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Use of vegetation maps to infer on the ecological suitability of species using central and western Kenya as an example

part II: tree species lists for potential natural vetation types

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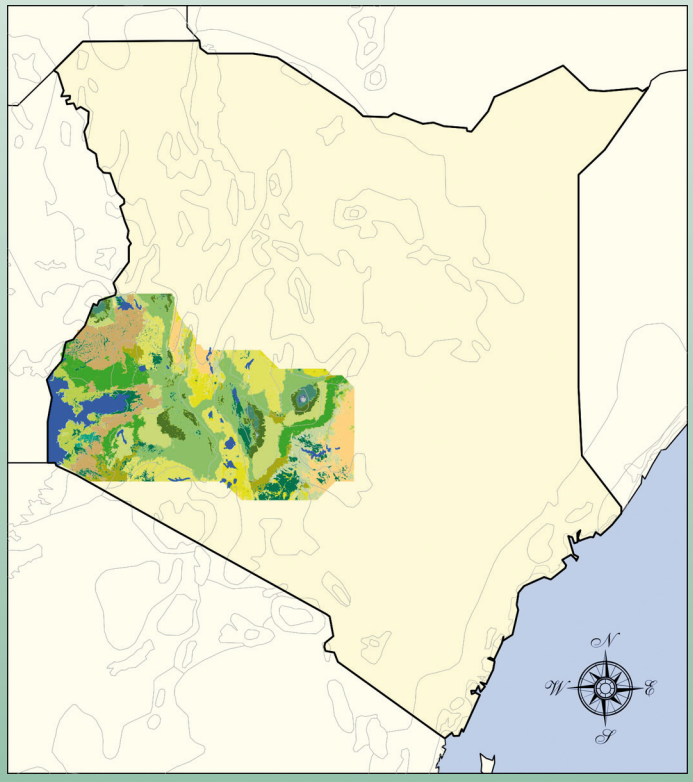

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Title
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Front page image
The digitized vegetation map of Southwest Kenya superimposed on the Kenya map (thick lines). The vague lines show the outlines of the vegetation types of White's (1983) vegetation map of Africa.

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Acronyms

ANN	Artificial neural networks
BAM	Bamboo woodland and thicket
BIOMOD	Biodiversity modelling approach, selects the model that provides the best predictions from GLM, GAM, CART and ANN
BM	Bayesian modelling
BP	Bioclimatic profiles, implemented in BIOCLIM software
CART	Classification and regression trees
DA	Discriminant analysis
DCO	Dry *Combretum* savanna
DIF	Dry Intermediate forest
DMF	Dry Montane forest
EB	Evergreen and semi-evergreen bushland
ENFA	Ecological niche factor analysis, implemented in the BIOMAPPER software
GA	Genetic algorithms; implemented in the desktop-GARP software
GAM	Generalised additive models
GDM	Generalised dissimilarity modelling
GLM	Generalised linear models
IAC	*Acacia* and allied vegetation on soils with impeded drainage
LAC	Lowland Acacia-*Commiphora* woodland, bushland and thicket
MCO	Moist *Combretum*-Terminalia savanna
MD	Mahalonobis distance
ME	Maximum entropy
MIF	Moist intermediate forest
MMF	Moist montane forest
PNV	Potential natural vegetation
SET	Semi-evergreen thicket
SI	Spatial interpolation
UAC	Upland *Acacia* woodland, savanna and bushland

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1. Introduction

Vegetation maps show classifications of plant communities based on differences in floristics (composition and relative abundances of species), physiognomic structure (such as growth form, height, ground cover, type of leaves) and seasonal activity patterns (van der Maarel 2005, Box and Fujiwara 2005). Potential natural vegetation (PNV) has been defined as the vegetation structure that would become established if all successional sequences were completed without interference by man under the present climatic and edaphic (soil) conditions, including those created by man (Tüxen 1956, Mueller-Dombois and Ellenberg 1974, Box and Fujiwara 2005). This definition makes it clear that PNV is not necessarily the original vegetation as the site conditions may have changed after the original vegetation was removed.

Trapnell and his co-workers (Trapnell *et al.* 1966, 1969, 1976, 1986; Trapnell and Brunt 1987) produced four sheets of a vegetation map for south-western Kenya at a scale of 1:250 000 that mapped vegetation as it was in 1960 (hereafter called the »original map«). We believe that the original map is still useful today as, despite the fact that the main aerial and field surveys were completed in the early 1960s, the map allowed to determine the PNV of the mapped area. Given that the distribution of species can be linked with the distribution of PNV, the new PNV map that we developed can assist in selecting species for particular locations within the map. Such selections can be linked conceptually to the ecological definition of agroforestry in 'mimicking natural ecosystems', which we interpret here to the detail of establishing similar tree species assemblages as those that were occurring under natural conditions.

Although Trapnell and his co-workers produced a detailed map, the documentation of the used methodology (i.e., Trapnell and Brunt 1987) in differentiating between different vegetation types lacks detail, especially since they did not provide the exact criteria that were used to differentiate between the various types. As we are convinced that the detail of the original vegetation maps was justified given the amount of survey work and the information provided within the limited documentation, the main attempt of this document is to provide lists of indigenous tree species for the different PNV types (hereafter called vegetation-specific species lists).

In accompanying documents (Kindt *et al.*, 2007, van Breugel *et al.*, 2007), we investigated published literature on differences between vegetation types and examined patterns of climatic, edaphic and topographic interpolated surface layers. These investigations revealed that floristic differences explain in part how the PNV types can be differentiated. Here we provide greater detail on how PNV types differ floristically.

As discussed below, there may not be a complete overlap between the distribution of a species and the distribution of vegetation types. This does not mean, however, that there is no congruence between vegetation and species lists as current views on the nature of community structure accept that any site possesses a reasonable predictable association of species that is

related to its environmental conditions. Neither does it mean that the many literature references that list typical species for specific types of vegetation should be disregarded.

In the appendix, we provide information on different uses that were listed for the species. This information can be used to select a number of species that can provide a particular service in a particular area within the map, although the caveat that the vegetation-species correspondence does not provide the complete information of where a species can occur should be expanded to a caveat that also the species-use correspondence documented in the appendix may not provide the total range of species for a particular use, or even list some species that are not most suitable to provide the particular use.

2. Methods

2.1 Compilation of species lists for potential natural vegetation types

It is unfortunate that the original vegetation maps and their documentation provide little information on the criteria that were used to distinguish between the different potential natural vegetation (PNV) types. Although the boundaries between the PNV types are provided on the map on a scale of 1:250 000, no information was provided on the actual criteria that were used to distinguish between the types on aerial photographs and during fieldwork.

We used five methods of inferences to obtain vegetation-specific species lists: (I_1) information from the legend of the map; (I_2) information from Trapnell (1997) on typical species for forest and bamboo vegetation types; (I_3) information from other sources of literature on vegetation types; (I_4) information from herbarium vouchers available from the East Africa Herbarium (based at the National Museums of Kenya); and (I_5) information from Beentje (1994) and species lists for particular forest surveys.

The first inference method was based on the species or genus names that were part of the names of some vegetation types in the original map (a complete list of all original vegetation types and how these correspond with the 17 PNV types of the new map is documented in Kindt *et al.* 2007). In many cases, the name of the original vegetation type only listed the generic name, but not the species name. In such cases, other inference methods often suggest what the species may be, although it is theoretically possible that the vegetation type of the legend refers to other species. Although there may be floristic or ecological reasons that a species may not be able to grow everywhere where a PNV type occurs (since the PNV types often cluster various vegetation classes and subclasses of the original map that do not occur everywhere in the map), we think that this information provides the best correspondence between the mapped vegetation and a species, as both species and vegetation distribution were available from the original maps.

The second method of inference was based on a reference by Trapnell (1997) that provided species lists for forest and bamboo PNV types. Since these species lists were compiled during the fieldwork of Trapnell and his co-workers when creating the original vegetation maps of which he was the principal author, we ranked the reliability of the correspondence of the species and the vegetation types in between that for the information from the legend (rank 1) and that of other sources of literature (rank 3). A difference of species of rank 1 with those of rank 2 could be that species of rank 1 are typical or dominant species for the listed vegetation types (as suggested by Beentje 1990).

Inference method 3 obtained species that were listed in other sources of literature than those of inference methods 1 and 2. Only species that were listed in Beentje (1994) as species that are occurring in Kenya were retained

in the lists. Beentje (1994) was also consulted for synonyms of botanical names. The fact that not a large number of species needed to be dropped from the vegetation-specific species lists confirms the interpretation by White (1983a) that vegetation boundaries can also delineate zones of plant endemism. Most species that needed to be dropped were secondary moist savanna species that were listed by White (1983a) within the Guineo-Congolian secondary grassland, as he mentioned that most of the species of the mosaic of Guineo-Congolian rainforest and secondary savanna species also occur in the Guineo-Congolian secondary grassland.

For inference method 4, we obtained information on herbarium positions from the East Africa Herbarium (based at the National Museums of Kenya). We think of this information as of lower reliability for correspondence between species and vegetation types than the previous inference methods for a number of reasons. The principal reasons to give lower priority to this list were that information was only obtained from a limited number of species (we initially selected the 124 species that were listed as indigenous to Kenya both in the *AgroforesTree Database* [Simons *et al.* 2005] and in the *Useful trees and shrubs for Kenya* [Maundu and Tengnäs 2005]; but for only 110 species were herbarium positions obtained within the area covered by the map, see below) and that for many species only a small number of occurrence data was available (see table 1). The information from the herbarium vouchers is therefore likely to provide a biased picture of the distribution of typical species for the PNV types, whereas the previous references provide typical species for particular PNV types. Another reason that a biased picture may have occurred is that most herbarium positions were not the original coordinates of the location where the herbarium sample was collected, but were the coordinates of the nearest location that was listed in a gazetteer (a list of coordinates for names of locations). We did not exclude the herbarium records for which only gazetteer positions were available (as this would have reduced the number of positions very much, Table 1), but opted instead to only list species if the position (including gazetteer position) and the habitat description on the herbarium voucher agreed with the PNV type. We did not follow the rule for habitat description for some genera that formed part of the name of the vegetation type (*Acacia* and *Combretum*) and only relied on the positions. We did not follow the rule for positions for *Acacia* and allied vegetation on soils with impeded drainage given the scattered distribution of the vegetation type, and thus only relied on the habitat descriptions.

For 14 species that were listed in the *AgroforesTree database* (Simons *et al.* 2005) and the *Useful trees and shrubs for Kenya* (Maundu and Tengnäs 2005), there were no herbarium positions that fell within the new map: *Acacia polyacantha* ssp. *campylacantha* (no specimens), *Afzelia quanzensis* (specimen positions only at the coast), *Albizia versicolor* (coast), *Borassus aethiopum* (no specimens), *Brachystegia spiciformis* (coast), *Commiphora myrrha* (north-east), *Elaeodendron schweinfurthianum* (coast), *Entada abyssinica* (no specimens), *Euphorbia tirucalli* (no specimens), *Moringa stenopetala* (north-west), *Rhizophora mucronata* (coast), *Ricinus communis* (no specimens), *Tamarix aphylla* (north-east), *Warburgia stuhlmannii* (coast) and *Xylopia aethiopica* (strange herbarium position at 40 m altitude).

Table 1. Herbarium records per species available at the East Africa Herbarium for a subset of species with native range in Kenya according to Simons et al. (2005) and Maundu and Tengnäs (2005). Species are sorted by total number of herbarium vouchers, which include vouchers outside the area covered by the map.

Species	Number of vouchers	Number of vouchers with original coordinates
Rhus natalensis	236	25
Euclea divinorum	161	19
Cadaba farinosa	142	11
Combretum molle	130	15
Commiphora africana	126	34
Carissa edulis	105	11
Acacia senegal	91	20
Acacia mellifera	89	19
Cordia sinensis	84	17
Bridelia micrantha	80	13
Acacia seyal	78	12
Teclea nobilis	77	8
Terminalia brownii	76	5
Nuxia congesta	75	10
Ekebergia capensis	75	9
Ficus thonningii	73	8
Combretum aculeatum	71	7
Crotalaria goodiiformis	70	8
Croton macrostachyus	69	10
Syzygium guineense	66	10
Grewia villosa	65	8
Syzygium cordatum	59	4
Ziziphus mucronata	58	10
Salvadora persica	55	11
Cassipourea malosana	55	8
Sesbania sesban	55	4
Albizia amara	52	11
Vangueria madagascariensis	52	10
Balanites aegyptiaca	50	10
Ximenia americana	50	10
Prunus africana	50	8
Acacia tortilis	49	12
Erythrina abyssinica	48	6
Boscia angustifolia	48	5
Senna singueana	48	4
Terminalia prunioides	47	5
Ficus sycomorus	47	3
Dichrostachys cinerea	45	8
Albizia anthelmintica	44	7
Flacourtia indica	44	5
Faurea saligna	43	9
Cordia africana	43	5
Juniperus procera	42	8
Cassia abbreviata	42	5
Trema orientalis	41	10
Zanthoxylum chalybeum	41	7
Podocarpus falcatus	40	5
Vangueria infausta	40	5
Grewia tenax	39	6
Trichilia emetica	38	5
Ziziphus abyssinica	37	10
Dodonaea viscosa	37	4
Ficus glumosa	36	10
Strychnos henningsii	36	6
Rauvolfia caffra	36	4
Albizia gummifera	35	6
Croton megalocarpus	33	5

Species	Number of vouchers	Number of vouchers with original coordinates
Acacia lahai	33	4
Grewia bicolor	32	8
Lawsonia inermis	32	4
Strychnos spinosa	32	3
Acacia xanthophloea	31	3
Calodendrum capense	31	3
Garcinia livingstonei	30	7
Berchemia discolor	29	6
Tamarindus indica	29	4
Macaranga kilimandscharica	28	4
Combretum collinum	28	2
Hagenia abyssinica	28	2
Harungana madagascariensis	27	6
Sapium ellipticum	25	8
Acacia elatior	24	6
Vitex doniana	23	5
Annona senegalensis	22	4
Vernonia amygdalina	21	4
Millettia dura	21	0
Dobera glabra	20	5
Kigelia africana	20	4
Sclerocarya birrea	19	6
Melia volkensii	19	5
Acacia nilotica	19	3
Delonix elata	19	3
Stereospermum kunthianum	18	0
Phoenix reclinata	17	4
Azanza garckeana	17	0
Markhamia lutea	16	3
Albizia coriaria	16	1
Dalbergia melanoxylon	16	1
Piliostigma thonningii	16	1
Vitex payos	15	1
Brachylaena huillensis	15	0
Ziziphus mauritiana	14	5
Ocotea usambarensis	13	4
Antiaris toxicaria	13	2
Newtonia buchananii	13	2
Polyscias kikuyuensis	12	2
Vitex keniensis	12	0
Diospyros mespiliformis	11	4
Spathodea campanulata	9	2
Parinari curatellifolia	9	0
Warburgia stuhlmannii	7	6
Acacia albida	7	1
Casimiroa edulis	6	0
Maesopsis eminii	6	0
Zanthoxylum gilletii	6	0
Adansonia digitata	5	0
Moringa stenopetala	5	0
Warburgia ugandensis	4	3
Olea capensis	4	2
Milicia excelsa	4	0
Olea europaea	4	0
Polyscias fulva	3	2

For some species that were listed in the *AgroforesTree Database* (Simons *et al.* 2005) and the *Useful trees and shrubs for Kenya* (Maundu and Tengnäs 2005), the rules followed for inference method 4 (position + habitat description) did not find any PNV types. For those species, we searched for information on habitat in Beentje (1994), species lists in Lind and Morrison (1974) and information on habitat from the herbarium vouchers. As mentioned above, we expect that such active search from species lists may not result in a typical list of species for a certain vegetation type, and we therefore attributed the lowest degree of correspondence (rank 5) to this inference between vegetation type and species.

Because of a progressively worse correspondence of these five types of information with the original vegetation types, we advise that users put higher trust in tables that are listed first. For this reason, species that are listed by an earlier inference method are not repeated in later tables, but information on their confirmation is mentioned. How various vegetation classification schemes correspond to each other is documented in the accompanying document (Kindt *et al.* 2007). Confirmation by herbarium positions means that the original or gazetteer position fell within the particular PNV type, but this was only possible for the subset of species for which herbarium voucher locations were available (see inference method 4 and Table 1). We used different references of Henk Beentje for confirmation analysis, as Beentje (1990) provides a more detailed classification of forest types than Beentje (1994), whereas Beentje (1990) only provides lists for forest types.

2.2 Details obtained from some literature references

Where specific literature references provided details additional to the link between a vegetation type and species occurrence, we attempted to include these details in the tables that document vegetation-specific species lists. For example, where a specific vegetation type was secondary to a PNV type, we provided information on the secondary nature of the vegetation type.

The information from Jolly *et al.* (1998) was interpreted as providing the following inferences about vegetation types: the tropical raingreen and savanna functional type (Tr3) corresponds to *Combretum* savanna, the evergreen (Te1 and Te2) and the wet-tropical raingreen trees types (Tr1) correspond to moist intermediate forest, dry-tropical raingreen trees (Tr2) corresponds to dry intermediate forest, the warm-temperate evergreen trees (wte) corres-pond to montane forests, the sclerophyll and xerophytic woods and scrubs types (Tss and tss) correspond to evergreen and semi-evergreen bushland and thickets, whereas the steppe (sf) corresponds to lowland *Acacia-Commiphora* bushland. Since these functional types do not overlap completely with the PNV types, the inference was only used in a confirmatory fashion.

For the references by Frank White, the abbreviations refer to whether the species was also listed as a species for Guineo-Congolian lowland rainforest (G), with closest relatives in Guineo-Congolian lowland rainforest (g), with closest

relatives elsewhere in the tropics but not in Guineo-Congolian rainforest (t), eastern montane (E), western montane (W) or island (I) populations, with information provided by White (1983b). The abbreviations were only added for those species that were listed in White (1983a), except for generalists that were listed as transgressors by White (1983b). White (1983b) used the Uluguru-Mulanje mountain system to characterize eastern African mountains, which occur further south than the Imatongs-Usambara system to which the Kenyan montane PNV types belong. Information from White (1978), however, shows that these two systems share most of the tree species that were investigated in the comparisons between the afromontane systems, with exceptions for *Brachylaena huillensis* and *Ptaeroxylon obliquum* that only occur in the Imatongs-Usambara system. The information provided between brackets as »Guineo-Congolian« refers to the description of various species as species of Guineo-Congolian lowland rainforest species that reach their easternmost limit in Kakamega forest mentioned in White (1983a).

2.3 Information on potential uses of indigenous tree species

We obtained information on potential uses of tree species for those species that were obtained by the different inference methods (see above). We consulted two sources of information on uses for tree species: (i) the *AgroforesTree Database* (Simons *et al.* 2005); and (ii) the *Useful trees and shrubs for Kenya* (ICRAF 1992, Maundu and Tengnäs 2005). From the first edition of the *Useful trees and shrubs for Kenya* (ICRAF 1992), and for the species that were listed there, we added information on the wood uses of flooring, boat building, and veneer or plywood. Tables with species and uses were compiled for each PNV type and were provided in Appendix I.

2.4 Ordination of potential natural vegetation types based on floristic differences

Community matrices were compiled for the 12 PNV types for which extensive species lists were obtained (excluding the alpine, montane moorland and scrubland, mixtures of broadleaved savanna and evergreen bushland, *Papyrus* and swamp, and grasslands on soils with impeded drainage PNV types), recording presence-absence of the 362 species that were encountered. Unconstrained (principal coordinates analysis) and constrained (distance-based redundancy analysis) ordination analyses were used to summarise relationships between the PNV types based on the Bray-Curtis and Kulczynski ecological distance measures (Legendre and Legendre 1998, Kindt and Coe 2005).

Bray-Curtis (A,C): $$D = 1 - 2\frac{\sum_{i=1}^{S} \min(a_i, c_i)}{\sum_{i=1}^{S} (a_i + c_i)}$$

Kulczynski (A,C): $$D = 1 - \frac{1}{2}\left(\frac{\sum_{i=1}^{S} \min(a_i, c_i)}{\sum_{i=1}^{S} a_i} + \frac{\sum_{i=1}^{S} \min(a_i, c_i)}{\sum_{i=1}^{S} c_i} \right)$$

(a_i: abundance of species *i* in community *A*; b_i: abundance of species *i* in community *B*; *S*: total number of species)

The constrained ordination analysis was based on the mean altitude and precipitation of each PNV type as calculated from sampled values from the interpolated surface layers (Kindt *et al.* 2007). Within the ordination diagrams, each PNV type was connected by an arrow with the type with which it had the smallest ecological distance (obviously excluding the same PNV type). The analyses were done for all species, only for species of inference 1-3 or only for species of inference 1-2 (see above). Analyses were done with the freely available Biodiversity.R statistical software (Kindt and Coe 2005).

3. Results

3.1 Species lists obtained from the various inference methods

Different methods were used to obtain the species lists of each PNV type. In total, 362 species were listed which ranged from 22 (bamboo, upland *Acacia*), over 24 (dry *Combretum* savanna), 28 (*Acacia* and allied vegetation on soils with impeded drainage), 29 (semi-evergreen thickets), 44 (moist *Combretum-Terminalia* savanna, evergreen and semi-evergreen bushland), 74 (dry intermediate forest), 91 (dry montane forest), 92 (lowland *Acacia-Commiphora*), 99 (moist montane forest) to 105 (moist intermediate forest). Species that were unique to particular PNV types followed a similar trend except for lowland *Acacia-Commiphora*, with 1 (upland *Acacia*) over 2 (bamboo, dry *Combretum* savanna), 5 (*Acacia* and allied vegetation on soils with impeded drainage), 8 (semi-evergreen thickets), 9 (evergreen and semi-evergreen bushland), 15 (dry montane forest), 18 (moist *Combretum-Terminalia* savanna), 20 (dry intermediate forest), 30 (moist intermediate forest), 35 (moist montane forest) to 61 (lowland *Acacia-Commiphora*) unique species. On average, species occurred on 1.9 PNV types, ranging from 1 (206 species) to 9 PNV types (*Rhus natalensis*). Other frequent species were *Carissa edulis* (8 PNV types), *Combretum molle* (7 PNV types) and *Acacia seyal* (6 PNV types)
Table 2 documents the species lists obtained from inference method 1, based on the legend of the original map. We provided some additional information that was available from the original map, such as whether the name was part of the class or subclass (boundaries are only drawn in the original map for the 55 classes and not for the 217 subclasses), or whether the original vegetation type was secondary or not.

Table 3 provides the species obtained by inference method 2 based on another reference of the main author of the original maps. Although we maintained a distinction between eastern and western distribution for some PNV types, we did not use the herbarium positions to confirm differentiation within the same PNV type (for example, we only tested whether the herbarium position was within moist intermediate forest, but not within the western part of the distribution of moist intermediate forest).

Table 2. Information on species composition provided in the legend of the original vegetation maps (Trapnell et al. 1966, 1969, 1976, 1986; Trapnell and Brunt 1987).

Vegetation type	Genus or species (original vegetation hierarchical level)	Confirmation[1]
Bamboo woodland and thicket	*Arundinaria alpina (class)*	TLB, White
	Hagenia (subclass)	Species in Table 2
Mountain scrubland and moorland	*Tree heathers* (subclass)	Species in TLB
Alpine	*Senecio* (class)	TLB
	Lobelia (class)	TLB
Moist montane forest	*Albizia* (subclass)	Species in Table 2
	Aningeria (subclass)	Species in Table 2
	Catha edulis (subclass, sometimes clearing)	Table 2
	Clerodendrum (clearing, subclass)	-
	Cordia (clearing, subclass)	Species in Table 4
	Hagenia (clearing, subclass)	Species in Table 2
	Harungana (clearing, subclass)	Species in Table 2
	Macaranga (subclass)	Species in Table 2
	Myrica (clearing, subclass)	Species in Table 2
	Neoboutonia (subclass)	Species in Table 2
	Olea capensis	Table 2
	Podocarpus latifolius (=milanjianus) (subclass)	Table 2
	Polyscias (subclass)	Species in Table 2
	Prunus (subclass, sometimes clearing)	Species in Table 2
	Tabernaemontana (=Conopharyngia) (secondary, subclass)	Species in Table 2
	Triumfetta (clearing, subclass)	-
Dry montane forest	*Acacia drepanolium* (secondary savanna or bushland, subclass)	-
	Acacia gerrardii (secondary savanna, subclass)	-
	Acacia seyal (secondary savanna, subclass)	Herbarium
	Acokanthera (clearing, class and subclass)	-
	Cassipourea (subclass)	Species in Table 2
	Dodonaea (secondary bushland, class or subclass)	Species in Table 2
	Dombeya (subclass, sometimes clearing)	Species in Table 2
	Erythrina (secondary savanna, class)	Species in TLB
	Euphorbia (subclass)	Species in Table 2
	Juniperus procera (class)	Table 2
	Olinia (secondary bushland, subclass)	Species in Beentje
	Podocarpus falcatus (=gracilior) (subclass)	Table 2
	Podocarpus latifolius (=milanjianus) (subclass)	Table 2
	Prunus (subclass)	Species in Table 2
	Tarchonanthus (secondary bushland, class)	Species in Table 2
	Vernonia (secondary savanna or scrub, class or subclass)	Species in Table 2
Moist intermediate forest	*Acacia* (secondary montane or clearing, subclass)	-
	Acanthus (clearing, subclass)	-
	Albizia (clearing, subclass)	Species in Table 2
	Bridelia (clearing, subclass)	Species in Table 2
	Croton (clearing, subclass)	Species in Table 2
	Croton megalocarpus (subclass)	Table 2
	Cordia (clearing, subclass)	Species in Table 2
	Erythrina (clearing or secondary savanna, class or subclass)	Species in TLB
	Harungana (clearing, subclass)	Species in Table 2
	Lantana (clearing, subclass)	-
	Lovoa swynnertonii (subclass)	Table 2
	Macaranga (clearing, subclass)	Species in White, Herbarium
	Markhamia (clearing, subclass)	Species in Table 2
	Milicia (=Chlorophora) (clearing, subclass)	Species in Table 2
	Newtonia buchananii (subclass)	Table 2
	Ocotea (subclass)	-
	Premna (subclass)	Species in Table 2
	Vernonia (clearing or secondary savanna, class or subclass)	Species in TLB and Table 4

Vegetation type	Genus or species (original vegetation hierarchical level)	Confirmation[1]
Dry intermediate forest	*Albizia* (clearing, subclass)	Species in Table 2
	Brachylaena huillensis (=hutchinsii) (subclass)	Table 2
	Calodendron (subclass)	Species in Table 2
	Combretum (secondary bushland, subclass)	Species in Table 4
	Cordia (clearing, subclass)	Species in Table 4
	Croton (clearing, subclass)	Species in Table 2
	Croton macrostachyus (clearing, subclass)	-
	Croton megalocarpus (subclass)	Table 2
	Diospyros (class)	Species in Table 2
	Dodonaea (secondary bushland, subclass)	Species in Table 4
	Dombeya (clearing, subclass)	TLB
	Erythrina (clearing or secondary savanna, class or subclass)	Species in TLB
	Euclea (clearing, subclass)	Species in Table 2
	Lantana (clearing, subclass)	-
	Olea (class)	Species in Table 2
	Tarchonanthus (secondary bushland, subclass)	-
	Vernonia (secondary bushland, subclass)	Species in TLB
Upland *Acacia* woodland, savanna and bushland	*Acacia brevispica* (subclass)	Beentje (woodland pp)
	Acacia drepanolium (subclass)	Beentje (savanna), LM (savanna)
	Acacia etbaica (subclass)	Beentje (savanna)
	Acacia gerrardii (subclass)	TLB, Beentje (savanna), LM (savanna)
	Acacia kirkii (class, subclass)	LM (woodland near rivers)
	Acacia mellifera (subclass)	Beentje (woodland pp), Herbarium
	Acacia polyacantha (subclass)	Beentje (savanna)
	Acacia tortilis (subclass)	Beentje (bushland pp), LM (savanna)
	Acacia xanthophloea (class)	LM (woodland near water), Herbarium
	Albizia amara ssp. sericocephala	Beentje (bushland pp), Herbarium
	Combretum (subclass)	Species in Table 4
	Tarchonanthus (subgroup or class)	-
	Terminalia (subclass)	-
Savanna – evergreen bushland mixtures	*Acacia* (subclass)	-
	Combretum (subclass)	-
	Dodonaea ((subclass)	-
	Dombeya (subclass)	-
	Heeria (subclass)	-
	Lannea (subclass)	-
	Terminalia (subclass)	-
	Uvaria (subclass)	-
Lowland *Acacia-Commiphora* woodland, bushland and thicket	*Acacia brevispica* (subclass)	TLB, Beentje (bushland, woodland pp)
	Acacia reficiens (subclass)	TLB, White, Beentje (bushland pp)
	Acacia tortilis (class, subclass)	TLB, White, Beentje (bushland pp), Herbarium
	Adansonia (subclass)	Species in White, Beentje, Jolly, Herbarium
	Combretum (class)	Species in White, Beentje, Jolly, Herbarium
	Commiphora (group)	Species in White, Beentje, Herbarium
	Terminalia (subclass)	Species in White, Beentje

Vegetation type	Genus or species (original vegetation hierarchical level)	Confirmation[1]
Dry *Combretum* savanna	*Acacia* (subclass)	TLB, Herbarium
	Combretum (group)	Species in TLB, White, Jolly, Herbarium
	Commiphora (subclass)	Species in TLB, Jolly, Herbarium
	Croton (subclass)	-
	Diospyros (subclass)	-
	Dodonaea (subclass)	Species in Table 4
	Faurea (subgroup)	Species in Beentje and Herbarium
	Faurea saligna (subclass))	Beentje (savanna pp), Herbarium
	Thespesia (subclass)	-
	Ozoroa (=Heeria) (subclass)	-
	Parinari (subgroup or subclass)	-
	Piliostigma (subclass)	-
	Terminalia (subclass)	Species in TLB
Moist *Combretum-Terminalia* savanna	*Albizia* (subclass)	White
	Bridelia (subclass)	Species in Herbarium
	Combretum (group)	Species in TLB, White, Beentje, LM
	Euclea racemosa ssp. schimperi (subclass)	Beentje (savanna pp)
	Erythrina (subclass)	-
	Faurea (subgroup)	-
	Faurea rochetiana (=speciosa) (subclass)	Beentje (savanna pp)
	Ficus (subclass)	-
	Ozoroa (=Heeria) (subclass)	-
	Parinari (subgroup or subclass)	Species in White, Herbarium
	Piliostigma (subclass)	Species in White, Beentje, Herbarium
	Terminalia (group)	Species in TLB, White
	Vernonia (subclass)	-
Evergreen and semi-evergreen bushland	*Acacia brevispica* (secondary savanna, class or subclass)	-
	Acacia drepanolobium (class, sub-class, sometimes sec. types)	TLB, White (secondary)
	Acacia gerrardii (subclass, sometimes secondary savanna)	Species in TLB
	Acacia hockii (secondary savanna, subclass)	TLB, White (secondary)
	Acacia mellifera (secondary savanna, subclass)	Herbarium
	Acacia seyal ((subclass, sometimes secondary savanna)	TLB, White (secondary), Herbarium
	Albizia (subclass)	-
	Balanites (subclass)	TLB
	Combretum (subclass)	Species in Table 4
	Dodonaea (subclass)	Species in White, Herbarium
	Euphorbia (subclass)	Species in White
	Justicia (secondary open grasslands, subclass)	-
	Maerua (subclass)	-
	Olea (subclass)	Species in TLB and White
	Psiadia (subclass)	-
	Rhus (subclass)	Species in TLB, White, Herbarium
	Tarchonanthus (class or subclass)	Species in TLB and White
	Uvaria (subclass)	-

Vegetation type	Genus or species (original vegetation hierarchical level)	Confirmation[1]
Semi-evergreen thickets	*Acacia brevispica* (subclass, sometimes secondary bushland)	TLB
	Acacia seyal (subclass, sometimes secondary bushland)	TLB, Herbarium
	Albizia coriaria (clearing and secondary bushland, subclass)	Herbarium
	Balanites (subclass, sometimes secondary bushland)	TLB
	Combretum (secondary savanna)	Species in Table 4
	Euphorbia (subclass, sometimes clearing)	TLB, species in White
	Harrisonia (subclass, sometimes secondary bushland)	Species in TLB
	Lannea (secondary savanna, subclass)	-
	Lantana (secondary scrub, subclass)	-
	Ozoroa (=Heeria) (secondary savanna, subclass)	-
	Parinari (secondary savanna, subclass)	-
	Rhus (clearing or secondary bushland, class or subclass)	Species in TLB, Herbarium
	Terminalia (secondary savanna, subclass)	-
	Turraea (subclass, sometimes secondary bushland)	Species in TLB
	Vitex (secondary savanna, subclass)	-
***Acacia* and allied vegetation on soils with impeded drainage**	*Acacia gerrardii* (subclass)	LM
	Acacia mellifera (subclass)	White, LM (drier), Herbarium
	Acacia polyacantha (subclass)	TLB, Beentje, LM
	Acacia seyal (subclass)	TLB, White, Beentje, LM, Herbarium
	Acacia sieberiana (subclass)	-
	Combretum (subclass)	-
	Euphorbia (subclass)	Species in White
	Lannea (subclass)	-
	Themeda (class)	-

1 Beentje: for forest types – Beentje (1990), for other vegetation types – Beentje (1994); Herbarium: information from position of the vouchers of the East Africa Herbarium; Jolly: Jolly *et al.* 1998, see main text for abbreviations; LM: Lind and Morrison (1974); TLB: Trapnell and Langdale Brown (1972); White: White (1983a).

Table 3. Species listed by Trapnell (1997) for the various forest and bamboo vegetation types.

Vegetation type	Region	Species	Confirmation[1]
General	All	*Albizia gummifera* (secondary)	TLB, Beentje, White[EWGI], Herbarium
		Bersama abyssinica	White[EWG]
		Cassipourea malosana	TLB, Beentje, LM, Herbarium
		Croton macrostachyus (secondary)	TLB, White[EWG], LM, Herbarium
		Diospyros abyssinica	TLB, Beentje, White (EWGI), LM
		Dracaena steudneri	-
		Ehretia cymosa	White [EWG]
		Ekebergia capensis (secondary)	Beentje, White [EWG], LM, Herbarium
		Ficus sur	-
		Ficus thonningii	LM, Herbarium
		Nuxia congesta	TLB, Beentje, White (EWI), LM, Herbarium
		Teclea (=Vepris) nobilis	Beentje, Herbarium
Bamboo	All	*Afrocrania (=Cornus) volkensii*	TLB, White, Beentje, LM
		Euphorbia obovalifolia (or marginal forest)	-
		Galiniera saxifrage (or marginal forest)	-
		Gnidia glauca (or marginal forest)	-
		Hagenia abyssinica	TLB, White, Beentje, LM, Herbarium
		Hypericum revolutum (or marginal forest)	-
		Lepidotrichilia volkensii (or marginal forest)	TLB, White, LM
		Pittosporum lanatum (or marginal forest)	-
		Schefflera volkensii	LM

Vegetation type	Region	Species	Confirmation[1]
Moist montane forest	All	*Acacia abyssinica* (invader)	TLB (woodland)
		Afrocrania (=Cornus) volkensii (marginal or bamboo)	-
		Alangium chinense (secondary)	Beentje, White (EWI), LM
		Albizia gummifera (secondary in marginal forest)	Beentje
		Allophylus abyssinicus	LM
		Allophylus africanus (residual)	-
		Aningeria (=Pouteria) adolfi-friederici (climax)	TLB, Beentje, White (Eg)
		Anthocleista grandiflora	LM
		Apodytes dimidiata	White (EWI), Jolly (wte)
		Casaeria battiscombei (also residual)	LM
		Catha edulis (secondary)	-
		Celtis africana	-
		Croton sylvaticus	-
		Dombeya torrida	-
		Dracaena afromontana	-
		Euphorbia obovalifolia (marginal or bamboo)	-
		Ficus lutea	-
		Galiniera saxifraga	-
		Hagenia abyssinica (marginal or bamboo)	White (disturb., E), Jolly (wte), Herbarium
		Harungana madagascariensis (secondary)	Herbarium
		Heinsenia diervillioides	-
		Kigelia moosa	-
		Lepidotrichilia volkensii (marginal or bamboo)	-
		Macaranga kilimandscharica (secondary)	TLB, Herbarium
		Maesa lanceolata	-
		Myrica salicifolia (secondary)	White (EW), LM
		Neoboutonia macrocalyx (secondary)	Beentje, LM
		Ocotea kenyensis (climax)	TLB, Beentje, LM
		Olea capensis (=welwitschii)	TLB, White (EWG), Jolly (wte), LM, H.
		Olea europaea ssp. africana (residual)	Jolly (wte)
		Oxyanthus speciosus	-
		Podocarpus latifolius (=milanjianus) (climax)	TLB, White (EW), LM
		Polyscias kikuyuensis (secondary in marginal forest)	Beentje (endemic), Herbarium
		Prunus africana (also residual)	TLB, White (EWI), Jo (wte), LM, Herbarium
		Psychotria mahonii	-
		Psydrax parviflora	-
		Rapanea melanophloeos	Jolly (wte)
		Schefflera abyssinica	Beentje
		Schefflera volkensii	-
		Strombosia scheffleri	Beentje, White (EW), LM
		Syzygium guineense	Beentje, White (EWGI), LM, Herbarium
		Tabernaemontana pachysiphon (=holstii) (secondary)	LM (genus)
		Tabernaemontana stapfiana (=johnstonii) (secondary)	Beentje, White, LM (genus)
		Turraea holstii	-
		Xymalos monospora	White (EW)
		Zanthoxylum gillettii	Beentje, LM, Herbarium
		Zanthoxylum rubescens	-
	East only	*Cassipourea gummiflua*	White (EWI)
		Chrysophyllum gorungosanum	Beentje, White (Eg)
		Cola greenwayi	White (Eg)
		Cylicopmorpha parviflora	White
		Garcinia volkensii	-
		Macaranga capensis	-
		Maytenus acuminata	-
		Ochna keniensis	-
		Ocotea usambarensis	White (Et), LM, Herbarium
		Synsepalum (Pachystela) brevipes	-
		Vitex keniensis	Beentje (endemic), Herbarium

Vegetation type	Region	Species	Confirmation[1]
Dry montane forest	All	*Abutilon longicuspe* (secondary)	-
		Acacia abyssinica (invader)	TLB (woodland)
		Acacia lahai (invader)	TLB (woodland), HB
		Afrocrania (=Cornus) volkensii (marginal or bamboo)	Beentje
		Apodytes dimidiata	White (EWI)
		Casaeria battiscombei	-
		Celtis africana	LM
		Cussonia holstii	White (Et)
		Cussonia spicata	-
		Dodonaea viscosa (angustifolia) (secondary)	Herbarium
		Dombeya burgessiae (secondary)	-
		Dombeya torrida (=goetzenii) (secondary)	TLB, Beentje, LM
		Dovyalis abyssinica	-
		Euclea divinorum (secondary)	Herbarium
		Euphorbia obovalifolia	Beentje
		Faurea saligna	LM, Herbarium
		Galiniera saxifrage (marginal or bamboo)	-
		Gnidia glauca (marginal or bamboo)	Beentje
		Hagenia abyssinica (marginal or bamboo)	Beentje (disturb.), Jolly (wte), Herbarium
		Hypericum revolutum (marginal or bamboo)	LM
		Ilex mitis	White (EWI)
		Juniperus procera (driest)	White (E), Beentje, Jolly (wte), Herbarium
		Lepidotrichilia volkensii (marginal or bamboo)	-
		Maytenus undata	Beentje
		Mystroxylon aethiopicum	-
		Ochna holstii	-
		Olea capensis (=hochstetteri)	TLB, Beentje, Jolly (wte), LM
		Olea europaea ssp africana (secondary)	Beentje (occ. codo.), Jolly (wte), LM, H.
		Olinia rochetiana (=usambarensis)	TLB, Beentje, LM
		Pistacia aethiopica	-
		Pittosporum lanatum (marginal or bamboo)	-
		Pittosporum viridiflorum	-
		Podocarpus falcatus (=gracilior)	Beentje, White (EW), LM, Herbarium
		Podocarpus latifolius (=milanjianus) (moister)	Beentje, TLB, White (EW), LM
		Prunus africana	White (EWI), Jolly (wte), Herbarium
		Rapanea melanophloeos	Beentje, White (EWI), Jolly (wte)
		Ritchiea albersii	-
		Schefflera abyssinica	-
		Schefflera volkensii (marginal or bamboo)	-
		Suregada procera	-
		Syzygium guineense (also residual)	Beentje, Herbarium
		Tarchonanthus camphoratus (invader)	-
		Trichocladus ellipticus	-
		Zanthoxylum usambarense	-

Vegetation type	Region	Species	Confirmation[1]
Moist intermediate forest	All	*Anthocleista grandiflora*	-
		Blighia unijugata (secondary)	-
		Bridelia micrantha (secondary)	Herbarium
		Casaeria battiscombei	LM (genus)
		Celtis gomphophylla (=durandii)	Beentje
		Chaetacme aristata	-
		Cordia africana (secondary)	Herbarium
		Croton megalocarpus (dominant in west)	TLB, Beentje, LM, Herbarium
		Croton sylvaticus	Beentje
		Drypetes gerrardii	LM (genus)
		Fagaropsis angolensis	-
		Ficus exasperata	-
		Ficus lutea	-
		Harungana madagascariensis	Jolly (Te1), Herbarium
		Heinsenia diervillioides	-
		Kigelia moosa	-
		Manilkara butugi	-
		Markhamia lutea (secondary)	-
		Milicia excelsa	Herbarium
		Mimusops bagshawei	-
		Mimusops kummel	-
		Neoboutonia macrocalyx	White (Eg)
		Olea capensis	Herbarium
		Psydrax parviflora	-
		Rothmannia urcelliformis	-
		Sapium ellipticum	Jolly (Tr1), Herbarium
		Strombosia scheffleri	Beentje, White (EW), LM (genus)
		Tabernaemontana pachysiphon (=holstii)	-
		Tabernaemontana ventricosa	-
		Trema orientalis (secondary)	Herbarium
		Trichilia emetica	Jolly (Te2), Herbarium
		Turraea holstii	White (Et)
		Warburgia ugandensis	-
		Zanthoxylum gillettii (=Fagara macrophylla)	LM, Herbarium
		Zanthoxylum rubescens	-
	West only	*Afrosersalisia cerasifera*	-
		Albizia zygia	-
		Allophylus ferrugineus	-
		Aningeria altissima	White (Guineo-Congolian)
		Anthocleista vogelii	-
		Antiaris toxicaria	Herbarium
		Cassipourea ruwensorensis	-
		Celtis mildbraedii	-
		Chrysophyllum albidum	-
		Cordia millenii	White (Guineo-Congolian)
		Entandophragma angolense	White (Guineo-Congolian)
		Ficus amadiensis	-
		Ficus saussureana	-
		Funtumia africana	-
		Garcinia buchananii	-
		Lecaniodiscus fraxinifolius	White (Guineo-Congolian)
		Maesopsis eminii (secondary)	Herbarium
		Manilkara butugi	-
		Monodera myristica	White (Guineo-Congolian)
		Polyscias fulva	-
		Premna angolensis	-
		Pseudospondias microcarpa	-
		Spathodea campanulata	Herbarium
		Trichilia dregeana	-
		Trilepisium madagascariense	Jolly (Te2)
		Zanthoxylum mildbraedii	-
	East only	*Lovoa swynnertonii*	Beentje
		Myrianthus holstii (secondary)	-
		Newtonia buchananii (dominant)	Beentje, Herbarium
		Premna maxima	Beentje
		Rauvolfia caffra	Herbarium

Vegetation type	Region	Species	Confirmation[1]
Dry intermediate forest	All	*Acokanthera schimperi (=friesiorum)* (secondary)	LM
		Albizia schimperiana (secondary)	-
		Brachylaena huillensis (climax)	Beentje, LM, Herbarium
		Bridelia micrantha (secondary)	Herbarium
		Calodendrum capense (secondary)	Beentje, Herbarium
		Cassipourea rotundifolia	-
		Chrysophyllum viridifolium	Beentje
		Craibia brownii	-
		Croton megalocarpus (frequent)	Beentje, LM, Herbarium
		Drypetes gerrardii	Beentje
		Elaeodendron buchananii	LM
		Euclea divinorum ssp. keniensis (secondary)	Beentje, Herbarium
		Euphorbia cussonoides	Beentje (near-endemic)
		Fagaropsis angolensis	-
		Ficus thonningii	-
		Heywoodia lucens	-
		Manilkara discolor	-
		Margaritaria (=Phyllanthus) discoidea	LM
		Markhamia lutea	Herbarium
		Mimusops bagshawei	-
		Mimusops kummel	-
		Olea europaea ssp. africana (secondary)	Jolly (Tr2)
		Psydrax (=Canthium) schimperiana	LM
		Rawsonia lucida	-
		Rothmannii urcelliformis	-
		Sapium ellipticum	-
		Schrebera alata	LM
		Strychnos henningsii	TLB, Beentje, LM, Herbarium
		Strychnos mitis	Beentje
		Teclea (=Vepris) simplicifolia	Beentje, LM
		Teclea trichocarpa	-
		Trema orientalis (secondary)	Herbarium
		Uvariodendron anisatum	Beentje (near-endemic)
		Warburgia ugandensis	Herbarium

[1] Beentje: Beentje (1990); Herbarium: information from the position of the vouchers of the East Africa Herbarium; Jolly: Jolly *et al.* 1998, see main text for abbreviations; LM: Lind and Morrison (1974); TLB: Trapnell and Langdale Brown (1972); White: White (1983a), see main text for abbreviations; occ. dom.: occasionally dominant.

Table 4. Species lists provided by other sources of literature than the original vegetation map (Trapnell et al. 1966, 1969, 1976, 1986; Trapnell and Brunt 1987) and Trapnell (1997)

Vegetation type	Genus or species	Sources[1]
Bamboo woodland and thicket	*Dombeya torrida (=goetzenii)*	TLB (bamboo), White (bamboo), LM (Hagenia woodland)
	Faurea saligna	White (bamboo), LM (bamboo, Hagenia woodland), Herbarium
	Ilex mitis	White (bamboo)
	Juniperus procera	White (bamboo)
	Myrica salicifolia	TLB (bamboo)
	Nuxia congesta	White (bamboo), Herbarium (bamboo)
	Podocarpus falcatus	LM (bamboo)
	Podocarpus latifolius (=milanjianus)	TLB (bamboo), Beentje, White (bamboo), LM (bamboo)
	Prunus africana	White (bamboo), LM (Hagenia woodland), Herbarium (highland forest)
	Rapanea melanophloeos (=pulchra, =rhododendroides)	TLB (bamboo), White (bamboo) , LM (Hagenia woodland)
	Tabernaemontana johnstonii	White (bamboo)
	Xymalos monospora	LM (bamboo)
Mountain scrubland and moorland Alpine	*Erica arborea*	TLB, Beentje
	Stoebe kilimandscharica	TLB, LM
	Senecio	TLB, LM
	Lobelia	TLB, LM
Moist montane forest	*Albizia grandibracteata*	LM (Aningeria forest)
	Albizia zygia	LM (Aningeria forest)
	Canthium oligocarpum	Beentje (endemic to Ocotea forest)
	Chassalia kenyensis	Beentje (endemic to Ocotea forest)
	Coffea fadenii	Beentje (endemic to Ocotea forest)
	Craibia zimmermannii	Beentje (endemic to Ocotea forest)
	Drypetes gerrardii	Beentje (codominant in Aningeria-Strombosia-Drypetes forest), White (Et)
	Embelia keniensis	Beentje (endemic to Albizia-Neoboutonia-Polyscias forest)
	Entandophragma excelsum	TLB, White (Eg)
	Erythrina abyssinica	TLB (secondary savanna)
	Ilex mitis	LM (Ocotea-Podocarpus, lower valleys)
	Ixora scheffleri ssp. keniensis	Beentje (endemic to Ocotea forest)
	Maytenus keniensis	Beentje (endemic to Ocotea forest)
	Memecylon teitense	Beentje (endemic to Ocotea forest)
	Millettia oblata ssp. teitensis	Beentje (endemic to Ocotea forest)
	Mitragyna rubrostipulata	White (Eg)
	Myrianthus holstii	White (Eg)
	Ochna holstii	White (Et)
	Ozoroa insignis ssp. reticulata	TLB (secondary savanna)
	Polyscias fulva	Beentje (Albizia-Neoboutonia-Polyscias forest), Jolly (wte)
	Psychotria crassipetala	Beentje (endemic to Ocotea forest)
	Psychotria petitii	Beentje (endemic to Ocotea forest)
	Rhus natalensis	TLB (secondary savanna), Herbarium
	Rubus keniensis	Beentje (endemic to Ocotea forest)
Dry montane forest	*Allophylus abyssinicus*	LM (Juniperus forest)
	Calodendrum capense	White (E), Herbarium (evergreen forest with Olea and Warburgia)
	Croton megalocarpus	Beentje (lower altitudes in mixed Podocarpus latifolius forest), LM (Juniperus forest), Herbarium (margins, not very common)
	Drypetes gerrardii	White (Et)
	Elaeodendron (=Cassine) buchananii	White
	Erythrina abyssinica	TLB (secondary savanna)
	Halleria lucida	White (E)
	Maytenus heterophylla	Beentje (Juniperus and Juniperus-Olea forest)
	Myrsine africana	LM (Juniperus forest)
	Neoboutonia macrocalyx	Beentje (lowe altitudes in mixed Podocarpus latifolius forest)
	Nuxia floribunda	Beentje (higher altitudes in mixed Podocarpus latifolius forest), White (Et)
	Ocotea keniensis (=bullata)	White
	Ozoroa insignis ssp. reticulata	TLB (secondary savanna)
	Premna maxima	Beentje (near-endemic in mixed Podocarpus latifolius forest)
	Rhus natalensis	TLB (secondary savanna), Herbarium

Vegetation type	Genus or species	Sources[1]
	Rinorea convallarioides ssp. Marsabitensis	Beentje (endemic in mixed *Podocarpus latitfolius* forest)
	Schrebera alata	White (EL)
	Strychnos mitis	Beentje (*Podocarpus latitfolius* forest)
	Tabernaemontana stapfiana	Beentje (lower altitudes in mixed *Podocarpus* forest)
	Teclea (=Vepris) simplicifolia	TLB, Beentje (lower altitudes in *Juniperus-Nuxia-Podocarpus* forests)
	Teclea trichocarpa	Beentje (lower altitudes in *Juniperus-Nuxia-Podocarpus* forest)
	Vernonia auriculifera	TLB (secondary savanna)
	Warburgia ugandensis	Beentje (*Podocarpus falcatus* forest, *Juniperus* and *Juniperus-Olea* forests), LM (*Juniperus* forest), Herbarium (drier upland forest)
	Xymalus monospora	White
Moist intermediate forest	*Apodytes dimidiate*	White (EWI)
	Bequartiodendron oblanceo-latum	Beentje (typical for tropical rain forest)
	Erythrina abyssinica	TLB (secondary savanna), Herbarium
	Macaranga kilimandscharica	White (afromontane, Eg), Herbarium (rain montane forest)
	Nuxia floribunda	Beentje (Newtonia forest)
	Ozoroa insignis ssp. reticulata	TLB (secondary savanna)
	Prunus africana	White (afromontane, EWI), Jolly (Te2), Herbarium (tropical rain forest)
	Nuxia floribunda	Beentje (endemic to Newtonia forest)
	Rapanea melanophloeos	Beentje (Newtonia forest)
	Rhus natalensis	TLB (secondary savanna), Herbarium
	Tabernaemontana stapfiana	Beentje (Newtonia forest)
	Tiliacora keniensis	Beentje (endemic to tropical rain forest)
	Vernonia auriculifera	TLB (secondary savanna)
	Xymalos monospora	Beentje (Newtonia forest)
Dry intermediate forest	*Adenia metriosiphon*	Beentje (endemic to *Croton-Brachylaena-Calodendrum* forest)
	Apodytes dimidiata	LM (*Brachylaena-Croton* forest)
	Canthium guineense	Beentje (endemic to *Croton-Brachylaena-Calodendrum* forest)
	Dombeya burgessiae	LM (*Brachylaena-Croton* forest)
	Erythrina abyssinica	TLB (secondary savanna), Herbarium
	Erythrococca bongensis	LM (*Brachylaena-Croton* forest)
	Juniperus procera	LM (*Brachylaena-Croton* forest), Herbarium (dry upland evergreen forest)
	Lepisanthes senegalensis	Beentje (*Diospyros abyssinica – Olea europaea* forest)
	Ochna ovata	LM (*Brachylaena-Croton* forest)
	Olea capensis	Beentje (*Diospyros abyssinica – Olea europaea* forest), LM (Brachylaena-Croton forest)
	Ozoroa insignis ssp. reticulata	TLB (secondary savanna)
	Rhus natalensis	TLB (secondary savanna), Herbarium
	Teclea villosa	LM (*Brachylaena-Croton* forest)
	Vernonia auriculifera	TLB (secondary savanna)
Upland Acacia-woodland, savanna and bushland	*Acacia nilotica*	TLB (savanna), Beentje (savanna), Herbarium (dry thorn scrub)
	Acacia Senegal	TLB (savanna), Beentje (woodland pp)
	Acacia seyal	TLB (savanna), Beentje (woodland pp), Herbarium (rocky bushland)
Lowland Acacia-*Commiphora* woodland, bushland and thicket	*Acacia bussei*	TLB (bushland), White (characteristic canopy), Beentje (*Acacia-Commiphora* bushland)
	Acacia brevispica	TLB (bushland), Beentje (woodland pp)
	Acacia mellifera	TLB (bushland), White (characteristic canopy), Beentje (*Acacia-Commiphora* bushland), Herbarium (*Acacia-Commiphora*)
	Acacia nilotica ssp. subalata	TLB (bushland), White (characteristic canopy), Beentje (woodland pp), Herbarium
	Acacia polyacantha ssp. campylacantha	TLB (woodland)
	Acacia Senegal	TLB (bushland), Beentje (*Acacia-Commiphora* woodland or bushland), Herbarium (with *Commiphora*)
	Acacia thomasii	White (characteristic canopy), Beentje (*Acacia-Commiphora* bushland)
	Acacia tortilis ssp. spirocarpa	TLB (woodland, bushland), White (above canopy, clear trunk), Beentje (bushland pp), LM (drier woodland)
	Acacia xanthophloea	TLB (woodland)
	Acalypha fruticosa	TLB (bushland), Beentje (bushland pp)
	Adansonia digitata	White (above canopy, clear trunk), Beentje (woodland pp), Herbarium (*Acacia-Commiphora* savanna)

Vegetation type	Genus or species	Sources[1]
	Adenium obesum	White (stem-succulent), Beentje (bushland pp)
	Balanites aegyptiaca	LM (frequent), Herbarium (*Acacia-Commiphora* thicket)
	Balanites rotundifolia (=orbicularis)	White (evergreen canopy), Beentje (bushland pp)
	Bauhinia taitensis	White (smaller), Beentje (*Acacia-Commiphora* bushland)
	Boscia coriacea	TLB (bushland), White (evergreen canopy, secondary), Beentje (bushland pp)
	Boswellia neglecta (=hildebrandtii)	White (characteristic canopy), Beentje (*Acacia-Commiphora* bushland)
	Bourreria (=Ehretia) teitensis	White (smaller, secondary), Beentje (bushland pp)
	Bridelia taitensis	White (smaller), Beentje (woodland pp)
	Cadaba farinose	White (characteristic canopy), Beentje (bushland pp), Herbarium
	Cadaba heterotricha	White (characteristic canopy), Beentje (bushland pp)
	Caesalpinia trothae	White (smaller), Beentje (*Acacia-Commiphora* bushland)
	Calyptrotheca somalensis	White (stem-succulent)
	Calyptrotheca taitensis	White (stem-succulent), Beentje (*Commiphora* bushland)
	Carphalea (=Dirichletia) glaucescens	White (smaller), Beentje (*Acacia-Commiphora* bushland)
	Cassia abbreviate ssp. kassneri	White (characteristic canopy), Beentje (*Acacia-Commiphora* bushland)
	Caucanthus albidus	White (smaller), Beentje (bushland pp)
	Cissus quadrangularis	White (climber), Beentje (bushland pp)
	Cissus rotundifolia	White (climber), Beentje (bushland pp)
	Combretum aculeatum	White (smaller), Beentje (*Acacia-Commiphora* bushland), Herbarium (*Acacia-Commiphora* bushland)
	Commiphora africana	White (characteristic canopy), Beentje (*Acacia-Commiphoraa* bushland), Herbarium (*Acacia-Commiphora*)
	Commiphora campestris	White (characteristic canopy), Beentje (*Acacia-Commiphora* bushland)
	Commiphora edulis (= boiviniana)	White (characteristic canopy), Beentje (*Acacia-Commiphora* bushland)
	Commiphora holtziana (= erythrae)	White (characteristic canopy), Beentje (*Acacia-Commiphora* bushland)
	Commiphora mollis (= riparia)	White (characteristic canopy), Beentje (*Acacia-Commiphoraa* woodland)
	Commiphora schimperi (=throtae)	White (characteristic canopy), Beentje (*Acacia-Commiphora* bushland)
	Cordia monoica (=ovalis)	White (characteristic canopy)
	Cordia sinensis (=gharaf, =rothii)	White (characteristic canopy), Beentje (bushland pp), Herbarium
	Croton dichogamus	TLB (bushland), Beentje (bushland pp)
	Delonix elata	White (above canopy, clear trunk), Beentje (*Acacia-Commiphora* bushland), Herbarium (hot dry country)
	Dobera glabra	White (evergreen canopy), Beentje (*Acacia-Commiphora* bushland or woodland), Herbarium
	Dobera loranthifolia	White (evergreen canopy), Beentje (bushland pp)
	Erythrochlamys spectabilis	White (smaller), Beentje (*Acacia-Commiphora* bushland or woodland)
	Euphorbia nyikae	White (restricted succulent)
	Euphorbia robecchii	White (above canopy, clear trunk), Beentje (*Acacia-Commiphora* bushland)
	Euphorbia quinquecostata	White (restricted succulent), Beentje (bushland pp)
	Euphorbia scheffleri	White (characteristic canopy), Beentje (bushland pp)
	Gerrardanthus lobatus	White (climber), Beentje (bushland pp)
	Givotia gosai	White (characteristic canopy), Beentje (*Acacia-Commiphora* bushland)
	Grewia fallax	White (smaller), Beentje (bushland pp)
	Grewia similis	LM (common)
	Grewia tembensis	TLB (bushland), White (smaller), Beentje (*AAcacia-Commiphora* bushland)
	Grewia tenax	White (smaller), Beentje (bushland pp), Herbarium (under dense *Acacia* reficiens)
	Grewia villosa	White (smaller), Beentje (*Acacia-Commiphora* bushland), Herbarium (*Acacia-Commiphora* woodland)
	Hymenodictyon parvifolium	White (characteristic canopy), Beentje (bushland pp)
	Kedrostis gijef	White (climber), Beentje (*Acacia-Commiphora* bushland)
	Lannea alata	White (characteristic canopy), Beentje (*Acacia-Commiphora* bushland)
	Lannea triphylla	White (characteristic canopy), Beentje (*Acacia-Commiphora* bushland)
	Lannea schweinfurthii (=stuhlmannii)	LM (common)
	Maerua decumbens (=subcordata)	White (smaller)

Vegetation type	Genus or species	Sources[1]
	Maerua denhardtiorum	White (smaller)
	Melia volkensii	White (above canopy, clear trunk), Beentje (bushland pp), Herbarium (*Acacia-Commiphora* savanna or bushland)
	Platycelyphium voense	White (characteristic canopy, secondary), Beentje (*Acacia-Commiphora* bushland)
	Premna hildebrandtii	White (characteristic canopy)
	Premna resinosa	White (smaller), Beentje (bushland pp)
	Salvadora persica	White (evergreen canopy), Beentje (bushland pp), Jolly (sf), Herbarium (*Combretum*-Commiphora dry bushland)
	Sesamothamnus rivae	White (characteristic canopy), Beentje (*Acacia-Commiphora* bushland)
	Sterculia africana	White (characteristic canopy), Beentje (bushland pp)
	Sterculia stenocarpa	Beentje (bushland pp)
	Terminalia orbicularis	White (thickets, impeded drainage), Beentje (*Acacia-Commiphora* bushland)
	Terminalia parvula	White (characteristic canopy), Beentje (*Acacia-Commiphora* bushland)
	Terminalia spinosa	White (above canopy, clear trunk), Beentje (*Acacia-Commiphora* bushland)
	Thunbergia guerkeana	White (climber), Beentje (bushland pp)
	Thylachium thomasii	White (characteristic canopy)
Dry *Combretum* savanna	*Combretum collinum (=binderianum)*	TLB, White (*Combretum* savanna pp), Herbarium (*Combretum* wooded and bushed grassland)
	Combretum molle	TLB, Herbarium (*Combretum* savanna)
	Combretum zeyheri	TLB
	Commiphora africana	TLB, Jolly (Tr3), Herbarium (savanna)
	Terminalia brownie	TLB, Herbarium (*Combretum* woodland)
Moist *Combretum-Terminalia* savanna	*Aningeria altissima*	White (Lake Victoria)
	Annona senegalensis	White (secondary grassland), UT (wet lowland savanna)
	Antiaris toxicaria	White (Lake Victoria), Herbarium
	Borassus aethiopum	White (secondary grassland)
	Chrysophyllum albidum	White (Lake Victoria)
	Combretum collinum (=binderianum)	TLB, White (secondary grassland), Beentje (*Combretum* savanna pp), LM (most common *Combretum* species), Herbarium
	Combretum molle	TLB, LM (most common *Combretum* species), Herbarium (dominant in *Combretum* savanna, high rainfall savanna)
	Combretum zeyheri	TLB
	Cussonia arborea	White (secondary grassland), Beentje (*Combretum* savanna pp)
	Dichrostachys cinerea	White (secondary grassland), Beentje (*Combretum* savanna pp), Jolly (Tr3), Herbarium (riverine)
	Entada abyssinica	White (secondary grassland)
	Entandophragma angolense	White (Lake Victoria)
	Gardenia ternifolia	White (secondary grassland)
	Hymenocardia acida	White (secondary grassland)
	Maesopsis eminii	White (Lake Victoria), LM (plantations)
	Maytenus senegalensis	White (secondary grassland), Jolly (Tr3)
	Milicia (=Chlorophora) excelsa	White (Lake Victoria), LM (plantations), Herbarium (cultivated area)
	Morus mesozygia	White (Lake Victoria)
	Nauclea latifolia	White (secondary grassland)
	Parinari curatellifolia	White (secondary grassland), Herbarium (savanna)
	Piliostigma thonningii	White (secondary grassland), Beentje (*Combretum* savanna), Herbarium (*Combretum* savanna)
	Psorospermum febrifugum	White (secondary grassland)
	Securidaca longipedunculata	White (secondary grassland)
	Stereospermum kunthianum	White (secondary grassland), Herbarium
	Strychnos madagascariensis	White (secondary grassland)
	Strychnos spinosa	White (secondary grassland)
	Syzygium guineense	White (secondary grassland, EWGI), Herbarium (*Combretum*-Terminalia)
	Terminalia mollis	TLB, Beentje (*Combretum* savanna)
	Vitex doniana	White (secondary grassland), Herbarium (high rainfall savanna)
Evergreen and semi-evergreen bushland	*Acacia gerrardii*	TLB (main species, secondary savanna)
	Acacia kirkii	White (secondary)
	Acokanthera schimperi	TLB, White (canopy), Beentje (semi-evergreen bushland)
	Aloe kedongensis	White (succulent), Beentje (evergreen bushland)
	Calodendrum capense	White (stunted at higher altitude, E)
	Canthium keniense	White (large bush)
	Capparis fascicularis	White (climber), Jolly (Tss)

Vegetation type	Genus or species	Sources[1]
	Carissa edulis	TLB, White (evergreen, also secondary), Herbarium (evergreen-clump grassland; bushland with Grewia)
	Croton dichogamus	White (large bush)
	Cussonia holstii	White (stunted at higher altitude, Et), Beentje (evergreen bushland)
	Dodonaea viscose (=angustifolia)	White (evergreen, large bush, also secondary), Beentje (evergreen bushland), Jolly (tss), Herbarium (bushland with Tarchonanthus)
	Dombeya burgessiae	White (large bush), Beentje (semi-evergreen bushland)
	Dracaena ellenbeckiana	White (rosette tree), Beentje (semi-evergreen bushland)
	Drypetes gerrardii	White (stunted at higher altitude, Et)
	Elaeodendron (=Cassine) buchananii	White (stunted at higher altitude)
	Euclea divinorum	TLB (ssp. keniensis), White (evergreen, canopy, also secondary), Beentje (evergreen and semi-evergreen bushland), Herbarium (semi-deciduous bushland, Tarchonanthus)
	Euclea racemosa ssp. schimperi	White (evergreen, also secondary), Beentje (semi-evergreen bushland)
	Euphorbia candelabrum	White (emergent succulent), LM (subtype of Tsavo and Amboseli bushland)
	Euphorbia tirucalli	LM (subtype of Tsavo and Amboseli bushland)
	Gnidia subcordata	White (canopy), Beentje (evergreen bushland)
	Grewia similis	White (large bush), Beentje (evergreen bushland)
	Grewia tembensis	White (large bush)
	Juniperus procera	White (stunted at higher altitude;. Maybe the evergreen bushland is the orginal habitat of the species and not the dry montane forest, E), Jolly (tss), Herbarium (bushland)
	Maytenus heterophylla	White (large bush)
	Olea europaea ssp. africana	TLB (short), White (canopy, ELI)
	Psiadia punctulata (=Arabica)	White (shrub), Beentje (evergreen bushland)
	Pterolobium stellatum	White (climber)
	Rhus natalensis	TLB, White (large bush), Beentje (evergreen and semi-evergreen bushland), Herbarium (Maerua-Tarchonanthus)
	Schrebera alata	White (stunted at higher altitudes, EL), Beentje (evergreen bushland)
	Scutia myrtina	TLB, White (climber), Beentje (evergreen bushland)
	Tarchonanthus camphorates	TLB (secondary), White (evergreen, canopy, especially secondary), Beentje (evergreen and semi-evergreen bushland)
	Teclea (=Vepris) simplicifolia	White (canopy), Beentje (evergreen bushland)
	Turraea mombassana	White (shrub), Beentje (semi-evergreen bushland)
Semi-evergreen thickets	*Acacia gerrardii*	White (secondary savanna)
	Acacia hockii	White (secondary savanna), Beentje (semi-evergreen bushland)
	Acacia kirkii ssp. mildbraedii	White (secondary savanna)
	Acacia Senegal	White (secondary savanna), Herbarium
	Allophylus africanus	White
	Azima tetracantha	White
	Capparis fascicularis	White, Jolly (Tss)
	Capparis tomentosa	White
	Carissa edulis	White, Herbarium
	Cissus quadrangularis	White (bushy)
	Cissus rotundifolia	White (bushy)
	Erythrococca bongensis	White
	Euclea racemosa ssp. schimperi	TLB, Beentje (semi-evergreen bushland)
	Euphorbia candelabrum	White (secondary savanna)
	Grewia bicolour	White
	Harrisonia abyssinica	TLB
	Maerua triphylla (=hildbrandtii)	White, Beentje (evergreen bushland)
	Olea europaea ssp. africana	White (ELI)
	Psydrax (=Canthium) schimperiana	White, Beentje (evergreen bushland)
	Rhus natalensis	TLB, White, Beentje (evergreen and semi-evergreen bushland), Herbarium (frequent in dry thickets)
	Tarenna graveolens	White
	Teclea (=Vepris) nobilis	TLB (reduced), Herbarium
	Turraea nilotica	White

Vegetation type	Genus or species	Sources[1]
	Turraea robusta	TLB (secondary savanna, Et)
Acacia and allied vegetation on soils with impeded drainage	*Acacia drepanolium*	TLB, White, Beentje (vertisol), LM (rainfall above 760 mm)
	Acacia etbaica	White
	Acacia tortilis	TLB, White, HH (little surface drainage)
	Albizia amara	White
	Albizia harveyi	White
	Balanites	TLB, species in Table 4
	Commiphora schimperi	White
	Dalbergia melanoxylon	White, Beentje (vertisol)
	Lannea humilis	White
	Sclerocarya birrea	White

1 Beentje: for forest types – Beentje (1990), for other vegetation types and only confirming other sources – Beentje (1994); Herbarium: information from the position on the vouchers of the East Africa Herbarium, used for confirmation of other sources only and with information on habitat where this corresponded to the vegetation type; LM: Lind and Morrison (1974); TLB: Trapnell and Langdale Brown (1972); White: White (1983).

Table 5 provides the results for the analyses of the herbarium vouchers positions for the 110 species with positions within the map (inference method 4), excluding species that were listed earlier.

Table 6 documents the results of inference method 5 for those species for which position and habitat description (inference method 4) had not provided any PNV type. *Ziziphus mauritiana* was the only species for which no vegetation type could be identified with inference method 5. This is a species that is possibly introduced (Beentje 1994).

Table 5. Species lists obtained from the positions and habitat description from the East Africa herbarium for a limited number of species native to Kenya

Vegetation type	Genus or species	Habitat description of some herbarium vouchers
Moist montane forest	*Bridelia micrantha*	Forest with *Prunus africana*
	Carissa edulis	Forest edge
	Combretum collinum	Derived grassland
	Euclea divinorum	Forest
	Faurea saligna	Forest
	Sapium ellipticum	Forest
Dry montane forest	*Bridelia micrantha*	Forest
	Carissa edulis	Forest
	Flacourtia indica	Forest relict
	Macaranga kilimandscharica	Forest
	Spathodea campanulata	Intermediate forest
	Syzygium cordatum	Riverine forest
	Trema orientalis	Forest
	Vangueria infausta	Forest margins
Moist intermediate forest	*Acacia lahai*	Forest edge
	Carissa edulis	Forest of small trees and small shrubs (Bridelia)
	Combretum molle	Forested area
	Flacourtia indica	Forest relict
	Hagenia abyssinica	Lower montane forest
	Kigelia africana	Forest
	Podocarpus falcatus	Forest
	Sesbania sesban	Grassland in forest or riverine
	Syzygium cordatum	Forest remnants
	Syzygium guineense	Forest
	Vangueria infausta	Thicket in forest
	Vernonia amygdalina	Forest
	Vitex doniana	Forest glades in Kakamega
	Ziziphus abyssinica	Forest

Vegetation type	Genus or species	Habitat description of some herbarium vouchers
Dry intermediate forest	*Carissa edulis*	Forest
	Combretum molle	Forest but more often savanna
	Cordia africana	Open or forest edge
	Crotalaria goodiaeformis	Understorey in forest
	Dodonaea viscosa	Forest
	Kigelia africana	Riverine forest
	Newtonia buchananii	Dry evergreen forest dominated by *Croton megalocarpus*
	Podocarpus falcatus	Riverine forest dominated by *Diospyros abyssinica, Olea capensis* and *O. europaea*
	Rauvolfia caffra	Riverine
	Sesbania sesban	Riverine forest relicts
	Syzygium cordatum	Forest edge
	Vangueria infausta	Forest
	Vangueria madagascariensis	
Upland *Acacia* woodland, savanna and bushland	*Boscia angustifolia*	Dry bushland
	Combretum molle	Bushland
	Dichrostachys cinerea	*Acacia*-Commiphora woodland
	Euclea divinorum	*Acacia*-Tarchonanthus mixtures
	Garcinia livingstonei	Rock outcrops with *Acacia brevispica, A. mellifera*
	Juniperus procera	*Acacia drepanolobium - Themeda triandra – Tarchonanthus*
	Kigelia africana	High-level *Acacia* zones
	Rhus natalensis	*Acacia xanthophloea* or *drepanolobium*
	Salvadora persica	*Acacia* woodland or bushland
	Vangueria madagascariensis	Thicket savanna with *Acacia brevispica, A. mellifera and A. drepanolobium*
Lowland Acacia-*Commiphora* woodland, bushland and thicket	*Acacia elatior*	Riverline
	Albizia amara	*Acacia* woodland, *Acacia*-Balanites bushland
	Albizia anthelmintica	Dry bushland, *Acacia*-Balanites bushland
	Boscia angustifolia	*Acacia-Commiphora* bushland
	Dalbergia melanoxylon	Dry thorn-bush area
	Grewia bicolor	*Acacia-Combretum* bushland
	Kigelia africana	*Acacia-Commiphora* bushland
	Lawsonia inermis	*Acacia-Commiphora* bushland
	Rhus natalensis	*Acacia-Commiphora* bushland
	Senna singueana	*Acacia-Commiphora* dry woodland or bushland
	Terminalia prunioides	*Acacia-Commiphora* woodland or bushland
	Vangueria madagascariensis	*Acacia* woodland
	Ximenia americana (=caffra)	*Acacia-Commiphora* bushland
	Zanthoxylum chalybeum	*Combretum-Commiphora* woodland
	Ziziphus mucronata	*Acacia-Combretum*
Dry *Combretum* savanna	*Acacia senegal*	Savanna
	Acacia seyal	*Combretum* molle wooded and bushed grassland
	Azanza garckeana	*Combretum* savanna
	Boscia angustifolia	*Combretum* bushed grassland
	Cadaba farinosa	Savanna
	Carissa edulis	*Combretum* woodland
	Combretum aculeatum	*Commiphora-Boswellia* woodland
	Cordia africana	Dominant in higher portion of moist parkland
	Dichrostachys cinerea	*Combretum* savanna
	Ekebergia capensis	Savanna
	Erythrina abyssinica	Dry savanna
	Flacourtia indica	*Combretum-Themeda* savanna
	Senna singueana	*Combretum-Themeda* savanna
	Stereospermum kunthianum	Savanna
	Strychnos spinosa	Orchard country
	Vangueria madagascariensis	*Combretum* savanna
	Vitex payos	Wooded and bushed grassland
	Ziziphus abyssinica	Savanna

Vegetation type	Genus or species	Habitat description of some herbarium vouchers
Moist *Combretum-Terminalia* savanna	*Acacia lahai*	High rainfall savanna
	Bridelia micrantha	In *Combretum*
	Cadaba farinosa	Savanna
	Carissa edulis	Dense woodland with *Combretum* and *Terminalia*
	Cordia africana	*Combretum* savanna
	Dodonaea viscosa	Wooded grassland, forest relict
	Ficus glumosa	*Ficus-Combretum* woodland
	Ficus sycomorus	Open savanna, riverine
	Ficus thonningii	Savanna
	Rhus natalensis	Woodland of mainly *Combretum* and *Terminalia*
	Sapium ellipticum	Relicts of rain forest as riverine forest
	Senna singueana	High rainfall savanna
	Vitex doniana	High rainfall savanna
	Ziziphus abyssinica	*Combretum* woodland
Evergreen and semi-evergreen bushland	*Acacia xanthophloea*	*Tarchonanthus* and *Euphorbia*
	Azanza garckeana	Bushland with *Olea*
	Combretum molle	Open bushland with *Jasminum* and *Allophylus*
	Flacourtia indica	Rhus bush clumps
	Senna singueana	Common in bushland with *Olea europaea*
	Vangueria madagascariensis	Semi-deciduous bushland
Semi-evergreen thickets	*Cordia sinensis*	Lake shore
	Grewia villosa	Lake shore
Acacia and allied vegetation on soils with impeded drainage	*Acacia elatior*	Little surface drainage
	Acacia senegal	Little surface drainage
	Acacia xanthophloea	Vertisol
	Balanites aegyptiaca	Little surface drainage, seasonally flooded
	Cadaba farinosa	Seasonal drainage impediment, black clay soil
	Combretum molle	Impeded drainage
	Cordia sinensis	Little surface drainage
	Grewia tenax	Little surface drainage
	Phoenix reclinata	Riverine with *Acacia xanthophloea*
	Polyscias fulva	Swamp forest with *Acacia xanthophloea*
	Salvadora persica	Poor surface drainage
	Sesbania sesban	Black cotton soil, lake shore
	Syzygium guineense	Badly drained areas
	Ziziphus mucronata	Poor drainage

Table 6. Information from species lists and habitat descriptions for species that were not listed in previous tables

Vegetation type	Genus or species	Some positions	Habitat[1]
Moist intermediate forest	*Millettia dura*	Yes	Beentje (moist forest edge) LM (colonising forest in the Lake Victoria belt)
Dry intermediate forest	*Diospyros mespiliformis*	No	Beentje (riverine and dry forest) LM (riverine forest in Tanzania below 2000 m)
	Faidherbia albida	No	Beentje (riverine)
Low *Acacia* woodland, bushland and thicket	*Berchemia discolor*	Yes	Herbarium (*Acacia-Commiphora* bushland)
	Tamarindus indica	No	Herbarium (Wooded grassland and bushland dominated by *Acacia nilotica*, *A. seyal* and *Commiphora africana*)

1 Beentje: Beentje (1994); Herbarium: information from the position on the vouchers of the East Africa Herbarium, information on habitat where position did not corresponded to the vegetation type; LM: information from species lists from Lind and Morrison (1974)

3.2 Information on uses

Information was available from the two references (Simons *et al.* 2005, Maunda and Tengnas 2005) that we consulted for 203 species. These uses were tabulated in Appendix I for the 12 PNV types with large numbers of species.

The 203 species ranged from 13 (bamboo), over 22 (upland *Acacia*, semi-evergreen thickets), 23 (dry *Combretum* savanna), 25 (*Acacia* and allied vegetation on soils with impeded drainage), 33 (evergreen and semi-evergreen bushland), 36 (moist *Combretum-Terminalia* savanna), 53 (lowland *Acacia-Commiphora*), 54 (moist montane forest), 55 (dry intermediate forest), 60 (dry montane forest) to 72 (moist intermediate forest). What was clearly different to the list with all species was the lower position of lowland *Acacia-Commiphora* as it was now listed below all forest types. Species that were unique (endemic) to particular PNV types followed a different trend with 1 (bamboo, upland *Acacia*) over 2 (dry montane forest, dry *Combretum* savanna), 3 (evergreen and semi-evergreen bushland, semi-evergreen thickets, *Acacia* and allied vegetation on soils with impeded drainage), 7 (moist montane forest), 9 (dry intermediate forest), 13 (moist intermediate forest, moist *Combretum-Terminalia* savanna) to 27 (lowland *Acacia-Commiphora*) species. For unique species, forest PNV types were not always the types with highest numbers of species.

3.3 Description of potential natural vegetation types with information from spatial datasets

Although the unconstrained ordinations were only based on floristic differences, they separated PNV types of different physiognomic categories. Ordinations based on the Bray-Curtis (Figure 1a) and Kulczynski (Figure 1b) distances clearly differentiated forest types (DMF, MMF, DIF and MIF) and bamboo from the other PNV types. Bamboo is associated with dry montane forest, which is a result from the ecotone between the two types (Trapnell 1997). Within the other PNV types, the *Combretum* savanna types were clearly differentiated (Figure 1a, Figure 1b), which confirms the suspected floristic differences with savanna types identified by *Acacia* species. Evergreen bushland is most similar to upland *Acacia*, whereas semi-evergreen thicket is very similar to evergreen bushland. Both diagrams suggest that floristic differences among the three *Acacia* types are small relative to the other types.

The constrained ordination results show that a combination of floristic and environmental differences can explain the differences of the various types (Figure 1b, Figure 2b). The floristic difference of the forest and bamboo types to the other types can be explained by their higher altitude and rainfall, whereas differences within forest PNV types can be explained by the combination of altitude and precipitation (as suggested by the names of the PNV types). The difference between dry *Combretum* savanna and semi-evergreen thickets became less clear in the diagram as semi-evergreen thickets

have higher average rainfall than dry *Combretum* savanna. Within the driest conditions, a sequence from evergreen bushland over upland *Acacia* and *Acacia* and allied vegetation on impeded drainage to lowland *Acacia-Commiphora* savanna can be observed, indicating that there are clearer floristic differences between these types than indicated by the unconstrained ordination and that these are related to differences in altitude.

Analysis only with species of the first levels of inference revealed that relationships between PNV types became less clear, although similar trends could be observed (figures 1c-d, 2c-d). Where analyses with all species indicated a sequence of moist montane forest → dry montane forest → dry intermediate forest → moist intermediate forest, analyses with species of inference 1-3 (figures 1c, 2c) suggested the sequence moist intermediate forest → moist montane forest → dry montane forest → dry intermediate forest (thus giving priority to moisture over altitude). Analyses with species of inference 1-2 (figures 1d, 2d) grouped intermediate and montane forests in separate clusters. Where species of inference 1-3 clustered the two *Combretum* savannas separately (figures 1c, 1d), species of inference 1-2 suggested that Moist *Combretum-Terminalia* savanna is more similar to bamboo (the difference between all species and those of inference 1-3 was already that bamboo and moist *Combretum-Terminalia* were more similar with the smaller subset of species). In an analogous fashion, species of inference 1-3 clustered the evergreen bushland and semi-evergreen thickets separately (figures 1c, 1d), whereas species of inference 1-2 confused these two types with *Acacia* PNV types.

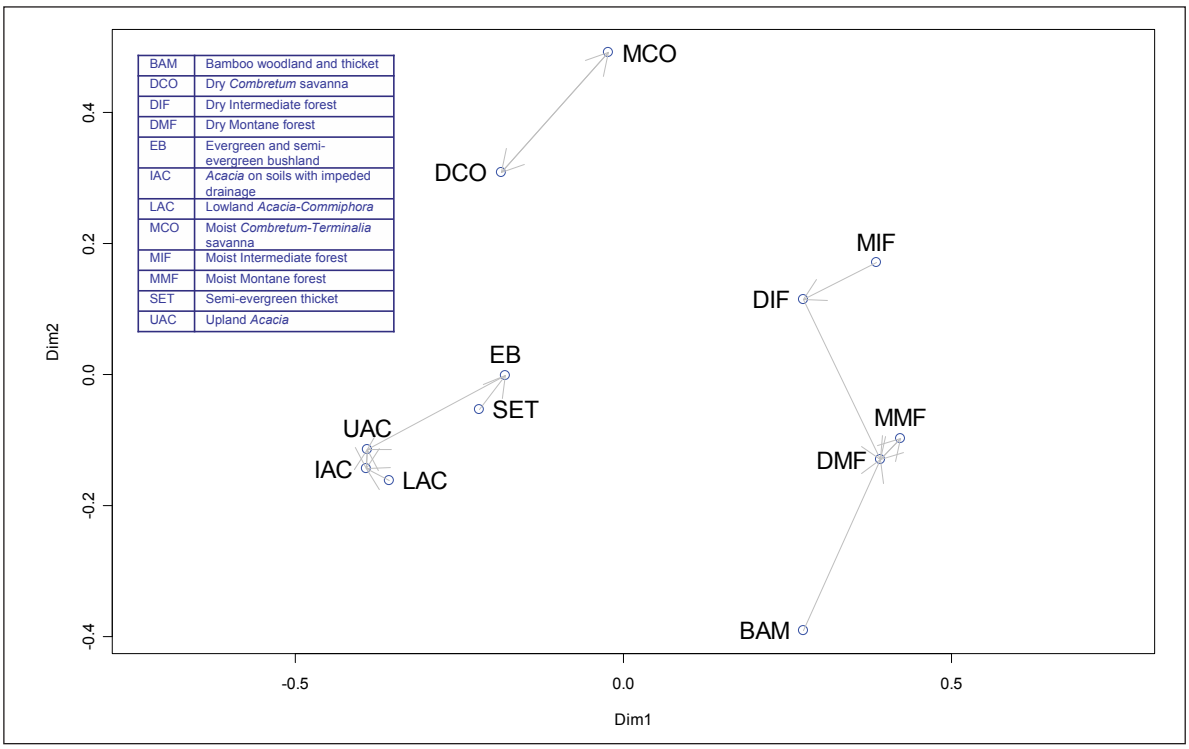


Fig 1a

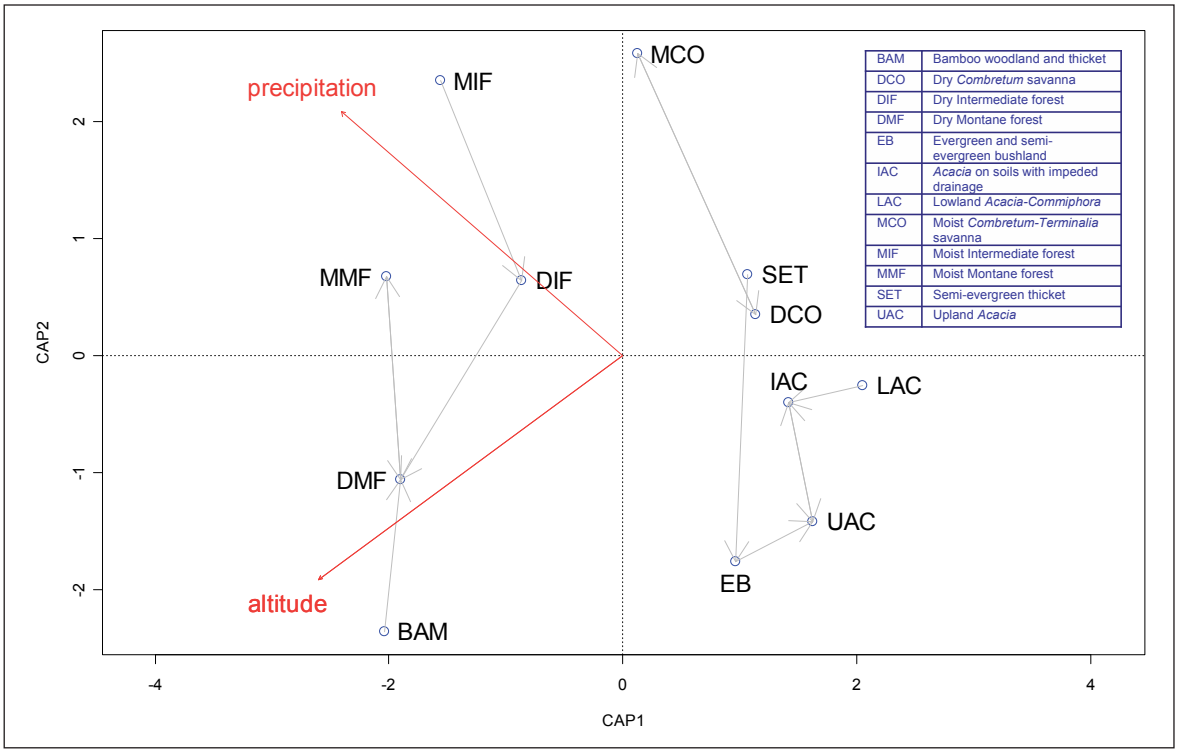
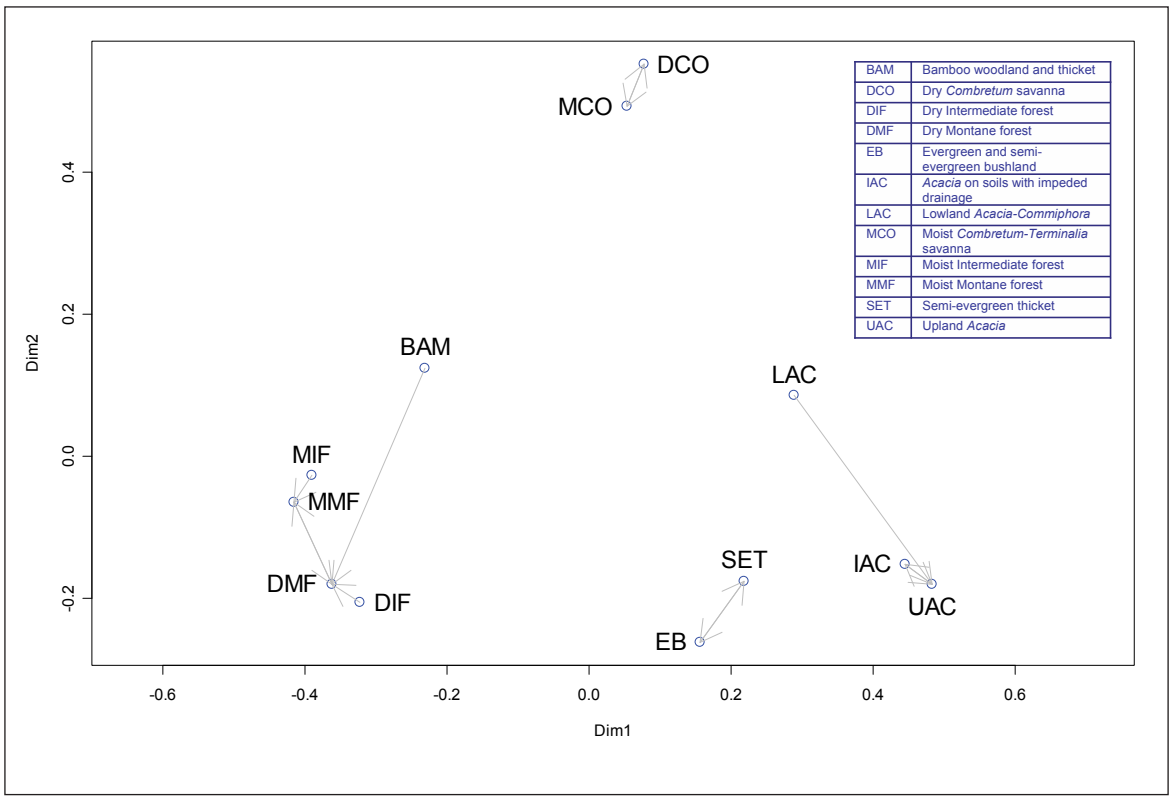


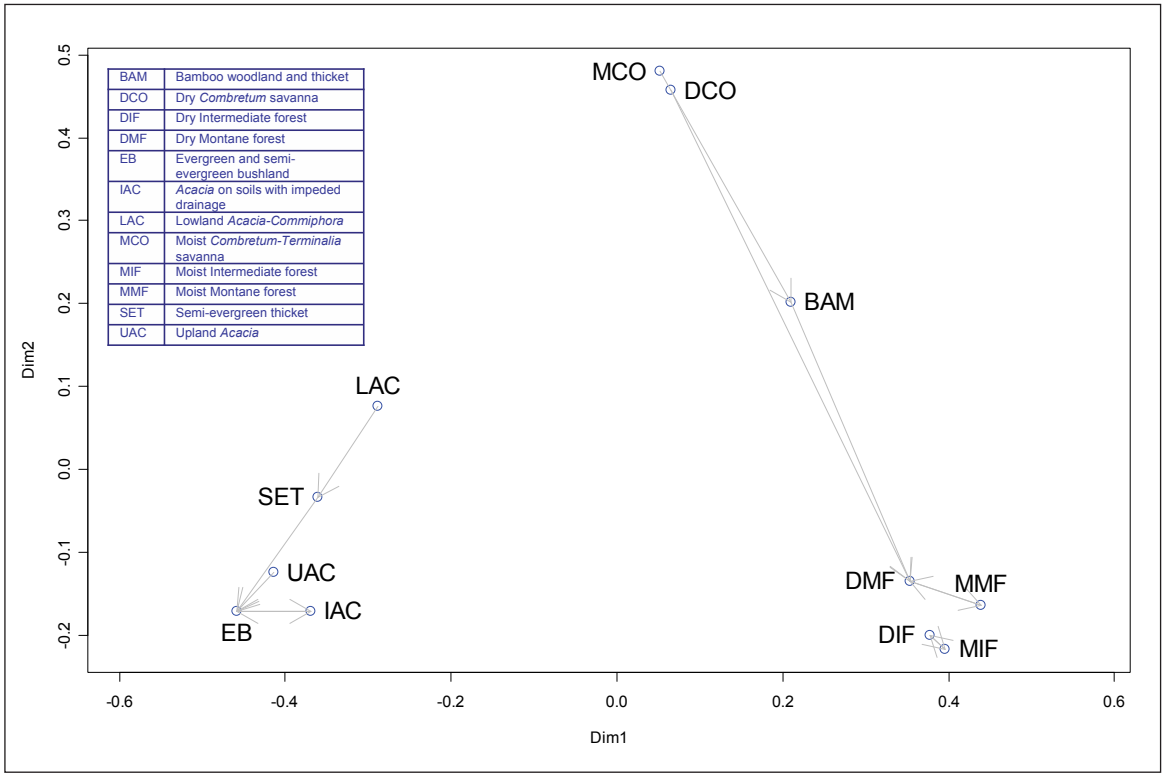
Fig 1b

Figure 1. Floristic relationships between potential natural vegetation types revealed by the Bray-Curtis distance and principal coordinates analysis (a, c, d) and distance-based redundancy analysis (b). Community datasets were based on presence-absence for all species (a, b), species of inferences 1-3 (c) or species of inferences 1-2 (d).



BAM	Bamboo woodland and thicket
DCO	Dry *Combretum* savanna
DIF	Dry Intermediate forest
DMF	Dry Montane forest
EB	Evergreen and semi-evergreen bushland
IAC	*Acacia* on soils with impeded drainage
LAC	Lowland *Acacia-Commiphora*
MCO	Moist *Combretum-Terminalia* savanna
MIF	Moist Intermediate forest
MMF	Moist Montane forest
SET	Semi-evergreen thicket
UAC	Upland *Acacia*

Fig 1c



BAM	Bamboo woodland and thicket
DCO	Dry *Combretum* savanna
DIF	Dry Intermediate forest
DMF	Dry Montane forest
EB	Evergreen and semi-evergreen bushland
IAC	*Acacia* on soils with impeded drainage
LAC	Lowland *Acacia-Commiphora*
MCO	Moist *Combretum-Terminalia* savanna
MIF	Moist Intermediate forest
MMF	Moist Montane forest
SET	Semi-evergreen thicket
UAC	Upland *Acacia*

Fig 1d

Figure 1. cont.d

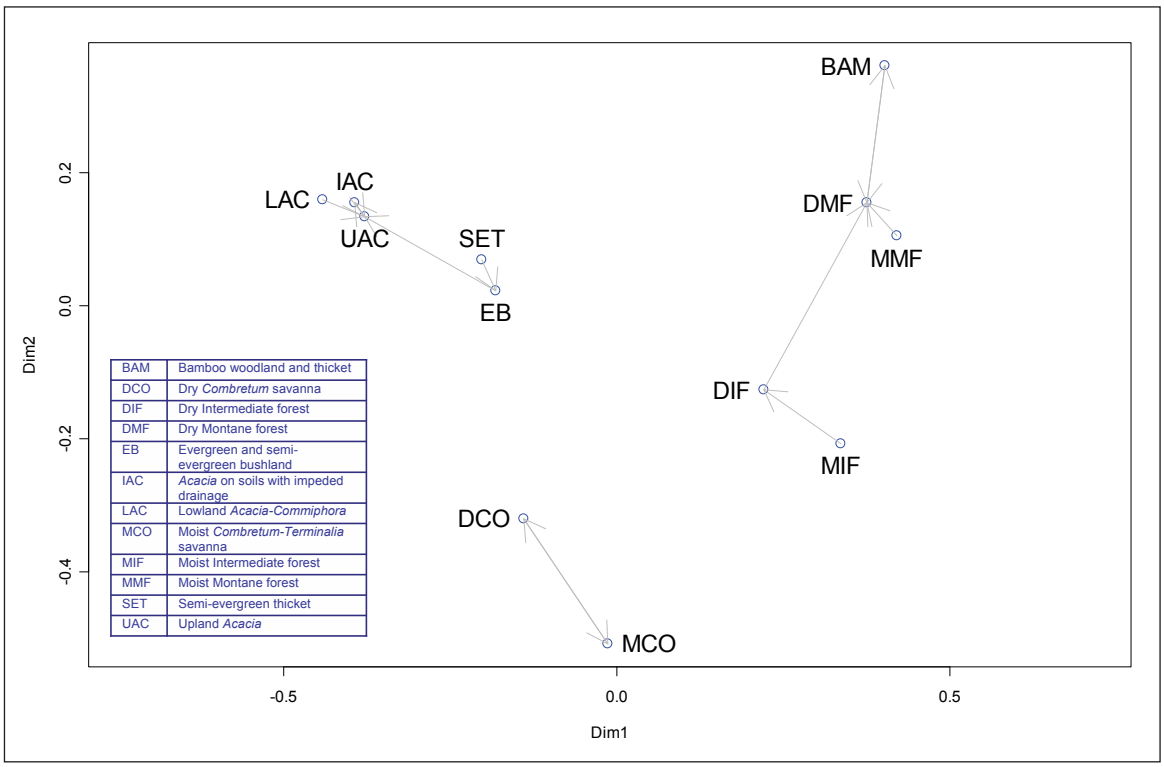


Fig 2a

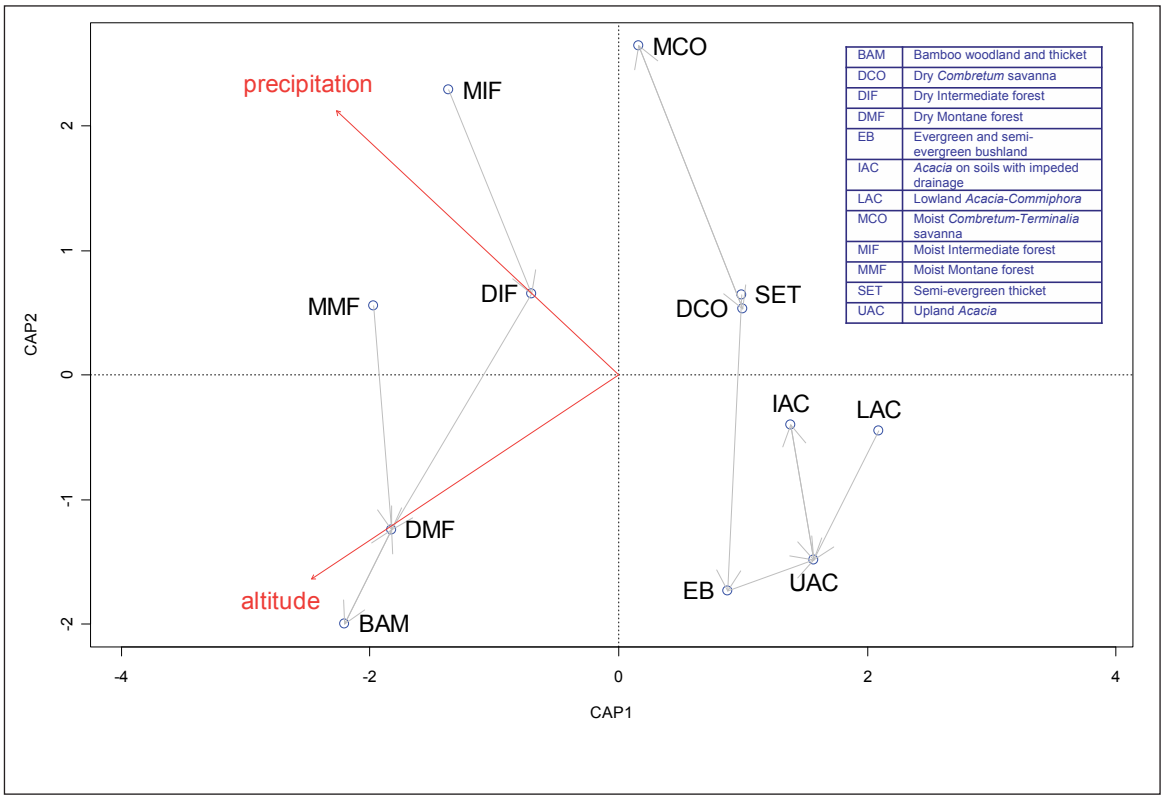
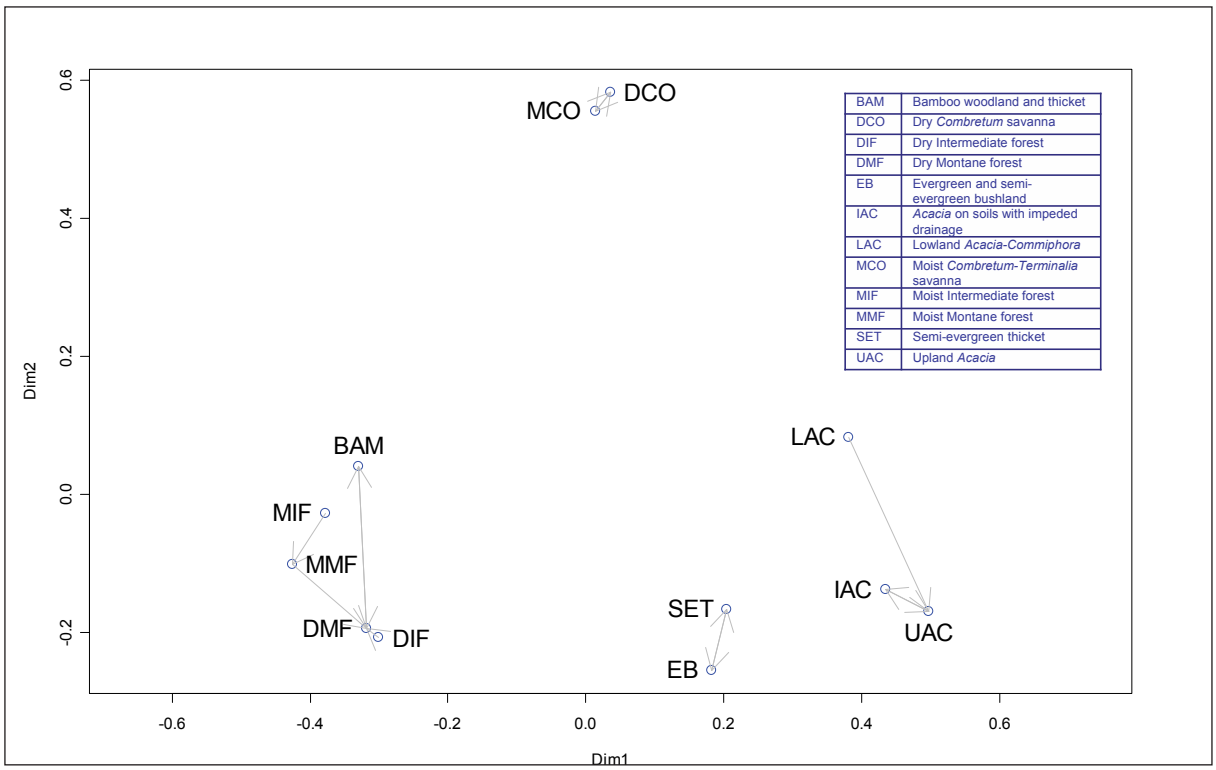


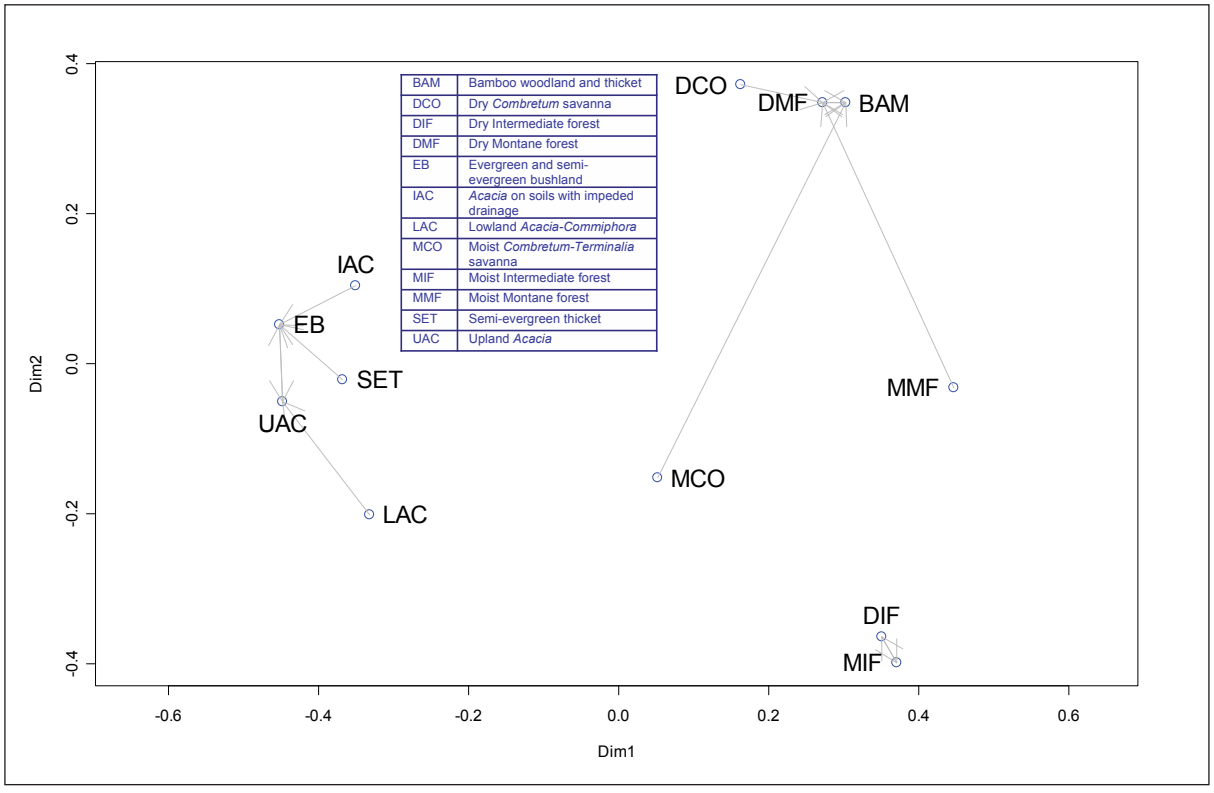
Fig 2b

Figure 2. Floristic relationships between potential natural vegetation types revealed by the Kulczynski distance and principal coordinates analysis (a, c, d) and distance-based redundancy analysis (b). Community datasets were based on presence-absence for all species (a, b), species of inferences 1-3 (c) or species of inferences 1-2 (d).



BAM	Bamboo woodland and thicket
DCO	Dry *Combretum* savanna
DIF	Dry Intermediate forest
DMF	Dry Montane forest
EB	Evergreen and semi-evergreen bushland
IAC	*Acacia* on soils with impeded drainage
LAC	Lowland *Acacia-Commiphora*
MCO	Moist *Combretum-Terminalia* savanna
MIF	Moist Intermediate forest
MMF	Moist Montane forest
SET	Semi-evergreen thicket
UAC	Upland *Acacia*

Fig 2c



BAM	Bamboo woodland and thicket
DCO	Dry *Combretum* savanna
DIF	Dry Intermediate forest
DMF	Dry Montane forest
EB	Evergreen and semi-evergreen bushland
IAC	*Acacia* on soils with impeded drainage
LAC	Lowland *Acacia-Commiphora*
MCO	Moist *Combretum-Terminalia* savanna
MIF	Moist Intermediate forest
MMF	Moist Montane forest
SET	Semi-evergreen thicket
UAC	Upland *Acacia*

Fig 2d

Figure 2. continued

4. Discussion

4.1 Obtained floristic differentiation

The information from the literature and ordination analyses provided clear evidence for floristic differences between potential natural vegetation (PNV) types. Unique species were listed for each PNV type, whereas a large number of species was compiled (362 species in total, 203 species with information on potential uses). The PNV types that were richest in species (> 70 species) were the four forest and the lowland *Acacia-Commiphora* PNV types. Smallest numbers of species (between 20-25 species) were tabulated for the bamboo and dry *Combretum* savanna PNV types. Many species were mentioned in several references, confirming the correspondence between the types inferred by the names of the different vegetation classification schemes (Kindt *et al.* 2007).

The species lists are tentative for the vegetation types. It is possible that some species only occur within a limited area of the area occupied by a certain vegetation type, whereas it is also possible that species occur in a wider area than delimited by vegetation boundaries (especially if ecotones exist). Since the vegetation types do not always form contiguous areas, species may also not occur everywhere where the vegetation type occurs. For example, some species were only encountered in forests in the western part of the map and not the eastern part of the map (Trapnell 1997, Table 3). Given that many biotic factors also influence the distribution of species (see below), it may therefore not be possible for some of these species to grow in the eastern part of the map if vegetation types only provide information on the abiotic factors. Future studies may therefore update the species lists that are provided here, and more detailed studies could explore the correspondence between the boundaries of species suitability maps and the boundaries of the vegetation maps for species of particular interest, and various factors that contribute to ecosystem restoration should also be considered. The hypothesis that the boundaries of the vegetation map provide floristic differences can also be tested with ordination analysis (using similar methods as used in this document, but now allowing for significance testing), but with several samples for each vegetation type. Careful selection of sample units at increasing distance from boundaries could be used in particular to test hypotheses of the accuracy of boundaries and ecotones.

We also want to point out that the information on uses should be interpreted carefully. For example, *Euphorbia candelabrum* was mentioned for bee forage in the second edition of the *Useful trees and shrubs for Kenya* (Maundu and Tengnäs 2005), whereas the first edition mentioned that 'honey from flowers burn the mouth' (ICRAF 1992, p. 209). In this case we removed bee forage as potential use for this species in Appendix I, but we did not systematically check the correspondence between the various references and mainly relied on Maundu and Tengnäs (2005) as this reference provided information on a wider range of species. Users should also be aware of the statement by Maundu and Tengnäs (2005, pp. 5-6) on information on tree uses that:

»It is important to note that the uses listed are those that have been *reported or deemed to be worth reporting*. The use of trees and other plants in herbal medicine is a huge subject, and for several reasons this book does not provide details on local preparations and administrations of herbal medicines«

4.2 Species suitability maps

As information on occurrence of species is limited for the majority of species (Ferrier 2002a), distribution maps of vegetation often provide the best information that is available to date to map the distribution of the majority of species. Better models of distribution of species can only be constructed by expanding the information of where on earth a species occurs, and, if possible, including information on where a species can not occur. Some argue to exclude sink population locations from the data of where a species can occur to make better models of where a species can reproduce and survive (Guisan and Thuiller 2005). As some researchers may be wishing to build better models for species of particular interest, we first provide an overview of some of the recent methods that have been used to produce suitability maps for particular species.

Many statistical modelling approaches have been developed to model species distribution, including artificial neural networks (ANN), Bayesian modelling (BM), bioclimatic profiles (BP, implemented in BIOCLIM software), classification and regression trees (CART), discriminant analysis (DA), ecological niche factor analysis (ENFA, implemented in the BIOMAPPER software), generalised additive models (GAM), generalised dissimilarity modelling (GDM), generalised linear models (GLM), genetic algorithms (GA, implemented in the desktop-GARP software), gower-similarity (implemented in the DOMAIN software), Mahalonobis distance (MD), maximum entropy (ME) and spatial interpolation (SI) (Segurado and Araújo 2004; Guissan and Thuiller 2005). Thuiller (2003) describes the biodiversity modelling approach (BIOMOD) that selects the model that provides the best predictions from GLM, GAM, CART and ANN, since there is usually no single model that provides the best predictions for each species (see also Thuiller *et al.* 2005). Brotons *et al.* (2004) concluded that methods that use presence-absence perform better in general than methods that use presence-only data by comparing GLM to ENFA. In evaluating seven modelling approaches, Segurado and Araújo (2004) reached similar conclusions that no single approach was always the best, although ANN (using presence-absence) was generally better and ENFA and DOMAIN (using presence-only data) performed poorer. They offer a more detailed discussion on how users could choose between the various models, in choosing between automated data-driven processes such as BIOMOD or GARP, and models with well-known assumptions, such as GLM or ENFA. The approach of showing results for different models and allowing the reader to compare the results is also a worthwhile approach (e.g., McClean *et al.* 2005).

Various studies show that including information on vegetation together

with other explanatory variables increases the accuracy of predictions where a species occurs (e.g., Stockwell and Peterson 2002, 2003, Brotons *et al.* 2004, Segurado and Araújo 2004, Guisan *et al.* 2006). Although vegetation has no direct influence on occurrence of species (as there is a theoretical difference between the structure and the composition of vegetation types; for instance, species could be randomly distributed over physiognomically-defined vegetation types, and only height and cover of vegetation types could be influenced by environmental factors), information on vegetation provides some information on some of the factors that influence the occurrence of species. For example, Soberón and Peterson (2005) list abiotic factors (such as climate and soils), biotic factors (interactions with other species, such as seed dispersers, pollinators, competitors or diseases; see also Arnold and Asquith 2002, Dupre and Ehrlen 2002, Wilson 1999, Catherine *et al.* 2006, Orrock *et al.* 2006), landscape configuration (see also Grashof-Bokdam 1997, Aldrich and Hamrick 1998, Bawa 2001, Benitez-Malvido and Martinez-Ramos, 2003a,b, Jacquemyn *et al.* 2003) and the evolutionary capacity to adapt to change (see also Huenneke 1991, Müller-Starck 1995, Young and Boyle 2000) as different categories of factors that influence the distribution of a species. Mueller-Dombois and Ellenberg (1974) list habitat (all environmental factors, including climate, soil, topography and disturbance), flora and characteristics of plants (including ability to compete), accessibility (dispersal and establishment) and time (including time for evolution) as causal factors for vegetation types. Austin (2005) also lists abiotic (such as rainfall or soil nitrogen) and biotic (such as competion) factors as those that influence vegetation types.

Since there is some correspondence between the distribution of species and vegetation types, it makes sense to provide species lists for vegetation types (e.g. White 1983a, WWF 2005, tables 2-5), to list vegetation types for a particular species (e.g., Beentje 1994), to calculate the total number of species or species turnover for ecoregions (e.g. White 1983a, Kier *et al.* 2005), or to determine the vegetation type from information on taxonomic composition (e.g. Jolly *et al.* 1998, Elenga *et al.* 2000, Bongers *et al.* 2004).

Box and Fujiwara (2005) mention that mapping of potential vegetation and ecosystems must be based primarily on climate as it has overriding control on their distribution, and that their mapping only has problems for areas with unusual soil conditions. They list annual precipitation, annual potential evapotranspiration, mean temperature of the warmest month, absolute minimum temperature and mean minimum temperature of the coldest month as factors that determine vegetation structure. Prentice *et al.* (1992) include some other factors such as growing degree days and the ratio between actual evapotransparation and equilibrium evapotranspiration as the environmental constraints for global biomes.

Ideally, we would have modelled the distribution of each species (using occurrence data and including information from the vegetation maps as explanatory variables), and would then have compared the species distribution (suitability maps) for each species with the distribution of the potential natural vegetation types (vegetation maps). Due to limited availability of occur-

rences (Table 1), it was not possible to generate accurate distribution maps for most species. It may be worthwhile, however, to construct distribution maps for the two species that had more than 20 occurrences (a criterion for sufficient occurrence data, see below) and use these two species as test cases for the accuracy of the vegetation maps.

Some authors (Stockwell and Peterson 2002, McClean *et al.* 2005) have argued to use all available occurrence data as calibration data while not reserving any data as validation data for those species that have small datasets. We think that testing the accuracy of a model is fundamental and that the users of the maps should be given some statistics on the accuracy of the map (which require some validation data). If users insist in having distribution maps for those species with limited information on their occurrences, we strongly suggest that these maps are accompanied by the positions of these occurrences so that users can get an idea of the level of extrapolation that was involved in obtaining the map and can make visual comparisons between the positions of the occurrence data and the modelled species distribution.

Guisan *et al.* (2006) suggest that species with limited information (< 20 occurrences) can only be modelled through simple approaches (such as climatic envelopes), by modelling more common species or by modelling communities. The latter approaches require previous studies on communities or common species with which the rare species are associated, and this requires extensive floristic information (Ferrier *et al.* 2002a,b). Since none of these approaches can substitute for obtaining additional occurrence information, additional sampling schemes may be required such as those suggested by Guisan *et al.* (2006).

4.3 The use of vegetation maps to select indigenous tree species for particular locations

Although vegetation maps can be used to document the distribution of species, vegetation maps are not necessarily correct for all species (Olson *et al.* 2001). No single biogeographic framework is optimal for all taxa but provides a compromise for as many taxa as possible, and ecoregions contain some habitats that differ from the assigned biome (Whittaker 1978, Olson *et al.* 2001). That vegetation maps do not provide the distribution for all species is also shown by the criterion of 50% of endemism (and not 100%) used as a criterion for African phytochoria (White 1983a). It has to be pointed out as well that the correspondence between vegetation and climate is not completely known. Global models therefore do not give predictions of climate that are valid everywhere (Prentice *et al.* 1992).

We want to make it very clear that there may be several limitations to the use of the new PNV maps to select indigenous tree species, although we do not want to imply that we disagree with our earlier statement that PNV maps have much to offer to agroforestry.

One of the limitations is that some site conditions may have changed so much that it is not possible to grow a particular species in a place at present, although the species was growing there before. This may have to do with changes in climatic conditions (the climate of Africa has undergone several cycles, see for example Olago (2001) or Nicholson (2001)), soil degradation (Aide and Cavelier 1994, McGrath *et al.* 2001, Uhl *et al.* 1982, Holl 1999, Friedel 1991), limits to regeneration due to absence of propagules because of either the distance to sources or constraints of pollinators and seed dispersal vectors (Asquith 1997, Camargo *et al.* 2002, Duncan and Colin 1999, Holl 1998a,1999, Boshier 2004), altered competitive processes including competition with invasive species (Holl 1998b, Moore 2005, Yelenik *et al.* 2004), frequent and intense perturbation by fire (Walters *et al.* 2004, Uhl and Kaufman 1990, Nepstad *et al.* 1999), pollution (Ashmore 1997) or the effect of the altered microclimate on plant behaviour (Bell and Lechowicz 1994; Holl 1999). In particular in closed forest types, many plant species require different degrees of shade to regenerate and can not establish themselves in open degraded landscapes (Hubbell 1998). Often vegetation and environmental conditions are some kind of chicken-or-egg situation: the vegetation creates the environmental conditions that favour the persistence of the vegetation types (Bounoua *et al.* 2002, Foley *et al.* 2000, Ganopolski *et al.* 1998, Brovkin *et al.* 2003; Pielke *et al.* 1998), although ecosystems are also dynamic systems that undergo natural disturbances that are required for their survival (e.g. Watt 1947; Ashton, 1978; Hartshorn 1978; Whitmore 1978; Pickett and Cadenasso 1995). That the present conditions do not favour the regeneration of a particular species does not mean that the species – and therefore the vegetation type – may never come back to a certain area. We recommend that closer attention is paid to the ecosystem restoration literature in finding out how vegetation can be brought closer to original types. There is also a long tradition and experience of forest management and plantation establishment of how to establish or regenerate natural vegetation and shade tolerant species in mixed plantations to be utilised from both temperate areas (e.g. Röhrig *et al.*, 2006) and tropical forestry (e.g. Troup 1928, Dawkins and Phillips 1998, Lamprecht 1989).

Another limitation is conceptual: the range where a species occurs may only in part overlap with the range where a certain vegetation type occurs. A wide suite of statistical methods have recently been developed to test for these assumptions (see above), but given the limited data that was available on the distribution of indigenous species we were not able to statistically test this assumption at this point. The fact that species-specific distribution data is not readily available was actually the reason that we turned to the vegetation maps – where details are provided on the spatial distribution – to provide some information on where we expect that species can grow.
The reverse may also be true: that a species occurs in a wide range of vegetation types. The description of the vegetation of Africa mentioned that it is difficult to distinguish between various forest parts due to the large environmental tolerance of species (White 1983a). The fact that species may occur in several vegetation types is illustrated by *Juniperus procera*. This species dominates the driest montane forest types, but also occurs in other dry montane forest types, in dry intermediate forest and in semi-evergreen

bushland. White (1983a) expects that the semi-evergreen bushland is actually the natural habitat for this species. The general experience with plantation species is that important genetic variation is most likely to exist between populations of plant species that cover large or environmentally heterogeneous distribution areas. Studies from tropical, subtropical and temperate areas have confirmed this picture for a large number of tree species by revealing genetic variation in key quantitative traits (von Bothmer and Seberg 1995, Guarino 1995). Genetic variation has not only been observed in survival and growth rates of plantings but also in the quantity and quality of their end products (Mouna 1990, Mandal and Gibson 1998, Zobel and Jett 1995, Zobel *et al.* 1987).

Where a species occurs in several vegetation types, we warn against transferring seeds or other planting materials from one vegetation type to another. When trees are planted outside their native environment, there is no guarantee that they will grow well (Vinceti *et al.* 2004). In some situations, there may be no problems with such transfers. Without having tested such transfers, we simply do not know. In such cases it is better to adhere to the safety principal. That is, for those who can not take the risk, it is safest to use local seed sources with »local« meaning that they are from the same vegetation (Kindt *et al.* 2006).

The third limitation is closely related to the second one: by classifying vegetation in a limited number of types, some information on the natural variation in vegetation is lost. Not all boundaries between vegetation types are abrupt and in many situations do ecotones exist between the vegetation types (see above). One should therefore not interpret the map in being completely homogeneous within vegetation types. Being limited in the number of classes that can be portrayed is actually an inherent feature of a map – and being a meaningful summary of reality can also be a useful feature for a tool that has primarily been designed as an extension tool. The user should be aware that ecoregions rarely form abrupt edges but are bound by ecotones and mosaic habitats, however.

5. Conclusion/Recommendations

As the authors of the original vegetation maps provided limited information on the methods that they used to produce their maps (they did not list criteria or species lists for the different vegetation types), we consulted other literature and herbarium information to obtain species lists for each vegetation type. This information allowed to confirm a floristic differentiation between the mapped vegetation types and provided species lists for each vegetation type. By combining this information with information on uses (available for a subset of species), it is now possible to get a list of candidate species that can be planted for a particular purpose in a particular area of the map.

In the discussion section, we highlighted that there are several limitations to the approach of using vegetation maps to provide information on the suitability of particular species, some that are related to the necessary abstraction level that a map provides (in the same way that no statistical model is ever 100% accurate, no map is ever 100% correct) and some that are related to limitations in knowledge on species distribution (which is the rationale to use vegetation maps as a proxy for species distribution). Given that we only obtained a limited dataset on occurrences for most of the indigenous tree species that we investigated, a recommended way forward is to increase these datasets. Such larger datasets can then be used to construct suitability maps for particular species, test hypotheses about the accuracy of the boundaries on the map or its ecotone widths, and investigate floristic differences between vegetation types (probably by constrained ordination analysis).

We recommend that users treat the information provided by the map cautiously – by using the map as a decision support tool and not as a decision making tool. For example, the list of species and their uses could be checked with key informants (such as long-term residents of the area, experienced extension workers, or experienced botanists, ecologists or foresters) or by a rapid survey of the target area. Before embarking on large-scale promotion, it may also be worthwile to test species' growth and survival on a small scale first. Complementing the information with some economic or cultural analyses will also enrich the capability of selecting particular species for particular areas. Finally, although we did not dwell on the advantages of tree species diversity in terms of stability of production and the limitation of risks (complementing the biodiversity value of assemblages of indigenous tree species), we hope that the maps will be used to select several indigenous species for a particular area and not a silver-bullet single species that is expected to provide all products and services in a sustainable way.

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Appendix: Species lists for each vegetation type

The species that are listed are those species for which information on uses was available for the various potential natural vegetation types. The table column refers to the expected reliability that the species could occur in certain vegetation type (rank 1= highest expected reliability, rank 5= lowest expected reliability; see methods).

1. Bamboo woodland and thicket

Species		Wood											Food							Fodder		Environmental							Other										
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamental/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Afrocrania volkensii	2	x		x																																		
Arundinaria alpina	1			x	x						x			x						x			x			x			x									
Dombeya torrida	3	x	x	x	x					x	x								x		x								x									
Faurea saligna	3	x	x	x	x														x		x		x	x														
Hagenia abyssinica	2	x	x	x	x	x					x								x				x	x		x												
Ilex mitis	3	x	x	x						x		x							x																			
Juniperus procera	3	x	x	x	x	x			x										x			x	x					x					x			x			
Nuxia congesta	3	x	x																x		x											x						
Podocarpus falcatus	3	x		x	x		x												x			x	x															
Podocarpus latifolius	3	x		x	x		x												x			x	x															
Prunus africana	3	x	x	x	x						x								x		x	x	x				x									x		
Rapanea melanophloeos	3			x															x																			
Schefflera volkensii	2	x		x															x			x	x	x		x					x							

2. Moist montane forest

Species		Wood											Food							Fodder		Environmental							Other										
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamental/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Acacia abyssinica	2	x	x		x														x	x	x	x	x		x														
Afrocrania volkensii	2	x		x																																		
Albizia gummifera	2	x		x				x	x		x								x	x	x	x	x	x														
Albizia zygia	3	x	x	x						x	x	x		x					x	x	x	x	x	x	x	x	x				x	x				x			
Allophylus africanus	2																		x	x	x					x			x										
Aningeria adolfifriedericii	2	x	x	x													x					x																	
Apodytes dimidiata	2	x	x	x						x									x		x																		
Bersama abyssinica	2	x	x	x					x		x								x		x	x	x	x								x							
Bridelia micrantha	4	x	x	x	x					x	x		x						x	x	x	x		x			x					x							
Carissa edulis	4	x											x								x							x											
Casaeria battiscombei	2			x																																			
Cassipourea gummiflua	2			x																																			
Cassipourea malosana	2	x		x					x							x			x		x																		
Celtis africana	2	x	x	x						x		x								x		x																	
Combretum collinum	4	x	x		x														x		x	x										x							
Croton macrostachyus	2	x	x	x	x					x									x	x	x		x			x							x			x			
Croton sylvaticus	2	x		x															x	x		x	x													x		x	
Diospyros abyssinica	2	x	x	x	x					x	x	x										x																	
Dombeya torrida	2	x	x	x	x					x	x								x		x	x		x					x										
Dracaena steudneri	2				x														x		x	x	x										x						
Ehretia cymosa	2	x	x		x					x									x		x		x																
Ekebergia capensis	2	x	x	x	x					x									x		x	x	x					x											
Erythrina abyssinica	3	x		x					x		x								x		x		x	x	x	x							x			x			
Euclea divinorum	4	x		x						x	x		x			x			x	x	x	x											x		x		x		
Faurea saligna	4	x	x	x	x														x		x		x	x				x					x						

continued

Species		Wood											Food							Fodder		Environmental							Other									
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamental/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Ficus sur	2	x		x					x		x		x						x	x	x									x			x					
Ficus thonningii	2	x											x						x	x		x	x	x					x	x	x	x	x	x				
Garcinia volkensii	2												x																										
Hagenia abyssinica	2	x	x	x	x	x					x								x				x	x		x										x			
Harungana madagascariensis	2	x	x	x	x					x	x		x						x		x										x						x		
Ilex mitis	3	x	x	x						x		x							x																				
Macaranga kilimandscharica	2	x	x	x	x														x							x													
Myrianthus holstii	3	x									x		x							x		x		x		x													
Nuxia congesta	2	x	x																x		x																		
Ocotea kenyensis	2			x																																			
Ocotea usambarensis	2	x	x	x	x		x												x																				
Olea capensis	1	x	x	x			x			x									x		x																		
Olea europaea	2	x	x	x	x	x					x		x		x	x			x		x	x	x					x					x	x					
Ozoroa insignis	3	x	x	x							x								x			x									x								
Podocarpus latifolius	1	x		x	x		x												x			x	x																
Polyscias fulva	3	x		x					x		x								x		x			x															
Polyscias kikuyuensis	2	x		x			x				x								x					x		x													
Prunus africana	2	x	x	x	x						x								x		x	x	x				x									x			
Rapanea melanophloeos	2			x															x																	x			
Rhus natalensis	3	x	x	x									x						x	x		x	x									x		x					
Sapium ellipticum	4	x	x	x						x		x							x	x		x	x																
Schefflera volkensii	2	x		x															x			x	x	x		x					x								
Strombosia scheffleri	2	x	x	x							x											x																		

continued

Species		Wood											Food							Fodder		Environmental							Other											
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamental/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Synsepalum brevipes	2	x	x	x	x						x		x									x		x															
Syzygium guineense	2	x	x	x	x					x			x						x		x											x							
Teclea nobilis	2	x	x	x	x					x	x								x																	x			
Vitex keniensis	2	x		x	x		x						x									x	x					x											
Zanthoxylum gilletii	2	x	x	x															x																				
Zanthoxylum rubescens	2			x																																			

3. Dry montane forest

Species		Wood											Food							Fodder		Environmental							Other											
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamental/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Acacia abyssinica	2	x	x		x														x	x	x	x			x														
Acacia drepanolobium	1	x	x														x		x	x	x															x			
Acacia gerrardii	1	x	x	x	x						x						x		x	x	x	x			x														
Acacia lahai	2	x	x	x	x												x				x	x								x									
Acacia seyal	1	x	x		x											x	x		x	x	x			x			x			x	x	x							
Afrocrania volkensii	2	x		x																																			
Albizia gummifera	2	x		x				x	x		x								x	x		x	x	x	x														
Apodytes dimidiata	2	x	x	x						x									x		x																		
Bersama abyssinica	2	x	x	x					x		x								x		x	x	x	x								x							
Bridelia micrantha	4	x	x	x	x					x	x		x						x	x	x		x				x					x							
Calodendrum capense	3	x	x	x	x					x		x								x	x	x	x					x											
Carissa edulis	4	x											x								x							x											
Casaeria battiscombei	2			x																																			
Cassipourea malosana	2	x		x					x							x			x		x																		
Celtis africana	2	x	x	x						x		x								x	x		x																
Croton macrostachyus	2	x	x	x	x					x									x	x	x				x								x			x			
Croton megalocarpus	3	x	x	x	x														x		x	x	x												x	x			
Cussonia holstii	2			x					x	x	x								x	x	x																		
Diospyros abyssinica	2	x	x	x	x					x	x	x									x																		
Dodonaea viscosa	2	x			x					x									x			x				x							x		x				
Dombeya burgessiae	2																		x									x											
Dombeya torrida	2	x	x	x	x					x	x								x		x		x					x											
Dovyalis abyssinica	2												x		x	x		x	x	x	x												x						
Dracaena steudneri	2				x														x		x	x												x					

continued

Species		Wood											Food							Fodder		Environmental							Other												
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamental/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Ehretia cymosa	2	x	x		x					x									x		x		x																	
Ekebergia capensis	2	x	x	x	x					x									x		x	x	x					x												
Elaeodendron buchananii	3	x	x	x															x			x		x													x				
Erythrina abyssinica	3	x		x					x		x								x		x		x	x	x								x			x				
Euclea divinorum	2	x		x						x	x		x			x			x	x	x										x			x	x		x				
Faurea saligna	2	x	x	x	x														x		x		x	x				x				x			x						
Ficus sur	2	x		x					x		x		x						x	x	x	x													x						
Ficus thonningii	2	x											x						x	x		x	x	x					x	x	x	x	x	x						
Flacourtia indica	4	x	x	x	x					x	x	x	x					x	x	x	x												x								
Hagenia abyssinica	2	x	x	x	x	x					x								x				x	x		x											x				
Ilex mitis	2	x	x	x						x		x							x																						
Juniperus procera	1	x	x	x	x	x			x										x			x	x					x								x					
Macaranga kilimandscharica	4	x	x	x	x														x							x															
Nuxia congesta	2	x	x																x		x											x								
Ocotea kenyensis	3			x																																				
Olea capensis	2	x	x	x			x			x									x		x																			
Olea europaea	2	x	x	x	x	x					x		x		x	x			x		x	x	x					x						x	x						
Ozoroa insignis	3	x	x	x							x								x			x									x									
Pistacia aethiopica	2	x			x					x						x	x		x		x													x						
Podocarpus falcatus	1	x		x	x		x												x			x	x																
Podocarpus latifolius	1	x		x	x		x												x			x	x																
Premna maxima	3			x																																				
Prunus africana	2	x	x	x	x						x								x		x	x	x	x				x									x				

continued

Species		Wood											Food							Fodder		Environmental							Other											
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamenta/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Rapanea melanophloeos	2			x															x																				
Rhus natalensis	3	x	x	x									x						x	x		x	x									x			x				
Schefflera volkensii	2	x		x															x			x	x	x		x					x								
Schrebera alata	3	x	x																x				x																
Spathodea campanulata	4	x	x								x								x		x	x	x	x				x											
Strychnos mitis	3	x	x	x	x																	x	x																
Syzygium cordatum	4	x	x	x					x				x			x			x	x	x	x	x				x					x					x		
Syzygium guineense	2	x	x	x	x					x			x						x		x											x							
Tarchonanthus camphoratus	2	x		x												x			x	x			x			x	x								x		x		
Teclea nobilis	2	x	x	x	x					x	x								x																x				
Trema orientalis	4	x	x		x														x	x	x	x	x	x		x						x				x	x		
Vangueria infausta	4	x			x					x	x	x	x																										
Warburgia ugandensis	3	x		x						x			x		x	x			x			x	x	x						x				x		x	x		

4. Moist intermediate forest

Species		Wood											Food							Fodder		Environmental							Other																
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamental/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Acacia lahai	4	x	x	x	x												x				x	x																				
Albizia gummifera	2	x		x				x	x		x								x	x	x		x	x	x	x																
Albizia zygia	2	x	x	x						x	x	x		x					x	x	x	x	x	x	x	x	x			x	x				x							
Antiaris toxicaria	2			x															x	x																						
Apodytes dimidiata	3	x	x	x						x									x	x		x																				
Bersama abyssinica	2	x	x	x					x		x								x	x	x	x	x								x											
Blighia unijugata	2	x	x	x	x											x			x		x																					
Bridelia micrantha	2	x	x	x	x					x	x		x						x	x	x		x				x				x											
Carissa edulis	4	x											x								x						x															
Casaeria battiscombei	2			x																																						
Cassipourea malosana	2	x		x					x							x			x																						
Cassipourea ruwensorensis	2			x																																						
Chrysophyllum albidum	2			x									x																													
Combretum molle	4	x	x	x	x					x									x		x			x		x											x					
Cordia africana	2	x		x					x		x		x						x	x	x	x	x			x			x		x					x						
Croton macrostachyus	2	x	x	x	x					x									x	x			x			x							x				x					
Croton megalocarpus	1	x	x	x	x														x		x	x	x										x			x	x					
Croton sylvaticus	2	x		x															x	x	x	x														x		x				
Diospyros abyssinica	2	x	x	x	x					x	x	x									x																						
Dracaena steudneri	2				x														x		x	x												x							
Ehretia cymosa	2	x	x		x					x									x			x																			
Ekebergia capensis	2	x	x	x	x					x									x		x	x					x															
Erythrina abyssinica	3	x		x					x		x								x			x	x	x	x								x			x					

continued

Species		Wood											Food							Fodder		Environmental							Other										
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamental/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Fagaropsis angolensis	2	x		x																																		
Ficus sur	2	x		x					x		x		x							x	x	x								x			x					
Ficus thonningii	2	x											x							x		x	x	x					x	x	x	x	x	x					
Flacourtia indica	4	x	x	x	x					x	x	x	x					x	x	x	x												x						
Funtumia africana	2	x		x																	x	x									x								
Garcinia buchananii	2												x																										
Hagenia abyssinica	4	x	x	x	x	x					x								x				x	x		x										x			
Harungana madagascariensis	2	x	x	x	x					x	x		x						x		x											x						x	
Kigelia pinnata	4	x	x	x	x				x		x					x			x	x	x	x					x						x			x			
Lecaniodiscus fraxinifolius	2	x	x		x					x	x		x						x		x	x								x									
Lovoa swynnertonii	1	x		x																	x					x													
Macaranga kilimandscharica	3	x	x	x	x														x								x													
Maesopsis eminii	2	x		x	x		x												x	x		x	x																
Manilkara butugi	2												x																											
Markhamia lutea	2	x	x	x	x			x		x	x								x		x	x	x	x		x		x						x		x				
Milicia excelsa	2	x	x	x	x					x									x	x	x	x	x	x		x		x						x						
Millettia dura	5				x					x										x		x	x	x		x														
Mimusops kummel	2	x	x	x					x	x	x		x			x			x			x																		
Monodera myristica	2	x											x		x				x																					
Myrianthus holstii	2	x									x		x							x		x		x		x														
Newtonia buchananii	1	x		x				x												x		x	x	x	x														
Nuxia congesta	2	x	x																x		x												x						
Olea capensis	2	x	x	x			x			x									x		x																		
Ozoroa insignis	3	x	x	x							x								x			x								x									

continued

Species		Wood											Food							Fodder		Environmental							Other											
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamental/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Podocarpus falcatus	4	x		x	x		x												x			x	x																
Polyscias fulva	2	x		x					x		x								x		x			x															
Premna angolensis	2			x																																			
Premna maxima	2			x																																			
Prunus africana	3	x	x	x	x						x								x		x	x	x	x				x							x				
Rapanea melanophloeos	3			x															x																				
Rauvolfia caffra	2	x		x					x		x								x		x	x	x													x				
Rhus natalensis	3	x	x	x									x						x	x		x	x								x			x						
Sapium ellipticum	2	x	x	x						x		x							x	x		x	x																	
Sesbania sesban	4	x			x														x	x		x			x	x			x							x		x		
Spathodea campanulata	2	x	x								x								x		x	x	x				x													
Strombosia scheffleri	2	x	x	x							x											x																		
Syzygium cordatum	4	x	x	x					x				x			x			x	x	x	x					x				x						x			
Syzygium guineense	4	x	x	x	x					x			x						x		x											x								
Teclea nobilis	2	x	x	x	x					x	x								x																	x				
Trema orientalis	2	x	x		x														x	x	x	x	x			x						x					x	x		
Trichilia emetica	2	x		x	x					x	x								x	x	x	x				x		x				x					x		x	
Vangueria infausta	4	x			x					x	x	x	x																											
Vernonia amygdalina	4	x												x					x				x			x							x			x				
Vitex doniana	4	x	x	x	x						x		x						x	x	x	x		x								x				x				
Warburgia ugandensis	2	x		x						x			x		x	x			x			x	x	x							x				x		x	x		
Zanthoxylum gilletii	2	x	x	x															x																					
Zanthoxylum mildbraedii	2			x																																				
Zanthoxylum rubescens	2			x																																				
Ziziphus abyssinica	4	x	x	x	x						x		x						x	x	x	x							x			x	x	x							

5. Dry intermediate forest

Species		Wood											Food							Fodder		Environmental							Other														
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamental/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Acokanthera schimperi	2									x			x									x	x													x	x			
Albizia gummifera	2	x		x				x	x		x								x	x	x		x	x	x	x															
Apodytes dimidiata	3	x	x	x						x									x		x																				
Bersama abyssinica	2	x	x	x					x		x								x		x	x	x																		
Brachylaena huillensis	1	x	x	x	x						x											x																	x		
Bridelia micrantha	2	x	x	x	x					x	x		x						x	x	x		x				x					x									
Calodendrum capense	2	x	x	x	x					x		x									x	x	x				x														
Carissa edulis	4	x											x								x						x														
Cassipourea malosana	2	x		x					x							x			x		x																				
Combretum molle	4	x	x	x	x					x									x		x		x			x											x				
Cordia africana	4	x		x					x		x		x						x	x	x	x	x			x			x							x					
Craibia brownii	2			x							x		x						x											x											
Crotalaria goodiaeformis	4	x																	x	x						x														
Croton macrostachyus	1	x	x	x	x					x									x	x			x			x							x			x				
Croton megalocarpus	1	x	x	x	x														x		x	x	x									x			x	x				
Diospyros abyssinica	2	x	x	x	x					x	x	x									x																				
Diospyros mespiliformis	5	x	x	x							x		x			x			x		x	x																			
Dodonaea viscosa	4	x			x					x									x			x				x						x		x						
Dombeya burgessiae	3																		x									x												
Dracaena steudneri	2				x														x		x	x											x							
Ehretia cymosa	2	x	x		x					x									x			x																		
Ekebergia capensis	2	x	x	x	x					x									x		x	x					x														
Elaeodendron buchananii	2	x	x	x															x		x		x			x										x					
Erythrina abyssinica	3	x		x					x		x								x			x	x	x	x								x			x				
Euclea divinorum	2	x		x						x	x		x			x			x	x	x											x		x	x		x				
Fagaropsis angolensis	2	x		x																																					
Faidherbia albida	5	x	x	x	x						x		x		x				x	x		x		x	x	x		x	x				x								
Ficus sur	2	x		x					x		x		x						x	x	x									x				x							

continued

Species		Wood											Food							Fodder		Environmental							Other									
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamenta/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Ficus thonningii	2	x											x						x	x		x	x	x				x	x	x	x	x	x					
Juniperus procera	3	x	x	x	x	x			x										x			x	x					x					x			x			
Kigelia pinnata	4	x	x	x	x				x		x					x			x	x	x	x	x					x					x			x			
Lepisanthes senegalensis	3	x	x	x	x					x	x		x						x			x															x		
Manilkara discolor	2												x																										
Margaritaria discoidea	2	x	x	x	x														x																				
Markhamia lutea	2	x	x	x	x			x		x	x								x		x	x	x	x		x		x					x		x				
Mimusops kummel	2	x	x	x					x	x	x		x			x			x			x																	
Newtonia buchananii	4	x		x				x												x		x	x	x	x														
Nuxia congesta	2	x	x																x		x												x						
Olea capensis	3	x	x	x			x			x									x		x																		
Olea europaea	2	x	x	x	x	x					x		x		x	x			x		x	x	x					x					x	x					
Ozoroa insignis	3	x	x	x							x								x			x									x								
Podocarpus falcatus	4	x		x	x		x												x			x	x																
Rauvolfia caffra	4	x		x					x		x								x		x	x	x													x			
Rhus natalensis	3	x	x	x									x						x	x		x	x									x							
Sapium ellipticum	2	x	x	x						x		x							x	x		x	x																
Schrebera alata	2	x	x																x				x																
Sesbania sesban	4	x			x														x	x		x			x	x			x							x		x	
Strychnos henningsii	2				x					x			x			x			x													x				x			
Strychnos mitis	2	x	x	x	x																	x	x																
Syzygium cordatum	4	x	x	x					x				x			x			x	x	x	x					x									x			
Teclea nobilis	2	x	x	x	x					x	x								x																	x			
Trema orientalis	2	x	x		x														x	x	x	x	x	x		x						x				x	x		
Vangueria infausta	4	x			x					x	x	x	x																										
Vangueria madagascariensis	4	x			x					x	x		x						x		x	x															=		
Warburgia ugandensis	2	x		x						x			x		x	x			x			x	x	x							x					x	x		

6. Upland *Acacia* woodland, savanna and bushland

Species		Wood											Food							Fodder		Environmental							Other												
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamenta/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Acacia brevispica	1	x																	x	x	x															x				
Acacia drepanolobium	1	x	x														x		x	x	x															x				
Acacia etbaica	1	x		x															x																					
Acacia gerrardii	1	x	x	x	x						x						x		x	x	x	x			x															
Acacia mellifera	1	x	x	x						x	x						x		x	x	x				x	x							x				x			
Acacia nilotica	3	x	x		x					x	x					x			x	x	x				x	x	x	x			x	x		x		x				
Acacia polyacantha	1	x	x	x						x		x					x		x	x		x			x	x														
Acacia senegal	3	x	x		x					x							x		x	x	x					x	x		x								x				
Acacia seyal	3	x	x		x											x	x		x	x	x				x			x			x	x	x							
Acacia tortilis	1	x	x	x	x								x				x		x	x	x	x	x		x	x	x	x	x			x	x	x			x				
Acacia xanthophloea	1	x	x	x	x												x		x	x	x		x		x		x						x							
Albizia amara	1	x	x	x	x							x			x		x		x	x	x		x		x	x						x	x	x					x		
Boscia angustifolia	4									x												x							x											
Combretum molle	4	x	x	x	x					x									x		x			x		x											x				
Dichrostachys cinerea	4	x								x										x	x		x		x	x								x						
Euclea divinorum	4	x		x						x	x		x			x			x	x	x											x		x	x		x			
Garcinia livingstonei	4	x			x					x	x		x						x		x	x				x						x								
Juniperus procera	4	x	x	x	x	x			x										x			x	x					x						x			x			
Kigelia pinnata	4	x	x	x	x				x		x					x			x	x	x	x	x					x						x			x			
Rhus natalensis	4	x	x	x									x						x	x		x	x					x				x			x					
Salvadora persica	4												x						x	x	x	x				x	x								x		x			
Vangueria madagascariensis	4	x			x					x	x		x						x		x	x																		

7. Lowland *Acacia-Commiphora* woodland, bushland and thicket

Species		Wood											Food							Fodder		Environmental							Other														
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamental/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Acacia brevispica	1	x																	x	x	x															x				
Acacia elatior	4	x	x	x	x						x								x	x	x			x		x						x								
Acacia mellifera	3	x	x	x						x	x						x		x	x				x	x							x				x				
Acacia nilotica	3	x	x		x					x	x					x			x	x	x			x	x	x	x			x	x	x		x		x				
Acacia polyacantha	3	x	x	x						x		x					x		x	x		x		x	x															
Acacia senegal	3	x	x		x					x							x		x	x						x	x		x								x				
Acacia tortilis	1	x	x	x	x								x				x		x	x	x	x			x	x	x		x		x	x	x				x				
Acacia xanthophloea	3	x	x	x	x												x		x	x		x			x		x						x								
Adansonia digitata	3							x					x	x	x				x	x	x		x	x					x	x	x	x					x				
Adenium obesum	3																		x	x	x												x				x	x			
Albizia amara	4	x	x	x	x							x			x		x		x	x	x			x	x	x					x	x	x						x		
Albizia anthelmintica	4	x		x															x	x	x			x								x				x				
Balanites aegyptiaca	3	x	x	x	x					x	x		x	x			x		x	x	x		x					x			x		x	x					x		
Balanites rotundifolia	3	x	x		x					x	x		x						x	x	x					x						x				x				
Berchemia discolor	5	x	x	x	x					x	x		x		x	x			x	x	x	x						x			x	x								
Boscia angustifolia	4									x											x							x												
Boswellia neglecta	3	x		x							x					x	x		x	x										x	x			x			x		
Bridelia taitensis	3												x						x														x							
Cadaba farinosa	3	x												x	x				x	x													x				x			
Caesalpinia trothae	3																			x																				
Combretum aculeatum	3	x											x						x	x	x								x			x					x		x	
Commiphora africana	3	x									x	x	x			x	x		x	x		x								x		x	x	x			x			
Commiphora edulis	3	x											x						x		x					x				x										
Cordia sinensis	3	x		x	x					x	x		x			x	x		x	x								x		x			x				x			
Dalbergia melanoxylon	4	x	x	x	x						x								x	x			x	x																
Delonix elata	3			x	x				x	x	x	x	x						x	x	x	x										x								
Dobera glabra	3	x		x							x		x				x		x	x	x												x	x		x				

continued

Species		Wood											Food							Fodder		Environmental							Other										
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamental/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Dobera loranthifolia	3	x		x							x		x				x		x	x		x										x				x			
Grewia bicolor	4	x			x					x	x		x						x	x		x							x					x					
Grewia tembensis	3	x									x		x						x	x												x							
Grewia tenax	3	x								x	x	x	x						x	x	x								x		x				x		x			
Grewia villosa	3	x			x					x	x		x						x	x		x							x							x				
Kedrostis gijef	3																		x	x																			
Kigelia pinnata	4	x	x	x	x				x		x					x			x	x	x	x					x						x			x			
Lannea alata	3	x											x						x	x									x										
Lannea triphylla	3			x									x			x	x		x	x									x			x		x					
Lawsonia inermis	4	x			x					x	x	x					x		x	x	x						x			x		x					x		
Maerua decumbens	3												x						x	x	x											x					x		
Melia volkensii	3	x		x															x	x	x		x			x												
Premna resinosa	3	x								x	x		x						x	x																			
Rhus natalensis	4	x	x	x									x						x	x	x	x										x			x				
Salvadora persica	3												x						x	x	x					x	x								x		x		
Senna singueana	4																		x													x							
Sterculia africana	3			x																	x		x						x	x	x								
Tamarindus indica	5	x	x	x	x			x			x		x		x	x			x	x	x	x	x	x	x							x					x		
Terminalia orbicularis	3	x		x							x								x	x			x									x							
Terminalia prunioides	4	x	x	x	x					x									x	x				x								x							
Terminalia spinosa	3	x	x	x	x						x								x	x												x							
Thylachium thomasii	3												x	x					x			x																	
Vangueria madagascariensis	4	x			x					x	x		x						x		x	x																	
Ximenia americana	4	x		x	x					x	x		x						x	x	x	x										x	x			x		x	
Zanthoxylum chalybeum	4	x	x	x	x						x				x	x			x	x															x		x		
Ziziphus mucronata	4	x	x		x					x	x		x			x			x	x	x	x										x							

8. Dry *Combretum* savanna

Species		Wood											Food							Fodder		Environmental							Other																
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamental/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Acacia senegal	4	x	x		x					x							x		x	x	x					x	x		x						x								
Acacia seyal	4	x	x		x											x	x		x	x	x				x						x	x	x										
Azanza garckeana	4	x	x	x						x			x				x	x		x	x	x	x						x														
Boscia angustifolia	4									x												x							x														
Cadaba farinosa	4	x												x	x					x	x													x		x							
Carissa edulis	4	x											x								x							x															
Combretum aculeatum	4	x											x							x	x								x				x				x						x
Combretum collinum	3	x	x		x															x	x	x												x									
Combretum molle	3	x	x	x	x					x										x	x			x														x					
Commiphora africana	3	x									x	x	x			x	x			x	x		x							x			x	x	x			x				
Cordia africana	4	x		x					x		x		x							x	x	x	x	x		x			x		x					x						
Dichrostachys cinerea	4	x								x										x	x		x		x	x								x									
Ekebergia capensis	4	x	x	x	x					x									x		x	x	x					x															
Erythrina abyssinica	4	x		x					x		x								x		x		x	x	x	x								x			x						
Faurea saligna	1	x	x	x	x														x		x		x	x			x							x									
Flacourtia indica	4	x	x	x	x					x	x	x	x					x	x	x	x												x										
Senna singueana	4																		x													x										
Stereospermum kunthianum	4	x	x		x					x									x		x		x									x										
Strychnos spinosa	4	x	x	x									x						x	x		x	x												x								
Terminalia brownii	3	x	x	x	x				x	x	x	x							x	x		x	x	x		x						x					x					
Vangueria madagascariensis	4	x			x					x	x		x						x		x	x																					
Vitex payos	4	x			x					x	x		x								x	x																					
Ziziphus abyssinica	4	x	x	x	x						x		x						x	x	x								x			x	x	x									

9. Moist *Combretum-Terminalia* savanna

Species		Wood											Food							Fodder		Environmental							Other											
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamental/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Acacia lahai	4	x	x	x	x												x				x	x																	
Annona senegalensis	3												x						x	x			x					x			x								
Antiaris toxicaria	3			x															x	x																			
Borassus aethiopum	3			x	x					x			x	x	x	x							x						x	x		x						x	
Bridelia micrantha	4	x	x	x	x					x	x		x						x	x	x			x			x					x								
Cadaba farinosa	4	x												x	x				x	x														x		x				
Carissa edulis	4	x											x								x						x													
Chrysophyllum albidum	3			x									x																											
Combretum collinum	3	x	x		x														x		x												x							
Combretum molle	3	x	x	x	x					x									x		x		x			x										x				
Cordia africana	4	x		x					x		x		x						x	x	x	x	x			x			x		x				x				
Dichrostachys cinerea	3	x								x										x		x		x	x								x						
Dodonaea viscosa	4	x			x					x									x			x				x								x					
Entada abyssinica	3	x																	x		x	x	x	x									x		x				
Euclea racemosa	1	x		x						x	x		x			x			x	x	x										x			x	x				
Ficus glumosa	4			x															x																				
Ficus sycomorus	4	x		x					x		x		x				x		x	x		x	x	x		x	x		x				x			x			
Ficus thonningii	4	x											x						x	x		x	x	x					x	x	x	x	x	x					
Gardenia ternifolia	3									x	x								x																				
Hymenocardia acida	3	x	x	x									x						x	x	x					x						x		x					
Maesopsis eminii	3	x		x	x		x												x	x	x	x																	

continued

Species		Wood											Food							Fodder		Environmental							Other										
	Table	Firewood	Charcoal	Timber/Furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamenta/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Maytenus senegalensis	3	x	x		x					x	x								x	x	x											x					x	
Milicia excelsa	3	x	x	x	x					x									x	x	x	x	x			x								x					
Parinari curatellifolia	3	x	x	x	x								x						x		x	x																	
Piliostigma thonningii	3	x	x		x								x	x			x		x	x	x	x	x	x		x			x			x	x					x	
Rhus natalensis	4	x	x	x									x						x	x		x	x									x							
Sapium ellipticum	4	x	x	x						x		x							x	x		x	x																
Securidaca longepedunculata	3	x	x	x										x					x		x		x						x								x	x	
Senna singueana	4																		x													x							
Stereospermum kunthianum	3	x	x		x					x									x		x		x									x							
Strychnos madagascariensis	3																																						
Strychnos spinosa	3	x	x	x									x						x	x		x	x											x					
Syzygium guineense	3	x	x	x	x					x			x						x		x											x							
Terminalia mollis	3	x	x	x	x					x	x								x					x		x							x						
Vitex doniana	3	x	x	x	x						x		x						x	x	x			x								x			x				
Ziziphus abyssinica	4	x	x	x	x						x		x						x	x	x								x			x	x	x					

10. Evergreen and semi-evergreen bushland

Species		Wood											Food							Fodder		Environmental							Other											
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamenta/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Acacia brevispica	1	x																	x	x	x															x				
Acacia drepanolobium	1	x	x														x		x	x	x															x				
Acacia gerrardii	1	x	x	x	x						x						x		x	x	x	x			x															
Acacia hockii	1	x															x			x									x			x								
Acacia kirkii	3	x	x																x	x		x											x								
Acacia mellifera	1	x	x	x						x	x						x		x	x	x				x	x							x				x				
Acacia seyal	1	x	x		x											x	x		x	x	x				x			x			x	x	x							
Acacia xanthophloea	4	x	x	x	x												x		x	x	x		x		x		x						x								
Acokanthera schimperi	3									x			x									x	x														x	x			
Azanza garckeana	4	x	x	x						x			x				x	x		x	x	x	x	x					x												
Calodendrum capense	3	x	x	x	x					x		x									x	x	x	x				x													
Capparis fascicularis	3												x						x																					
Carissa edulis	3	x											x								x							x													
Combretum molle	4	x	x	x	x					x									x		x			x		x											x				
Cussonia holstii	3			x					x	x	x								x	x	x	x																		
Dodonaea viscosa	3	x			x					x									x		x	x				x						x		x						
Dombeya burgessiae	3																		x		x							x												

continued

Species		Wood											Food							Fodder		Environmental							Other									
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamenta/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Dracaena ellenbeckiana	3										x																											
Elaeodendron buchananii	3	x	x	x															x			x		x												x			
Euclea divinorum	3	x		x						x	x		x			x			x	x	x												x			x			
Euclea racemosa	3	x		x						x	x		x			x			x	x	x												x			x			
Euphorbia candelabrum	3	x		x					x		x								x			x								x		x	x			x			
Euphorbia tirucalli	3	x																	x	x	x	x								x		x	x		x		x		
Flacourtia indica	4	x	x	x	x					x	x	x	x					x	x	x	x											x							
Grewia tembensis	3	x									x		x						x	x												x							
Juniperus procera	3	x	x	x	x	x			x										x			x	x					x								x			
Olea europaea	3	x	x	x	x	x					x		x		x	x			x		x	x	x					x					x	x		x			
Rhus natalensis	3	x	x	x									x						x	x		x	x					x				x		x					
Schrebera alata	3	x	x																x				x																
Scutia myrtina	3												x						x	x		x																	
Senna singueana	4																		x													x							
Tarchonanthus camphoratus	3	x		x												x			x			x			x	x								x		x			
Vangueria madagascariensis	4	x			x					x	x		x						x		x	x																	

11. Semi-evergreen thickets

Species		Wood											Food							Fodder		Environmental							Other												
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamenta/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Acacia brevispica	1	x																	x	x	x															x				
Acacia gerrardii	3	x	x	x	x						x						x		x	x	x	x			x															
Acacia hockii	3	x															x			x								x				x								
Acacia kirkii	3	x	x																x	x		x											x							
Acacia senegal	3	x	x		x					x							x		x	x	x					x	x		x								x			
Acacia seyal	1	x	x		x											x	x		x	x	x				x			x		x	x	x								
Albizia coriaria	1	x	x	x	x			x							x				x	x	x	x	x		x									x		x				
Allophylus africanus	3																		x	x	x					x			x											
Capparis fascicularis	3												x						x																					
Capparis tomentosa	3	x																	x														x							
Carissa edulis	3	x											x								x						x													
Cordia sinensis	4	x		x	x					x	x		x			x	x		x	x	x							x		x			x			x				
Euclea racemosa	3	x		x						x	x		x			x			x	x	x										x		x	x		x				
Euphorbia candelabrum	3	x		x					x		x								x		x									x		x	x			x				
Grewia bicolor	3	x			x					x	x		x						x	x	x							x												
Grewia villosa	4	x			x					x	x		x						x	x	x							x								x				
Harrisonia abyssinica	3																		x		x											x				x				
Olea europaea	3	x	x	x	x	x					x		x		x	x			x		x	x					x						x	x						
Rhus natalensis	3	x	x	x									x						x	x	x	x									x									
Teclea nobilis	3	x	x	x	x					x	x								x																	x				

12. *Acacia* and allied vegetation on soils with impeded drainage

Species		Wood											Food							Fodder		Environmental							Other																
	Table	Firewood	Charcoal	Timber/furniture/Construction	Poles/posts	Flooring	Veneer/plywood	Boat building	Beehives	Tools/Tool handles/Shafts	Carvings/Utensils/Walking stick/Bow/arrow	Farm Implements	Edible fruit/nuts/seed	Vegetable/edible leaves/edible roots	Seasoning/Flavouring	Drink/Soap	Edible oil/gum/inner bark	Jam/Syrup	Medicine	Fodder	Bee forage	Shade	Ornamental/Avenue tree	Mulch	Nitrogen fixation	Soil conservation/soil improvement	River bank/sand stabilization	Windbreak	Fibre/weaving/rope	Thatch/roofing/Mats/Baskets	Resin/Gum/Glue/Latex	Tannin/Dye	Live fence/Dead fence	Ceremonial	Toothbrushes	Boundary marking	Veterinary medicine	Toxin/Insecticide/Repellent	Cosmetic/Soap/Perfume/Oil	Brooms
Acacia drepanolobium	3	x	x														x		x	x	x															x					
Acacia elatior	4	x	x	x	x						x								x	x	x	x		x		x						x									
Acacia etbaica	3	x		x															x																						
Acacia gerrardii	1	x	x	x	x						x						x		x	x	x			x																	
Acacia mellifera	1	x	x	x						x	x						x		x	x				x	x							x				x					
Acacia polyacantha	1	x	x	x						x		x					x		x	x		x		x	x																
Acacia senegal	4	x	x		x					x							x		x	x					x	x		x								x					
Acacia seyal	1	x	x		x											x	x		x	x				x			x			x	x	x									
Acacia sieberiana	1	x	x	x													x			x	x	x			x				x		x	x				x					
Acacia tortilis	3	x	x	x	x								x				x		x	x	x	x			x	x	x		x		x	x	x				x				
Acacia xanthophloea	4	x	x	x	x												x		x	x		x			x		x						x								
Albizia amara	3	x	x	x	x							x			x		x		x	x		x			x	x					x	x	x						x		
Balanites aegyptiaca	4	x	x	x	x					x	x		x	x			x		x	x	x			x				x			x		x	x					x		
Cadaba farinosa	4	x												x	x				x	x															x		x				
Combretum molle	4	x	x	x	x					x									x		x			x		x											x				
Cordia sinensis	4	x		x	x					x	x		x			x	x		x	x									x		x			x			x				
Dalbergia melanoxylon	3	x	x	x	x						x								x	x				x	x																
Grewia tenax	4	x								x	x	x	x						x	x									x		x				x		x				
Phoenix reclinata	4	x		x									x			x				x		x								x				x							
Polyscias fulva	4	x		x					x		x								x	x				x																	
Salvadora persica	4												x						x	x	x					x	x								x		x				
Sclerocarya birrea	3	x	x	x	x				x		x		x			x	x		x	x	x			x					x			x					x				
Sesbania sesban	4	x			x														x	x	x				x	x			x							x		x		
Syzygium guineense	4	x	x	x	x					x			x						x		x											x									
Ziziphus mucronata	4	x	x		x					x	x		x			x			x	x	x	x										x									

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