederici*.

Table 3: Importance Value Index (IVI) for all recorded species per habitat

Species	Floodplain forest			Wetland	Montane forest			Montane forest, PFM			Bamboo forest
	AG	GO-riv	SHO		BK	BO	KO	KE-AB	BE-CH	AW	
<i>Acacia brevispica</i> Harms						0.7					
<i>Albizia grandibracteata</i> Taub.			5.7	5.9						7.3	
<i>Albizia gummifera</i> (J.F.Gmil.) GA.Sm.	2.6			6.8		1.5	2.9				
<i>Allophylus abyssinicus</i> (Hochst) Radlk.					23.1	5.6	4.4		6.6		
<i>Apodytes dimidiata</i> E. Mey. ex Arn.		1.4				5.5					
<i>Arundinaria alpina</i> K. Schum.											215.4
<i>Asparagus africanus</i> lam.				5.8							
<i>Bersama abyssinica</i> Fresen	16.2	6.7	4.7		3.3	3.7	1.0		4.9	3.2	
<i>Bothrocline schimperi</i> olivi & Hiern.			2.4								
<i>Brucea antidysenterica</i> J. F. Mill		1.7	2.3				1.0				
<i>Canthium oligocarpum</i> Hiern							2.0	9.7			
<i>Cassipourea malosana</i> (Baker) Alston		2.0									
<i>Celtis africana</i> Burm. f.							1.1			15.7	
<i>Chionanthus mildbraedii</i> (Gilg & Schellenb.) Stearn	2.6	12.5	10.4		3.3	12.8	7.8			5.7	
<i>Clausena anisata</i> (Willd.) Hook.f. ex Benth.					3.3	4.7	1.0		7.0		
<i>Clematis longicaudata</i> Steud ex A. Rich.						0.7					
<i>Clerodendrum myricoides</i> (Hochst) Vatke		1.4									
<i>Coffea arabica</i> L.	2.7	4.4	7.0			3.0	2.5	15.6	5.8	62.1	
<i>Combretum paniculatum</i> Vent.		3.3	2.3				1.0		4.8		
<i>Cordia africana</i> Lam.		2.6	5.8	5.9			2.8			2.7	
<i>Croton macrostachyus</i> Del.	24.1	7.4	36.2	9.7		15.9	8.9		8.5	8.0	
<i>Cyathea manniana</i> Hook.							1.0				
<i>Cyphostemma adenocaula</i> (Steud. ex A. Rich.) Desc. ex Wild & Drummond					8.0	0.7					
<i>Cyphostemma</i> sp.						2.4					
<i>Dalbergia lactea</i> Vatke							1.0				
<i>Deinbollia kilimandscharica</i> Taub.		1.4				0.9					
<i>Diospyros abyssinica</i> (Hiern) F. White						0.7					
<i>Dombeya torrida</i> (J.F.Gmel.) Bamps					3.3						
<i>Dracaena afromontana</i> Mildbr.						1.2	4.7				
<i>Dracaena fragrans</i> (L.) Ker Gawl.			2.4	8.4			1.0		4.8	3.4	
<i>Dracaena steudneri</i> Engl.	7.3		66.5	8.4		0.7	3.7		6.2		
<i>Ehertia cymosa</i> Thonn.		1.7	10.5	14.2		2.6	2.4				
<i>Ekebergia capensis</i> Sparm	6.2						2.4			3.3	
<i>Elaeodendron buchananii</i> (Loes.) Loes.		29.2	2.4			3.9	9.0			17.1	
<i>Embelia schimperi</i> Vatke					12.9						6.0
<i>Erythrina brucei</i> Schweinf.	3.1										
<i>Erythrocca trichogyne</i> (Muell Arg.) Prain	3.6					2.9	1.0				
<i>Euphorbia candelabrum</i> Kotschy						0.8	1.0				
<i>Ficus exasperata</i> Vahl	2.6		7.2			2.7	1.0				
<i>Ficus lutea</i> Vahl	2.9	4.7									
<i>Ficus ovata</i> Vahl	2.6					3.5	2.9			31.7	
<i>Ficus plamata</i> Forssk.	3.1					1.5					
<i>Ficus platyphylla</i> Del.	6.7	6.4									
<i>Ficus spec</i>	2.6				9.2	4.0	3.6		8.8		

Species	Floodplain forest			Wetland	Montane forest			Montane forest, PFM			Bamboo forest
	AG	GO-riv	SHO		BK	BO	KO	KE-AB	BE-CH	AW	
<i>Ficus sur</i> Forssk.		12.4				4.3	1.0			33.1	
<i>Ficus thonningi</i> Blume		1.4				0.7			4.8		
<i>Ficus vasta</i> Forssk	12.6										
<i>Galiniera saxifraga</i> (Hochst.) Bridson	3.1	3.4	2.4		14.7	10.9	3.0	9.3	9.4		
<i>Hagenia abyssinica</i> (Bruce) J.F. Gmel.					3.3						7.5
<i>Hippocratea africana</i> (Willd.) Loes.						1.3	1.0				
<i>Hippocratea goetzei</i> Loes.	3.1	5.0	4.7		9.0	4.6	1.0		5.8		
<i>Ilex mitis</i> (L.) Radlk.		4.6	2.3		5.0	12.9	1.0	25.4			6.0
<i>Ipomoea tenuirostris</i> chelsy						0.7					
<i>Jasminum abyssinicum</i> Hochst. ex DC.		1.4			4.0						
<i>Justicia schimperiana</i> (Hochst. ex Nees) T. Anders		1.4					1.0				
<i>Landolphia buchananii</i> (Hallier f.) Stapf		3.7	2.3	5.8		6.6	2.0				
<i>Lantana trifolia</i> L.						0.7					
<i>Lepidotrichilia volkensii</i> (Gurke) Leory.		1.4	4.2		13.7	5.2	2.5		27.4		6.2
<i>Macaranga capensis</i> (Baill) Sim	45.0					11.8	3.3	9.2			
<i>Maesa lanceolata</i> Forssk.		3.4	5.6	7.4	15.2	4.6	2.0				
<i>Maytenus arbutifolia</i> (A. Rich.) Wilczek	2.7					10.8					
<i>Maytenus graulipes</i> Loes.			2.3				1.0				
<i>Maytenus</i> spp.					12.5	3.9			4.8		
<i>Millettia ferruginea</i> (Hochst.) Bak.	35.4	8.2	11.7	17.4		15.6	21.2	9.9	31.9	6.8	
<i>Mimusops kummel</i> A.DC.		39.2								20.3	
<i>Myrsine africana</i> L.					3.3						
<i>Ocimum lamiifolium</i> Hochst. ex Benth						0.7					
<i>Ocimum urticifolium</i> Roth						0.7					
<i>Ocotea kenyensis</i> (Chiov.) Robyns & Wilcze							1.0	138.6			
<i>Olea welwitschii</i> (Knobl) Gilg&Schellenb.					3.3	3.3	82.4		38.5	10.4	
<i>Oncinotis tenuiloba</i> Stapf.		1.4									
<i>Oxyanthus speciosus</i> DC.	3.1	3.1	5.2	10.1		2.8	3.3				
<i>Oxyanthus speciosus</i> DC. ssp. <i>globosus</i> (Sond.) Bridson		8.4		5.8			2.2	18.4	4.8	2.9	
<i>Pavetta abyssinica</i> Fresen.		1.4		5.8							
<i>Pavetta oliveriana</i> Hiern					10.1	7.1					
<i>Pavonia urens</i> Cav.	2.6					0.7					
<i>Peponium vogelii</i> (Hook.f.) Engl.						0.7					
<i>Periploca linearifolia</i> Quart.-Dill. & A. Rich.					3.3						
<i>Phoenix reclinata</i> Jacq.	50.5	55.1	16.9	44.6			6.7			7.2	
<i>Phyllanthus reticulatus</i> Poir.		2.8									
<i>Piper umbellatum</i> L.			0.4								
<i>Pittosporum viridiflorum</i> Sims			2.4			1.3	3.2		4.8		
<i>Podocarpus falcata</i> R.Br.									37.7		
<i>Polyscias fulva</i> (Hiern.) Harms						1.9	12.9	10.8	15.2	8.6	
<i>Pouteria adolfi-friederici</i> (Engl.) Baehni			3.2			15.9	2.0			8.8	
<i>Premna schimperi</i> Engl.							1.0				
<i>Prunus africana</i> (Hook.f.) kalkm	3.1		2.4		3.3	9.1	1.0				
<i>Rhamnus prinoides</i> L'Herit.		1.4									

Species	Floodplain forest			Wetland	Montane forest			Montane forest, PFM			Bamboo forest
	AG	GO-riv	SHO	GO-wet	BK	BO	KO	KE-AB	BE-CH	AW	BA
<i>Ricinus communis</i> L.			2.4								
<i>Ritchiea albersii</i> Gilg		2.0									
<i>Rothmannia urcelliformis</i> (Hiern.) Robyns		1.4	3.3			5.5	2.9		4.8	3.0	
<i>Rumex abyssinicus</i> Jacq.						0.7					
<i>Rytigynia neglecta</i> (Hiern) Robyns						2.9	2.3	9.2	12.5		
<i>Sapium ellipticum</i> (Hochst.) Pax.	14.1	14.1		65.2			6.8			12.6	
<i>Schefflera volkensii</i> (Engl.) Harms					87.0						58.0
<i>Scheffleria abyssinica</i> (Hochst.ex A. Rich) Harms					15.8	7.7	21.6	11.0			
<i>Solanecio mannii</i> (hook f.) C. Jeffery	2.7										
<i>Spathodae</i> Sps						2.1	2.0				
ssp. 1						0.8			4.8		
ssp. 10		0.2									
ssp. 11						0.8					
ssp. 12					4.7						
ssp. 13						1.4					
ssp. 14						1.0					
ssp. 15		1.4									
ssp. 16						1.6					
ssp. 17		1.7				0.8	2.2				
ssp. 18		0.2									
ssp. 19							1.3				
ssp. 2	2.6										
ssp. 20		3.6									
ssp. 21		1.4				1.1					
ssp. 4						0.7					
ssp. 5						2.2					
ssp. 6						0.7					
ssp. 7				5.8							
ssp. 9					3.3						
<i>Syzigium guineense</i> (Willd.) DC. ssp. <i>afromontanum</i> F	9.5	6.1		8.7		32.8	11.0	12.1	7.6		
<i>Tacazzea conferta</i> N.E. Br.					3.3						
<i>Teclea nobilis</i> Del.						1.1	3.2				
<i>Tiliacora troupinii</i> Curod.		1.4				0.7	2.0				
<i>Trichilia emetica</i> Vahl	10.5	3.2		11.2						4.6	
<i>Trilepisium madagascariense</i> DC	4.5	5.8	23.5			3.0		11.6		16.7	
<i>Triumfetta brachyceras</i> Schum		1.4									
<i>Urera hypselodendron</i> (A. Rich.) Wedd.					12.6						
<i>Vangueria apiculata</i> K. Schum.		1.4									
<i>Vepris dainellii</i> (Pichi-serm) Kokwara		3.7	21.3	35.6		7.1	13.9	9.3	6.9	2.9	
<i>Vernonia amygdalina</i> Del.	5.8		13.8	5.8		1.9	1.0		4.8		
<i>Vernonia auriculifera</i> Hiern.						0.9	1.0		16.1		

Dividing the IVI scores by habitat (see Table 3), it is clear that the species *Millettia ferruginea* (see Figure 6), *Croton macrostachyus*, *Elaeodendron buchananii*, *Vepriis dainellii*, *Dracaena steudneri*, *Syzygium guineense* ssp. *afromontanum*, *Ilex mitis*, *Trilepisium madagascariensis*, *Coffea arabica* and *Oxyanthus speciosus* ssp. *globosus* are generalists, as they occur in different habitat types (wetlands in lower elevations and montane forests at higher elevations). The IVI for those species is very high (see Table 3).

Bersama abyssinica, *Hippocratea goetzei*, *Vernonia amygdalina*, *Oxyanthus speciosus*, *Prunus africana*, *Galiniera saxifraga*, *Chionanthus mildbraedii*, *Rothmannia urcelliformis* (Figure 18), *Lepidotrichilia volkensii*, *Maesa lanceolata*, *Combretum paniculatum*, *Landolphia buchananii*, *Dracaena fragrans* and *Cordia africana* are also generalists occurring in different habitats but with a lower IVI.

Olea welwitschii, *Allophylus abyssinicus*, *Schefflera abyssinica*, *Polyscias fulva*, *Ocotea kenyensis*, *Pouteria adolfi-friederici*, *Ficus ovata* are species with a high IVI which occur in montane forest habitats but not in floodplain forests/wetlands.

Albizia gummifera, *Rytigynia neglecta*, *Clausena anisata*, *Maytenus* ssp. and *Pavetta oliveriana* are also exclusive to montane forests, but with lower IVI scores.

Vernonia auriculifera, *Cyathea manniana*, *Hippocratea africana*, *Dracaena afromontana*, *Teclea nobilis*, *Euphorbia candelabrum*, *Canthium oligocarpum* and *Spathodea* sp. *ehretia cymosa* are also exclusive to montane forests, but have low IVI scores.

For the bamboo habitat, only bamboo itself (*Arundinaria alpina*) and *Schefflera volkensii* have high IVI scores.

In the floodplain and wetland habitats, *Phoenix reclinata*, *Sapium ellipticum* (see Figure 11) and *Trichilia emetica* have high IVI scores and occur in both floodplain and wetland habitats. *Pavetta abyssinica* and *Albizia grandibracteata* have lower IVI scores, but also occur in floodplain/riverine and wetland habitats. In contrast, *Mimusops kummel*, which has a very high IVI, and *Ficus platyphylla* and *Ficus lutea*, which have lower but still high IVI scores, only occur in floodplain/riverine habitats and were not recorded in the wetland habitat.

In montane forest PFM sites, some of the species with a high IVI are the same as those found in natural montane forests (e.g., *Olea welwitschii*). The species *Albizia gummifera* and *Pavetta oliveriana* have high IVI scores and are found in the natural montane forests, but do not occur in the PFM sites, whereas *Ocotea kenyensis*, *Ficus sur* and *Ficus ovata* exhibit considerably higher IVI scores in the PFM sites compared to the natural habitats. *Podocarpus falcatus* only occurs in PFM sites and not in natural ones. *Coffea arabica* exhibits the highest IVI in PFM sites, which can be explained by the promotion of this species on these sites. These results show that there is a significant difference in species composition between PFM sites and natural montane forests. In general, it is very conspicuous that we found fewer species with high IVI values in PFM sites than in natural forest montane sites.

4. Conclusions and Recommendations for Conservation and Monitoring

Diversity indices show that the montane forests of Boginda, Komba and Boka have the highest species diversity and therefore require more studies and further protection. But the wetlands also exhibit very high species diversity (see Table 2). Since no core area has currently been established in the wetland and riverine forests, we recommend doing so to protect the high plant diversity in these habitats. This recommendation is based on both the high vascular plant diversity and the fact that we found a considerably different species composition in the wetlands compared to the other habitats.

The most famous plant species in the Kafa montane forest is *Coffea arabica* (Figure 3). It is popular due to its local cultural and economic significance, and because it originates from the montane cloud forests of Kafa and surrounding similar habitats. Therefore, the coffee

tree should be the most important flagship plant species. Since *Coffea arabica* is the main income for many households in Kafa and is favoured by annually slashing other shrubs in the mountainous PFM sites (e.g., the Awurada PFM sites), *Coffea arabica* is currently not under threat and is well protected by local communities. Ethiopia is the centre of origin for the species, and the wild coffee varieties are only available in the southwest Ethiopian forests, with Bonga forest being one of the major sites. Hence, conservation of these forests is vital to preserve this wild coffee variety, as it can be the basis for improving the productivity and quality of coffee. Another flagship species could be *Phoenix reclinata* (Figure 19), which is abundant in the wetland areas of Kafa. It is a conspicuous, easily recognisable plant, known for its numerous uses, including food, medication and timber. The mature stems of the species are currently overexploited by the local

community to construct traditional bridges and fences. As its regeneration is very slow, overexploitation may lead to a local reduction of the species.

Thanks to its conspicuous appearance, the African dragon tree (*Dracaena afromontana*) (Figure 20), could also be a flagship species for the Kafa BR, representing both a threatened plant species (Least Concern, IUCN Red List) and as a representative of natural primary forests in Kafa BR. The main threat to this species is habitat fragmentation and light penetration due to disturbance from deforestation, selective slashing or grazing.

The tree fern *Cyathea manniana*, an indicator for natural montane forests and a so-called “living fossil”, could also be a flagship species. Even minimal selective forest thinning can prove a threat to this sensitive forest species, and it therefore needs to be carefully protected in undisturbed forests.

Both *Cyathea manniana* and *Dracaena afromontana* are adapted to natural and undisturbed habitats and are susceptible to disturbance. They were only found in the montane forests habitats and both had very low IVI scores. The liana *Hippocratea africana* is another species with a low IVI in the Afromontane forest in Kafa, but it is absent from all other habitats. It needs dense closed forest vegetation.

Since these species are susceptible to disturbance, they have been chosen as indicator species for primary and near to natural montane forests. This finding is partly in accordance with Schmitt et al. (2009), who found that tree ferns only appear in natural forests and need well-shaded and moist surroundings.

The rare tree species *Pavetta abyssinica* should be an indicator species for undisturbed wetlands and riverine forests. It is classified as Vulnerable by the IUCN. It is both rare and threatened, and was only found in the Gojeb Wetland during our survey. *Phoenix reclinata* (Figure 19) is significantly dominant in the riverine forest habitat, but does not occur in other habitats. Therefore, it is also chosen as an indicator species for wetland forest patches and floodplain forests. In the bamboo habitat, species diversity was very low. Only the bamboo itself (*Arundinaria alpina*) (Figure 4) had a high IVI. It was the only dominant species. Therefore, there is no point in choosing an indicator species for this habitat. Bamboo does not occur in the other habitats. Since it is a very dominant species with an IVI of 215, it is not endangered at all.

In conclusion, further investigations into vascular plant species are needed. The limited timeframe prevented us for investigating herbaceous vegetation and epiphytes. A more in-depth analysis should include these types of vegetation to better understand the impact of forest fragmentation through tree crown thinning, shrub slashing, clear cutting and deforestation. The reliability of habitat comparisons will also increase if more transects/plots are investigated. Riverine and wetland habitats have been particularly overlooked in this regard. They seem to be quite species rich, which reinforces the need for more in-depth analysis of the Kafa BR wetlands, particularly with the inclusion of herbaceous plant species, since wetlands often lack trees and shrubs.

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6. Appendix

6.1. Tables

Table 4: Vascular plant species recorded during the NABU biodiversity assessment (Life form: T: tree, Sh: shrub, C: climber, H: herb, G: grass. Distribution: w: wide, k: Kafa, r: rare, ni: no information. Endemism: e: endemic. Threat: E: extant, LC: least concern, LR: lower risk-near threatened, NE: not evaluated, VU: vulnerable)

Species' scientific name	Family	Local name	Life form	Voucher no	Forest type	Site	Distribution	Endemism	Total no of Individuals	Threat (IUCN)
<i>Acacia brevispica</i> Harms	Fabaceae	Mengi garoo	C	97	Montane forests	BO	w		1	E
<i>Acanthus pubescens</i> (Oliv.) Engl	Acanthaceae	Pheco/gucino	H	Pc4	Wetlands	SHO	w			NE
<i>Achyranthes aspera</i> L.	Amaranthaceae	Shwudo	H	0	Montane forests	BK	w			NE
<i>Achyropermum schimperi</i> (Hochst. ex Briq.) Perkins	Lamiaceae	Sheaddo	H	91	Montane forests/ Wetlands	AW/GO-wet	w			NE
<i>Aframomum alboviolaceum</i> (Ridl.) K. Schum.	Zingiberaceae	Shexxo agiyo	H	88	Floodplain forests	GO-riv	w			NE
<i>Aframomum corrorima</i> (Braun) Jansen	Zingiberaceae	Ogiyo/Ofiyo	H	AL6	Floodplain forests	GO-riv	k	e		NE
<i>Albizia grandibracteata</i> Taub.	Fabaceae	Kadchino	T	19	Montane forests/ Wetlands	AW/GO-wet/SHO	w		8	E
<i>Albizia gummifera</i> (J.F.Gmil.) GA.Sm.	Fabaceae	Caatto	T	75	Montane forests/ Wetlands	AG/BO/GO-wet/KO	w		7	E
<i>Alchemilla fischeri</i> Engl.	Rosaceae	AL6	H	AL1	Bamboo forests	BA	w			NE
<i>Allophylus abyssinicus</i> (Hochst) Radlk.	Sapindaceae	She'o	T	29	Montane forests	BE-CH/BK/BO/KO	w		32	NE
<i>Apodytes dimidiata</i> E. Mey. ex Arn.	Icacinaceae	Wundifo	T	AL13/689	Floodplain forests/Montane forests	GO-riv/BO	w		14	NE
<i>Arthropteris monocarpa</i> (Cordem) C.Chr.	Oleandraceae	Gixo	F	47	Montane forests	KO	w			NE
<i>Arthraxon micans</i> (Nees) Hochst	Poaceae	Doli moco	G	73	Floodplain forests/Montane forests	KO/GO-riv	w			NE
<i>Arundinaria alpina</i> K. Schum.	Poaceae	Chinato	T	3	Bamboo forests	BA	w		2787	NE
<i>Asparagus africanus</i> lam.	Asparagaceae	Ufoo	C	109	Wetlands	GO-wet	w		1	NE
<i>Bersama abyssinica</i> Fresen	Melianthaceae	Boqo	T	15	Floodplain forests/Montane forests/ Wetlands	AG/AW/BE-CH/BK/BO/GO-riv/KO/SHO	w		36	NE
<i>Bothrocline schimperi</i> olivi & Hiern.	Asteraceae	Yamesho	Sh	113	Wetlands	SHO	k	e	1	LC
<i>Brucea antidysenterica</i> J. F. Mill	Simaroubaceae	Nuqisho	Sh	PL2	Floodplain forests/Montane forests/ Wetlands	GO-riv/KO/SHO	w		4	NE

Species' scientific name	Family	Local name	Life form	Voucher no	Forest type	Site	Distribution	Endemism	Total no of Individuals	Threat (IUCN)
<i>Canthium oligocarpum</i> Hiern	Rubiaceae	Titidibo	T	71	Montane forests	KE-AB/KO	w		3	LR
<i>Cassipourea malosana</i> (Baker) Alston	Rhizophoraceae	Worallo	T	0	Floodplain forests	GO-riv	w		2	NE
<i>Celtis africana</i> Burm. f.	Ulmaceae	Ufo	Sh	0	Montane forests	AW/KO	w		31	NE
<i>Chionanthus mildbraedii</i> (Gilg & Schellenb.) Stearn	Oleaceae	Shigiyo	T	27	Floodplain forests/Montane forests/Wetlands	AG/AW/BK/BO/GO-riv/KO/SHO	w		134	NE
<i>Clausena anisata</i> (Willd.) Hook.f. ex Benth.	Rutaceae	Emicho	T	0	Montane forests	BE-CH/BK/BO/KO	w		26	NE
<i>Clematis longicaudata</i> Steud ex A. Rich.	Ranunculaceae	Shagee qombo	C	113	Montane forests	BO	w	e	1	NE
<i>Clerodendrum myricoides</i> (Hochst) Vatke	Lamiaceae	Agiyo	Sh	96	Floodplain forests	GO-riv			1	NE
<i>Coffea arabica</i> L.	Rubiaceae	Bunoo	Sh	20	Floodplain forests/Montane forests/Wetlands	AG/AW/BE-CH/BO/GO-riv/KE-AB/KO/SHO	w		262	VU
<i>Combretum paniculatum</i> Vent.	Combretaceae	Bagee qombo	C	61	Floodplain forests/Montane forests/Wetlands	BE-CH/GO-riv/KO/SHO			7	NE
<i>Commelina latifolia</i> Hochst. ex A Rich.	Commelinaceae	AL1	H	AL9	Bamboo forests	BA	w			NE
<i>Cordia africana</i> Lam.	Boraginaceae	Di'o	T	51	Floodplain forests/Montane forests/Wetlands	AW/GO-riv/GO-wet/KO/SHO	w		15	NE
<i>Croton macrostachyus</i> Del.	Euphorbiaceae	Wago	T	6	Floodplain forests/Montane forests/Wetlands	AG/AW/BE-CH/BO/GO-riv/GO-wet/KO/SHO	w		130	E
<i>Cyathea manniana</i> Hook.	Cyatheaceae	Sheshino	T	45	Montane forests	KO	w		1	NT
<i>Cyphostemma adenocaula</i> (Steud. ex A. Rich.) Desc. ex Wild & Drummond	Vitaceae	Cheecho	C	2	Montane forests	BK/BO	w		5	NE
<i>Cyphostemma</i> sp.	Vitaceae	Shudo	C	39	Montane forests	BO			13	0
<i>Dalbergia lactea</i> Vatke	Fabaceae	Bitibito	C	77	Montane forests	KO			1	NE
<i>Deinbollia kilimandscharica</i> Taub.	Sapindaceae	Qaqirecho	T	92	Floodplain forests/Montane forests	BO/GO-riv	w		3	NE
<i>Desmodium repandum</i> (Vahl) DC	Fabaceae	AL9	H	99	Montane forests	AW	w			NE
<i>Diospyros abyssinica</i> (Hiern) F. White	Ebenaceae	Gayo	T	117	Montane forests	BO	w		1	NE
<i>Dissotis canescens</i> Graham/hook.f.	Melastamaceae	Gashi gano	H	AL5	Floodplain forests	GO-riv	w			NE

Species' scientific name	Family	Local name	Life form	Voucher no	Forest type	Site	Distribution	Endemism	Total no of Individuals	Threat (IUCN)
<i>Dombeya torrida</i> (J.F.Gmel.) Bamps	Sterculiaceae	Shawuko	S	Pc8	Montane forests	BK	w		1	NE
<i>Dracaena afromontana</i> Mildbr.	Dracaceae	Coqimaxo	T	0	Montane forests	BO/KO	w		16	LC
<i>Dracaena fragrans</i> (L.) Ker Gawl.	Dracaceae	Emo	Sh	66	Montane forests/ Wetlands	AW/BE-CH/ GO-wet/ KO/SHO	w		10	NE
<i>Dracaena steudneri</i> Engl.	Dracaceae	Yudo	T	0	Montane forests/ Wetlands	AG/BE-CH/ BO/GO-wet/KO/ SHO	w		62	NE
<i>Ehertia cymosa</i> Thonn.	Boraginaceae	Wogamo	T	13	Floodplain forests/Montane forests/ Wetlands	BO/GO-riv/ GO-wet/ KO/SHO	w		32	NE
<i>Ekebergia capensis</i> Sparm	Maliaceae	Ororoo	T	23	Montane forests/ Wetlands	AG/AW/KO	w		8	NE
<i>Elaeodendron buchananii</i> (Loes.) Loes.	Celastraceae	Washo	T	11	Floodplain forests/Montane forests/ Wetlands	AW/BO/ GO-riv/KO/ SHO	w		80	NE
<i>Embelia schimperi</i> Vatke	Myrsinaceae	Dupho	T	33	Bamboo forests/Montane forests	BA/BK	w		13	NE
<i>Erythrina brucei</i> Schweinf.	Fabaceae	Beroo	Sh	70	Wetlands	AG		e	1	LC
<i>Erythrococca trichogyne</i> (Muell Arg.) Prain	Euphorbiaceae	Biceeri kucoo	Sh	34	Montane forests/ Wetlands	AG/BO/KO			12	NE
<i>Euphorbia candelabrum</i> Kotschy	Euphorbiaceae	Gacho	T	0	Montane forests	BO/KO	w		2	E
<i>Ficus exasperata</i> Vahl	Moraceae	Bu/caro mocero	T	24	Montane forests/ Wetlands	AG/BO/KO/ SHO	w		9	NE
<i>Ficus lutea</i> Vahl	Moraceae	Meello	T	PL3	Floodplain forests/ Wetlands	AG/GO-riv	w		2	E
<i>Ficus ovata</i> Vahl	Moraceae	Caroo	T	83	Montane forests/ Wetlands	AG/AW/BO/ KO	w		34	LC
<i>Ficus plamata</i> Forssk.	Moraceae	Shotto	T	54	Montane forests/ Wetlands	AG/BO			3	
<i>Ficus platyphylla</i> Del.	Moraceae	Opo	T	58	Floodplain forests//Wetlands	AG/GO-riv	w		5	NE
<i>Ficus spec.</i>	Moraceae	Charo	T	31/94	Montane forests/ Wetlands	AG/BE-CH/ BK/BO/KO			13	
<i>Ficus sur</i> Forssk.	Moraceae	Naco caroo	T	25	Floodplain forests/Montane forests	AW/BO/GO-riv/KO	w		5	NE
<i>Ficus thonningi</i> Blume	Moraceae	Chigago	T	53	Floodplain forests/Montane forests	BE-CH/BO/ GO-riv	w		3	NE

Species' scientific name	Family	Local name	Life form	Voucher no	Forest type	Site	Distribution	Endemism	Total no of Individuals	Threat (IUCN)
<i>Ficus vasta</i> Forssk	Moraceae	Capheero	T	60	Wetlands	AG	w		2	NE
<i>Galiniera saxifraga</i> (Hochst.) Bridson	Rubiaceae	Angrango	Sh	1	Floodplain forests/Montane forests/Wetlands	AG/BE-CH/BK/BO/GO-riv/KE-AB/KO/SHO			82	NE
<i>Hagenia abyssinica</i> (Bruce) J.F. Gmel.	Rosaceae	Koso	T	8	Bamboo forests/Montane forests	BA/BK	w		3	E
<i>Hippocratea africana</i> (Willd.) Loes.	Celastraceae	Phi'o	C	0	Montane forests	BO/KO	w		6	NE
<i>Hippocratea goetzei</i> Loes.	Celastraceae	Kawo	C	42	Floodplain forests/Montane forests/Wetlands	AG/BE-CH/BK/BO/GO-riv/KO/SHO	w		39	NE
<i>Ilex mitis</i> (L.) Radlk.	Aquifoliaceae	Qeto	T	17	Bamboo forests/Floodplain forests/Montane forests/Wetlands	BA/BK/BO/GO-riv/KE-AB/KO/SHO	w		73	NE
<i>Impatiens hochstetteri</i> Warb.	Balsaminaceae	AL5	H	AL4	Bamboo forests	BA	w			NE
<i>Ipomoea tenuirostris</i> chelsy	Convolvulaceae	Yimbire	C	112	Montane forests	BO	w		1	NE
<i>Jasminum abyssinicum</i> Hochst. ex DC.	Oleaceae	Hawuto	C	0	Floodplain forests/Montane forests	BK/GO-riv	w		3	NE
<i>Justicia schimperiana</i> (Hochst. ex Nees) T. Anders	Acanthaceae	Sharisharo	Sh	114	Floodplain forests/Montane forests	GO-riv/KO	w		2	NE
<i>Landolphia buchananii</i> (Hallier f.) Stapf	Apocynaceae	Ceele yeemo	C	28	Floodplain forests/Montane forests/Wetlands	BO/GO-riv/GO-wet/KO/SHO	w		29	NE
<i>Lantana trifolia</i> L.	Verbenaceae	Shoboo	Sh	0	Montane forests	BO	w		1	E
<i>Laportea alatipes</i> Hook. f.	Euphorbiaceae	AL4	H	0	Bamboo forests	BA	w			NE
<i>Leersia hexandra</i> Sw.	Poaceae	Shavkirubo	G	AL3	Wetlands	SHO	w			NE
<i>Lepidotrichilia volkensii</i> (Gurke) Leory.	Meliaceae	Shahiyo	T	0	Bamboo forests/Floodplain forests/Montane forests/Wetlands	BA/BE-CH/BK/BO/GO-riv/KO/SHO	w		65	NE
<i>Macaranga capensis</i> (Baill) Sim	Euphorbiaceae	Shakero	T	67	Montane forests/Wetlands	AG/BO/KE-AB/KO	w		108	NE
<i>Maesa lanceolata</i> Forssk.	Myrsinaceae	Caggo	T	0	Floodplain forests/Montane forests/Wetlands	BK/BO/GO-riv/GO-wet/KO/SHO	w		45	NE
<i>Maytenus arbutifolia</i> (A. Rich.) Wilczek	Celastraceae	Anami agixo	Sh	#NV	Montane forests/Wetlands	AG/BO			47	VU

Species' scientific name	Family	Local name	Life form	Voucher no	Forest type	Site	Distribution	Endemism	Total no of Individuals	Threat (IUCN)
<i>Maytenus graulipes</i> Loes.	Celastraceae	Mach shiko	Sh	0	Montane forests/ Wetlands	KO/SHO			2	
<i>Maytenus</i> spp.	Celastraceae	Shiko	T/ Sh	0	Montane forests	BE-CH/BK/ BO			23	
<i>Millettia ferruginea</i> (Hochst.) Bak.	Fabaceae	Bibero	T	12	Floodplain forests/Montane forests/ Wetlands	AG/AW/ BE-CH/BO/ GO-riv/GO-wet/KE-AB/ KO/SHO		e	220	LC
<i>Mimusops kummel</i> A.DC.	Sapotaceae	Gayo	T	36	Floodplain forests/Montane forests	AW/GO-riv	w		68	E
<i>Monothecium glandulosum</i> Hochst.	Acanthaceae	AL3	H	AL7	Bamboo forests	BA	w			NE
<i>Myrsine africana</i> L.	Myrsinaceae	Gexxoo	Sh	74	Montane forests	BK	w		1	NE
<i>Ocimum lamiifolium</i> Hochst, ex Benth	Lamiaceae	Damo	Sh	AL8	Montane forests	BO	ni		1	NE
<i>Ocimum urticifolium</i> Roth	Lamiaceae	Dame gaboo	Sh	0	Montane forests	BO	w		1	NE
<i>Ocotea kenyensis</i> (Chiov.) Robyns & Wilcze	Lauraceae	Najjo	T	5	Montane forests	KE-AB/KO	w		23	VU
<i>Olea welwitschii</i> (Knobl) Gilg&Schellenb.	Oleaceae	Yaho	T	0	Montane forests	AW/BE-CH/ BK/BO/KO	w		78	NE
<i>Oncinotis tenuiloba</i> Stapf.	Apocynaceae	Bayiree qombo	C	114	Floodplain forests	GO-riv			1	NE
<i>Oxyanthus speciosus</i> DC.	Rubiaceae	Aa'imato	Sh	43	Floodplain forests/Montane forests/ Wetlands	AG/BO/ GO-riv/GO-wet/KO/ SHO	w		27	NE
<i>Oxyanthus speciosus</i> DC. ssp. <i>globosus</i> (Sond.) Bridson	Rubiaceae	Ophero	T	0	Floodplain forests/Montane forests/ Wetlands	AW/BE-CH/ GO-riv/GO-wet/KE-AB/ KO	w		30	NE
<i>Panicum subabidum</i> Kunth	Poaceae	Shomeko	G	80	Wetlands	SHO				
<i>Parochaetus communis</i> D. Don	Fabaceae	AL7	H	AL11	Bamboo forests	BA	w			LC
<i>Pavetta abyssinica</i> Fresen.	Rubiaceae	Naxxachee gabo	T	0	Floodplain forests/ Wetlands	GO-riv/GO-wet	r		2	VU
<i>Pavetta oliveriana</i> Hiern	Rubiaceae	Aemato	T	65	Montane forests	BK/BO			40	NE
<i>Pavonia urens</i> Cav.	Malvaceae	Gahijjoo	Sh	109	Montane forests/ Wetlands	AG/BO	w		2	NE
<i>Peponium vogelii</i> (Hook.f.) Engl.	Cucurbitaceae	Tojjo	C	82	Montane forests	BO	w		1	NE
<i>Periploca linearifolia</i> Quart.-Dill. & A. Rich.	Asclepiadaceae	Borimoo	C	0	Montane forests	BK	w		1	NE
<i>Phaulopsis imbricata</i> (Forssk.) Sweet	Acanthaceae	AL11	H	95	Montane forests	AW	w			LC

Species' scientific name	Family	Local name	Life form	Voucher no	Forest type	Site	Distribution	Endemism	Total no of Individuals	Threat (IUCN)
<i>Phoenix reclinata</i> Jacq	Arecaceae	Yeeboo	T	10	Floodplain forests/Montane forests/Wetlands	GO-riv/GO-wet	w		249	NE
<i>Phyllanthus reticulatus</i> Poir.	Euphorbiaceae	Meego	Sh	50	Floodplain forests	GO-riv	w		2	NE
<i>Physalis peruviana</i> L.	Solanaceae	Huqicho	H	90	Floodplain forests	GO-riv	w			NE
<i>Piper capense</i> L.f.	Piperaceae	Turifo	H	122	Floodplain forests/Montane forests	AW/GO-riv	w			NE
<i>Piper umbellatum</i> L.	Piperaceae	Turife gabo	Sh	119	Wetlands	SHO	w		1	NE
<i>Pittosporum viridiflorum</i> Sims	Pittosporaceae	Shollo	T	79	Montane forests/Wetlands	BE-CH/BO/KO/SHO	w		11	NE
<i>Podocarpus falcata</i> R.Br.	Podocarpaceae		T	0	Montane forests	BE-CH	w		1	
<i>Polyscias fulva</i> (Hiern.) Harms	Araliaceae	Karesho	T	52	Montane forests	AW/BE-CH/BO/KE-AB/KO	w		52	E
<i>Pouteria adolfi-friederici</i> (Engl.) Baehni	Sapotaceae	Qareero	T	26	Montane forests/Wetlands	AW/BO/KO/SHO	w		9	E
<i>Premna schimperi</i> Engl.	Lamiaceae	Xumo	T	0	Montane forests	KO	w		1	NE
<i>Prunus africana</i> (Hook.f.) kalkm	Rosaceae	Omo	T	18	Montane forests/Wetlands	AG/BK/BO/KO/SHO	w		10	VU
<i>Pycnostachys recurvata</i> Rydiag	Lamiaceae	Boqeli kakkoo	H	48	Montane forests	BO	w			NE
<i>Rhamnus prinoides</i> L'Herit.	Rhamnaceae	Gesho	Sh	100	Floodplain forests	GO-riv	w		1	NE
<i>Ricinus communis</i> L.	Euphorbiaceae	Eho	Sh	0	Wetlands	SHO	w		1	NE
<i>Ritchiea albersii</i> Gilg	Capparidaceae	Uchee wamoo	Sh	85	Floodplain forests	GO-riv	w		3	NE
<i>Rothmannia urcelliformis</i> (Hiern.) Robyns	Rubiaceae	Diboo	Sh	35	Floodplain forests/Montane forests/Wetlands	AW/BE-CH/BO/GO-riv/KO/SHO	w		33	NE
<i>Rumex abyssinicus</i> Jacq.	Polygonaceae	Ambaxxoo	Sh	106	Montane forests	BO			1	NE
<i>Rytigynia neglecta</i> (Hiern) Robyns	Rubiaceae	Natacho	T	16	Montane forests	BE-CH/BO/KE-AB/KO	w		20	NE
<i>Sanicula elata</i> Buch.-Ham. ex D. Don	Apiaceae	Xepheleshe	H	AL16	Montane forests	KO	w			NE
<i>Sapium ellipticum</i> (Hochst.) Pax.	Euphorbiaceae	Sheddo	T	22	Floodplain forests/Montane forests/Wetlands	AG/AW/GO-riv/GO-wet/KO	w		24	NE
<i>Schefflera volkensii</i> (Engl.) Harms	Araliaceae	Komo	T	4	Bamboo forests/Montane forests/	BA/BK	w		24	E
<i>Scheffleria abyssinica</i> Hochst.ex A. Rich) Harms	Araliaceae	Buttoo	T	9	Montane forests	BK/BO/KE-AB/KO	w		19	NE

Species' scientific name	Family	Local name	Life form	Voucher no	Forest type	Site	Distribution	Endemism	Total no of Individuals	Threat (IUCN)
<i>Snowdenia polystycha</i> (Fresen.) Plig.	Poaceae	Cameroo	G	78	Wetlands	SHO				NE
<i>Solanecio mannii</i> (hook f.) C. Jeffery	Asteraceae	Amitibalo	Sh	32	Wetlands	AG			1	NE
<i>Spathodae</i> ssp.	Bignoniaceae	Yayo	T	55	Montane forests	BO/KO			4	
ssp. 1		Chokmacho	T	41	Montane forests	BE-CH/BO			2	
ssp. 10		Shasheroo	Sh	0	Floodplain forests	GO-riv			1	
ssp. 11		Shekino	Sh	56	Montane forests	BO			1	
ssp. 12		Shinato	T	69	Montane forests	BK			3	
ssp. 13		Shino	T	0	Montane forests	BO			1	
ssp. 14		Shurato	T	0	Montane forests	BO			3	
ssp.15		Smirico	Sh	103	Floodplain forests	GO-riv			1	
ssp. 16		Titiroo	T	87	Montane forests	BO			3	
ssp. 17		Tushimo	Sh	44	Floodplain forests/Montane forests	BO/GO-riv/KO			7	
ssp. 18		Woyeello	C	Pc-7	Floodplain forests	GO-riv			1	
ssp. 19		Xixidebo	T	93	Montane forests	KO			2	
ssp. 2		Cikkoo	Sh	0	Wetlands	AG			1	
ssp. 20		Yagibaroo	Sh	0	Floodplain forests	GO-riv			9	
ssp. 21		Yeem gombo	T	0	Floodplain forests/Montane forests	BO/GO-riv			5	
ssp. 4		Kakusho	Sh	120	Montane forests	BO			1	
ssp. 5		Kereth	T	81	Montane forests	BO			1	
ssp. 6		Kombo	T	62	Montane forests	BO			1	
ssp. 7		Mechii majeech	Sh	46	Wetlands	GO-wet			1	
ssp. 9		Shaqo	C	105	Montane forests	BK			1	
<i>Stellaria media</i> (L.) Vill.	Caryophyllaceae	AL16	H	AL2	Montane forests	AW	w			NE
<i>Streblochaete longiarista</i> (A. Rich.) Pilg.	Poaceae	AL2	G		Bamboo forests	BA	w			NE
<i>Syzigium guineense</i> (Willd.) DC. ssp. <i>afromontanum</i> F	Myrtaceae	Yino	T	37	Floodplain forests/Montane forests/Wetlands	AG/BE-CH/BO/GO-riv/GO-wet/KE-AB/KO	w		107	NE

Species' scientific name	Family	Local name	Life form	Voucher no	Forest type	Site	Distribution	Endemism	Total no of Individuals	Threat (IUCN)
<i>Tacazzea conferta</i> N.E. Br.	Asclepiadaceae	Tugo	C	P3/10	Montane forests	BK			1	NE
<i>Teclea nobilis</i> Del.	Rutaceae	Shenigaro	T	57	Montane forests	BO/KO	w		11	NE
<i>Tiliacora troupinii</i> Curod.	Menispermaceae	Caamo	C	63	Montane forests	KO	k	e	4	VU
<i>Trichilia emetica</i> Vahl	Meliaceae	Timo	T	49	Floodplain forests/Montane forests/Wetlands	AG/AW/GO-riv/GO-wet	w		4	NE
<i>Trilepisium madagascariense</i> DC	Moraceae	Gaboo	T	PS3	Floodplain forests/Montane forests/Wetlands	AG/AW/BO/GO-riv/KE-AB/SHO	w		43	NE
<i>Triumfetta brachycerask.</i> Schum	Tiliaceae	Mogeco	Sh	103	Floodplain forests	GO-riv	w		1	NE
<i>Urera hypselodendron</i> (A. Rich.) Wedd.	Urticaceae	Emaamo	C	PT3	Montane forests	BK	w		10	NE
<i>Vangueria apiculata</i> K. Schum.	Rubiaceae	Gujjii machoo	Sh	76	Floodplain forests	GO-riv	w		1	NE
<i>Vepris dainellii</i> (Pichi-serm) Kokwara	Rutaceae	Mengorexo	T	7	Floodplain forests/Montane forests/Wetlands	AW/BE-CH/BO/GO-riv/GO-wet/KE-AB/KO/SHO		e	137	LC
<i>Vernonia amygdalina</i> Del.	Asteraceae	Girawo	T	30	Montane forests/Wetlands	AG/BE-CH/BO/GO-wet/KO/SHO	w		27	NE
<i>Vernonia auriculifera</i> Hiern.	Asteraceae	Dangireto	T	0	Montane forests	BE-CH/BO/KO	w		14	NE

Table 5: Overall Importance Value index. Life form: T: Tree, Sh: Shrub, C: Climber, H: Herb, G: Grass

Species' scientific name	Life form	Importance value	Rank	Rank class
ssp. 10	Sh	0.17	1	5
ssp. 9	C	0.17	1	5
<i>Asparagus africanus</i> lam.	C	0.17	1	5
<i>Clematis longicaudata</i> Steud ex A. Rich.	C	0.17	1	5
<i>Ipomoea tenuirostris</i> chelsy	C	0.17	1	5
<i>Peponium vogelii</i> (Hook.f.) Engl.	C	0.17	1	5
ssp. 18	C	0.17	1	5
<i>Tacazzea conferta</i> N.E. Br.	C	0.17	1	5
<i>Myrsine africana</i> L.	Sh	0.17	1	5
<i>Piper umbellatum</i> L.	Sh	0.17	1	5
<i>Rumex abyssinicus</i> Jacq.	Sh	0.17	1	5
ssp. 7	Sh	0.17	1	5
<i>Lantana trifolia</i> L.	Sh	0.17	1	5
ssp. 4	Sh	0.17	1	5

Species' scientific name	Life form	Importance value	Rank	Rank class
<i>Ocimum urticifolium</i> Roth	Sh	0.17	1	5
<i>Oncinotis tenuiloba</i> Stapf.	C	0.17	1	5
<i>Ocimum lamiifolium</i> Hochst. ex Benth	Sh	0.17	1	5
<i>Diospyros abyssinica</i> (Hiern) F. White	T	0.17	1	5
<i>Clerodendrum myricoides</i> (Hochst) Vatke	Sh	0.17	1	5
<i>Triumfetta brachycerask.</i> Schum	Sh	0.17	1	5
<i>Rhamnus prinoides</i> L'Herit.	Sh	0.17	1	5
ssp. 15	Sh	0.17	1	5
ssp. 2	Sh	0.17	1	5
ssp. 6	T	0.17	1	5
<i>Periploca linearifolia</i> Quart.-Dill. & A. Rich.	C	0.17	1	5
<i>Dombeya torrida</i> (J.F.Gmel.) Bamps	S	0.17	1	5
<i>Ricinus communis</i> L.	Sh	0.18	2	4
<i>Acacia brevispica</i> Harms	C	0.18	2	4
<i>Vangueria apiculata</i> K. Schum.	Sh	0.18	2	4
<i>Dalbergia lactea</i> Vatke	C	0.18	2	4
<i>Bothrocline schimperi</i> Oliv. & Hiern.	Sh	0.18	2	4
<i>Cyathea manniana</i> Hook.	T	0.18	2	4
ssp. 11	Sh	0.18	2	4
<i>Solanecio mannii</i> (hook f.) C. Jeffery	Sh	0.18	2	4
<i>Premna schimperi</i> Engl.	T	0.18	2	4
<i>Erythrina brucei</i> Schweinf.	Sh	0.19	3	4
ssp. 12	T	0.21	4	4
ssp. 14	T	0.21	4	4
<i>Cassipourea malosana</i> (Baker) Alston	T	0.21	4	4
<i>Ritchiea albersii</i> Gilg	Sh	0.22	5	4
ssp. 19	T	0.23	6	4
ssp. 13	T	0.25	7	4
ssp. 20	Sh	0.33	8	4
ssp. 5	T	0.34	9	4
<i>Pavetta abyssinica</i> Fresen.	T	0.35	10	4
<i>Pavonia urens</i> Cav.	Sh	0.35	10	4
<i>Justicia schimperiana</i> (Hochst. ex Nees) T. Anders	Sh	0.35	10	4
<i>Phyllanthus reticulatus</i> Poir.	Sh	0.35	10	4
<i>Maytenus graulipes</i> Loes.	Sh	0.35	10	4
ssp. 1	T	0.35	10	4
<i>Jasminum abyssinicum</i> Hochst. ex DC.	C	0.37	11	4
<i>Deinbollia kilimandscharica</i> Taub.	T	0.37	11	3
ssp. 16	T	0.37	11	3
<i>Euphorbia candelabrum</i> Kotschy	T	0.37	11	3
<i>Cyphostemma</i> sp.	C	0.40	12	3
ssp. 21	T	0.41	13	3
<i>Hippocratea africana</i> (Willd.) Loes.	C	0.43	14	3
<i>Ficus thonningi</i> Blume	T	0.52	15	3
<i>Urera hypselodendron</i> (A. Rich.) Wedd.	C	0.53	16	3
<i>Brucea antidysenterica</i> J. F. Mill	Sh	0.54	17	3
<i>Ficus plamata</i> Forssk.	T	0.55	18	3
<i>Canthium oligocarpum</i> Hiern	T	0.55	18	3
<i>Cyphostemma adenocaula</i> (Steud. ex A. Rich.) Desc. ex Wild & Drummond	C	0.56	19	3

Species' scientific name	Life form	Importance value	Rank	Rank class
<i>Ficus lutea</i> Vahl	T	0.59	19	3
<i>Ficus vasta</i> Forssk	T	0.59	19	3
<i>Tiliacora troupinii</i> Curod.	C	0.70	20	3
<i>Teclea nobilis</i> Del.	T	0.72	21	3
<i>Hagenia abyssinica</i> (Bruce) J.F. Gmel.	T	0.73	22	3
<i>Vernonia auriculifera</i> Hiern.	T	0.76	23	3
ssp. 17	Sh	0.76	24	3
<i>Spathodae</i> ssp.	T	0.78	25	3
<i>Embelia schimperi</i> Vatke	T	0.87	26	3
<i>Dracaena afromontana</i> Mildbr.	T	0.87	26	3
<i>Ekebergia capensis</i> Sparm	T	0.95	27	3
<i>Dracaena fragrans</i> (L.) Ker Gawl.	Sh	0.96	28	3
<i>Erythrococca trichogyne</i> (Muell Arg.) Prain	Sh	1.00	29	3
<i>Ficus platyphylla</i> Del.	T	1.01	30	3
<i>Combretum paniculatum</i> Vent.	C	1.06	31	2
<i>Pittosporum viridiflorum</i> Sims	T	1.15	32	2
<i>Albizia grandibracteata</i> Taub.	T	1.17	33	2
<i>Albizia gummifera</i> (J.F.Gmil.) GA.Sm.	T	1.21	34	2
<i>Ficus exasperata</i> Vahl	T	1.23	35	2
<i>Trichilia emetica</i> Vahl	T	1.34	36	2
<i>Apodytes dimidiata</i> E. Mey. ex Arn.	T	1.34	36	2
<i>Clausena anisata</i> (Willd.) Hook.f. ex Benth.	T	1.43	37	2
<i>Celtis africana</i> Burm. f.	Sh	1.44	38	2
<i>Cordia africana</i> Lam.	T	1.46	39	2
<i>Rytigynia neglecta</i> (Hiern) Robyns	T	1.47	40	2
<i>Maytenus</i> spp.	T/Sh	1.49	41	2
<i>Podocarpus falcata</i> R.Br.	T	1.54	42	2
<i>Maytenus arbutifolia</i> (A. Rich.) Wilczek	Sh	1.63	43	2
<i>Pavetta oliveriana</i> Hiern	T	1.71	44	2
<i>Oxyanthus speciosus</i> DC. ssp. <i>globosus</i> (Sond.) Bridson	T	1.94	45	2
<i>Ehertia cymosa</i> Thonn.	T	1.98	46	2
<i>Prunus africana</i> (Hook.f.) kalkm	T	2.02	47	2
<i>Rothmannia urcelliformis</i> (Hiern.) Robyns	Sh	2.15	48	2
<i>Vernonia amygdalina</i> Del.	T	2.15	48	2
<i>Oxyanthus speciosus</i> DC.	Sh	2.26	49	2
<i>Landolphia buchananii</i> (Hallier f.) Stapf	C	2.46	50	2
<i>Ficus spec.</i>	T	2.58	51	2
<i>Maesa lanceolata</i> Forssk.	T	2.75	52	2
<i>Hippocratea goetzei</i> Loes.	C	2.75	52	2
<i>Lepidotrichilia volkensii</i> (Gurke) Leory.	T	3.27	53	2
<i>Pouteria adolfi-friederici</i> (Engl.) Baehni	T	3.38	54	1
<i>Allophyllus abyssinicus</i> (Hochst) Radlk.	T	3.45	55	1
<i>Bersama abyssinica</i> Fresen	T	3.54	56	1
<i>Ilex mitis</i> (L.) Radlk.	T	3.57	57	1
<i>Polyscias fulva</i> (Hiern.) Harms	T	3.67	58	1
<i>Ocotea kenyensis</i> (Chiov.) Robyns & Wilcze	T	4.10	59	1
<i>Galiniera saxifraga</i> (Hochst.) Bridson	Sh	4.32	60	1
<i>Trilepisium madagascariense</i> DC	T	4.65	61	1
<i>Macaranga capensis</i> (Baill) Sim	T	4.70	62	1

Species' scientific name	Life form	Importance value	Rank	Rank class
<i>Mimusops kummel</i> A.DC.	T	5.06	63	1
<i>Ficus ovata</i> Vahl	T	5.23	64	1
<i>Dracaena steudneri</i> Engl.	T	5.37	65	1
<i>Sapium ellipticum</i> (Hochst.) Pax.	T	5.55	66	1
<i>Chionanthus mildbraedii</i> (Gilg & Schellenb.) Stearn	T	5.79	67	1
<i>Vepris dainellii</i> (Pichi-serm) Kokwara	T	5.84	68	1
<i>Elaeodendron buchananii</i> (Loes.) Loes.	T	6.08	69	1
<i>Ficus sur</i> Forssk.	T	6.29	70	1
<i>Schefflera abyssinica</i> Hochst.ex A. Rich) Harms	T	7.31	71	1
<i>Coffea arabica</i> L.	Sh	7.44	72	1
<i>Syzigium guineense</i> (Willd.) DC. ssp. <i>afromontanum</i> F	T	7.95	73	1
<i>Croton macrostachyus</i> Del.	T	9.06	74	1
<i>Phoenix reclinata</i> Jacq	T	9.75	75	1
<i>Millettia ferruginea</i> (Hochst.) Bak.	T	10.59	76	1
<i>Schefflera volkensii</i> (Engl.) Harms	T	12.36	77	1
<i>Olea welwitschii</i> (Knohl) Gilg&Schellenb.	T	21.90	78	1
<i>Arundinaria alpina</i> K. Schum.	T	58.51	79	1

6.2. Photos



Figure 3: *Coffea arabica* at the Awurada PFM site (photo: Anna Leßmeister)



Figure 4: Dense bamboo forest dominated by the montane bamboo *Arundinaria alpina* (photo: Anna Leßmeister)



Figure 5: Bamboo forest understory, dominated by the same few grass species and shrubs (photo: Viola Clausnitzer)



Figure 6: The endemic species *Millettia ferruginea* (photo: Anna Leßmeister)



Figure 7: *Hagenia abyssinica* (photo: Anna Leßmeister)



Figure 8: *Schefflera volkensii* (photo: Anna Leßmeister)

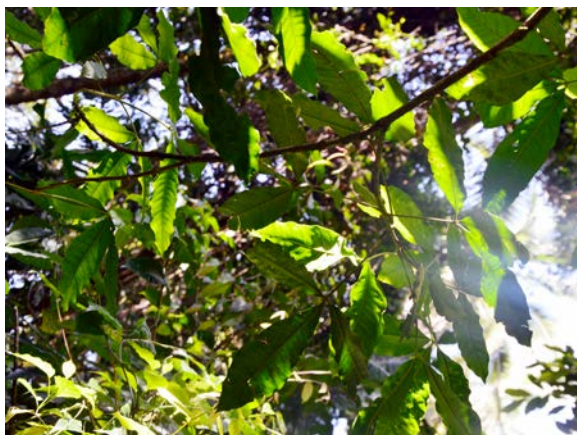


Figure 9: The endemic species *Vepris dainellii* (photo: Anna Leßmeister)



Figure 10: Gojeb riverine/floodplain habitats (photo: Anna Leßmeister)

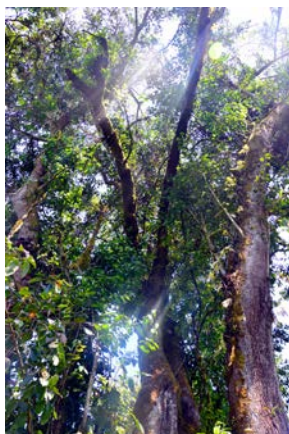


Figure 11: *Sapium ellipticum* in the floodplain forests (photo: Anna Leßmeister)



Figure 12: PFM site, Awurada (AW) (photo: Anna Leßmeister)



Figure 13: PFM site, Awurada (AW) (photo: Anna Leßmeister)



Figure 14: Gojeb Wetland (photo: Anna Leßmeister)



Figure 15: Herborisation of unknown species (photo: Anna Leßmeister)



Figure 16: Diameter at breast height (DBH) measurements in the Awurada Valley (photo: Anna Leßmeister)



Figure 17: Diameter at breast height (DBH) measurements in the Awurada Valley (photo: Anna Leßmeister)



Figure 18: *Rothmannia urcelliformis* (photo: Anna Leßmeister)



Figure 19: *Phoenix reclinata* at Gojeb River (GO-riv) (photo: Anna Leßmeister)



Figure 20: *Dracaena afromontana* in Boginda (BO) (photo: Anna Leßmeister)