BOTANICAL ASSESSMENT OF NGEZI FOREST, PEMBA

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Prepared for the Zanzibar Forestry Development Project of FINNIDA and the Finnish National Board of Forestry

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RECOMMENDATION

1. - A policy decision should be taken about the role of Ngezi Forest Reserve. If there is an interest in either forestry based on indigenous species, or in conservation, then a core forest area should be protected completely, without any disturbance, as a gene pool of forest species, and two buffer zones should be declared in which activities such as harvesting can take place; rehabilitation of the secondary bush should be accelerated. Specific recommendations about zonation are made in 3.3.5.1.

2. - For any timber harvesting zone there should be a plan involving a balance between extraction and growth rate of the standing timber; such a plan requires research into sustained yield capability. Minimum diameter size classes for harvestable timber are strongly recommended, to prevent depletion of stock.

3. - Verani tourist development: the establishment of a hotel for sport fishing is not compatible with the function of a Forest Reserve. It is recommended that the hotel is sited elsewhere. If this is not possible, strict guidelines should be adhered to; the site for the hotel should not be as large as 900 x 300 meter; and the fishing boat harbour for the hotel should under no circumstances be sited on the southeast of the Verani{Tondooni peninsula, because of the fragile and unique vegetation there. The authority of the hotel site should remain under the Forest Department, so the FD can keep control over any changes on the site. The permanent accommodation for researchers, as recommended by Bensted-Smith, in the form of two bandas, would greatly help the research on Ngezi by Tanzanian and overseas researchers.

4.- The spread of *Maesopsis eminii* should be monitored. If there is reason to assume that the species is going to be a problem, larger stands should be harvested, and other individuals should be ring barked. A year later the forest should be checked again for new saplings, which should be removed.
BETWEEN 20 DECEMBER 1989 AND 2 JANUARY 1990 I VISITED NGEZI FOREST WITH THE PURPOSE OF PREPARING A REPORT, WHICH WAS TO INCLUDE:

A. -a description of vegetation types and their location in the reserve area
B. - an assessment of the conservation values and importance of the vegetation types for conservation in Pemba and globally; identification of the species that are most important from a conservation viewpoint and their main areas of occurrence
C. -ecological aspects affecting the management of Ngezi Forest for conservation or for forestry, and an assessment of the effects of the exploitation and the introduction of exotic species in the ecology of the forests.
D. -a review of the existing plant lists, and the list of vernacular names/botanical names of the tree species
E. -general forest and vegetation maps and any maps necessary to illustrate the findings, results and recommendations
F. -identification of areas of concern or proposals for future management considerations

Ngezi Forest is situated in northwest Pemba (Northern Region, Micheweni District).

The soils of the main part of the forest are recent alluvial sands, but in the southern half there are stands of Philippia heath-land on white and red loam sands (these are very leached, and thus poor in minerals; the groundwater table is low). On the western side of the reserve (Tondooni peninsula) the soils are of the so-called "coral rag" type: thin sandy soil over coral, with many coral outcrops.

The climate of Ngezi is no different from that of the rest of Pemba: temperature between 212 celsius at the coldest and 342 celsius at the warmest; mean rainfall 1860 mm per year, with the Masika, or long rains (March-May), averaging 363 mm per month, and the Vuli, or short rains (November-December), averaging 175 mm per month. The climate is equable, and there is rain almost every week of the year.

Ngezi is a forest reserve, and the gazetted area covers 14.4 km2 (1440 hectare); of this area, some 550 hectare are covered with moist forest; 200 hectare are covered with coastal evergreen thicket and dry coastal forest; and 220 hectare are covered with giant heath vegetation. The remaining 490 hectares are secondary bush, resulting from over harvesting of the moist forest.

The status of Forest Reserve has been in force since the early 1920s. In 1923 the first planned extraction of timber started: mainly Mvule (Milicia), Mgulele (Antiaris), Msufi mwitu (Bombax) and Mwavi (Erythrophloeum). Since then, all of the moist forest has been used for selective harvesting, with the exception of the swamp forest. The forest on coral rag near Tondooni has also been exploited, mainly for Mvule. Replanting with both exotic and indigenous species has been carried out on harvested plots since the late 1940s. The Reserve is now divided into 84 compartments, which are marked by both cement beacons and boundary paths in the northern-central and eastern parts of the forest.

The ground staff at Ngezi Forest currently consists of 4 people; three of these accompanied me on all my visits to the forest, and impressed me by their sound knowledge of the trees of the forest.

Outside disturbance is encountered in the form of the cutting of poles (for building purposes) and firewood-collecting. This happens mostly near the margins of the forest, although the central heartland is regularly visited by poachers to collect firewood; in 1988 these poachers (or honey collectors) were probably responsible for the fire that devastated the entire heath area. In the Tondooni peninsula there is some collecting of young Mkindu (Phoenix) leaves for basketry.

A recent development is the proposed establishment of a beach hotel at Verani, near Tondooni village, but entirely within the Forest Reserve. At the time of my visit the
boundaries of this hotel plot, some 900m long and 300m wide, had been cleared and marked with small cement markers. The hotel is supposed to cater for a sport-fishing clientele, and I have heard reports that the organization concerned also wants to establish a base for their fishing boats on the south-eastern side of the Tondooni peninsula.
1. VEGETATION TYPES

1.1 MOIST FOREST

Situated on deep alluvial soils in the central Western part of the Reserve, the moist forest is dominated by Mjoho (Odyendea zimmermannii), with as common associates Mchenza msitu (Uapaca guineensis), Mgulele (Antiaris toxicaria), Mchikichi (Elaeis guineensis), Mwavi (Erythrophloeum suaveolens), Mchochia mke (Pachystela brevipes), Msufi mwitu (Bombax rhodognaphalon) and Mdadawada (Croton sylvaticus).

The number of tree species is generally quite high: in the 29 tree plots of this type there are (6-) 9-10 (-13) species per 30 trees counted. The canopy in the mature plots is some 30-40m high, and the common trees often have a DBH of a meter or more. It is noticeable that there are very few epiphytes.

Within the moist forest I was unable to distinguish separate subtypes, as Rodgers et al. did, and I cannot agree with Rodgers' division of moist high forest in two vegetation types: based on my 31 tree counts I was unable to distinguish any types, even when arranging my tables the way Rodgers et al. did theirs, I do believe the southeast part of Ngezi is moister than other pans, with species not occurring elsewhere: Ensete, Dracaena fragrans; and near the heath zone, the vegetation changes to a drier facies, with Uapaca becoming more important.

1.2 SWAMP FOREST

Riverine swamp forest is confined to a narrow belt, some 30-50m wide, along forest streams. The soils here are muddy and have a higher concentration of organic contents than those of the moist forest. Barringtonia racemosa and Samadera indica form an almost pure stand, with various lianas (see description of compartment # 18); the canopy is some 15-20m high, and stands are dense, although not many trees have diameters of ≥20cm.

Pond swamp forest: in compartments 12 and 19 there are swamps which have pure stands of Raphia farinifera, or stands of Raphia and Barringtonia, with some Anthocleista.

1.3 COASTAL THICKET AND DRY EVERGREEN FOREST

The coastal thicket is confined to the coral rag on the Tondooni peninsula. Dominant species are Mpilipili doria (Sorindeia madagascariensis) and Mjengo (Diospyros consolatae), with Mkwaju (Tamarindus indica), Mbambakofi (Afzelia quanzensis), Mkunguni (Terminalia boivinii), Mpapai dume (Cussonia zimmermannii), Mgulele (Antiaris), Mchungwa mwitu (Olea woodiana).

The number of tree species is as high as in the moist forest, but the canopy is much lower (8-15m, with emergents to 20-25m) and trunk DBH is generally less than that of the moist forest species. However, stands are much denser (more individuals per area). Towards the moist forest the character of the thicket changes: the canopy gets higher, Antiaris and Mvule (Milicia) become more common.

1.4 PHILIPPIA HEATHLAND

This type occurs in the centre of the reserve, surrounded by forest on all sides (although the strip of forest to the west is very thin). Soils are very poor; species are low in number - mainly Mdamba (Philippia mafiensis) which forms almost pure stands, although scattered individuals of Msambaru ziwa (Syzygium cordatum), Mfuu (Vitex doniana), Mlangawa (Ficus lutea), Psychotria holstii occur, mainly near the numerous little ponds; Raphia is often present in these ponds. Proper inventarization of this area was not possible- it looked like a battle area, since it had been burned at the end of the long dry season 1988. Dead trees dotted the landscape, and although Philippia is regenerating vigorously, most plants of this species were still only 1-2m high.
Rodgers et al. visited this area in December 1983, and found the canopy completely dominated by *Philippia*, at some 6-9m high. Some trees found were *Apodytes dimidiata*, *Canthium bibracteatum*, *Myrica* sp., *Mystroxylon aethiopicum*, *Psychotria holtzii*, *Psydrax recurvifolia*, *Syzygium cordatum* and *Vitex doniana*.

1.5 FRESHWATER SWAMP
Not visited by me situated at the northern edge of Ngezi, but outside the reserve itself. Rodgers et al. describe this vegetation type as a complex of grasses, sedges and fern, with towards the moist forest an area of dryer grassland with occasional thicket clumps of 8-10m high, with *Parinari curatellifolia*, *Syzygium cordatum* and *Uapaca sansibarica*.

To the south of the reserve, south of compartment 65, there is an area of freshwater swamp with sedges, *Typhonodorum*, and *Raphia*.

1.6 MANGROVE / SALINE SWAMP FOREST
A large mangrove area occurs north of the reserve, in the bay south of the Kigomasha peninsula; this is outside the Forest Reserve, and I did not visit it. Rodgers et al. did visit this area, and give some details (*Sonneratia alba*, *Avicennia marina*, *Bruguiera*, *Rhizophora*, *Ceriops*, *Lumnitzera*, *Heritiera*).

Smaller patches of mangrove occur within the Reserve area, around the bay to the east of the Tondooni peninsula. *Rhizophora*, *Bruguiera*, *Ceriops*, *Heritiera*, *Xylocarpus granatum* were seen on the west side of compartment 65.

CONSERVATION VALUES

2.1 VEGETATION TYPES

Introduction
Forest in lowland East Africa is not common. Excessive exploitation, agricultural encroachment, wholesale clearing for the establishment of plantations, tourism development and its concurrent spreading disturbance, are all factors affecting the existing natural forests. The protection of any type of forest in lowland East Africa is a logical step, if one is interested in conserving the natural resources of a country; and this conservation is becoming more urgent as more and more forest is disappearing. Some reasons for the general conservation of forests:
- storehouses of species: the amount of species of plants and animals in a forest is higher than in almost any other kind of terrestrial habitat. The fact that many species are interdependent (for shelter, food, pollination or procreation) means that if forest species are a target for protection, then their original habitat is the cheapest and most convenient way to conserve them. Reasons for species protection may range from pure economic (timber, medicinal plants, local products, source of foreign exchange through tourism) through abstract economic (in-situ gene bank for possible future uses) to religious (protection of species for their own sake).
- the reasons to protect the forest for the forests sake, rather than as an assemblage of species, range from environmental (global and local climate buffering, pollution buffering, erosion control) to cultural (the role of the forest in local community culture, as part of a peoples' history).

Ngezi Forest.
Ngezi encompasses some vegetation types that are important for their specific Conservation values.

The moist forest of Ngezi shows an assemblage of species that is not paralleled in any other East African forest. Not only is the most common Ngezi species, *Mjoho*,
classified as globally rare (see Atlas of the rare trees of Kenya), but the occurring together of species restricted to coastal East African forests (Odyendea, Bombax), montane elements (Cassipourea, Philippia), Eastern Indian species (Samadera of the swamp forest, Chrysophyllum lanceolatum) and Madagascan links (Chrysalidocarpus, Typhonodorum) is unique in a global sense.

Quite apart from these considerations, Ngezi is the only sizeable forest on all of Pemba. Up to year 1840 most of Pemba was covered with forest; it is only in the last 150 years that clearing for plantations has destroyed over 95 % of the former forest area. Ngezi is, together with Ras Kiuyu forest (200 hectare) and Msitu Mkuu forest (200 hectare) the only forest left on Pemba. It is, therefore, part of the historical and cultural inheritance of the people of Pemba. The least disturbed parts of the forest are also extraordinarily beautiful.

The Philippia heath type is unique to Mafia and Pemba, and is rapidly being destroyed on Mafia (see a recent article in News Bulletin); therefore, conservation of this type of vegetation also assumes a global importance.

The coastal evergreen thicket/dry evergreen forest was once a common type, widespread on coral rag in East Africa. However, the "widespread" was confined to a narrow coastal belt, in which many land use factors are nowadays competing for space; as usual, natural vegetation loses out to agriculture and tourism development in most areas. The importance of the remaining coral rag forests increases with their diminution in extent. Many species in this zone are restricted to this type of vegetation; again, conservation values are local, national, regional and global. As far as Zanzibar, Unguja and Pemba are concerned, the coral rag thicket/forest of Ngezi is the best and most undisturbed I have seen (and I have visited all of these forests and most of the thicket).

Mangrove vegetation is of national importance, both as a nursery for many commercial marine fish and crustaceans, and as a renewable source of poles. The area of mangrove within the Reserve is quite small, however.

2.2 PLANT SPECIES

The two Ngezi Forest endemics: Chrysalidocarpus pembanus and Ensete proboscideum are of global importance. Chrysalidocarpus is in the category endangered in the World IUCN Red Data Book; Ensete was not known to the compilers of this book but should be in the same category. Chrysalidocarpus is doing well all over the forest, in areas of high forest, in rather secondary areas, and in the coral rag (forest/thicket there must be several thousand individuals (estimate 3000). Ensete is much less common, and is restricted to the south western part of Ngezi high forest; there' are an estimated 400 individuals.

Rare species occurring in Ngezi are Odyendea zimmermannii, Philippia mafiensis, Typhonodorum lindleyanum, Allophylus vestitus, Eugenia sp. novo The first two species are common within the forest; Typhonodorum is not uncommon in the swamps to the north and south; Allophylus vestitus is very rare within the forest; and Eugenia occurs in the southern' part of Tondooni peninsula, in coral rag thicket.

I believe that there will be more exciting finds, probably including new plant species, when a systematic and careful inventory of the forest is undertaken. Collections up to now have been casual (Vaughan, Greenway), or systematic but short-term (Rodgers et al., this study).

2.3 OTHER WILDLIFE

Although not really part of this study, faunal considerations also have to be taken into account when looking at the conservation values of Ngezi.

Pteropus voeltzkowi Matschie, the Pemba flying fox, is endemic to Pemba, and we found a colony of 150-200 animals roosting in the north western part of the forest (Compartment #4).

Cercopithecus aethiops nesiotes Schwarz, the Pemba vervet or green monkey, is near endemic to Pemba, and occurs in Ngezi.
Cephalophus monticola pembae Kershaw, the Pemba Blue Duiker, is possibly endemic to Pemba (at the moment the status of the races is uncertain), and occurs in Ngezi.

I am uncertain whether Otus pembaensis/rutila, the Pemba Scops Owl, and a full endemic species, occurs in the Reserve.

Of the endangered Zanzibar endemic Colobus basius kirkii Gray, the Zanzibar red colobus, some fourteen specimens were translocated to Ngezi forest in the early 1970s (1974?). Nd. Toufiq tells me there are now some 240 of these animals; however, I never saw any myself.

Again, I believe that there are many undiscovered species in Ngezi, especially with regard to insects (no investigations done to my knowledge), arachnids, annelids, amphibians and so forth.


3. ECOLOGICAL ASPECTS OF FOREST MANAGEMENT

3.1 EFFECTS OF EXPLOITATION AND INTRODUCTION OF EXOTIC SPECIES

Ngezi Forest has been exploited systematically since it was gazetted as a forest reserve. Details are only available on timber harvesting since 1957. Between 1957 and 1964 an Indian sawmiller, V.R. Joshi, had a sawmill in what is now compartment 32. The cut trees had to be taken out by truck, for which access tracks had to be cut. Replanting took place with Mvule (*Milicia*), Mtondoo (*Calophyllum*), *Terminalia catappa*, *Cordia alliodora*, *Khaya nyasica*, *Tabebuia pentaphylla* and *Grevillea robusta*.

From 1964 to 1966 the sawmill was run by the Government, but in 1966 it was dismantled.

In 1975 the Kizimbani Sawmill was established at Wete, and Chinese experts used Ngezi Forest Reserve as the main source of raw materials. They did their harvesting between 1975 and 1978, and took out logs with a tractor, which made more parts of the forest accessible with less need for good tracks. Replanting was done with Mvule (*Milicia*), Mtondoo (*Calophyllum*), *Terminalia ivorensis* and *Cordia alliodora*.

Between 1978 and 1988 felling continued for the Kizimbani sawmill, first under the Ministry of Industries and Trade [replanting with *Msisi*, *Maesopsis eminii*, and *Cordia alliodora*], but from 1983 under the Forestry Department (replanting with Mtondoo, Mvule, *Terminalia catappa*, *T. ivorensis*, *Cordia alliodora*, *Maesopsis eminii*, *Khaya sp*, *Tabebuia pentaphylla*). At present the Forestry Department is responsible for the issue of permits for the felling of trees in the Forest Reserve. The favorite tree is still Mvule (*Milicia excelsa*) but supplies of mature trees are running low.

### HARVESTING OVERVIEW:

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As can be seen in the notes on Compartments (see 8) there is enormous variation in the effects of exploitation. Some compartments, having been harvested only once (e.g. comps. 8 and 11, harvested by the Chinese in 1975-78) are low and bushy, and the canopy is almost completely destroyed. Adjacent plots may be in better shape, despite having undergone harvesting twice (e.g. compt. 10, harvested by Joshi in 1958-63, and by the Chinese in 1975-78: canopy 30-40 % at 40m, 80 % at 20m) or may be in deplorable shape (e.g. compt. 9, harvested at the same times as compt. 10).

Most introduced timber species need careful tending, otherwise they are unable to compete with the indigenous species, at least in their sapling stage; examples are plot nr. 36 and plot 70: this last plot was planted with Khaya, but we were unable to find a single one.

There are only two species that do well in competition. One is A verra hoa, which we found rejuvenating in plots 58 and 70; the other one is Maesopsis, which we found rejuvenating in plots 1, 3, 4, 6, 8, 9, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 35; this concerns seedlings and saplings, presumably wild-sown by birds. Obviously this species is doing quite well, and monitoring of the spread of Maesopsis is recommended. In the Usambara mountains (Tanzania) Maesopsis is a serious weed, taking over large parts of the indigenous forests.

3.2 MANAGEMENT CONSIDERATIONS: CONSERVATION VIEWPOINT AND FORESTRY VIEWPOINT

Present management is restricted to the patrolling of the forest against unlicensed cutting and to the licensing of incidental timber harvesting; but from my field visits clear signs of an overall forest policy seem to be quite absent.

In some plots, especially those along the only road, undergrowth seems to be cleared at regular intervals. This is done, I presume, from reasons of "selection" forestry: all competition is removed, so the selected timber species may grow unhampered. Strict adherence to this policy has produced an impressive spectacle of giant trees soaring to some 40 meters - but no young trees or secondary canopy. This may be a very cosmetic spectacle; but from a nature conservation view it is not impressive, although the view of the mature trees is. For natural forest second and third stories, including a vigorous under storey, are an integral part of the whole. From a foresters' view, rejuvenation of timber species might seem useful - not an even-aged stand of mature trees.

As far as land use is concerned, I do not believe there is any conflict about the existence or boundaries of the Forest Reserve.

3.3 AREAS OF CONCERN; PROPOSALS FOR FUTURE MANAGEMENT

Introduction: forest use in general

Forests have always been a source of local products, but the use of large diameter trees of selected species as building materials is a development of the last century, from which Ngezi has not yet recovered.

Local products such as binding materials from climbers (Landolphia, Flaggellaria, Uvaria) thatching material from palms (Phoenix, Alaeis) and building poles and laths (Diospyros, Averrhoa, many other species) are relatively cheap, they are a renewable resource, and they preserve traditional building skills that are suited to local climate. Firewood and honey, medicines, edible fruits, basketry materials, hardwood for small
implements; all these "minor" forest products are part of traditional forest use by local people, and in other parts of the country make the forest part of the community, and provide local people with an interest in forest conservation. It is not known to me how many licences are given out for such products; but if core and buffer zones are established, the outer buffer zone might well be used by local people for such purposes, on a license basis, and sustainable yield of such products should be monitored at regular intervals, to prevent overuse and the resultant genetic erosion. Sustainable yield can be defined as the cropping of a resource without pushing the system beyond its limits of recovery; a wide safety margin is essential, in case of unforeseen factors.

3.3.1 Damaged sites

It is clear that plots like 8 and 9 are useless as far as yield is concerned. They have effectively been raped for short-term gain, without any thought for sustainable use. This is waste-ful, and bad policy. If the forest is to be exploited, it should be done on a sustainable yield base: the interest of the forest capital should be used, and the capital itself should not be depleted. If the plots which are now in bad shape (1, 5, 6, 7, 8, 9, 11, 13, 14, 15, 20, 21, 35, 53, 58, 59, 64, 68, 70, 71, 74, 75, 76, 71, 78) are to be rehabilitated, the method to go about this depends on the purpose - is the whole forest to be conserved as a Nature Reserve/National Park, or are the plots intended for sustained use by the Forestry Department.

If conservation is the main aim, there should be limited replanting with fast growing pioneer species so that a quick canopy can be established under which natural regeneration can take place. At the moment the tangled bush inhibits forest regeneration as it lets in too much light, and, choke pioneer forest species. Some limited clearing of bush before replanting is probably useful. *Ficus exasperata, Croton sylvaticus* and *Antiaris toxicaria* are species which might be considered, as I believe them to be the pioneer canopy trees of Ngezi.

If forestry is the main purpose, replanting should be done with pioneer species which are fast growing, and harvestable besides. There is probably more expertise within the Forest Department than I have, but species which seem to be doing well in a forest environment are *Cordia alliodora, Terminalia ivorensis* and *Maesopsis*; however, this last species should be harvested quickly, as there is a danger of its becoming a weed. The eventual target might be to establish semi-natural forest in a marginal buffer zone, with high value species such as *Mvule (Milicia)* and *Mtondoo (Calophyllwn)* as the main timber species.

3.3.2 Good forest sites

If forestry is to be the purpose of the Reserve, there should be research into the amount of timber which can be extracted on a sustainable yield basis. Although I am no forester, I can see that up to now most parts of the forest have been overexploited; especially the Chinese experts have harvested plots in such a way that they will not recover for a long time. I would think that the size of the high, moist forest in good state (canopy over 25m, canopy cover ≥70 %) is less than 2 km², and too small to give a viable yield.

There is a larger area with a lower canopy (say, 20m high and with a more or less closed canopy) but the harvesting of non-mature trees does not seem a very viable proposition either.

So the choice seems to narrow down to the exploitation of the forest on a quick-gain basis, with no consideration for conservation; this is how it has been done in the past, and most mature trees of timber species (Milicia, Antiaris) have been harvested already. I believe that Ngezi as a selection/exploitation forest is long past its prime; unless other timber species are found to be economically exploitable (such as Odyendea) the whole idea of large-scale harvesting might have to be abandoned. Advice from a professional forester should be sought if the forest is to be exploited further.

Another possibility is incidental harvesting of single trees; this seems to be the policy at the moment. If this way of exploiting the forest is economically worthwhile, it might
very well be combined with conservation: a central core area might be declared a Nature Reserve, while the area around it would be a buffer zone where incidental harvesting could take place, and where local people can harvest minor forest products, with a license from the Forest Department. The core area would serve as a gene pool of forest species, specifically of timber trees, from which planting material can be used for the rehabilitation of the buffer area.

If the whole forest is to be conserved as a Nature Reserve or National Park, without exploitation of any kind, some rehabilitation will have to take place, also starting from such a core area.

### 3.3.3 heath zone

Up to now, management of this area has been absent. I think that is probably a good thing – if fires like the 1988 one can be prevented in the future. The 1988 fire was caused by illegal entrants who were either collecting honey (when smoking out a hive?) or collecting firewood. Access to this area should be restricted, for instance by making the present track through plots 76-77-33 impassable to oxcarts. The point can be made that heath in general benefits from regular or cyclical burning and/or grazing, because it might otherwise revert to another type of vegetation; burning, however, if on the scale of a major conflagration, will attack the margins of the forest and push back these margins. This should not be allowed to happen.

The Forestry Department has so far not done anything with this area; Philippia, which is absolutely dominant over the whole area, is not used for anything (except firewood). Since this species is a rare one and the vegetation type rare as well, the heath zone might well be made into a conservation area. The planted trees (there are some Eucalyptus and cashew trees) should be removed. Any scientific investigation of this area would yield interesting data - as far as I know no serious studies have ever been done on the heath areas of either Mafia or Pemba.

### 3.3.4 coastal belt

Exploitation has been restricted to the harvesting of timber species; due to the nature of the terrain (rather low canopy, with only the large emergents interesting to the exploiter) this has not been as destructive as in other parts of the Reserve, with the possible exception of compartment 74. This coastal thicket/dry forest is much more vulnerable to disturbance, with its much shallower soil over coral, which also causes it to be drier than the rest of the forest. Any development in this area, and especially the proposed beach hotel, should be restricted as much as possible if the forest is to remain more or less intact. Tourism, especially if geared towards sport fishing, is not dangerous to the forest in itself; the building activities, access, and staff needs (firewood; small plots; kitchen gardens; living quarters?) definitely are a cause of prime disturbance. In Kenya, I have seen several hotels being built adjacent to dry forest of a similar kind; when the hotel is built, everything looks fine, and everybody pledges their soul to conservation; but after a few years, the forest within a radius of a kilometer is intensely degraded, or has completely disappeared. A study visit to Diani forest, on the south Kenya coast, might prove illuminating in this respect.

It is unclear to me why a hotel for sport fishing should be sited inside a Forest Reserve; especially since this Forest Reserve contains most of the natural forest on Pemba, and the hotel would contribute nothing to nature conservation or to forestry practices.

If it is true that this beach hotel would be connected to a boat harbour on the southern side of the peninsula (compartment 84) this whole southern area would be opened up to disturbance. It is this southern part of the peninsula which has the best and most undisturbed example of coral rag thicket/forest, and Rodgers et al. in their 1986 report recommended this area (plots 82, 83, 84) as a strict Nature Reserve. I would suggest the plots 80 and 81 are added to this proposed Reserve, to preserve this kind of vegetation which formerly was widespread on Pemba and Zanzibar, and that any activities are banned.
from this area, specifically including this harbour area for tourist boats and any paths leading to, or through, this area.

### 3.3.5 general and specific recommendations

#### 3.3.5.1 zonation - establishment of a core and two buffer zones.

The core zone would form an area in which disturbance is absent; it should serve as a refuge for forest wildlife, and an undisturbed gene pool from which the buffer areas can be rehabilitated. The forest core zone could be formed from compartments 18, 19, 23, 24, 25, 28, 29, 30, 31, 36, 37; no timber cutting or undergrowth clearing should be effected in this zone. An inner buffer (with minimal disturbance initially, and rehabilitation efforts concentrated here) could be of compartments 16, 17, 10, 11, 12, 13, 20, 26, 32, 44, 43, 42, 41, 35, 34, 33, 27, 21 and 22. The other compartments could form an outer buffer, with licensing to local people for the use of minor forest products (see 3.3, introduction)

The coastal forest/thicket core zone could be formed from compartments 82, 83, 84, with an inner buffer (minimal disturbance) of plots 80, 81 and an outer zone (minor local use, selected species harvesting) of 72, 73, 74, 78, 79.

#### 3.3.5.2 the removal of timber from the buffer zones should be done with minimum interference of the structure and functioning of the ecosystem: harvesting should be on a true selection basis, with sustained yield as a target, based on (over)mature specimens, with established minimum diameter sizes. The accelerated removal of Maesopsis, to prevent this species of becoming a serious problem, could be considered.

#### 3.3.5.3 establishment of nature trails for educational purposes; hiking trail for tourist purposes.

A nature trail, possibly with a small exhibit banda, for school use could be established near the eastern entrance to the reserve. Such a nature trail could go through high forest to the edge of the heath area and back to the entry by way of the stream; local guides and supporting leaflets would be necessary. A larger hiking trail through high forest, swamp forest; Raphia swamp, heath zone and coastal forest could form an attraction to tourists, and entrance fees.(for tourists) could generate some income; accommodation for tourists should be outside the Reserve, generating income to local people; and care should be taken that such trails are not used by illegal forest product poachers.

#### 3.3.5.4 A reserve such as Ngezi, with its diverse habitats (moist forest, swamp forest, coastal thicket/forest, heathland, swamps, mangrove) within such a small area is a prime site for integrated research projects by students of the University.

#### 3.3.5.5 The area between compartments 38/45 and the bay to the west shows houses and cultivated plots on the 1979 aerial photographs. Habitation so near the Reserve, and almost completely surrounded by the Reserve, is bound to cause conflicts. If there is a move towards conservation, this is one of the serious land use problems to be solved: with regards to nature conservation, there should be no strip of cultivation between the Reserve and the Bay. A visit to this area might prove whether this is still inhabited or not.
4. REVIEW OF EXISTING LITERATURE, REPORTS, PLANT LISTS, LOCAL
NAMES LISTS, AND MAPS

Existing literature is minimal: the only report on Ngezi is the one by W.A. Rodgers, John Hall, L.
Mwasumbi, I. Swai and K. Vollesen (July 1986) - the conservation status and values of Ngezi Reserve,
Pemba Island, Tanzania (cyclostyled report of the Forest Conservation Group, University of Dar es
Salaam). This is an excellent report based on a four-day visit to the Reserve in 1984. I do not agree with
some of their identifications (see species list, 9) and with their division of moist high forest in two
vegetation types: based on my 31 tree counts I was unable to distinguish any types, even when arranging
my tables the way Rodgers et al. did theirs. Apart from these minor criticisms, I found the report an
extremely useful introduction to the forest, and I made much use of it; especially their list of local
names/botanical names saved me a lot of time. I have expanded their list with 85 local names, and their
species list with 51 species.

A typed report by Grant, Conservator of Forests in the early part of this century, states that Antiaris
(15%) and Erythrophloeum (10 %) are the most common species; he calls Mvule scarce. In 3 transects he
found Antiaris the most common tree of more than 3.6m circumference (estimated at 522 cubic feet/acre)
and Odyendea second with 300 cubic feet/acre; other species totaled 528 cubic feet/acre.

A letter by L. Wigg (Forest Dept., Morogoro, dated 23.2.1939) gives the local names of common
species and some tentative identification.

It should be noted that there are discrepancies between the various maps of Ngezi Forest Reserve:
the map by T. Khamis (1950) and the map in Rodgers et al. (1986). On the Rodgers map the compartment
numbers between plots 43 and 69 do not agree with
those of the Khamis map: the plot to the east of 43 should be 44 (numberless on the Rodgers map) and all
plots between here and 68 should have one added to their number; so 68 should be 69 (and the Rodgers
69 is part of the Khamis 69). The Rodgers report should be read with this in mind.

I cannot agree with the recommendations of Rodgers et al. towards the strict conservation of
compartments 6, 7, 11,.17 and 18 (or 10 and 12 instead of 17 and 18) .
These are quite disturbed plots, and would not be as good a gene pool and source of planting material as
the core area recommended in 3.3.5.1. With their recommendation of plots 82, 83 and 84 to protect the
coastal thicket/dry forest I concur absolutely. Plots 45 and 46 (called 44, 45 and 51 in the Rodgers report)
do not need formal protection, since utilization of the heath zone is minimal (see 3.3.3)

5. ACKNOWLEDGEMENTS

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more time. N. Toufiq, who has worked in Ngezi for many years, has an unrivalled knowledge of the
whole Reserve, and gave me additional information on harvesting of various plots and the planting of
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I am also grateful for the help I received from the staff of the Forest Department at Wete, and
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from Konde to Ngezi (and beyond) many a time.
6. MAPS
6.1 Ngezi Forest Reserve in relation to the surrounding area page 13
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MAP 6.1 NGEZI FOREST RESERVE AND ITS SURROUNDING AREA
MAP 6.2  NGEZI FOREST RESERVE: COMPARTMENTS
MAP 6.4 PROPOSED ZONATION
MAP 6.5 DISTRIBUTION OF SOME INTERESTING SPECIES
Note that in 30 TREE COUNTS only those trees have been counted which have a DBH of more than 20cm; they are enumerated in sequence of most common first, least common last; only genus is mentioned, except in cases where this can lead to confusion. For the full species names, see 10.

The other species mentioned are the ones noticed during the quick survey of the compartments, and in general these will be the common ones.

**Compartment # 1**
Very open; boundary to N planted with, *Eucalyptus* and *Calophyllum*. Soil somewhat swampy.

The whole aspect of this plot is bushy, with some larger *Albizia adianthifolia*, *Elaeis (common)*, *Erythrophloeum*, *Ficus lutea*, *F. natalensis*, *Macaranga*, *Pachystela spp.*, *Syzygium cumini*, *Uapaca*, *Vitex*.

Shrubs, lianas and herbs: *Asplenium*, *Culcasia*, *Harungana (common)*, *Lomariopsis*, *Dissotis*, *Nephrolepis (common)*, *Salacia*, *Zamioculcas Maesopsis: young ones occasional.*

**Compartment # 2**
Canopy 30m high, canopy cover 60-75 %, soil sandy; signs of firewood collecting and pole-cutting.

30 TREE COUNT: Odyendea 14, Uapaca 9, Syzygium cumini 4, Cas.sipourea 1, Elaeis 1, Erythrophloeum 1.

Other trees: *Calophyllum*, *Cassipourea*, *Chrysalidocarpus*, *Elaeis*, *Ficus natalensis*, *Tabernaemontana ventricosa*, *Macaranga*, *Milicia*, *Pachystela sp.*, *Rawsonia*

Shrubs, lianas, herbs: *Asplenium*, *Chassalia*, *Culcasia*, *Flagellaria*, *Landolphia kirkii*, *MelaStomataceous herb*, *Nephrolepis*, *Strychnos*, *Zamioculcas*

**Compartment # 3**
Canopy 20m high, canopy cover 70-80 %. Signs of recent cutting (poachers). Soil sandy. Harvested 1978-83.


Other trees: *Antiaris*, *Chrysalidocarpus* (a grove of large specimens - DBH to 16cm!), *Elaeis (common)*, *Erythrophloeum*, *Tabernaemontana ventricosa*, *Ficus lutea*, *Pachystela*

Herbs, lianas and shrubs: *Adenia rumicifo*, *lia Culcasia*, *Dioscorea*, *Landolphia*, *Nephrolepis*, *Saba*, *Similax*, *Zamioculcas Maesopsis: young ones occasional.*

**Compartment # 4**
Canopy 10-20 (-30)m high, canopy cover 60 %; also one sizeable patch with canopy 30m high, canopy cover 60-80 %; clearings frequent.


Other trees: *Albizia adia*, *nthifolia Chrysalidocarpus*, *Elaeis*, *Tabernaemontana ventricosa*, *Odyendea*, *Pachystela sp.*, *Rauvolfia*.

Shrubs, lianas, herbs: *Culcasia*, *Dioscorea*, *Flagellaria*, *Gossypioides*, *cf Holarrhena*, *Landolphia*, *Nephrolepis*, *Polysphaeria parvifolia*, *Saba*, *Salacia*, *Strychnos*, *Suregada*, *Zamioculcas*

*Maesopsis* occasional young plants, frequent medium trees.

150-200 flying fox seen roosting here. Swahili name "popo".
Compartment # 5
Canopy patchy: 30m high cover < 50 %; 12-15m high cover 60 %; soil sandy. Plot harvested in the early'1960s (and then replanted with Cordia alliodora and Maesopsis) and In early 1980s.
30 TREE COUNT: Cordia alliodora 7, Odyendea 7, Maesopsis 6, Bombax 4, Elaeis 3, Erythrophloeum 2, Antiaris 1, Pachystela brevipes 1
Other trees: Bombax, Chrysalidocarpus, Odyendea, Pachystela sp., Rauvolfia
Shrubs, lianas and herbs: Acanth white, Aframomum, Costus, Culcasia, Cyperus, Gonatopus, Flagellaria, Landolphia, Polysphaeria parvifolia, Zamioculcas

Compartment # 6
Canopy patchy; up to 40m high but canopy cover < 50 %; soil sandy.
30 TREE COUNT: Odyendea 9, Maesopsis 6, Elaeis 5, Antiaris 2, Bombax 2, Cordia 2, Croton 1, Pachystela brevipes 1, Majidea 1, Uapaca 1
Other trees: Albizia adianthifolia, Chrysalidocarpus, Chrysophyllum cf. lanceolatum, Ficus sp., Pachystela sp., Rawsonia
Shrubs, lianas and herbs: Asplenium, Chassalia, Oncinotis tenuiloba, Psychotria schliebenii, Zamioculcas
Maesopsis: occasional young ones
The northern part of this plot is low and bushy. There is an oxcart track here, possibly leading from the Makangale area to the Raphia swamp in #7 and #12

Compartment # 7
I did not visit this compartment. Nd. Toufiq says it is low and bushy, and that the northern part grades into the mangrove area to the north. This information is consistent with the vegetation of plot 6.

Compartment # 8
Larger trees: Maesopsis (frequent), Odyendea, Antiaris, Erythrophloeum, Majidea
Other species: Albizia adianthifolia, Chrysalidocarpus, Chrysophyllum cf. lanceolatum, Culcasia, Elaeis, Tabernaemontana ventricosa, Landolphia, Pachystela, Rawsonia, Saba, Suregada, Zamioculcas
Maesopsis young plants locally common.

Compartment # 9
Harvested in 1957-64 and in 1975-78. Very bushy and low, with many open places and tangled undergrowth choked by lianas; with few larger trees: Antiaris 3, Croton 2, Macaranga 2, Antidesma 1, Ficus exasperata 1, Odyendea 1.
Other trees: Erythrophloeum, Tabernaemontana ventricosa (common), Pachystela spp, Rauvolfia
Shrubs, lianas and herbs: Adenia rumicifolia, Chassalia, Culcasia, Flagellaria, Landolphia, Saba, Salacia, Strychnos, Zamioculcas
Maesopsis rare; though Nd. Toufiq informs me this plot was planted with Maesopsis and Terminalia catappa.
Boundary beacon found destroyed.

Compartment # 10
Canopy at 20m high with canopy cover of 80 %; at 40m high with canopy cover of 30 40 %. Soil sandy. Harvested in 1957-64 and in 1975-78.
30 TREE COUNT: Pachystela brevipes 6, Bombax 4, Odyendea 4, Aniarias 3, Elaeis 3, Cassipourea 2, Artocarpus 1, Averrhoa 1, Bridelia, Croton 1, Erythrophloeum 1, Ficus lutea 1, Tabernaemontana ventricosa 1, Macaranga 1

Other trees: Erythrophloeum, Tabernaemontana ventricosa, Pachystela sp, Rauwolfia, Rawsonia, Rinorea

Shrubs, lianas and herbs: Asplenium, Culcasia, Dorstema, Flagellaria, Salacia, Smilax, Zamioculcas

Compartment # 11

Trees to 40m high but canopy very patchy. Soil very sandy, sloping down to the east. There is a pond of 70 x 50m in the centre of this plot, with open water. Harvested in 1975-78.

30 TREE COUNT: Odyendea 11, Elaeis 4, Uapaca 4, Cassipourea 3, Aniarias 2, Croton 1, Erythrophloeum 1, Maesopsis 1, Mango 1, Pachystela brevipes 1, P. msolo 1

Other trees: Chrysalidocarpus, Chrysophyllum cf. lanceolatum, Odyendea, Rawsonia

Maesopsis: no young ones seen, but one large tree.

Compartment # 12

Southeast corner with high forest, harvested in 1957-64; rest Raphia-Barringtonia swamp. The edge of the swamp has Anthocleista, Costus, Cerberus, Macaranga, Nephrolepis, Rauwolfia, Saba; inside the swamp Raphia and Barringtonia are almost the only species.

High forest to 30m; canopy cover some 50 %

30 TREE COUNT: Uapaca 15, Elaeis 6, Tabernaemontana ventricosa 4, Pachystela msolo 2, Croton 1, Macaranga 1, Pachystela brevipes 1

Other trees: Averrhoa (young), Calophyllum, Elaeis, Erythrophloeum, Ficus lutea, Pachystela spp., Rauwolfia, Rawsonia, Suregada

Shrubs, lianas and herbs: Adenia rumicifolia, Asplenium, Costus, Ensete, Landolphia, Lomariopsis, Nephrolepis, Schizozygia

Compartment # 13

Canopy 35-40m high; canopy cover patchy, less than 40 %. Soil sandy. Harvested in 1957-64.

30 TREE COUNT: Antiarias 6, Tectona 5, Elaeis 4, Erythrophloeum 4, Odyendea 3, Uapaca 3, Bombax 2, Calophyllum 1, Croton 1, Maesopsis 1.

Other trees: Chrysalidocarpus, Erythrophloeum, Tabernaemontana ventricosa, Pachystela brevipes, P. msolo, Rawsonia.

Shrubs, lianas and herbs: Acanth 17, Chassalia, Culcasia, Entada, Flagellaria, Landolphia, Nephrolepis, Polysphaeria parvifolia, Schizozygia, Zamioculcas.

Maesopsis: occasional saplings.

Boundary beacon found destroyed; hoard of poles found.

Compartment # 14

Harvested in the early 1960s. Very few large trees left (Antiarias, Bombax, Cassipourea; Ficus exasperata, Terminalia catappa), most of this compartment is very bushy with much Elaeis, CostUS, Entada.

Maesopsis planted along the boundary in 1963, now 20-25m high, 40cm DBH.

Boundary beacons destroyed.

Compartment # 15

Harvested in 1957-64, in 1975-78, and in 1978-83; replanted with Maesopsis by FD.

Canopy 20-25m high, very open; undercanopy cover 80 % at 10-12m high.

30 TREE COUNT: Maesopsis 24, Pachystela brevipes 2, Antiarias 1, Cassipourea 1, Ficus exasperata 1, Tabernaemontana ventricosa 1,
Other trees Elaeis, Tabernaemontana ventricosa (common), Macaranga, Pachystela (frequent), Rauvolfia
Shrubs, lianas and climbers: Culcasia, Landolphia, Nephrolepis, Psychotria schliebenii, Zamioculcas
Maesopsis frequent as young trees.

Compartment # 16
Canopy 15-20 (-25)m, canopy cover broken, 50-90 %. Soil sandy. Harvested in 1957-64 and 1975-78.
30 TREE COUNT: Elaeis 7, Maesopsis 7, Macaranga 6, Erythrophloeum 3, Odyendea 3, Ficus exasperata 1, F. lutea 1, Tabernaemontana ventricosa 1, "MUSINDAZI" 1 (unidentified).
Other trees: Elaeis, Funtumia, Odyendea, Pachystela spp, SorioOoeia, Rawsonia
Herbs, shrubs and lianas: Adenia rumicifolia, Culcasia, Dorstenia, Flagellaria, Landolphia, Nephrolepis, Psychotria schliebenii, Saba, Strychnos angolensis, Zamioculcas Maesopsis occasional young trees.

Compartment # 17
Canopy 15-20m high, canopy cover 50-70 %, few emergents to 35m high; soil sandy. Harvested by the Chinese. Southern part more bushy. Harvested in 1957-64 and 197578.
30 TREE COUNT: Odyendea 15, Croton 4, Antiaris 3, Elaeis 3, Averrhoa 1, Blighia 1, Bombax 1, Cassipourea 1, Erythrophloeum 1, Uapaca 1.
Other trees: Albizia adianthifolia, Chrysoidocarpus, Chrysophyllum, Tabernaemontana ventricosa, Pachystela spp., Rawsonia
Lianas, herbs, shrubs: Adenia rumicifolia, Chassalia, Culcasia, Dorstenia, Entada, Flagellaria, Landolphia, Nephrolepis, Polysphaeria parvifolia, Saba, Salacia, Schizotygia, Smilax, Strychnos, Sympatopoleis, Uncaria, Uvaria, Zamioculcas
Maesopsis: young ones occasional.

Compartment # 18
Harvested in 1957-64 and 1975-78.
Sampled here was the SWAMP FOREST near and in the stream running south-north.
In the stream: canopy 15-20m high, canopy cover 90 %, co-dominant Barringtonia, , Samadera; occasional species Combretum, Uncaria, Entada, Mucuna, Scuria, Adenia rumicifolia.
Forest close to stream: canopy 25m high, cover 80 %. Soil sandy.
30 TREE COUNT: Barringtonia 8, Odyendea 7, Maesopsis 4, Uapaca 4, Elaeis 3, Macaranga 2, Bombax 1, Tabernaemontana ventricosa 1.
Other trees: Erythrophloeum, Rawsonia
Shrubs, lianas, herbs: Acanthac., Adenia rumicifolia, Asplenium, Costus, Dorstenia, Entada, LaOOo/phi/a, Scutia, Vanilla sp.., Zamioculcas
Maesopsis: one patch.

Compartment # 19
On the northern edge there is a swamp with an almost pure stand of Raphia.
Southern half: canopy 20m, canopy cover 80 %, soil sandy. Harvested in 1957-64.
30 TREE COUNT: Uapaca 5, Bombax 4, Maesopsis 3, Odyendea 3, Croton 2, Mango 2, Pachystela brevipes 2, P. msolo 2, Averrhoa 1, Cassipourea 1, Elaeis 1, Tabernaemontana ventricosa 1, Macaranga 1, Milicia 1, "MULELE" 1 (not identified).
Other trees: Chrysoidocarpus, Elaeis, Ficus exasperata, F. lutea, Taber~aemontana ventricosa, Rauvolfia, Rawsonia (common)
Herbs, shrubs and lianas: Adenia rumicifolia, Landolphia sp., Nephrolepis, Smilax, Whitfieldia, Zamioculcas
Maesopsis: occasional saplings.
In the centre of the compartment there are 3 pools, one covered with *Raphia* and two with *Barringtonia*; also here are *Impatiens*, large *Chrysalidocarpus*, *Funrwnia*.

**Compartment # 20**
Canopy very patchy; some trees to 40111 but most trees only to 15m. Northern part very bushy and low. Soil sandy. Harvested in 1957-64.


Other trees: *Antidesma*, *Drypetes*, *Elaeis*, *Tabernaemontana ventricosa*, *Milicia*, *Rauvolfia*, *Rawsonia*

Shrubs, lianas, herbs: *Acanth 17*, *Adenia ruminifolia*, *Dioscorea*, *Ensete*, *Entada*, *Phyllanthus*, *Scutta*, *Tragia*, *Zamioculcas*

*Maesopsis*: occasional seedlings seen.

**Compartment # 21**

Trees: *Chrysophyllum*, *Cordia alliodora*, *Elaeis*, *Leptactina*, *Pachystela spp.*, *Rawsonia*.

Herbs, shrubs, lianas: *Asplenium*, *Chassalia*, *Nephrolepis*, *Suregada*  
*Maesopsis*: many young trees.

**Compartment # 22**
This compartment was clearcut in the middle 1970's (under the Chinese experts) and the intention was to replant it with rubber. Political pressure was put on to replant it with indigenous species; the result was the replanting in 1977 with *Msisi*, *Maesopsis eminii*, an exotic species but a very fast growing one. The compartment is a pure stand of this *Msisi*, already some 30m high.

**Compartment # 23**
Canopy 30-40m high, canopy cover 80 %; in northern quarter more open and rather bushy, with a pond. Harvested in 1983-85.


Other trees: *Chrysalidocarpus*, *Ficus lutea*, *Macaranga*, *Pachystela brevipes*, *P. msolo*, *Rauvolfia*.

Shrubs and herbs: *Asplenium*, *Chassalia*, *Costus*, *Culcasia*, *Flagellaria*, *Gonatopus*, *Polyphaeria parvifolia*, *Whitfieldia*, *Zamioculcas*.

**Compartment # 24**
Canopy 20-30m high, canopy cover 80 %; emergents to 35-40111 high, cover 70 %; soil sandy. Harvested in 1983-85.


Other trees: *Chrysalidocarpus*, *Chrysophyllum*, *Erythrophloeum*, *Macaranga*, *Odyendea*, *Pachystela spp.*, *Rawsonia*.

Shrubs, lianas and herbs: *Asplenium*, *Cnestis*, *Culcasia*, *Dorstenia*, *Gonatopus*, *Impatiens*, *Leptactina*, *Polyphaeria parvifolia*, *Psychotria schliebenii*, *Salacia*, *Schizogyzia*, *Strychnos*, *Tiliacora*, *Uncaria*, *Whitfieldia*, *Zamioculcas*

*Maesopsis*: occasional.

The southern part, near the road, has a canopy of 35-40m high, canopy cover 80-90 %, with very little understorey: only *Costus* and *Dracaena laxissima* to 2m. This area has been kept intact, as a nature reserve, since 1950; this is according to Nd. Toufiq. This would certainly agree with my observations here, although I believe that the southern part, Le. that part near the road, has been cleared from undergrowth at regular intervals. This
plot, when seen from the road, presents a very maridadi, majestic and tidy appearance (although rather unnatural to a botanists' eye) with smooth, thick trunks rising to a high canopy.

**Compartment # 25**

Southern part: much cultivated Cydrela, Tectona, Tabebuia, Prosopis; occasional Elaeis, Tabernaemontana, Rawsonia lucida. The part just N of the road is a so-called "Arboretum" which was planted in the early 1960's for girth increment measurements: Cordia alliodora, Maesopsis eminii, Ceiba pentandra, Terminalia ivorensis (very large!), Milicia excelsa, Khaya ivorensis, Tectona grandis, Eucalyptus sp. The undergrowth here consists of Costus, Zamioculcas, Acanthaceae, Gonatopus.

Northern part: Canopy 35m high, canopy cover 80 %; harvested in 1983-85.

30 TREE COUNT: Cordia alliodora 7, Erythrophloeum 5, Odyendea 5, Antiaris 3, Croton 2., Alangium 1, Bridelia 1, Cassipourea 1, Ficus exasperata 1, Ficus lutea 1, Macaranga 1, Pachystela brevipes 1, Syzygium cumini 1

Understorey with Rawsonia, Sorindeia, Rauvolfia, Whitfieldia, Dioscorea. Maesopsis occurs occasionally, both as young plants and as trees.

**Compartment # 26**

Canopy 20-25m high, canopy cover patchy, 40-70 %; soil sandy. Harvested in 1957 64.

30 TREE COUNT: Odyendea 12, Antiaris 6, Milicia 3, Pachystela brevipes 2, Averrhoa 1, Bombax 1, Croton 1, Erythrophloeum 1, Ficus exasperata 1, F. lutea 1, Macaranga 1, Terminalia ivorensis 1

Other trees: Chrysalidocarpus, Tabernaemontana ventricosa, Rauvolfia, Rawsonia, Sorindeia


Maesopsis occasionally as saplings; planted along the boundaries, where they are rejuvenating.

**Compartment # 27**

Harvested in 1983-84.

Trees: Albizia adianthifolia, Bombax, Elaeis, Erythrophloeum, Tabernaemontana ventricosa, Odyendea, Pachystela, Rawsonia, Sorindeia, Syzygium cumini, Uapaca

Herbs, shrubs and lianas: Adenia rumiGifolia, Culcasia, Nephro lep is, Polysphaeria parvifolia, Saba, Strychnos, Vittaria, Zamioculcas

An oxcart trail leads from Tondoni to the Philippia area, and looks frequently used. The vegetation near the Philippia has much Hibiscus, Vernonia, Phyllanthus, Phymatodes, bracken (Pteridium), Smilax; pools on the edge of the Philippia area are covered with Nymphaea, Nymphoides, while the edges have much Melastomataceae, Xyris. The Philippia area starts roughly at the southern boundary of this compartment (see # 33).

**Compartment # 28**

Canopy some 35m high, canopy cover 60-80 %, soil sandy. Harvested in 1957-64. 30 TREE COUNT: Odyendea 16, Pachystela brevipes 4, Elaeis 2, Erythrophloeum 2, Cassipourea 2, Antiaris 1, Bombax 1, Lannea 1, Pachystela msolo 1.

Trees: Chrysalidocarpus, Elaeis, Rawsonia.

Herbs and shrubs: Chassalia, Dioscorea, Flagellaria, Polysphaeria parvifolia, Psychotria schliebenii, Zamioculcas.

**Compartment # 29**
The southern part is very open and disturbed; in the better parts - canopy 30-35m high, canopy cover 70 %, soil sandy. Harvested in 1957-64, and in 1983-88.

**Compartment # 30**

- Canopy 35-40m high, canopy cover 60-80 %; soil sandy. Harvested in 1957-64.
- **30 TREE COUNT**: Odyendea 13, Uapaca 4, Antiaris 3, Maesopsis 3, Bombax 2, Pachystela brevipes 2, Antidesma 1, Bridelia 1, Elaeis 1
- Other trees - *Chrysialdicarpus, Elaeis, Ficus sur, Pachystela msolo, Rawsonia, Sorindeia*
- Shrubs & herbs - *Acanthac, Aframomum, Asplenium, Chassalia, Costus, Cyperus, Flagellaria, Impatiens, Nephrolepis, Polysphæria, Sansevieria, Schizozygyia, Virraria, Zamioculcas*
- *Maesopsis* no seedlings seen, few trees.

**Compartment # 31**

- Canopy some 35m high, canopy cover 60-80 %, most trees over 50cm DBH, few trees over 100cm DBH; undergrowth dense with much *Costus, Aframomum*. Harvested in 1957-64.
- **30 TREE COUNT**: Elaeis 5, Milicia 4, Odyendea 4, Maesopsis 3, Antiaris 2, Tabernaemontana ventricosa 2, Bombax 2, Majidea 2, Pachystela brevipes 2, Pachystela msolo 2, Alangium 1, Artocarpus 1.

**Compartment # 32**


**Compartment # 33**

- The western part of this plot is occupied by Philippia bush; the eastern part with forest.
- Forest: canopy 20-25m high, canopy cover 40-70 % with a patchy aspect, undergrowth bushy; soil sandy with humus. Harvested in 1957-64.
- **30 TREE COUNT**: Uapaca 7, Odyendea 5, Pachystela brevipes 5, Antiaris 4, Erythrophloeum 4, Averrhoa 2, Elaeis 1, Macaranga 1, Majidea 1, Milicia 1.
- Other trees: *Elaeis, Erythrophloeum, Ficus lutea, Lannea, Macaranga, Odyendea, Parinari* (edge), *Rawsonia*
- Shrubs, lianas, herbs: *Adenia rumicifolia, Allophylus ? vestitus, Chassalia, Gossypioïdes, Landolphia, Nephrolepis, Polysphæria parvifolia, Saba, Smilax, Suregada, Synaptolepis, Zamioculcas*

**Compartment # 34**

- Canopy 25-30m high, canopy cover patchy, 30-60 %; soil sandy. Harvested in 1957 64.
- **30 TREE COUNT**: Bombax 6, Odyendea 6, Uapaca 6, Erythrophloeum 4, Pachystela brevipes 3, Cassipourea 2, Antiaris 1, Antidesma 1, Elaeis 1
- Understorey with young *Macaranga, Rawsonia, Sorindeia*; herbs and shrubs *Adenia rumicifolia, Costus, Culcasia, Keetia, Nephrolepis, Tiliacora, Smilax*
Compartment # 35
The northern part was harvested in 1982 and replanted with *Maesopsis*. Due to poor tending (caused by lack of staff) this is not doing as well as it could.
The southern part was harvested in the 1960s; the canopy reaches 30-35m but canopy cover is patchy and generally only 50%. *Maesopsis* is frequent in the understorey, together with *Chrysalidocarpus, Flagellaria, GonLitopus, Psychotria schliebenii, Tetracera litoralis*.
30 TREE COUNT: Antiaris 7, Odyendea 6, Bombax 5, Uapaca 4, Pachystela brevipes 3, Antidesma 1, Cassipourea 1, Elaeis 1, Erythrophloeum 1, Macaranga 1, Rawsonia 1.
There is a small stream running west-east.

Compartment # 36
Harvested in the 1960s; replanted but poorly tended, very patchy. Canopy 25-30m high, canopy cover 60-80 %; soil sandy.
30 TREE COUNT: Uapaca 15, Odyendea 6, Antiaris 4, Elaeis 2, Macaranga 2, Pachystela brevipes 1
Other trees: *Chrysalidocarpus, Erythrophloeum, Funutumia, Pachystela msolo, Rawsonia, Rinorea*.
Shrubs, herbs, lianas: *Acanthac., Adenia rumicifolia, Chassalia, Cnestis, Costus, Culcasia, Flagellaria, Nephrolepis, Saba, Uvaria, Zamioculcas.*

Compartment # 37
Demonstration plot, for girth increment measuring. Not surveyed; said to be carefully surveyed by an American scientist in the early 1980s. The southern part has many *Maesopsis*, some *Polyscias* (same age as the group in 42), *Odyendea, Elaeis, Ficus lutea, Calophyllum* (young), *Pachystela, Uapaca*; undergrowth with *Nephrolepis, Allopheylus, Asplenium, Dracaena laxissima, Chrysalidocarpus, Rawsonia, Cnestis, Saba, Polysphaeria*. Harvested in 1957-64.

Compartment # 38
Mainly *Philippia*; on the western side there is a thin belt of mainly *Elaeis*, with some *Bombax* and *Erythrophloeum*; I was told this borders the sea and the mangrove, but studying the 1:10,000 maps and aerial photographs of 1979 afterwards I realized that this is the area (called Mkia ya ngombe) where there used to be houses and cultivation on the west-facing slopes down to the bay. The Khamis map, however, shows the forest boundary to be the Forest Reserve boundary, and so this slope is possibly outside tQe Reserve.

Compartment # 39
*Philippia.*

Compartment # 40
Common trees: *Albizia adianthifolia, Elaeis, Erythrophloeum, Ficus lutea, Tabernaemontana ventricosa, Pachystela brevipes, P. msolo, Rauvolfia, Rawsonia, Sorindeia, Uapaca* (especially near the *Philippia* area), *Vitex* In general a compartment intermediate between the *Philippia* heath and the moist forest. No reports on harvesting, but looks disturbed.
Lianas, shrubs and herbs: *Nephrolepis, Lomariopsis, Phymatodes, Synaptolepis, Smilax, Strychnos angolensis, Zamioculcas.*
On the eastern side there is a steep dip to a gully stream running north.

Compartment # 41
Most of this compartment is occupied by *Philippia mafiensis* scrub, looking very poor due to a fire which devastated this whole "mdamba" area about a year ago (end dry season 1988). The *Philippia* is now 1-2 m high, the soil, consisting of leached sand, is covered with bits of charcoal, and there are dead trees dotted over a dismal landscape. Between the
Forest (northern edge of #41, see nr. 35 for composition) and the Philippia there is a large pool.

Compartment # 42
Southern part Philippia; northern quarter with pools with Elaeis. Forest with a few large Odyendea, some Uapaca, Lagynias, Suregada, a few Ensete.
We found (and destroyed) 3 caches of poles in the forest (mainly Averrhoa and Leptactina). Just north of the pool there is a stand of Polyscias fulva, by Rodgers et al. believed to be indigenous; I am not sure, since they are fairly young, even-aged, and moreover of roughly the same age of a stand of Maesopsis and Calophyllum at the same site. Nd. Toufiq says these Polyscias have not been planted. The forest part was harvested in 1957-64.

Compartment # 43
Canopy 30m high, canopy cover 60-70 %; soil sandy, with humus. Harvested in 1957-64.
30 TREE COUNT: Uapaca 13, Odyendea 6, Bombax 4, Erythrophloeum 3, Pachystela brevipes 2, Averrhoa 1, Elaeis 1, Pachystela msolo 1, Syzygium curnini 1
Other trees: Chrysa/idocarpus, Elaeis, Macaranga, Rawsonia, Sorindeia, Lianas, shrubs and herbs: Chrysophyllum, Chassalia, Dracaena laxissima, Flagellaria, Landolphia, Muiuviu (not identified), Nephrolepis, Polysphaeria paTVifolia, Saba, Schizorygia, Smilax, Strychnos, Uvaria 4366, Zamioculcas.

Compartment # 44
A marginal plot similar to # 43; harvested in 1957-64 and in 1985-88.

Compartment # 45
Philippia; See 38.

Compartment # 46
Philippia.

Compartment: # 47
Philippia.

Compartment # 48
Philippia.

Compartment # 49
Philippia.

Compartment # 50
Philippia.

Compartment # 51
Canopy 30-35m, canopy cover 60 % and patchy, large open sited. Soil sandy. Harvested in 1957-64.
30 TREE COUNT: Erythrophloeum 12, Uapaca 6, Bombax 2, Croton 2, Averrhoa 1, Calophyllum 1, Macaranga 1, Mango 1, Odyendea 1, Pachystela brevipes 1, Terminalia catappa 1, Syzygium curnini 1.
Other trees: Albizia adianthifolia, Bombax, Chrysa/idocarpus, Elaeis, Erythrophloeum, Funtumia, Odyendea, Pachystela spp., Rauvolafia, Sorindeia, Syzygium curnini, Uapaca
Shrubs, lianas, herbs: Chassalia, Costus, Culcasia, Dracaena laxissima, Flagellaria, Nephrolepis, Salacia, Smilax, Zamioculcas
Southern part with large pond full of Raphia.
**Compartment # 52**
Philippia, as far as I can ascertain

**Compartment # 53**
Patchy and low, bushy. Canopy broken, generally low, with some larger trees (*Antiaris*, *FiatS lurea*, *F. exasperata*, *Milicia*, *Odyenda*, *Terminalia catappa*). No records of harvesting, but possibly near old settlementS.
Recently (1989) 4 youths were caught here at night, after felling an *Antiaris* without a pennit and pitsawing it into planks. I saw the stump, which was 1.3m across. The case is still pending.
A small stream here, flowing to the sea (due west).
Going east we encountered Philippia again - but it is difficult to say where, in 53 or 54 (or even 60).

**Compartment # 54**
Not visited. Possibly all Philippia and pools.

**Compartment # 55**
Philippia.

**Compartment # 56**
Philippia.

**Compartment # 57**
Philippia.

**Compartment # 58**
Canopy 12m high, canopy cover 80 %; emergents to 40m high, cover 10-40 %, some very large trees with DBH > 1m. Harvested in 1986-87 (partially - mainly outer edge).
30 TREE COUNT: Odyenda 8, Antiaris 7, Uapaca 3, Elaeis 2, Pachystela brevipes 2, Averrhoa 1, Blighia 1, Bombax 1, Croton 1, Erythrophloeum 1, Ficus lutea 1, Pachystela msolo 1, Syzygium cumini 1
Other trees: *Chrysalidocarpus* (frequent), *Elaeis*, *Tabernaemontana ventricosa*, *Macaranga*, *Rauvolfia*, *Tapura*, *Uapaca*
Shrubs, lianas, herbs: *Cnestis*, *Asplenium*, *Chassalia*, *Costus*, *Culcasia*, *Dioscorea*, *Dracaenafragrans*, *Ensete* (frequent), *Flagellaria*, *Gonatopus*, *Gossypioicks*, *Harungana*, *Landolphia*, *Phyllanthus*, *Polysphaeria parvifolia*, *Saba*, *Salacia*, *Schizogygia*, *Strychnos*, *Tinospora*, *Zamioculcas*
*Maesopsis*: none seen; *Averrhoa* occasionally seedlings spotted.

**Compartment # 59**
Canopy 12-15m, canopy cover 70 %; with emergents to 30m high (and some 40 % cover). Impression: patchy and secondary. Soil sandy. Ruins of a village (abandoned within the last two decades?) said to be close: Harvested in 1986.
30 TREE COUNT: Mango 9, *Tabernaemontana ventricosa* 5, Elaeis 4, Bombax 3, Uapaca 3, Macaranga 2, Pachystela brevipes 2, *Artocarpus* 1, Erythrophloeum 1
Other trees: *Albizia adianthifolia*, *Calophyllum*, *Chrysalidocarpus*, *Chrysophyllum*, *Ficus lutea*
Shrubs, herbs, lianas: *Adenia rumicifolia*, *Asplenium*, *Chassalia*, *Cremanopora*, *Culcasia*, *Dioscorea*, *Dracaenafragrans*, *Entada*, *Gonatopus*, *Landolphia*, *Nephrolepis*, *Saba*, *Salacia*, *Schizogygia*, *Zamioculcas*

**Compartment # 60**
Not visited
Compartment # 61
Not visited

Compartment # 62
Philippia.

Compartment # 63
Philippia in western half; soil sandy, greyish, leached.
- Eastern half forest, with canopy 30m high, canopy cover 60-80 %, soil sandy.
  30 TREE COUNT: Odyendea 14, Antiaris 6, Milicia 3, Bombax 1, Erythrophloeum 2, Ficus exasperata 1, Ficus lutea 1, Majidea 1, Uapaca 1
  Other trees: Albizia adianthifolia, Chrysia/idocarpus, Chrysophyllum, Macaranga, Pachystela spp., Raufovia, Tabernaemontana ventricosa, Trema, Uapaca
  Shrubs, lianas, herbs: Asplenium, Cnestis, Chassaia, Costus, Culcasia, Dragena fragrans, Ensete (rare), Landolphia, Tarenna pavettoides, Uvaria, Zamioculcas.
  Margin Philippia/forest: Syzygium cordatum

Compartment # 64
Very similar to # 58. Harvested in 1975-78 and in 1983-88.

Compartment # 65
Access difficult because of swampy southern side with Raphia, Typhonodorum, sedges. The western edge is mangrove, with Jhrugiera, Ceriops, Heritiera, Rhizophora, Xylocarpus.
  The margin mangrove/forest (where the ground rises steeply) is characterized by Heritiera, Chrysia/idocarpus, Elaeis, Pandanus kirkii, with Synaptolepis, Cnestis, Strychnos, Zamioculcas, Cremastra, Psychotria schiebenii, Dracaena laxissima, Polysphaeria parvifolia, with slightly higher Vitex, Macaranga, Chrysophyllum, Pachystela, Drypetes, Rawsonia, Bombax.

Compartment # 66, 67
Not visited. The southern edge has swamps with Raphia

Compartment # 68
Southern part bushy forest rather open, with occasional large trees. Probably harvested in 1986.
  Trees: Albizia adianthifolia, Croton, Elaeis, Erythrophloeum, Tabernaemontana ventricosa, Lannea, Macaranga, Pachystela msolo, Uapaca, Vitex
  Shrubs, lianas, herbs: Adenia rumicifolia, Asplenium, Chassaia, Cucasia, Dracaena fragrans, Flagearia, Landolphia, Melastoma, Nephrolepis, Phytotodes, Saba, Smilax, Vanilla sp., Zamioculcas
  Northern half Philippia area: main part with 0.5-2m high Philippia, dead trees; some planted cashew and eucalypts, Vernonia, bracken (Pteridium), Ficus lutea; ponds with Nymphaea, Utricularia, Xyris, some Raphia trees. On the margins Psychotria holtzii, Syzygium cordatum.
  Margin Philippia area/forest with Antidesma, Chassaia, Croton, Disperis, Erythrophloeum, Flagearia, Nephrolepis, Pachystela spp., Psychotria holtzii, Smilax, Strychnos, Synaptolepis, Zamioculcas.

Compartment # 69
Harvested in 1976 along the outer boundary.
Compartment # 70
Canopy 20m high, canopy cover 90%; emergents to 40m high, cover 30%. After harvesting in 1985-86 replanted with *Khaya*, but these were not seen, probably because they have died due to lack of tending.


Other trees: *Antidesma*, *Chrysophyllum*, *Chrysoidocarpus*, *Elaeis*, *Erythrophloeum*, *Ficus lutea*, *Macaranga*, *Majidea*, *Pachystela brevipes*, *P. msolo*, *Rauvolfia*, *Syzygium cumini*,

Lianas, herbs and shrubs: *Adenia rumicifolia*, *Aframomum*, *Asplenium*, *Cnestis*, *Chassalia*, *Cremaspora*, *Culcasia*, *Dracaena fragrans*, *Entada*, *Flagellaria*, *Polysphaeria parvifolia*, *Psychotria schliebenii*, *Saba*, *Salacia*, *Suregada*, *Tinospora*, *Uvaria*, *Zamioeuleas A verrhoa: seedlings and young trees, occasional

Compartment # 71
Rather open and bushy, with the occasional tree to 30m high. Harvested in 1985-86.

Trees: *Albizia adianthifolia*, *Croton*, *Elaeis*, *Erythrophloeum*, *Tabernaemontana ventricosa*, *Lannea*, *Maearanga*, *Pachystela msolo*, *Uapaea*, *Vitex*

Shrubs, lianas, herbs: *Adenia rumicifolia*, *Asplenium*, *Chassalia*, *Culcasia*, *Dracaena fragrans*, *Flagellaria*, *Landolphia*, *Melastomatac.*, *Nephrolepis*, *Phymatodes*, *Saba*, *Smilax*, *Vanilla sp.*, *Zamioculcas*

Compartment # 72
Coastal evergreen bushland with main canopy at 6-9m high, with emergent trees to 25m. Harvested in 1986.

Main trees: *Afzelia*, *Chrysalidoeareus*, *Croton*, *Cussonia*, *Erythrophloeum*, *Haploeoeulm*, *Leptactina*, *Milicia*, *Phoenix*, *Sorindeia*, *Tamarindus*, *Terminalia catappa* (beach only)

Understorey species: *Asparagusfalcatus*, *Chassalia*, *Cremaspora*, *Flagellaria*, *Ludia*, *Phyllanthus*, *Polysphaeria multiflora*, *P. parvifolia*, *Rauvolfia*, *Sansevieria*, *Suregada*, *Tragia*, *Zamioculcas*

The boundary for the proposed beach hotel site has already been cleared (some 900m N-S x 300m wide from HWI) and marked with concrete markers.

Compartment # 73
Coastal evergreen bushland; larger trees *Afzelia quanzensis* and the occasional *Tamarindus*. The area close to the beach has (common species) *Ancylobotrys petersoniana*, *Chassalia umbratieola*, *Chrysalideaeus pembeanus*, *Grewia stuhlmannii*, *Haploeoeulm inoploeum*, *Mystroxylon aethiopium*, *Pandanus kirkii*, *Polysphaeria parvifolia*, *Phymarodes schloendepia*, *Sansevieria kirkii*, *Sideroxylon inerme*; (occasional' species) *Casuarina*, *Colubrina asiatica*, *Cussonia zimmermannii*, *Ficus lutea*, *F. natalensis*, *Flagellaria guineensis*, *Hibiscus tiliaeus*, *Indigofera sp.*, *Manilkara sulcata*, *Scutia myrtina*, *Terminalia catappa*.

The Casuarinas here are said to have been planted by a Greek forester in the 1950s.

Compartment # 74
Coastal evergreen bushland; canopy 20m high, canopy cover 50%, undergrowth thick; soil sandy. Harvested in 1978-83 and in 1983-88; two large Mvule were being cut in January 1990.


Other trees: *Pachystela spp.*

Shrubs, herbs, lianas: *Ancylobotrys*, *Cassia*, *Culcasia*, *Landolphia*, *Melasromatac.*, *Polysphaeria parviflora*, *Psychotria schliebenii*, *Salacia*, *Smilax*, *Tiliacora*.

The northern boundary is planted with *Pteroearpus*. 
In January 1990 *Milicia* was still being harvested in this plot.

**Compartment # 75-76**

  Canopy 15m high, canopy cover 70 %, emergents to 30m high; open patches present; soil sandy. Harvested in 1978-83.


  Other trees: *Chrysophyllum, Elaeis, Tabernaemontana ventricosa, Pachystela msolo, Rauvolfia*

  Shrubs, herbs, lianas: *Chassalia, Culcasia, Deinbollia, Flagellaria, Gonatopus, Landolphia, Nephrolepis, Psychotria schliebenii, Sa/acia, SmUax, Zamiocu/cas*

**Compartment # 77**

  Canopy 20m high, canopy cover 60 %, with emergents to 30 m and open patches. Soil sandy. Harvested in 1978-8 and in 1983-88.


  Other trees: *Chrysophyllum, Deinbollia, Tabernaemontana ventricosa, Pachystela, Rauvolfia*

  Other plants: *Chassalia, Culcasia, Flagellaria, Gonatopus, Landolphia, Nephrolepis, Psychotria schliebenii, Salacia, Smilax, Zamiocu/cas*

**Compartment # 78**

  Canopy to 12m, canopy cover 40-60 %, with emergents to 20m; soil sandy with coral outcrops. Harvested in 1957-64 and in 1978-83.


  Other trees: *Chrysaidocarpus, Cussonia, Drypetes, Milicia, Mystroxyxlon, Pandanus kirkii, Termina/ia boivinii*

  Shrubs, lianas and herbs: *Flacourtia, Flueggia, Phymatodes, Rhoicissus, Synaptolepis*

**Compartment # 79**

  Canopy 12-15m, canopy cover 80 %; emergents to 30m; some large open patches. Harvested in 1960-61 (and replanted), harvested 1979.


  Other trees: *Calophyllum, Chrysaidocarpus, Chrysophyllum, Dalbergia, Dichrostachys, Elaeis* (young ones common), *Ficus sur, Flagellaria, Harungana, Macaranga, Mango, Milicia, Pachystela, Rauvolfia, Sorindeia, Syzygium cumini*

  Shrubs, lianas and herbs: *Aframomum, Chassalia, Costus, Creaspora, Cu/casia, Gonatopus, Landolphia, Nephrolepis, Phyllanthus, Polysphaeria parvifolia, Saba, Smilax*

**Compartment # 80**

  Very similar to # 78, but with more *Terminalia boivinii* and many Rubiaceae shrubs and Acanthaceae herbs.

  Additional species: *Allophyllus, Eugenia sp. nov., Nervilia, Pachystela sp., Phoenix, Rawsonia, Rhus sp., Suregada, Vepris eugeniifolia.*

  Here we encountered some illegal entrants who had come to poach young Phoenix, for weaving.
Compartment # 82-83
Canopy 8-10m high, cover 90 % with emergents to 20-25m; soil sand with coral.
30 TREE COUNT: Sorindeia 14, Elaeis 3, Ficus exasperata 3, Croton 2, Ficus lutea 2, Ehretia 1, Erythrophloeum 1, Haplocoelum 1, Milicia 1, Pachystela brevipes 1, Tamarindus
Other trees: Antiaris, Chrysalidocarpus, Diospyros consolatae, Drypetes, Margaritaria, Olea, Pachystela msolo, Phoenix, Rawsonia,
Shrubs, herbs, lianas: Chassalia, Cremaspora, Dioscorea, Eugenia sp. nov., Flagellaria, Gonatopus, Landolphia, Polysphaeria parvifolia, Schizozygia, Vepris, Zamioculcas

Compartment # 84
Very much like #82-83. There is some mangrove in small bays.
Near, the sea Haemanthus, Pemphis, Sideroxylon, Guettarda, Vanilla roscheri and Erythroxylum were found.
Additional species: Ficus exasperata, Flacourtia, Manilkara sulcata, Phymatodes, Polysphaeria spp., Suregada, Synaptolepis, Terminalia boivinii, Zanthoxylum
8. LOCAL NAMES

Kikwayakwaya  Lobelia fervens
Kirukia  generalized name for epiphytes
Majani mwitu  general ("forest leaves"): name for shrubs
Makunjuzi  generalized name for climbers
Mavimavi  Alangium salviifolium
Mbambakofi  Afzelia quanzensis
Mbirimbi  A verrhooa sp
Mbirimbi mwitu  Polyscias fulva.
Mbiye  Typhonomodorum lindleyanum
Mbungo  Saba comorensis
Mbuni mwitu  Leptactina platyphylla (NOT Panax spp)
Mbura  Parinari curatellifolia
Mchapia tumbili  Albizia adianthifolia
Mchenya  Majidea zanguebarica
Mchenza msitu  Uapaca guineensis
Mchilichi  Elaeis guineensis
Mchocha dume  Pachystela msolo
Mchocha mke  Pachystela brevipes
Mchochoni  Dioscorea spp.
Mchongoma  Flacourtia indica
Mchungwa mwitu  Olea woodiana
Mchungwa mwitu  Vepris cf. eugeniiifolia
Mdamba  Philippia mafiensis
Mdamudamu  Harungana madagascariensis
Mdamudamu  Pterocarpus angolensis
Mdawadawa  Croton sylvaticus
Mdimu  Lemon (Citrus aurantiacus)
Mdimu msitu  Suregada zanzibarensis
Mfenesi mfuu  Artocarpus heterophyllus, A. integrifolia
Mfupapu  Lannea schweinfurthii
Mfuu  Vitex doniana
Mgembakofi  Typhonodorum lindleyanum
Mgindeluki  Nephrolepis biserrata
Mgiani matano  Tabebuia pentaphylla
Mgole  Adenia runnicifolia (also more general?)
Mgombatumbili  Ensete proboscideum
Mguelele  Antiaris toxicaria
Mguni mwitu  Leptactina platyphylla
Mjafari  Drypetes natalensis, D. reticulata
Mjafari ya kipemba  Zanthoxylum holtzianum
Mjango  Diospyros consolatae
Mjoho  Odyendea zimmermannii
Mkadi  Pandanus kirkii
Mkala  Tetraclera litoralis
Mkalamu  Flagellaria guineensis
Mkamasi  Cordia alliodora
Mkangashale  Smilax anceps
Mkanja  Cremaspora triflora
Mkanja  Polysphaeria parvifolia
Mkarangga  Macaranga capensis
Mkarati  Bridelia micrantha
Mkaratusi  Eucalyptus spp.
Smilax anceps
Mkekewa  Uvaria spp. (aromatic)
Mkilua   Phoenix reclinata
Mkindu   Cordia alliodora
Mkodia   Mimusops sp.
Mkorosho Cashew (Anacardium occidentale)
Mkukilemba Blighia unjugata
Mkundu   Cassia sp.
Mkungu   Terminalia catappa
Mkungu   Terminalia ivorensis
Mkunguni Terminalia boivinii
Mkungu   Hibiscus. tiliaceus
Mkunguma Deinbollia borbonica
Mkuu(u)ngo Entada pursaetha
Mkuyu    Ficus sur
Mkwaju   Tamarindus indica
Mlandge  Ficus natalensis
Mlangamakele Funtumia africana
Mlangamakele Macaranga capensis
Mlangawa  Ficus lutea
Mpamba mwitu Gossypioides kirkii
Mpapei dume Cussonia zimmermannii
Mpapei mwitu Cussonia zimmermannii
Mppapindi Chrysalidocarpus pembeanus
Mpelewa  Dracaena laxissima
Mpelewa   Flagellaria guineensis
Mpenjepaa Whitfeldia elongata
Mpera mwitu Rawsonia lucida (NOT Combretum schumannii)
Mpesi   Trema orientalis
Mphilipili doria Sorindeia madagascariensis
Mpinepaa   Whitfeldia elongata
Mpingo Dalbergia melanoxylon
Mpoo    generalized name for climbers resembling Landolphia

Msaji    Tectona grandis
Msambarau ziwa Syzygium cordatum
Msambarau  Syzygium cumini
Msanaka  young Pandanus kirkii (no trunk)
Msasa dume  Ficus exasperata
Msikundazi Cassipourea gummiula
Msikundazi Heritiera littoralis
Msikundazi   Inhambanella henriquesii
Msindozi   ?
Msinduzi Croton sylvaticus
Msisi     Maesopsis eminii
Msisimizi   Antidesma venosum
Msiso   Scutia myrtina
Msiso  Uncaria africana
Msufi mwitu Bombax rhodognaphalon
Msufi peri   Ceiba pentandra
Mtomondo mke Barringtonia racemosa
Mtambu mwitu Anthocleista grandiflora
Mti   Pterocarpus angolensis
Mtomondo dume Samadera indica
Mtondoo Calophyllum inophyllum
Tabetemontana/Funtumia
Mtonga  
Mtonga  
Mtonga mwitu  
Mtonga mwitu  
Mtonga mwitu  
Mtoria  
Mtumbaku mwitu  
Mtumbi  
Muale  
Muarobaini  
Muchochoni  
Muembe  
Muhina mwitu  
Muivuivu  
Mukuongo  
Mulele  
Muangocha  
Mutumbi  
Mututututu  
Muumbu  
Mvinje  
Mvuje msitu  
Mvule  
Mvunjachoka  
Mwangachaa  
Mwangao  
Mwavi  
Mwembe  
Mwengechaa (cult.)  
Ndiga  
Ngimbikuti  
Upupu  
Vikwa  
Vitungu  
Wangadume  
Weni

Xylocarpus granatum  
Tabematemontana ventricosa  
Ficus natalensis  
Schizopygia coffaeoides  
Salacia madagascariensis  
Vernonia zanzibarica  
Haplocoelum inoplooeum  
Raphia farinifera  
Azadirachta indica  
Dioscorea spp.  
Mango (Mangifera indica)  
Margaritaria discoidea  
Cpt 43, poss. Suregada  
Entada pursaetha  
(in 19)  
Cerbera sp.  
Garcinia livingstonei  
Bridelia micrantha  
Lannea schweinfurthii  
Casuarina equisetifolia  
Strychnos angolensis  
Milicia excelsa  
("ax breaker") Dichrostachys cinerea  
Cerberus sp.  
Erythrophloeum suaveolens, also Ficus sp?  
Erythrophloeum suaveolens  
Mangifera indica  
Voacanga africana, Rauvolfia mombasiana, Cerbera  
Dioscorea zanzibarensis  
Lomarioipsis warneckei  
Mucuna gigantea  
Dioscorea zanzibarensis  
Costus sarmentosus  
Zamioculcas zamiifolia  
Tragia furialis
9. LIST OF PLANT SPECIES

BN = collections by Beentje.  
RMH = collections by Rodgers, Mwasumbi & Hall. Records seen by Rodgers, Hall, Mwasumbi, Swai & Vollesen have been incorporated in this list; where I have not been able to confirm their sightings, I have indicated such. 
SR denotes sight record by both Rodgers et al. and Beentje; otherwise there is a qualifier. 
FI denotes field identification (this differs from sight record: in FI one actually gets a piece of the plant and uses keys to identify it).

Plants are arranged by family; the families are listed alphabetically, within the supergroupings Pteridophytes/Dicotyledons/Monocotyledons.

PTERIDOPHYTES (FERNS)

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Collection Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrostichum aureum L.</td>
<td>RMH-SR</td>
</tr>
<tr>
<td>Asplenium nidus L.</td>
<td>SR</td>
</tr>
<tr>
<td>Cyclosorus sp.</td>
<td>RMH-SR</td>
</tr>
<tr>
<td>Dicranopteris linearis (Burm.f.) Underw</td>
<td>RMH-SR</td>
</tr>
<tr>
<td>Lomariopsis warneckeii (Hieron.) Alston - Mgimbikuti</td>
<td>BN 4313</td>
</tr>
<tr>
<td>Nephrolepis biserrata (W.) Schott</td>
<td>RMH 2691</td>
</tr>
<tr>
<td>Phymarodes scolopendria (Burm.f.) Ching</td>
<td>SR</td>
</tr>
<tr>
<td>Pteridium aquilinum L.</td>
<td>SR</td>
</tr>
<tr>
<td>Psi/otum nudum (L.) Beauv.</td>
<td>RMH 2783</td>
</tr>
<tr>
<td>Stenochlaena tenuifolia (Desv.) S. Moore.</td>
<td>RMH 2783</td>
</tr>
<tr>
<td>Thelypteris totta (Thunb.) Schelpe Vittaria elongata Sw.</td>
<td>RMH-SR</td>
</tr>
</tbody>
</table>

DICOTYLEDONS

ACANTHACEAE

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Collection Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adharoda englerana (Lindau) CRG.</td>
<td>RMH 2669</td>
</tr>
<tr>
<td>Asystasia multiflora KL.</td>
<td></td>
</tr>
<tr>
<td>Justicia tenella (Nees) T. Anders</td>
<td>RMH 2750</td>
</tr>
<tr>
<td>Pseuderanthemum tunicatum (Afz.) Milne-Redh</td>
<td>BN 4317</td>
</tr>
<tr>
<td>Ruspolia sp.</td>
<td>RMH-sr</td>
</tr>
<tr>
<td>Whitfieldia elongata (Beauv.) CRCI. –Mpenjepaa shrub of forest margins</td>
<td>RMH 2651</td>
</tr>
</tbody>
</table>

AMARANTHACEAE

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Collection Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alangium salviifolium (L.f.) Wangerin - Mavimavi</td>
<td>RMH 2707</td>
</tr>
</tbody>
</table>
Achyranthes aspera L.
herb

Cyathula prostrata (L.) Bl.
herb

Pupalia lappacea (L.) Juss.
herb

ANACARDIACEAE

[Lannea antiscorbutica (Hiern) Engl. tree, only known from southern Tanzania; I believe this sight record to be a mistake in identification; see next species.
Lannea schweinfurthii (Engl.) Engl. var. acutifoliata (Engl.) Kokw. - Muumbu, Mfupapu

Mango tree; coastal Kenya and Tanzania, Zanzibar & Pemba

Mangifera indica L. - Mwembe

Mango tree; introduction from Asia, usually associated with human habitation

Rhus sp.
shrub; only found sterile.

Sorindelia madagascariensis DC. - Mpilipili doria

medium-sized tree, especially in coastal bushland; East Africa and Madagascar.

ANNONACEAE

Uvaria sp. B of FrEA

restricted to north coastal Tanzania

APOCYNACEAE

Alafia caudata Stapf
large liana

Ancylobotrys petersiana (Kl.) Pierre
medium-sized liana

Funtumia africana (Benth.) Stapf - Mtonga, Mlangamakelele
medium to large tree.

Landolphia kirkii Dyer - Mpoo
large liana

Oncinotis tenuiloba Stapf
Small climber; new record for Pemba
[Rauvolfia caffra, sight record of Rodgers et al - believed to be the following species]

Rauvolfia mombasiana Stapf- Mwengechaa
small tree

Saba comorensis (Bojer) Pichon - Mbungo
large liana

Schizopygia coffaeoides (Bojer) Baill. - Mtonga mwitu
shrub

Strophanthus zimmennannii Monach.
Medium-sized liana; south coastal Kenya, coastal Tanzania; new record for Pemba; rare species
T abernaemontana pachysiphon Stapf
medium-sized forest margin tree (40)

T abernaemontana ventricosa ADC. - Mtonga mwitu
large tree

ARALIACEAE

Cussonia zimmennannii Hanns - Mpapei dume, Mpapei mwitu
large tree, especially in coastal bushland

Polysciasfulva (Hiern) Harms - Mbirimbi mwitu
Medium-sized tree; a single even-aged population which I believe to be introduced

ASCLEPIADACEAE
*Secamone rerusa* NE Br.  
Climber in heath/forest margin. New record for Pemba.  

**BALSAMINACEAE**  
*Impatiens wallerana* Hook. f.  
herb of moist sites  

**BIGONIACEAE**  
*Tabebuia pentaphylla* (BenoL) DC. - Mgjani matano  
introduced timber tree  

**BOMBACACEAE**  
*Bombax rhodogaphalon* K. Schum. var. *rhodogaphalon*  
(Rhodogaphalon schumannianum) - Msufi mwitu  
Canopy tree; restricted to coastal Kenya to Mozambique  

**BORAGINACEAE**  
*Bourreria petiolaris* (Lam.) Thulin [Ehretia petiolaris]  
shrub or small tree  

**BIGNONIACEAE**  
*Cordia alliodora* (Ruiz & Pavon) Oken - Mkamasia, Mkodia  
Introduced timber tree  

**BOMBACACEAE**  
*Bombax rhodogaphalon* K. Schum. var. *rhodogaphalon*  
(Rhodogaphalon schumannianum) - Msufi mwitu  
Canopy tree; restricted to coastal Kenya to Mozambique  

**BORGÁNACEAE**  
*Bourreria petiolaris* (Lam.) Thulin [Ehretia petiolaris]  
shrub or small tree  

**BIGNONIACEAE**  
*Cordia alliodora* (Ruiz & Pavon) Oken - Mkamasia, Mkodia  
Introduced timber tree  

**CAPARACEAE**  
*Cladostemon kirki* (Oliv.) Pax & Gilg  
coastal climber  

**BOPÁRACEAE**  
*Cladostemon kirki* (Oliv.) Pax & Gilg  
coastal climber  

**BORGÁNACEAE**  
*Casuarina equisetifolia* L. – Mvinje large tree on beach crest; usually  
said to be introduced, but possibly native; most individuals planted  

**CELASTRACEAE**  
*Hippocratea* sp.  

**BORGÁNACEAE**  
*May tenus senegalensis* (Lam.) Exell  
small spiny tree  

**CELASTRACEAE**  
*May tenus senegalensis* (Lam.) Exell  
small spiny tree  

**CASUARINACEAE**  
*Mystroxylon aethiopicum* (Thunb.) Loes  
medium-sized ttee  

**CELASTRACEAE**  
*Mystroxylon aethiopicum* (Thunb.) Loes  
medium-sized ttee  

**COMBRETACEAE**  
*Salacia elegans* Oliv.  
climbing shrub  

**CELASTRACEAE**  
*Salacia elegans* Oliv.  
climbing shrub  

**CHRYSOBALANACEAE**  
*Salacia madagascariensis* (Lam.) DC. - Mtora, mtoria  
liana  

**COMBRETACEAE**  
*Salacia madagascariensis* (Lam.) DC. - Mtora, mtoria  
liana  

**CHRYSOBALANACEAE**  
*Hirtella zanzibarica* Oliv.  
large tree  

**COMBRETACEAE**  
*Hirtella zanzibarica* Oliv.  
large tree  

**CHRYSOBALANACEAE**  
*Parinari curatellifolia* Benth. ssp. *curatellifolia* - Mbura  
large tree of heathland margin  

**COMBRETACEAE**  
*Parinari curatellifolia* Benth. ssp. *curatellifolia* - Mbura  
large tree of heathland margin  

**CHRYSOBALANACEAE**  
*Combretum paniculatum* Vent  
Climber to canopy, **new record for Pemba**  

**COMBRETACEAE**  
*Combretum paniculatum* Vent  
Climber to canopy, **new record for Pemba**  

**CHRYSOBALANACEAE**  
*Terminalia boivinii* Tul [T. fatraea] - Mkunguni  
medium to large tree of coastal thicket  

**COMBRETACEAE**  
*Terminalia boivinii* Tul [T. fatraea] - Mkunguni  
medium to large tree of coastal thicket  

**CHRYSOBALANACEAE**  
*Terminalia catappa* L. - Mkungu  
large tree; introduced  

**COMBRETACEAE**  
*Terminalia catappa* L. - Mkungu  
large tree; introduced  

**CHRYSOBALANACEAE**  
*Terminalia ivorensis* A. Chev. or *Terminalia superba* EngL & Diels - Mkungu india introduced timber tree  

**COMBRETACEAE**  
*Terminalia ivorensis* A. Chev. or *Terminalia superba* EngL & Diels - Mkungu india introduced timber tree  

**CHRYSOBALANACEAE**  
*Terminalia sambesiaca* EngL & Diels  
large tree - not seen by me  

**COMBRETACEAE**  
*Terminalia sambesiaca* EngL & Diels  
large tree - not seen by me
Vernonia zanzibarensis Less - Mtumbaku mwitu shrub of heathland margin

Pluchea sordida (Vatke) Oliv. & Hiem herb of moist sites- not seen by me

CONNARACEAE

Agelaea sp liana

Commars sp. novo liana - not seen by me

Cnestis corniculata Lam. liana

DICAPETALACEAE

Tapura fischeri Engl. - Mtama mwitu medium tree

DILLENIACEAE

Tetracera litoralis Gilg - Mkala shrub; coastal Kenya and Tanzania, Pemba

EBENACEAE

 Diospyros consolatae Chiov.- Mjengo medium-sized tree of coastal thicket

ERICACEAE

Philippia mafiensisEngl. - Mdamba Giant heath, a medium-sized shrub; restricted to Mafia and Pemba; a rare/vulnerable species

ERYTHROXYLACEAE

Erythroxylon emarginatum Thonn. shrub or tree of coastal thicket

EUPHORBIACEAE

Antidesma venosum Tul - Msisimizi shrub or small tree

Bridelia micrantha(Hochst) Baiil. - Mkarati, Mututututu large tree

Croton scheffleri Pax shrub - not seen by me

Croton sylvaticus Krauss - Mdawadawa canopy tree

Drypetes natalensis (Harv.) Hutch var. leiogyna Brenan -Mjafari . BN 4302 medium tree; restricted to coastal Kenya, NE and W Tanzania, Zanzibar and Pemba

Drypetes reticulata Pax small tree - not seen by me

Erythrocoeca kirkii (Mull. Arg.) Prain shrub - not seen by me

Flueggia virosa (Willd.) Voigt shrub

Macaranga capensis(Baiil.) Sim. - Mlangamakelele, Mkaranga canopy tree

Margaritaria discoidea (Baiil) Webster var. nitida (or triposphaera) Large tree found only in #82-83.

Phyllanthus nummularifolius Poir. small shrublet

Suregada zanzibariensis Baiil. - Mdimu msitu shrub or small tree
Tragia jurialis Bojer - Weni
small stinging nettle

Uapaca guineensis Mill. Arg. - Mchenza msitu
Large tree

Uapaca sansibarica Pax
large tree - not seen by me; if true, a new record for Pemba

Tragia jurialis Bojer - Weni
small stinging nettle

Tragia jurialis Bojer - Weni
small stinging nettle

FLACOURTIACEAE

Casaeria gladiiformis Mast
medium tree

Flacourtia indica (Burm.f.) Merr. - Mchongoma
medium tree

Ludia mauritiana Gmelin
shrub

Rawsontia lucida HaIV. & Sond. - Mpera mwitu
small tree

GUTTIFERAE

Calophyllum inophyllum L. - Mtondoo
large tree; most individuals planted

Garcinia livingstonei T. Anders
small tree - not seen by me

Harungana madagascariensis Poir. - Mdaurnadamu
forest margin shrub

ICACINACEAE

Apodytes dimidiata Am. var. acutifolia (A.Rich.) Boutique
medium tree in Philippia area - not seen by me (at least not alive)

LEYCIDIDACEAE

Barringtonia racemosa (L.) Spreng - Mtondoo (mke)
medium tree in swamp forest

LEGUMINOSAE-CAESALPINIACEAE

Afzelia guanzensis Welw. – Mbambakoti
Large tree in coastal thicket

Caesalpinia volkensii Harms
liana; restricted to Uganda, Kenya, Tanzania

Erythrophloeum suaveolens (Guill. & Perr.) Brenan - Mwavi
canopy tree

Tamarindus indica L. - Mkwaju
canopy tree/emergent in coastal thicket

LEGUMINOSAE-MIMOSACEAE

Albizia adianthifolia (Schum.) WF Wight - Mchapia tumbili
canopy tree

Dichrostachys cinerea (L.) Wight& Am. ssp. cinerea - Mvunja
choka
spiny small tree at forest margin

Entada purseaetha DC. -Mkuungo, mukuongo
large liana

Prosopis sp.
introduced tree reported

LEGUMINOSAE-PAPILIONACEAE

Dalbergia melanoxylonGuill. & Perr. - Mpingo
Small to medium tree in coastal thicket. New record for
Pemba.

Indigofera sp.
small shrub in coastal thicket

Millettia oblatata Dunn ssp. intermedia Gillett
medium tree - not seen by me
**Mucuna gigantea** (Willd) DC. [rather than M. pruriens] — Upupu

large liana

*Pterocarpus angolensis[indicus* Willd.- Mdamadumu

introduced large tree, used for marking boundaries of forest on
Verani side and SE margin

**LENTIBULARIACEAE**

*Utricularia gibba* L.

submerged aquatic in pools

**LOBELIACEAE**

*Lobeliafervens* Thunb. -Kikwayakwaya

herb of forest margin

**LOGANIACEAE**

*Anthocleista grandif/ora* Gilg - Mtambu mwitu small tree of
swamp forest

*Styrchnos angolensis* Gilg - Mvuje msitu
liahan

**LYTHRACEAE**

*Pemphis acidula* Forst.

shrub on beach crest- usually on coral

**MALPIDGIACEAE**

*Acridocarpus zanzibaricus* (Loud.) A. Juss.

shrub in coastal Wcket; restricted to coast from Somalia to
central Tanzania

**MALVACAEA**

*Gossypioides kirkii* (Mast.) JB Hutch. -Mpamba mwitu
small shrub

*Hibiscus tiliaeus* L.

Shrub on beach

**MELASTOMATACEAE**

*Tristemma mauritianum* IF Gmel.

shrubby herb of marshy sites

*Melastomasrrum segregarum* (Benth.) A & R Femandes

shrub of swamps

*Dissoiis rotundifolia* (Srn.) Triana

creeping herb of ruderal sites

**MELIACEAE**

*Cedrela mexicana*

introduced timber tree

*Entandophragma??*

reported to occur by foresters - but not seen

*Khay a* sp.

introduced timber tree

*Trichilia emetica* Vahl

tree

*XYlocarpus granatum* Koen - Mtonga

mangrove tree

**MENISPERMACEAE**

*Dioscoreophyllum volkensii* Engl. var. volkensii

liana

*Triclisia sacleuxii* (Pierre) Diels var. sacleuxii

liana

*Tinospora oblongifolia* (Engl.) Troupin

liana - if true, a new record for Pemba

**MENYANTIIACEAE**

*Nymphoides cf. kirkii* (NE Br.) ined.

floating aquatic in ponds; new record for Pemba
MORACEAE

**Antiaris toxicaria** Lesch. - Mgulele canopy tree.

**Artocarpus altius** (parkinson) Fosberg - Mfenesi mfuu introduced tree

**Artocarpus heterophyllus** Lam. introduced tree

**Dorstenia tayloriana** Rendle restricted to coastal Kenya and Tanzania; a rare species

**Ficus exasperata** Vahl- Msasa dume canopy tree

**Ficus lutea** Vahl- Mlangawa canopy tree

**Ficus natalensis** Hochst - Mlange, Mtonga mwitu canopy tree.

**Ficus nekbudu** Warb. not seen by me

**Ficus scasseltii** Pamp. large tree

**Ficus sur** Forssk. [F. capensis] - Mkuyu canopy tree

**Milicia excelsa** (Welw.) CC Berg [Chlorophora excelsa] - Mvule canopy tree

MYRICACEAE

**Myrica** sp.

shrub; not seen by me.

MYRTACEAE

**Eucalyptus** sp - Mkaratusi introduced timber tree

**Eugenia** sp nov = Vaughan 1676 - Mkaage shrub; **new, undescribed species restricted to Unguja and Pemba**

**Syzygium cordatum** Krauss - Msambarau ziwa medium tree in Philippia area

**Syzygium cumini** (L.) Skeels - Msambarau canopy tree

NYMPHAEACEAE

**Nymphaea nouchali** Bunn. var. *zanzibarensis* (Casp.) Verdc. aquatic

OCHNACEAE

**Sauvagesia erecta** L. herb

OLFACEAE

**Olea woodiana** Knob!. - Mchungwa mwitu large tree in coastal thicket; new record for Pemba

OXALIDACEAE

**Averrhoa** sp. (A. colomba in Forestry records) - Mbirimi introduced tree

PASSIFLORACEAE

**Adenia gununifera** (Harv.) Harms var. *gummifera* Climber in forest margins or disturbed forest.

**Adenia rwnicifoUa** Engl. - Mgole climber in forest margins

PIPERACEAE

BN 4368
Piper betle L.
small climber, possibly introduced

RHAMNACEAE

Colubrina asiatica (L.) Brongn.
climbing shrub

Maesopsis eminii Engl. - Msisi
Introduced timber tree

Scutia myrtina (Burm.f.) Kurz - Msoo
climbing shrub with thorns; **new record for Pemba**

RHIZOPHORACEAE

Bruguiera gymnorrhiza (L.) Lam. - Mchonga
mangrove tree

Cassipourea gummiflua Tul. var. verticillata (NE Br.) J Lewis - Msikundazi
4303 Medium-sized tree; south coastal Tanzania to south;
**usual altitude above 1800m**

Ceriops tagal (Perr.) CB Robinson - Mkandaa mwekundu
mangrove tree

Rhizophora mucronata L. - Mkoko
mangrove tree

RUBIACEAE

Agathisanthemum bojeri Klotzsch
herb

Canthium mombazense Baill.
shrub

Chassalia umbraticola Vatke
shrub

Craterispermum schweinfurthii Hiern
1482 small tree


Geophila repens (L.) IM Johnston
herb

Guettarda speciosa L.
beach, tree

Keetia guinezii (Sond.) Bridson [Canthium guinezii]
shrub

Keetia zanzibarica (Klotzsch) Bridson [Canthium zanzibaricum]
shrub or climber

Kraussia speciosa Bullock
shrub

Lagynias pallidiflora Bullock
shrub or small tree

Leptactinaplaryphylla (Hiern) Wernh. - Mguni mwitu
Small tree. A favourite for poles. **new record for Pemba**

Pavetta sp.
not seen by me

Pentas micrantha Bak.
not seen by me

Polysphaeria parvifolia Hiem - Mkanja
shrub

**new record for Pemba**
I doubt this record: this tree usually occurs above 900m, and Psychotria are notoriously difficult to identify in the field.

*Psychotria holtzii* (K. Schum.) Petit var. holtzii Small shrub of giant heath/forest margins. Restricted to coastal south Kenya and central Tanzania.

*Psychotria lauracea* (K. Schum.) Petit shrub

*Psychotria schliebenii* Petit var. schliebenii shrub

*Psychotria tanganyicensis* Verdc. var.ferruginea Verdc. shrub

*Psydrax kaessneri* (S. Moore) Bridson shrub

*Psydrax livida* (Hiern) Bridson [Canthium huillense] shrub or small tree

*Psydrax recurvifolia* (Bullock) Bridson shrub

*Pyrostria bibracteata* (Bak.) Cavaco [Canthium bibracteatum] shrub

*Tarenna pavettoides* (Harv.) Sim ssp. affinis (K. Schum.) Bridson restricted to coastal East Africa

*Uncaria africana* G. Don var. orientalis Verdc. - Msoo climber to canopy

**RUTACEAE**

*Vepris eugeniifolia* (Engl.) Verdoom - Mchungwa mwitu shrub; new record for Pemba

*Zanthoxylum holtzianum* (Engl.) Waterm. - Mjafari ya kipemba medium tree in coastal thicket

**SAPINDACEAE**

*Allophylus griseo-tomentosum* Gilg not seen by me

*Allophylus pervillei* Bl. liana

*Allophylus vestitus* FG Davies ined. only known from central Tanzania before

*Allophylus sp. near grotei* shrub

*Blighia unijugata* Bak. large tree

*Deinbollia borbonica* Scheff. - Mkunguma small tree

*Haplocoelum inoploeum* Radlk. - Mtumbi medium tree in coastal thicket

*Majidea zanguebarica* Oliv. - Mchenya canopy tree

*Paullinia pinnata* L. climber

**SAPOTACEAE**

*Bequaertiodendron magalismontanum* (Sond.) Heine & JH Hemsl [B. natalense SR of RMH]; medium tree

*Chrysophyllum lanceolatum* (BL.) DC. ver. stellatocarpum van Royen 4304,4376 small tree
**Inhambanella henriquesii** (Engl. & Warb.) Dubard - Msikundazi
   Medium-sized tree; coastal East Africa; **new record for**

**Pemba**

**Manilkara sansibarensis** (Engl.) Dubard
   medium tree

**Manilkara sulcara** (Engl.) D’lbard
   small tree of coastal thicket

**Pachystela brevipes** (Baker) Engl. - Mchocha (mke)
   canopy tree

**Pachystela msolo** (Engl.) Engl. - Mcocha dume
   canopy tree

**Sideroxylon inerme** L. ssp. *diospyroides* (Baker) JH Hems.
   small tree in coastal thicket

**SCROPHULARIACEAE**

**Bacopa crenata** (p. Beauv.) Hepper
   herb

**Limnophila indica** (L.) Druce
   herb

**SIMAROUBACEAE**

**Quassia indica** (Gaerm.) Nooteboom [Samadera indica] - BN
   Mtomondo dune
   4322 Medium-sized tree of swamp forest; an eastern species; **Pemba only African site**

**Quassia undulata** (Guill. & PeIT.) D. Dietr. [Odyendea zimmermannii ] - Mjoho canopy tree.

**SONNERATIACEAE**

**Sonneratia alba** Sm. - Mpira, Milana
   mangrove tree

**STERCULIACEAE**

**Heritiera littoralis** Ail. - Msikundazi
   Mangrove tree.

**THYMELEACEAE**

**Synaptolepis kirkii** Oliv.
   Small shrub or climber

**TILIACEAE**

**Grewia stuhlmannii** K. Schum.
   climbing shrub

**ULMACEAE**

**Trema orientalis** (L.) Bl. - Mpesi
   small tree

**VERBENACEAE**

**Avicen~ia marina** (Forssk.) Vierh. - Mehu
   mangrove tree

**Premna obrusifolia** R. Br.
   shrub - not seen by me

**Tectonagrandis**
   introduced timber tree

**Vitex doniana** Sweet - Mfuru, mfuu
   medium tree in open areas

**VIOLACEAE**

**Rinorea arborea** (Thou) Baill.
   coastal Kenya to Mozambique, Madagascar

**VITACEAE**
Cissus integrifolia (Bale.) Planch.  
Climber in forest margins. New record for Pemba

Cissus oliveri Gilg  
climber

Rhoicissus revoilii Planch.  
climber

Rhoicissus tridentata (L.f.) Wild & Drum.  
climber

MONOCOTYLEDONS

AMARYLLIDACEAE
Scadoxus multiflorus (Martyn) Raf.  
herb

ARACEAE
Culcasia orientalis Mayo  
climber

Gonatopus boivinii (Decne.) Engl.  
herb

Typhonodorum lindleyanum Schott  
herb; restricted to Madagascar and Pemba, Unguja

Zamioculcas zamiifolia (Lodd.) Engl. - Wangadume  
herb

COMMELINACEAE
Commelina diffusa Burm. f.  
herb

Murdannia axillaris Brenan  
herb

CYPERACEAE - the sedges
Cyperus prolifer Lam. ssp. isocladus Kukenth  
RMH 2756
Cyperus tenax Boeck. var tenax  
RMH 2754
Eleocharis acurangula (Roxb.) Schult.  
RMH 2741
Eleocharis geniculata (L.) Roem. & Schult  
RMH 2742
Fimbristylis longiculmis Steud  
RMH 2737
Fiurena claviseta Poir.  
RMH 2732
Fiurena umbellata Ronb.  
RMH 2729
Pycreus lanceolatus (Poir.) CRCl  
RMH 2733
Pycreus mundtii Nees  
RMH 2730
Rhynchospora candida (Nees) Boeck  
RMH 2740

DIOSCOREACEAE
Dioscorea sansibarensis Pax - Mchochoni, Muchochoni, Ndiga, Vikwa  
BN 4314

FLAGELLARIACEAE
Flagellaria guineensis Schum. - Mkalamu, Mpelewa  
climbing grass

GRAMINEAE - the grasses
Olyra latyfolia L  
RMH 2665
Opilomenes sp.  
SR
Panicum laticomum Nees  
RMH 2652
Panicum parvifolium L.  
RMH 2753
Pdnicum subjlabellatum Stapf  
RMH 2738
Paspalum vaginatum Sw.  
RMH 2736
Pseudoechinolaena polystachya (Kunth.) Stapf  
RMH 2726
Schizachyrium rupestre (K. Schum.) Stapf  
RMH 2755
Setaria megaphylla (Steud.) Th. Dur. & Schinz  
FTEA
Vetiveria nigritaiana (Benth.) Stapf
LILIACEAE
Asparagus falcams L.
climber.
Dracaena fragrans/deremensis
small shrub of high forest. Rare species; new
record for Pemba
Dracaen4 laxissima Engl. – Mpelewa
sarmentose shrub
Sanseviera conspicua N.E. Br.
succulent herb in coastal thicket
MUSACEAE :
Ensete sp. near proboscideum (Oliv.) Cheesm. -
Mgombatumbili
Wild banana; endemic to Ngezi Forest;
vulnerable species
ORCHIDACEAE-the orchids
Acampe sp.
Aerangis holoqottis (Schltr.) Schltr.
Aerangis kirkii (Reichb.f.) Schltr.
Bulbophyllum sp.
Disperis johnstonii Rolfe
Small terrestrial orchid. new record for Pemba.
Eulophilia sp.
Nervilla umbrosa (Reichb.f.) Schltr.
small terrestrial orchids
Vanilla roscheri Reichb.
liana.
PALMAE
Chrysalidocarpus pembanus Moore
Medium-sized palm tree. Endemic to Ngezi
Forest. A vulnerable species
Elaeis guineensis Jacq.
the oil palm (occurs wild)
Phoenix reclinata Jacq.
the wild date palm
Raphiafarinifera (Gaertn.) Hyland [Raphia ruffia]
the Raffia palm; forms stands in swamps.
PANDANACEAE
Pandanus kirkii Rendle
The beach screw pine
SMILACACEAE
Smilax anceps Willd. [So kraussiana] - Mkekewa
spiny climber
XYRIDACEAE
Xyris anceps Lam.
Small aquatic or swamp species
ZINGIBERACEAE
Aframomum angustifolium (Senn.) K. Schum.
herb in moist sites
Costus sarmentosus Bojer - Vitungu
herb