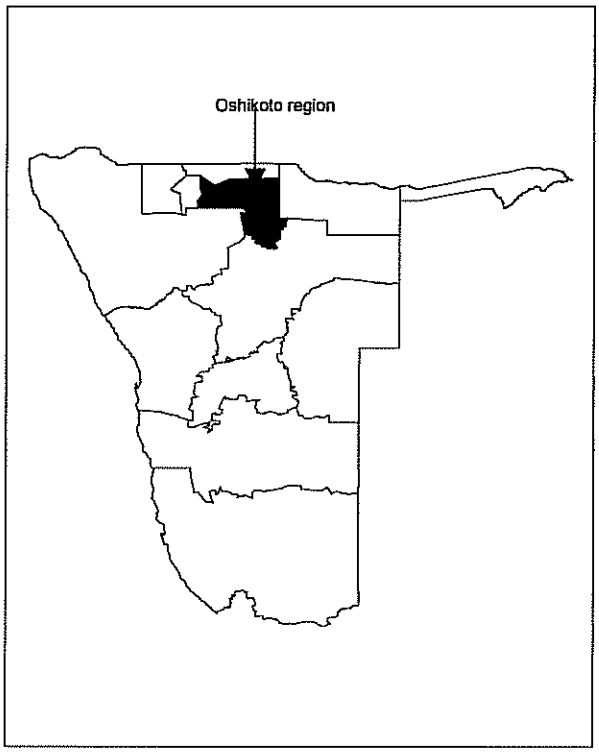
Ministry of Environment and Tourism
Directorate of Forestry

Inventory Report on the Woody Resources in Oshikoto Region



Namibia Finland Forestry Programme

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EXCECUTIVE SUMMARY

Woody species
A total of 57 woody species were recorded in the region. 34 species were found in both tree layer and shrub layer, while 17 species were found in the shrub layer. Hence, there is no big difference between the species diversity in the shrub layer and in the tree layer. Out of 57 species, only 6 species were found in the tree layer only. *Combretum collinum* and *Terminalia sericea* are the dominant species in the tree layer.

Vegetation types
On 1/3 of the region there is no woody vegetation, i.e. grasslands and bare land. Contrary, 70% of the region is covered with woody vegetation. Almost 30% of the area is Thicket. On 17% of the area there is distinct tree layer. On 1% of the area there is a dense tree layer to be called forest. Open and closed woodland covers 4 and 11% respectively. On 21% of the region there is a distinct shrub layer, most of this area with rather dense layer of shrubs. Bush land cover 15% while shrub land covers only 6%.

Forest resources
Both the total volume and the volume per hectare are high in Oshikoto region. Note that, the whole region was not inventoried due to the fact that almost half of the areas fall in commercial farms and some areas consist of grassland and oshanas. The mean tree volume is the second highest volume in all the regions inventoried so far.

The economic importance of the wooded areas in the region lies at present in the utilisation of the wood for fuel wood, poles and fodder. The demand for poles and fuel wood in the region is big. This is because most of the homesteads are constructed with woods. Some of these poles can only last for a couple of years and will have to be replaced by new ones. It was observed that not only people of Oshikoto are utilising the wooded areas, but also people from other regions are collecting poles or fuel wood from the forest in the region.

Woody resources on the farms
Oshikoto region is divided into two parts in respect of land tenure: communal land and commercial farm. Commercial farm areas were excluded from this inventory. Although the whole Oshikoto region area which was inventoried is communal land, a considerble part (46%) of the region is fenced off. The fenced off areas are mainly of two types; 1) small farms where the main part of the fenced off areas (2%) consists of the homestead and the surrounding field for cultivation and 2) big fenced off areas (44%), where the main use of the area is grazing. The fenced off areas are mainly small farms, where the main part of the fenced off area consists of the homestead and the surrounding field for cultivation.

The average volume and stems per hectare of trees grown inside the farms are lower than in the whole area. The situation is different from Oshana region where average stems inside the farms were bigger than what was found outside.

Regeneration
There is on average 1805 shrubs/saplings per hectare in the shrub layer, which is quite a considerable amount. Note, however, that this figure refers to the part of the region that was inventoried. Most of the saplings found in the region are between ½ - 2 m in height. Out of the most common species in the region, only *Terminalia sericea* and *Combretum collinum* were found among the six dominant tree sapling species in the region.

1. INTRODUCTION

The information on Namibian forest resources has been limited on all levels (local, regional and national). Therefore, in 1995 the Directorate of Forestry, supported by the Government of Finland, started a National Forest Inventory (NFI). The main aim was to produce region level information on the woody vegetation in the communal lands of northern Namibia. In April 1997 the Directorate of Forestry began a comprehensive implementation of the Namibia Forestry Strategic Plan of 1996 by launching the Namibia-Finland Forestry Programme and the NFI was incorporated as a sub-component into this programme. The main objectives of the NFI in NFFP Phase I were: (1) To produce regional level forest resource data on northern Namibia for strategic planning; (2) To produce more detailed forest resource data for strategic or operational management planning on sub region areas, and (3) To build a Namibian capacity to carry out the inventories.

The Directorate of Forestry has given first a higher priority to region level inventories in order to have basic knowledge of the forest resources in each region. After the region level inventories, the work will proceed to more detailed local level inventories. The support from the Government of Finland today – through Namibia-Finland Forestry Programme Phase II (2001-2005) – aims now more at strengthening the capacity of Directorate to serve the needs specifically for local level forest management planning.

The utilization of information from different levels of inventories is different. The region level inventories provide information on the forest resource for the entire region for region level planning. The sampling intensity is low, therefore information on very small units cannot be derived, and the results cannot be used for operational management. To get detailed information for operational management, local level inventories have to be carried out. Basically the information substance is similar for both region level and local level inventories. The sampling intensity in the local level inventories is high compared to the region level inventories, and the information is site specific to small units in the area inventoried.

This report presents the results for the region level inventory of the Oshikoto region. The results here for Oshikoto are presented for the region as one unit and are therefore not site-specific on any sub-region area. However, it is possible to derive results for sub-areas too by analyzing the clusters that were measured in that particular area. Data for each sample plot is available at the Directorate of Forestry Headquarter in Windhoek.

For those readers who may be interested to know what other forest areas the Directorate of Forestry has inventoried, a list of inventory reports has been attached as an Appendix 15 (P. 51) at the end of this report. These reports are available at the Directorate of Forestry in Windhoek.

2. INVENTORY DESIGN AND AREA

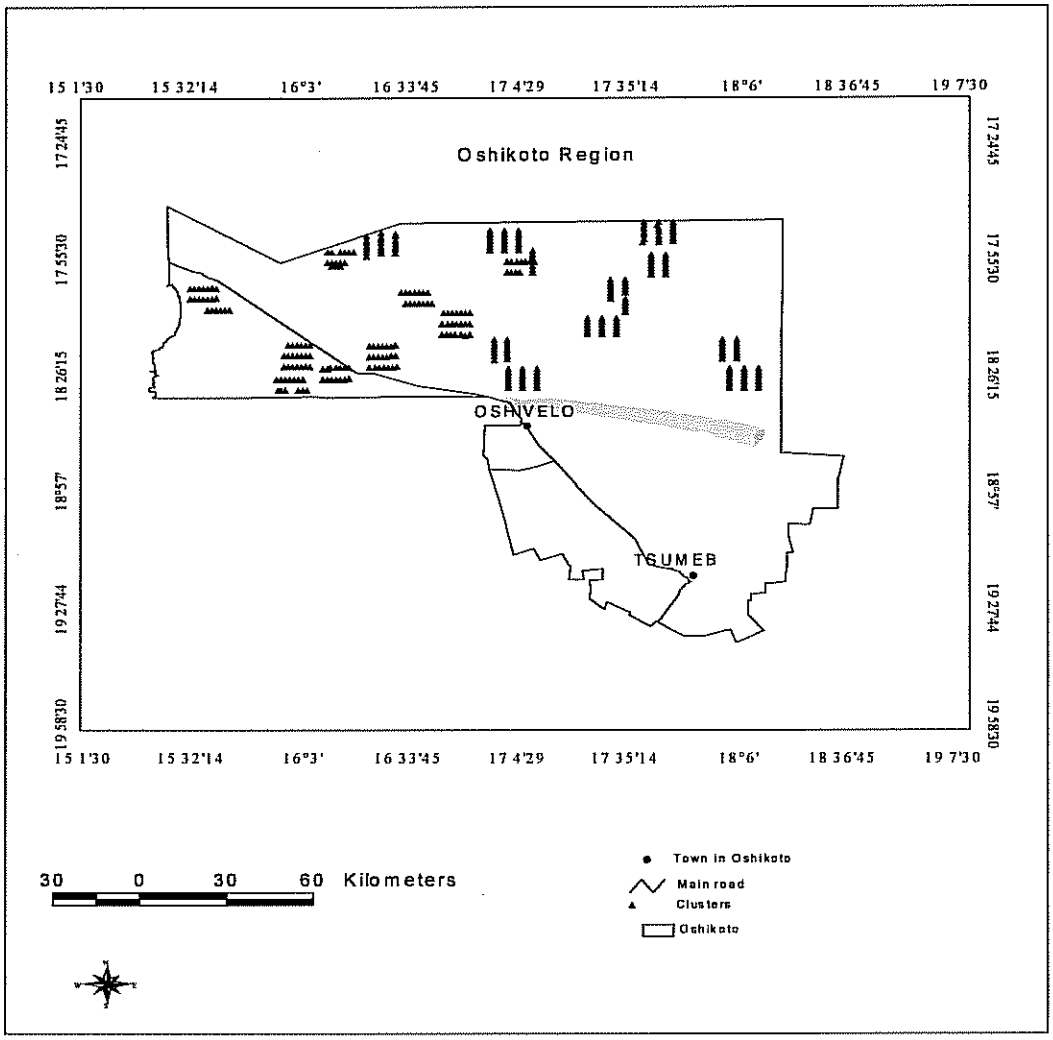
2.1 Inventory area

- ✓ The size of Oshikoto Region is 2,656,523 ha (according to the vegetation maps). 957,049 ha of this area are on commercial farms. Hence the total area of communal lands in the region is 1,699,474 ha.
- ✓ The Oshikoto Region Forest Resources Inventory covers the communal lands in the region, not the commercial farms.
- ✓ 53,073 hectares are grassland and oshanas. These areas are not included in the inventory; hence the area covered by the inventory is 1,646,401 ha.
- ✓ The communal lands are dominated by forest and savannah type vegetation. The forests are mainly in the northern parts of the region, while savannah dominates in the middle and southern parts. There is a distinct change in species composition when moving from the northeast to southwest. The north-western parts of the region are dominated by the vegetation type "extensive-agriculture with *Hyphaene petersiana* trees" (code EZ on the vegetation maps).
- ✓ The communal lands of Oshikoto region are located on the following map sheets: 1716C, 1716D, 1717CC, 1717CD, 1717DC, 1717DD, 1816A, 1816B, 1817AA, 1817AB, 1817AC, 1817AD, 1817BA, 1817BB, 1817BC, and 1817BD.
- ✓ Forest inventory focused only on communal land areas.

2.2 Sampling method

Stratified systematic plot sampling was used to estimate the quantity and quality of the woody resources in the Oshikoto region. Vegetation Maps at the Directorate of Forestry were used to stratify the region into 9 sampling strata. The density and structure of the woody vegetation was used as criteria for the stratification. The sampling intensity was higher for dense wooded areas than for areas with less woody vegetation.

The total number of clusters located in the region was 336. Each cluster consisted of 2 sample plots at a distance of 100 m apart in the north-south direction. Hence, a total of 672 sample plots were located in the region. The clusters were located in lines, with 7 clusters per line. The clusters in one line were located in more than 2 parallel lines in a group on north-south direction in the eastern parts of the inventory area. In other parts the lines are located both in the north-south and east-west direction. The line distance was 5 km and the cluster distance in one line 1.5 km. The groups of clusters were located mainly on the northern part of the region, simple because the southern part falls under commercial area and the emphasis was only on communal area. Map 1 shows the final location of the clusters after corrections to fulfil demands from the stratification.



Map 1: Location of the clusters in Omusati region.

The clusters plotted on the Vegetation Maps were digitised using Mapinfo software to obtain coordinates for each cluster. The coordinates and GPS were used for locating the clusters in the field. The map coordinates, reference ellipsoid and compass declination used when locating the cluster coordinates were:

- Datum: Schwarzeck
- Ellipsoid: Modified Bessel 1841
- Compass declination: 13.3° west of true north

Both sample plots in each cluster are regarded as permanent measurement plots. They have coordinates and are marked in the field with an aluminium pole and can be re-located for re-measurements in future. The coordinates are shown in Appendix 10 for other users who may wish to locate the plots in the field. The coordinates are the locations of the first plot (the plot most to the south) in the cluster. To locate the second plot a compass and measurement tape are used.

2.2 Field measurements

The data is collected in circular sample plots. The woody vegetation is classified into trees and shrubs. In this inventory trees are defined as woody plants with DBH ≥ 5cm, and shrubs are woody plants with DBH < 5 cm.

For tree measurements the size of the circular sample plot depends on the size of the tree (see Figure 1 below). For small trees (DBH 5 - 20 cm) the radius is 10 m, for medium size trees (DBH 20 - 45 cm) the radius is 20 m and for big trees (DBH>45 cm) the radius is 30 m.

Diameter, location, species, crown class, quality, length and quality of possible saw log were measured for all trees in all sample plots. The trees in the first plot of each cluster are called sample trees. For them also height, diameter of canopy, crown height, damages and phenology were recorded.

Shrubs, regeneration, coverage of grasses and herbs were measured in two sub-plots (radius 3.99 m) located only in the first plot of each cluster (see Figure 1).

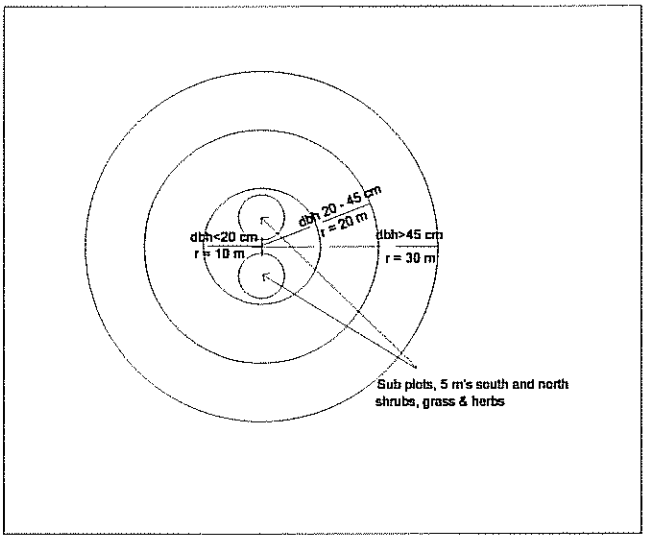


Figure 1: Plot Design

Information describing the environment surrounding the sample plot ("the stand") was also recorded. This description includes e.g. the soil, the land type, damage to the woody vegetation and human influence. All the measurements are described in more detail in the field instructions (Field Instructions Western Bushmanland 1996).

2.3 Stem analysis and volume functions.

So far stem analysis for the development of volume functions has been carried out in West Tsunkwe, Caprivi, Omusati region and Oshikoto region. A total of 254 trees of the most common species have been felled and measured for this purpose. These volume functions were used in the analysis of the data for Oshikoto region.

Volume functions have been developed only for the most common species. For the other species the volume functions were applied to estimate the volumes of those species. For other users who may wish to use the models, Appendix 13 (P. 50) shows which models that were applied to the species where no functions were developed.

3. INVENTORY RESULTS

3.1 Measured trees and shrubs

The inventory field work in Oshikoto region was carried out from October 1999 to April 2000. A total of 672 sample plots (336 clusters) were measured in the inventory. 178 clusters (52.6 %) fall into communal area open, 150 clusters (45%) fall in communal area "Fenced off" and 8 clusters (2.4%) fall in private farm. 3794 trees with dbh≥5 cm were enumerated in the sample plots (see Appendix 1 p. 38), which is on average 5.6 trees per sample plot. Caprivi Region where the biggest number of trees was registered in all the regions inventoried so far has 4.8 trees per sample plot. Omusati and Oshana region has 1.5 and 0.6 trees per hectare respectively. Comparing to other regions mentioned above, this is an extremely reasonable number of trees per sample plot.

Furthermore, all areas classified as oshanas, grasslands and commercial area on the vegetation maps (almost half of the region) were not included in the inventory. Hence the 5.6 trees per sample plot represent about half of the region, where according to the DoF vegetation maps there is woody vegetation. Out of the 3794 trees 1982 were sample trees, i.e. trees of which additional variables were measured.

A total of 56 woody species were recorded in Oshikoto region. 40 of the species were recorded both as trees and shrubs, while 16 of the species were found as shrubs, i.e. species with dbh<5cm.

Figure 2 shows the six most common measured tree species in the region. More than 2/3 of the measured trees are from these common species. The following are the most frequent species in the tree layer data (shown also in figure 2): *Combretum collinum, Terminalia sericea, Burkea Africana, Baikiaea plurijuga, Dichrostachys cinerea (Africana), Dichrostachys cinerea (Setulosa)*, and are also showed in figure 2 below.

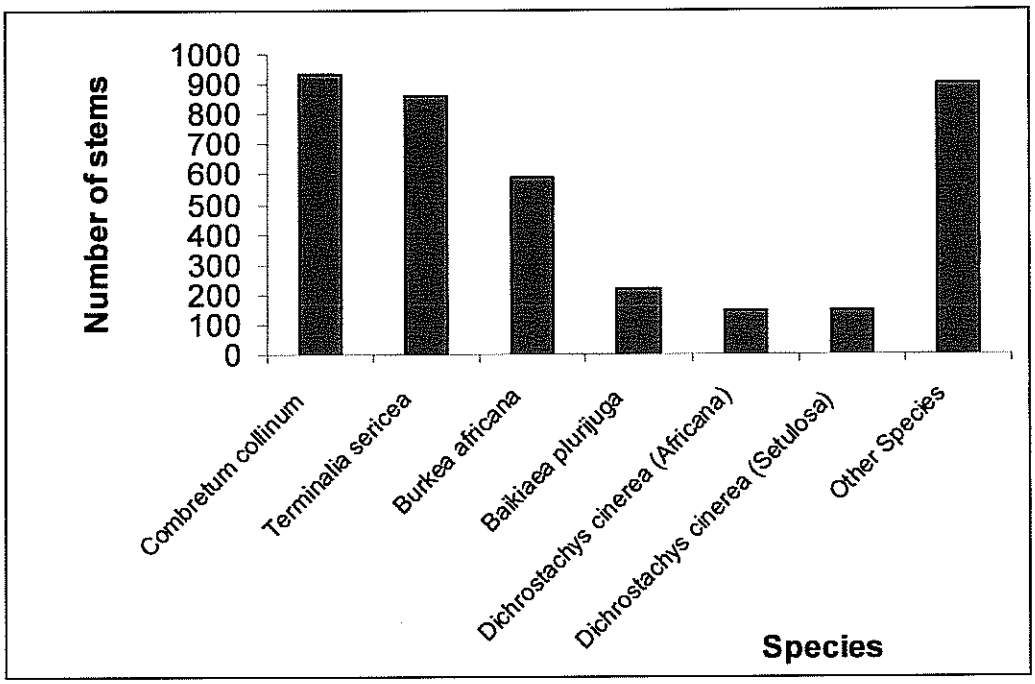


Figure 2: Number of measured trees

A total of 1344 shrubs were recorded (see Appendix 9 (P. 45). Even though *Terminalia sericea* is the most common species as shown in the figure 3, it covers only 10% of the measured shrubs. This is an indication that the region is not dominated by one species like in many regions, i.e. Oshana and Omusati region where one species cover more than 2/3 of the measured shrubs. *Colophospermum mopane*, which is the dominant species in those two regions mentioned above, is not even in the top six common species in Oshikoto region. Two of the most common species in the tree layer also occur among the 6 most common species in the shrub layer. None of the most common species in the shrub layer are typical shrub species, i.e. they were not found as trees in the inventory. Figure 3 below shows the 6 most common species in the shrub layer. Full list of shrub species can be found in Appendix 9 (P. 45).

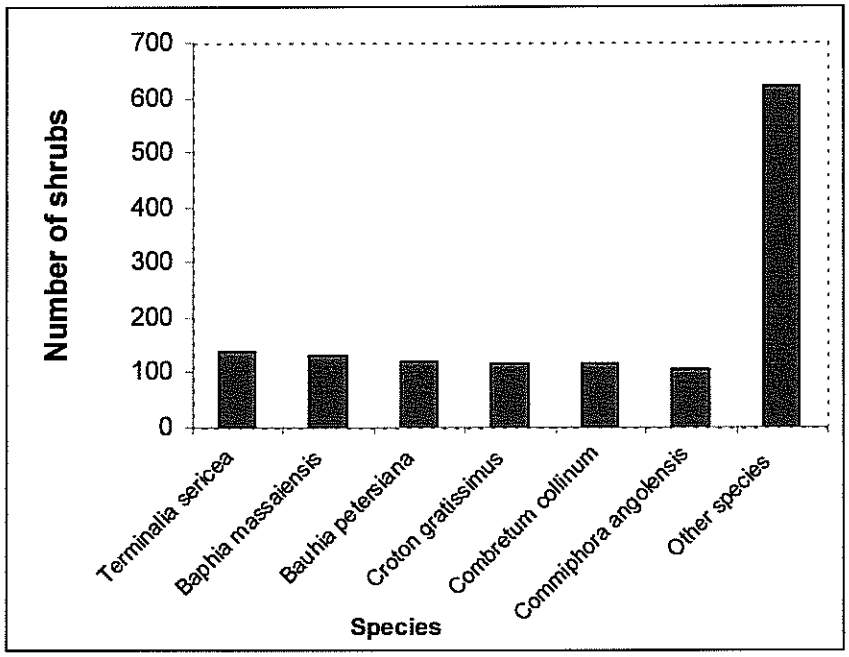


Figure 3: Number of measured shrubs

3.2 Structure of the woody vegetation

3.2.1 The vegetation type classification used in this report

Edwards Vegetation Structural Types (Edwards 1983) is used for describing the structure of the woody vegetation (Appendix 11, p 49). This classification is based on the crown cover of the tree, shrub and grass layer and the height of the tree and shrub layer. There are 6 main vegetation types determined by the layer in which the woody vegetation is, namely; forest, woodland, thicket, bushland, shrubland and grassland. Each main vegetation type is further divided into sub-types depending on the height and density of the woody vegetation. For instance, short closed woodland, tall closed woodland, short open woodland and short closed woodland. The main vegetation types can briefly be described as follows:

Vegetation type	Description
Forest	Dense tree layer. Not much shrubs.
Woodland	The woody vegetation is in the tree layer. The shrub layer is sparse. Open and sparse woodland implies very little woody vegetation.
Thicket	The woody vegetation is in two layers, i.e. in both the tree layer and the shrub layer. As the name indicates, these areas are thick
Bushland	The woody vegetation is in the shrub layer. But there is still trees scattered in the area. Hence, there is a scarce three layer.
Shrubland	The woody vegetation is in the shrub layer. There are virtually no trees in the area. Open and sparse shrubland implies very little woody vegetation in any layer.
Grassland and herbland	The vegetation is in form of grasses and herbs. There is virtually no woody vegetation in the area.

The FAO classification of woody vegetation is commonly used in international reporting. The Edwards classification used in this report is more rigorous when it comes to defining forests than the FAO classification. The vegetation types "Closed Woodland" and "Short Thicket" in Edwards classification would be classified as forests in the FAO classification.

In the vegetation maps produced by the Directorate of Forestry a slightly different classification is used. Here there are 3 main vegetation types; forest, savanna and grassland. The height of the woody vegetation determines if the area is classified as forest or savanna. Forest and savanna are then classified according to their woody cover into "dense", "medium dense" etc. Therefore, also in this classification the crown coverage and height of the woody vegetation are used as classification criteria and the classification in the vegetation maps is compatible with the Edwards classification.

3.2.2 Structure of the woody vegetation in the Oshikoto Region

The structure of the woody vegetation in Oshikoto Region is shown in Figure 4 (P. 13). The inventory focused only on wooded areas in communal area as described in Chapter 2.1 (p. 5). The figure includes both areas without woody vegetation (i.e. grasslands and bare land that was already in the vegetation maps classified as grassland and oshanas (see Chapter 2.1 p. 5) and areas that in the vegetation maps classified as wooded areas but in the inventory were found to be grasslands or bare land) and commercial farms area. The vegetation types in commercial farms area were not taken into consideration, so they were not indicated what vegetation types are there in the commercial farms.

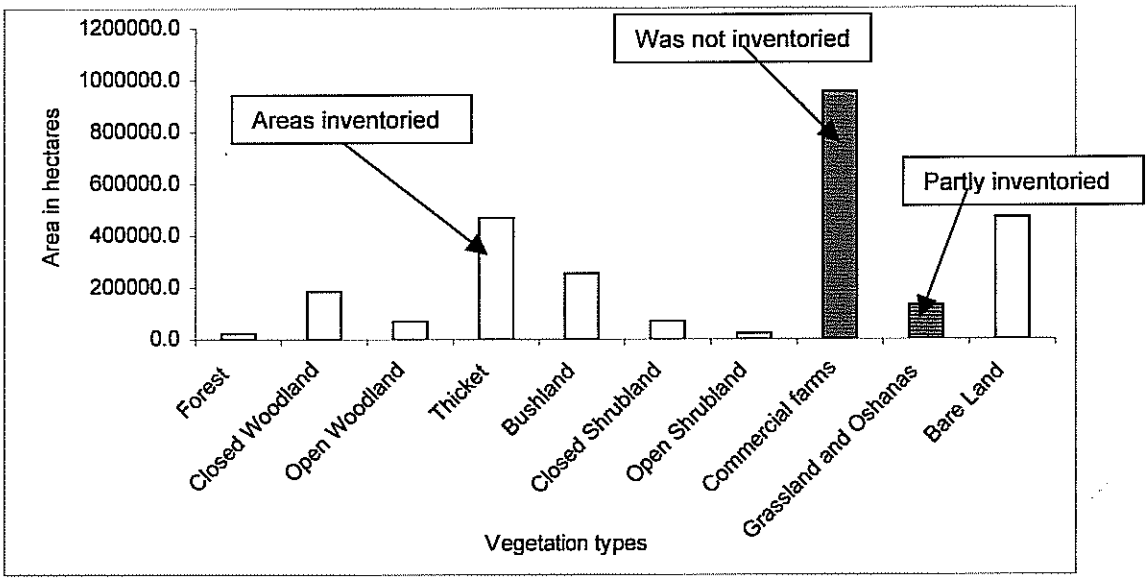


Figure 4: Vegetation structure of the whole region

On 1/3 of the region there is no woody vegetation, the area is grasslands and bare land. Contrary, 70% of the region is covered with woody vegetation. Almost 30% of the area is Thicket. On 17% of the area there is dense tree layer. On 1% of the area there is a distinct tree layer to be called forest. Open and closed woodland covers 4 and 11% respectively. On 21% of the region there is a distinct shrub layer, most of this area with rather dense layer of shrubs. Bush land cover 15% while shrub land covers only 6%.

Figure 5 (P. 14) shows the average, (minimum, maximum) height of the tree species in the area with higher average height. Respective list of all species can be found in Appendix 2 (P. 38). The reason why height information is lacking for some species is that they were found only in the second plot of the cluster where height is not measured (see Chapter 2.2 p. 6).

The tree layer in the region is much higher compare to the tree layer in Oshana and Omusati regions. The common species in the region, *Combretum collinum* has an average height of 5.3 m. The highest tree found in the inventory was a *Burkea africana* with the height of 18.3 m.

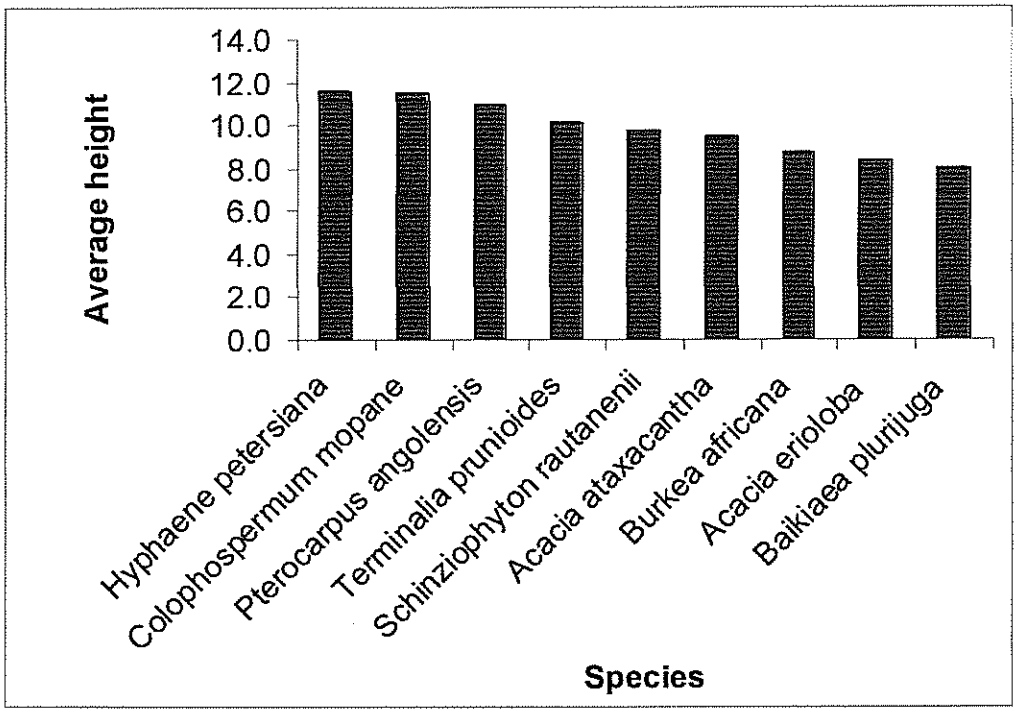


Figure 5: Average height by species

To sum up:

- ✓ On 1% there is a distinct tree layer to be classified as forest. On 16.6% there is dense tree layer.
- ✓ Shrub layer covers almost 21% the area inventoried.
- ✓ On 1/3 of the region there is no woody vegetation.

3.4 Dominant species in the tree layer

Dominant species is the tree species that is the most common in the tree layer. The clusters were classified according to the dominant species. Dominant species for each cluster was derived from the crown coverage of each species in the measured sample plots. The species with the largest crown coverage in the sample plot is the dominant species.

Figure 6 shows the areas of dominant species in Oshikoto region. The full list of all the species is in Appendix 3, (P. 39). Note that this is the dominant species in the tree layer, not in the shrub layer. The figures include only areas with trees; hence only 62% (1,030,474 ha) of the region is included in the Appendices and Figures. The rest of the area is not included, since there are no trees on those areas and hence no dominant species.

On almost 1/3 of the area where there is a tree layer, the dominant species in that layer is *Terminalia sericea*. On almost 2/3 of the area with a tree layer the dominant species is *Terminalia sericea, Combretum collinum* or *Burkea africana. Baikiaea plurijuga* was found dominating only on 6% of the area with a tree layer.

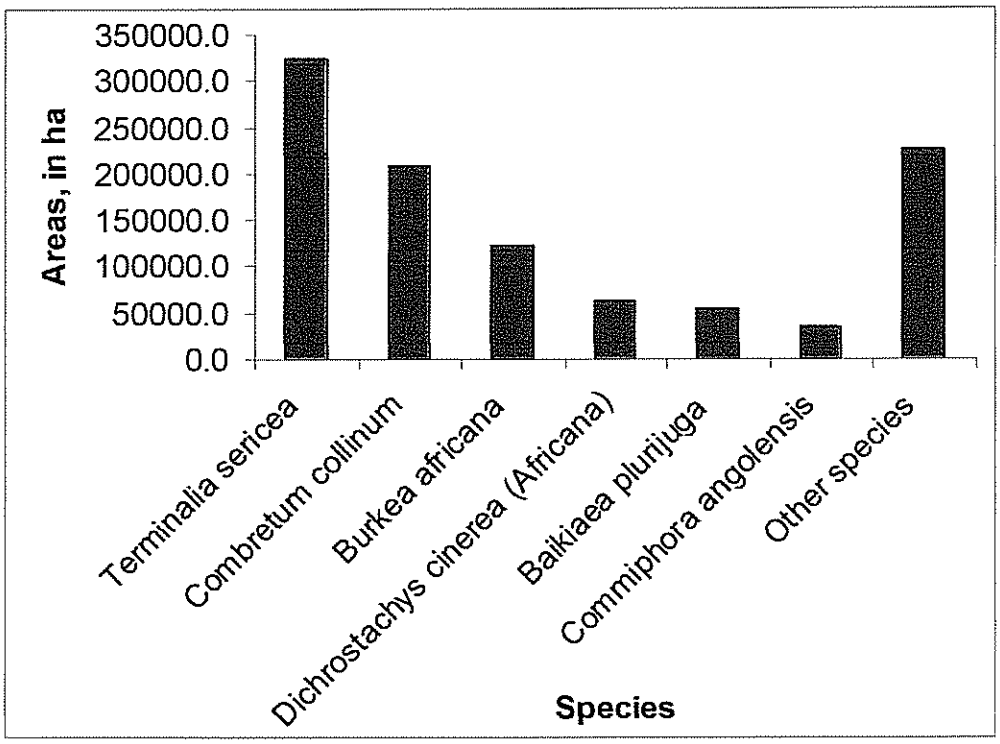


Figure 6: Areas of dominant species

Table 2 below (P. 17) shows the dominant species in the different vegetation types found in the region. Hence, the table shows which species are likely to be found as dominant in different tree vegetation classes of various densities. Since most of the areas have few trees, the table also generally shows in which kind of vegetation types different species are likely to be found. Note that the table shows only the 8 species most commonly occurring as dominant.

The common species *Terminalia sericea* and *Combretum collinum* was found in all vegetation types except in closed woodland. In the most common species only *Dichrostachys cinerea (Africana)* and *Terminalia sericea* were found in the vegetation type forest.

3.5 Tree volumes and number of stems

Volume functions: An important activity within the NFI region inventories is to develop volume functions for the most common tree species in each region. This is done by stem- analysis on a representative number of stems for the most common species. Stem analysis has so far been carried out in Otjozondjupa, Caprivi, Omusati and Oshikoto regions. The volume functions used to calculate the volumes in Oshikoto region are presented in Appendix 4. Volume functions are developed for the most common species only, but the functions are also applied on the other species without own volume functions. For other users who may wish to use the models, Appendix 13 (P. 50) shows which models were applied to the species without volume functions.

Unless specified otherwise, **Tree volume** means the volume of the entire tree comprising of the main tree trunk and branch wood. The number of trees and volumes for; (1) the area included in the inventory and (2) the whole Oshikoto region are as follows:

	Area included in the inventory
Total number of trees	211,840,000
Mean number of trees per hectare	128.67
Total tree volume, m^3	18,833,980
Mean volume per hectare, m^3	11.44

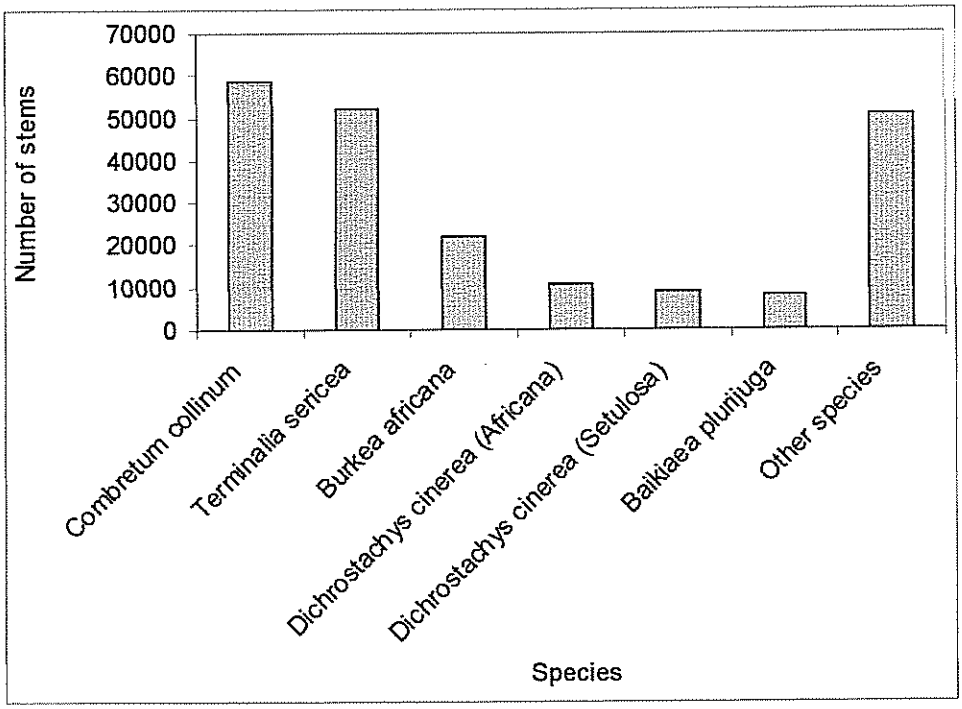
Both the total volume and the volume per hectare are higher in Oshikoto region. Note that, the whole region was not inventoried due to the fact that almost half of the areas fall in commercial farms and some areas consist of grassland and oshanas. So, the figures focused only on inventoried areas. The mean tree volume is the second highest volume in the all the regions inventoried so far. There are also a considerable number of trees in Oshikoto region compared to other regions.

Total number of stems for Oshikoto is; 5 times of Omusati, 70 times of Oshana and 1.5 times of Caprivi region. Even thought there are more trees in Oshikoto than in Caprivi, the volume in Caprivi is much higher (1.9 times the volume of Oshikoto). The mean tree volume in Omusati region was 3.2 m^3/ha, in Otjozondjupa region 4.2 m^3/ha, in Caprivi region 21.37 m^3/ha, while Oshikoto region is 11.44 m^3/ha.

There are some factors which to be considered when assessing these volumes. Caprivi region is one of the regions in Namibia with a highest average rainfall per annum. The soil and species type contribute to the growth of the tree and to the size of the tree respectively.

From the observation above it appears that the size of the trees in Oshikoto region were relatively small in diameter compared to the stems found in Caprivi region. Therefore, this contributes significantly to the tree volume as the volume of the tree is determined by the diameter at breast height of the tree. The size of the stems will be discussed in the next chapter: Diameter distribution.

The figures above include all different vegetation types including bare land and grassland, which were found inside the inventoried area. Table 3 shows the volumes and number of trees for the main vegetation types. Note that Table 3 describes only the part of the region included in the inventory.



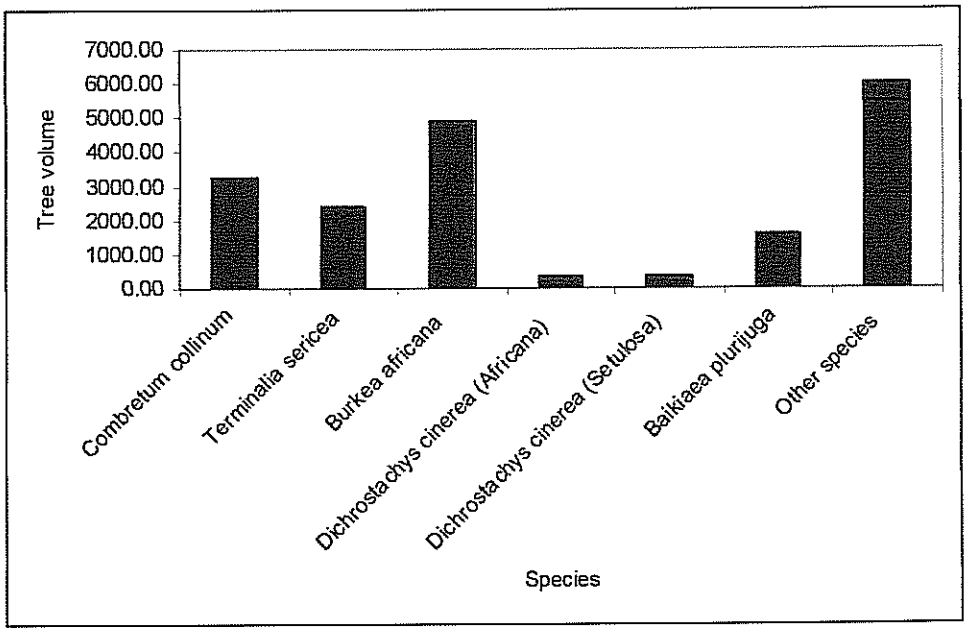


Figure 7: Total number of stems and total tree volume in 1000's

There is a considerably large amount of species that can be used for poles, namely *Terminalia sericea*, and *Combretum species*. There are 609 000 stems of *Colophospermum mopane*. The total volume for *Terminalia* species, *Colophospermum mopane, Dichrostachys cinerera* species and *Combretum* species is 7,236,660 m^3 (141,010,000 stems). This volume includes trees of all sizes. Trees used for poles include trees only up to a certain diameter at breast height. Consequently, the volume of the poles will be smaller.

The timber trees; *Pterocarpus angolensus* and *Baikiaea plurijuga*, only *Baikiaea plurijuga* was found in the most common species in the region. Furthermore, the 79,950 m^3 include trees of all sizes while trees only up to a certain diameter are used as poles. Therefore the volumes available for poles are even smaller than the above-mentioned figure.

To sum up:

- ✓ There is high tree volume both total and per hectare. The mean tree volume is a second highest volume in all the regions inventoried so far.
- ✓ There is quite larger number of trees compare to other regions
- ✓ Species mostly used for poles *Terminalia sericea* and *Combretum collinum* were found in the region as a dominant species.
- ✓ Potential to utilise these species for poles in the region is viable.

Most of the species that are to be used for poles for homestead construction and fencing were also found among the most common species in the region. Therefore there is a potential to extract some poles from the forest in the region.

The figures (10 and 11) bellow illustrates the distribution of stems and volumes by diameter class among the most common timber trees used in the country. As is it shown in the figures most of the stems are concentrated in small diameter class. The volumes are concentrated in the middle diameter class. This is due to the fact that small trees have a low volume compare to the big trees.

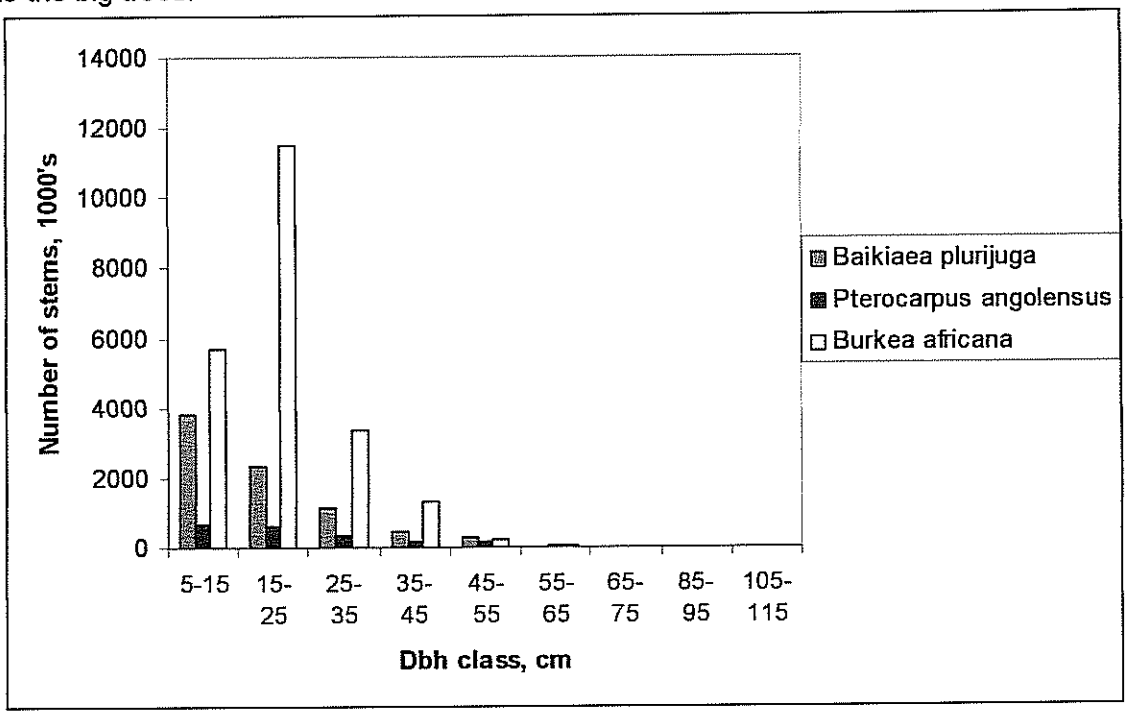


Figure 10: Stem size distribution of for *Baikiaea plurijuga, Burkea africana and Pterocarpus angolensis*

3.7 Damage to the woody vegetation

Damage to the woody vegetation was recorded both at stand level, for the sampled vegetation unit (Table 4), and at tree level for the measured sample trees. In the damage assessment for the stand level the damages were classified into 5 different classes; (1) no damage, (2) mild, (3) moderate, (4) serious and (5) fatal damage.

Table 4: Damaging agent and the severity of damage at stand level, in ha

	Severity of damage						
Damaging agent	Fatal	Mild	Moderate	No Damage	Serious	Total (ha)	% of total damaged area
Forest fire		253738	136672	10944	24515	425869	40.41
No Damage observed			4411	351291		355702	33.75
Mammals domestic		91555	41044			132599	12.58
Human	6327	47929	44751		8405	107412	10.19
Mammals wild		12654	6327	10738		29719	2.82
Storm					2559	2559	0.24
Total	6327	405876	233205	372973	35478	1053860	100

Note that Table 4 above includes only areas with woody vegetation. Therefore, the areas excluded from the inventory and areas in the inventory that were found to be without woody vegetation (no trees or shrubs) are not included in the table. Hence, only 64% (1,053,860 ha) of the region is included in the table.

The table shows that the area seems to be severly affected by fire. On 40% of the total area with woody vegetation the cause of damage is fire. 6% of the fire damage were classified as serious, while on 60% the damage was mild, i.e. the damages can be observed but is not affecting the health of the trees. On 1/3 of the total area with woody vegetation there was no damage observed.

The signs of cutting were few in the area. Damages related to human activities means cutting here. Only 10% of damage was caused by human activities. Most (45%) of these human damages on the area were mild. On 7% of the area where the cutting was observed, cutting was serious. This implies that there are signs of cutting on almost 10% of the wooded areas in the region. On the other hand, since the most damage were classified as "mild" it indicates that where cutting was observed, only small parts of the woody vegetation had been removed.

To sum up:

- ✓ The area is affected by fire.
- ✓ Most of the damages were mild, i.e damage can be observed but is not affecting the health of the tree.
- ✓ Signs of cutting were few in the area. 10% of the damage was caused by human activities.

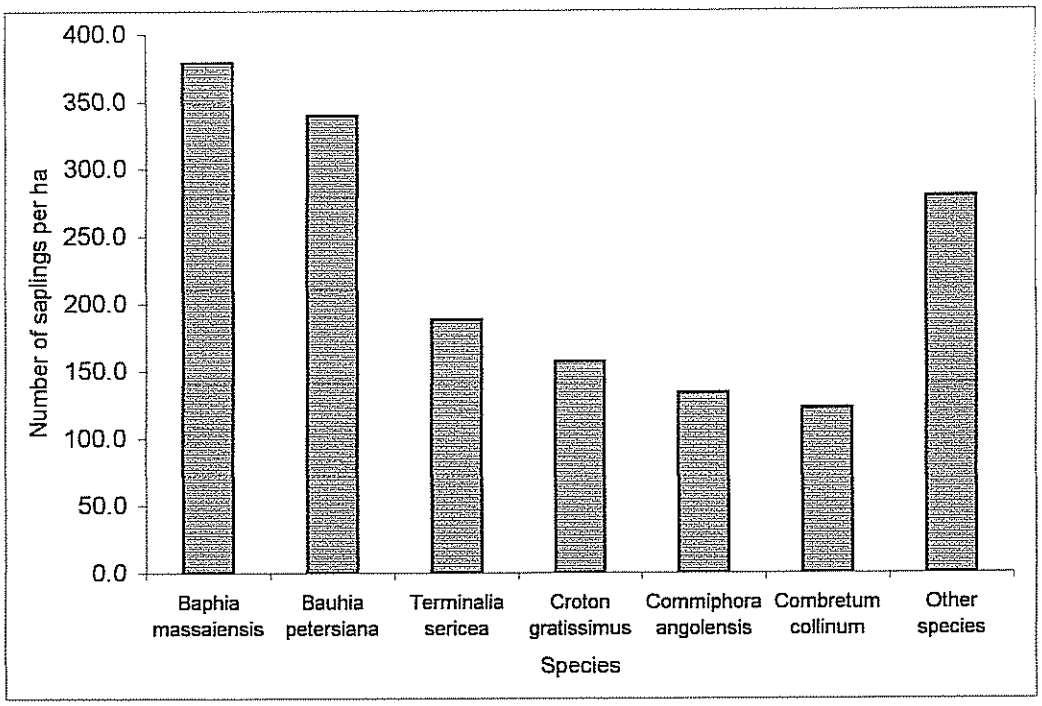


Figure 13: Number of tree saplings per hectare in by height classes and species

Most of the saplings found in the region are between ½ - 2 m in height. *Baphia massaiensis* and *Bauhia petersiana* have about 40% of the tree seedlings. Out of the most common species in the region, only *Terminalia sericea* and *Combretum collinum* were found among the six dominant tree sapling species in the region.

3.10 The grass and herbs layer

Figure 15 and 16 show the grass cover and herb cover per different vegetation types in the Oshana region. Note that only the part of the region included in the inventory is represented in the table. Therefore the table does not give information on the grass or herb cover on the grasslands or in the commercial area in the region. The inventory field work was carried out from Octomber 1999 to April 2000, hence the grass and herbs cover reflects the situation during that period.

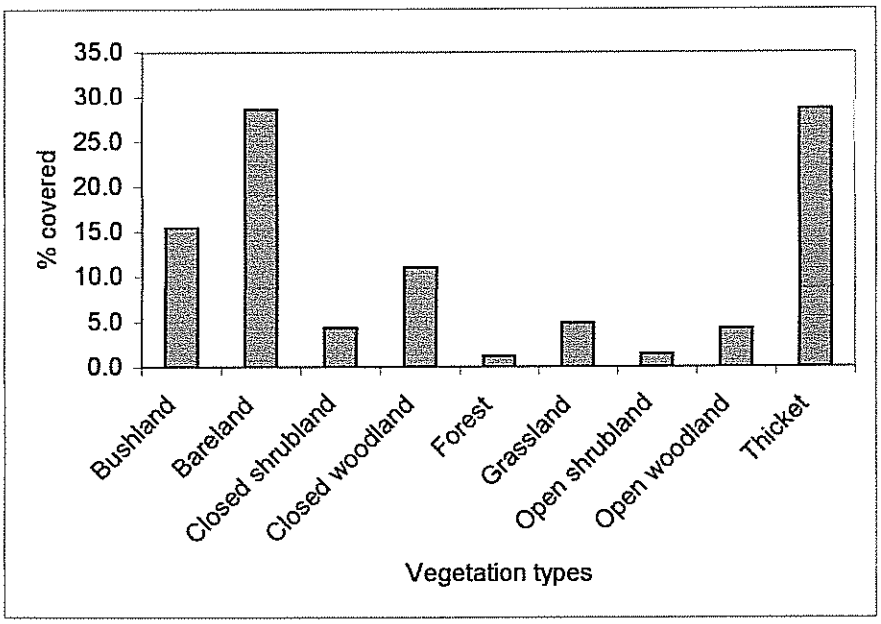


Figure 14: Cover of grasses per vegetation type

The highest grass cover is found in the grassland where grasses cover almost half of the land area. The grass covers around 20% in each vegetation types found in the region. The table should be interpreted with caution since the cover of grasses varies with the time of the year. This table represents a situation during and after the rainy season. Figure 15 shows that the cover of herbs is generally very low. Herbs covers only below 10% of each vegetation type found in the region.

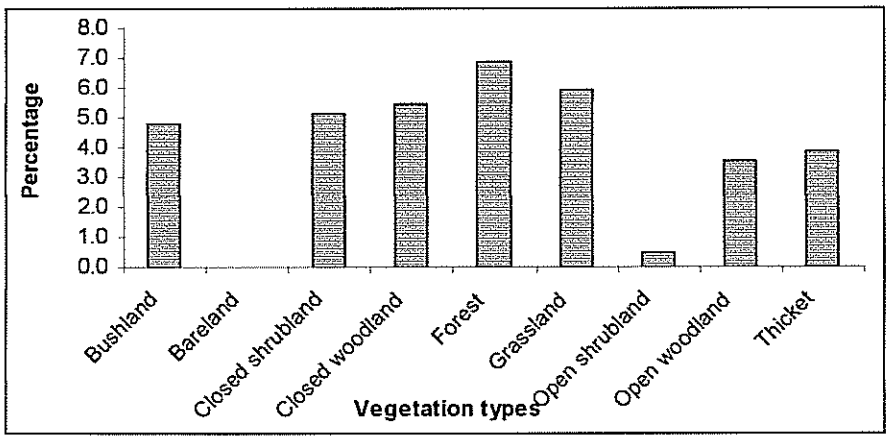


Figure 15: Cover of herbs per vegetation type

Figure 17 "Grazing" (P. 32) and figure 18 "Fenced areas" (P. 33) give indications on the area used for cattle farming. Note however that the figures include only the part of the region that was inventoried. Hence, the utilisation of the grasses in the grasslands and commercial farm in the region was not assessed. The information on grazing was obtained by observing lower vegetation and branches of trees and bushes in and surrounding the sample plots. Almost half of the inventoried areas showed signs of low grazing. The areas seem not to be over-grazed, since most of the grazing is classified as "moderate". On 20% of the area, there were no signs of grazing observed. High grazing was observed only on 7% of the inventoried area.
No code: The information on grasses was gathered using the codes. No code means that a recording error was made and the information is missing. No code represents here 30% of the total.

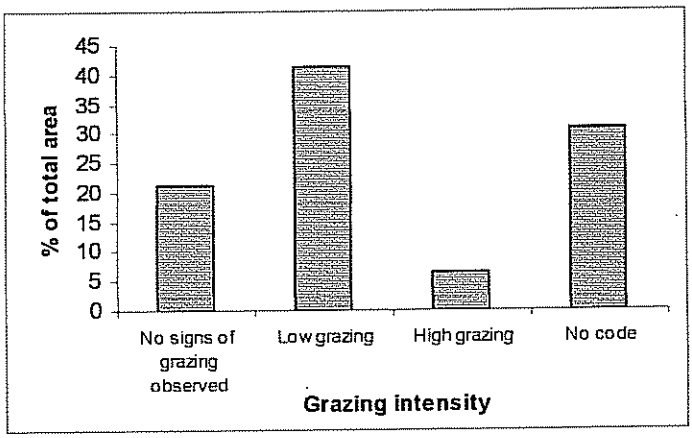


Figure 17: Grazing

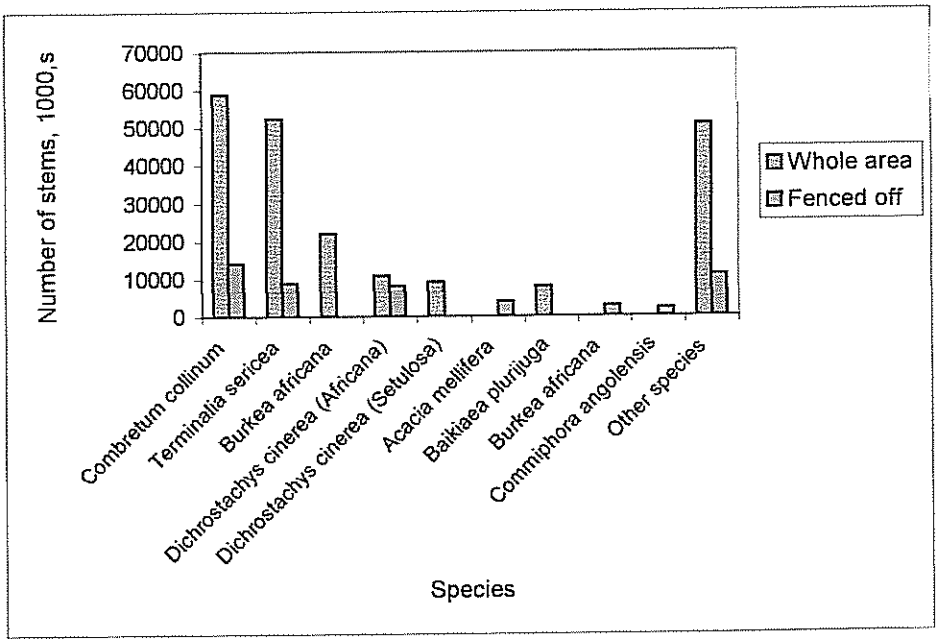


Figure 19: Number of stems inside the fenced off areas and in the whole area

4. CONCLUSION

In 1995 the Directorate of Forestry, supported by the Government of Finland, started a National Forest Inventory (NFI). The main aim was to produce region level information on the woody vegetation in the communal lands of northern Namibia. In April 1997 the Directorate of Forestry began a comprehensive implementation of the Namibia Forestry Strategic Plan of 1996 by launching the Namibia-Finland Forestry Programme. The NFI was incorporated as a sub-component into this programme. The main objectives of the NFI in NFFP Phase I were: (1) To produce regional level forest resource data on northern Namibia for strategic planning; (2) To produce more detailed forest resource data for strategic or operational management planning on sub region areas, and (3) To build a Namibian capacity to carry out the inventories.

Region level forest inventory gives basic information about the amount and structure of the woody resources in the regions. It also gives a rough idea where the resources are located. This report of the Oshikoto Region Inventory completes the work that was started in the mid 90's. Unfortunately two forested regions (Kavango and Ohangwena) had to be left out due to the security situation along the Namibia-Angola border. The picture of the forest resources of the North is now reasonably good although the two missing regions would need to be inventoried too in order the get a full picture. However, the security situation does not allow a traditional approach there in the near future.

Results of all region level inventories have been printed and distributed to potential data users. For other people who may be interested in the information, the reports are available in the Dirtectorate of Forestry in Windhoek.

The Directorate of Forestry aims now at developing a new system for monitoring the changes in the woody resources. This system will be based on the use of remotely sensing material, mainly satellite images, and ground truthing. The need for the system arises from the fact that in the future it will be too expensive to carry out traditional forest inventories with intensive field work. With the new system it would also be possible to inventory areas such as Kavango and Ohangwena too.

In addition to the above mentioned development work the Directorate will in the near future concentrate on detailed local level inventories. These inventories will be used for forest management planning.

Appendix 2: Average and maximum height by species

Species	Average height in meters	Minimum height in meters	Maximum height in meters
Hyphaene petersiana	11.6	11.4	11.8
Colophospermum mopane	11.5	5.3	17.8
Pterocarpus angolensis	10.9	2.7	16.5
Terminalia prunioides	10.1	4.8	14.2
Schinziophyton rautanenii	9.7	3.1	16.9
Acacia ataxacantha	9.5	9.5	9.5
Burkea africana	8.7	1.3	18.3
Acacia erioloba	8.3	2.6	13.7
Baikiaea plurijuga	8.0	1.7	15.6
Peltophorum africanum	7.1	4.3	10.3
Erythrophleum africanum	6.9	5.5	9.2
Acacia mellifera	6.5	5.5	7.3
Strychnos pungens	6.2	4.4	7.3
Acacia Tortilis (spirocarpa)	5.9	3.4	13.4
Combretum zeyheri	5.9	3.5	10
Securidaca longepedunculata	5.9	5.9	5.9
Combretum collinum	5.3	1.4	13.8
Combretum engleri	5.2	5.2	5.2
Boscia albitrunca	5.2	2.8	9.2
Terminalia sericea	5.1	2.4	12.3
Boscia Foetida	5.0	4.2	5.8
Lonchocarpus nelsii	5.0	2.7	8.9
Combretum psidioides (psidioides)	4.9	2.8	8
Dichrostachys cinerea (Setulosa)	4.9	3.3	8.2
Ochna pulchra	4.8	2.8	8
Dichrostachys cinerea (Africana)	4.6	2.9	6.4
Acacia tortilis (heterecantha)	4.6	3.9	5.8
Croton gratissimus	4.3	3.3	5.9
Albizia anthelmintica	4.3	3.1	6.4
Acacia fleckii	4.3	2.8	6.4
Acacia hebeclada (hebeclada)	4.3	4.3	4.3
Baphia massaiensis	4.3	4.3	4.3
Commiphora angolensis	4.1	2.1	6.8
Commiphora africana	3.3	3.3	3.3
Ximenia americana var americana	3.3	3.3	3.3
Ximenia caffra var microphylla	3.3	3.3	3.3

Appendix 4: Total number of stems, stems/ha, total tree volume and average tree volume by species and for the whole area

Species	Total number of stems, 1000s	Stems per ha	Total tree volume, 1000s, m3	Average tree volume, m3/ha
Combretum collinum	58876	35.76	3279.93	1.992
Terminalia sericea	52344	31.79	2381.62	1.447
Burkea africana	22060	13.40	4885.14	2.967
Dichrostachys cinerea (Africana)	10821	6.57	370.81	0.225
Dichrostachys cinerea (Setulosa)	9125	5.54	321.25	0.195
Baikiaea plurijuga	7966	4.84	1581.06	0.960
Lonchocarpus nelsii	5797	3.52	464.00	0.282
Commiphora angolensis	5202	3.16	322.31	0.196
Combretum psidioides (psidioides)	4454	2.71	131.97	0.080
Acacia mellifera	4247	2.58	154.03	0.094
Ochna pulchra	3898	2.37	261.36	0.159
Acacia Tortilis (spirocarpa)	3241	1.97	143.21	0.087
Terminalia prunioides	3126	1.90	522.46	0.317
Acacia erioloba	3055	1.86	918.93	0.558
Albizia anthelmintica	2698	1.64	115.47	0.070
Boscia albitrunca	2130	1.29	248.63	0.151
Combretum zeyheri	2073	1.26	107.35	0.065
Pterocarpus angolensis	2028	1.23	896.50	0.545
Erythrophleum africanum	1510	0.92	126.37	0.077
Acacia fleckii	1231	0.75	34.15	0.021
Schinziophyton rautanenii	1014	0.62	1133.58	0.689
Croton gratissimus	966	0.59	16.10	0.010
Strychnos pungens	717	0.44	47.26	0.029
Colophospermum mopane	609	0.37	119.52	0.073
Boscia Foetida	466	0.28	50.73	0.031
Acacia tortilis (heterecantha)	429	0.26	40.92	0.025
Baphia massaiensis	366	0.22	4.63	0.003
Peltophorum africanum	295	0.18	28.10	0.017
Dichapetalum cymosum	201	0.12	7.44	0.005
Combretum engleri	191	0.12	1.75	0.001
Bauhinia petersiana	149	0.09	10.52	0.006
Ximenia americana var americana	149	0.09	6.71	0.004
Acacia hebeclada (hebeclada)	92	0.06	12.19	0.007
Hyphaene petersiana	75	0.05	56.86	0.035
Commiphora africana	70	0.04	5.27	0.003
Ximenia caffra var microphylla	70	0.04	1.03	0.001
Securidaca longepedunculata	64	0.04	5.89	0.004
Acacia ataxacantha	19	0.01	14.05	0.009
Lonchocarpus capassa	16	0.01	4.87	0.003
Total	211840	128.67	18833.98	11.439

Appendix 6: Number of tree saplings per hectare by height classes and species

	Height class, in cm									
Species	0-25	26-50	51-100	101-150	151-200	201-250	251-300	300+	Total	% of total
Baphia massaiensis	30.1	41.1	125.6	103.0	48.8	21.1	6.8	2.4	378.9	23.3
Bauhia petersiana	23.2	45.5	124.1	70.2	45.5	18.8	7.7	4.2	339.3	20.9
Terminalia sericea	2.1	5.7	39.0	35.1	39.6	36.9	21.4	8.0	187.8	11.6
Croton gratissimus	4.2	9.8	40.5	38.1	42.6	11.3	4.5	6.0	156.8	9.7
Commiphora angolensis	1.5	8.0	54.8	42.0	22.3	3.0	1.5	0.6	133.6	8.2
Combretum collinum	0.9	4.8	23.8	26.2	34.5	17.0	7.7	7.1	122.0	7.5
Ochna pulchra	2.4	4.8	14.3	7.1	3.3	2.7	1.8	0.6	36.9	2.3
Lonchocarpus nelsii	1.5	6.0	10.7	3.6	4.2	4.5	2.1	0.3	32.7	2.0
Burkea africana	3.9	3.9	9.2	8.0	2.4	3.3	0.3	0.9	31.8	2.0
Baikiaea plurijuga	0.9	2.7	13.1	3.3	3.0	0.0	2.7	0.9	26.5	1.6
Acacia ataxacantha	0.3	2.1	5.4	5.7	4.2	3.9	2.4	0.9	24.7	1.5
Combretum engleri		0.3	3.6	4.2	6.0	2.7	1.8		18.5	1.1
Dichrostachys cinerea (Setulosa)	0.3	0.6	3.3	4.8	4.5	3.0	0.6	1.2	18.2	1.1
Dichrostachys cinerea (Africana)	0.6	0.3	1.8	1.5	3.0	4.8	2.7	0.9	15.5	1.0
Colophospermum mopane	0.0	0.3	5.7	4.2	2.1	0.9	0.3	1.2	14.6	0.9
Acacia erioloba	0.3	2.1	5.7	0.3	2.1	2.7	0.9	0.3	14.3	0.9
Acacia fleckii			2.4	2.1	1.8	1.5	0.3	0.3	8.3	0.5
Boscia albitrunca	0.0	1.2	3.3	1.5	0.9	0.9	0.3		8.0	0.5
Commiphora africana		0.3	3.9	1.2	1.8	0.3	0.3	0.0	7.7	0.5
Combretum zeyheri			0.3	2.4	3.3	0.6	0.3	0.3	7.1	0.4
Terminalia prunioides		0.3	0.0	0.9	0.0	0.6	1.5	2.1	5.4	0.3
Combretum psidioides (psidioides)			2.7	0.6	1.8	0.0	0.3		5.4	0.3
Peltophorum africanum			2.1	0.6	1.8				4.5	0.3
Ximenia americana var americana		0.3	1.8	0.3	0.6	1.2			4.2	0.3
Erythrophleum africanum	0.3	0.0	1.5			1.8			3.6	0.2
Strychnos pungens	0.3		1.2	0.9	0.9				3.3	0.2
Albizia anthelmintica			0.3	0.6	0.3	0.6	0.0	1.2	3.0	0.2
Ximenia caffra var microphylla		0.3	1.2	0.3		0.6	0.3		2.7	0.2
Dichapetalum cymosum	0.6	1.2							1.8	0.1
Acacia mellifera		0.3	0.9				0.3		1.5	0.1
Boscia Foetida			0.3	0.3	0.3	0.3			1.2	0.1
Hyphaene petersiana		1.2							1.2	0.1
Acacia Tortilis (spirocarpa)					0.9				0.9	0.1
Acacia tortilis (heterecantha)			0.3		0.6				0.9	0.1
Total	73.2	142.9	502.4	368.8	282.7	144.6	68.8	39.3	1622.6	
% of total	4.5	8.8	31.0	22.7	17.4	8.9	4.2	2.4		100.0

Appendix 8: Tree volumes and stems inside the fenced off areas

Species	Total number of stems, 1000s	Stems per hectare	Total tree volume	Average tree vcolume
Combretum collinum	13953.0	19.2	596.4	0.819
Terminalia sericea	8759.3	12.0	384.7	0.528
Dichrostachys cinerea (Africana)	8102.3	11.1	293.3	0.403
Acacia mellifera	3846.7	5.3	119.3	0.164
Burkea africana	2777.2	3.8	582.3	0.800
Commiphora angolensis	2039.2	2.8	160.6	0.220
Lonchocarpus nelsii	1845.0	2.5	149.4	0.205
Terminalia prunioides	1491.6	2.0	207.8	0.285
Acacia erioloba	1141.0	1.6	215.1	0.295
Combretum psidioides (psidioides)	971.6	1.3	25.0	0.034
Combretum zeyheri	907.7	1.2	55.5	0.076
Dichrostachys cinerea (Setulosa)	857.0	1.2	34.9	0.048
Albizia anthelmintica	810.2	1.1	41.2	0.057
Ochna pulchra	762.8	1.0	44.5	0.061
Boscia albitrunca	748.0	1.0	84.2	0.116
Croton gratissimus	366.1	0.5	5.6	0.008
Acacia tortilis (heterecantha)	302.1	0.4	20.0	0.027
Colophospermum mopane	265.6	0.4	103.0	0.141
Boscia Foetida	206.6	0.3	26.4	0.036
Acacia fleckii	140.4	0.2	1.6	0.002
Acacia Tortilis (spirocarpa)	75.5	0.1	15.8	0.022
Pterocarpus angolensis	70.5	0.1	87.7	0.120
Total	50439.3	69.3	3254.3	4.469

Appendix 10: Cluster coordinates for Oshikoto region

Cluster	Latitude	Longitude
1	-18.2542	17.8106
2	-18.268	17.8106
3	-18.2815	17.8105
4	-18.2951	17.8106
5	-18.3091	17.8104
6	-18.3227	17.8106
7	-18.3364	17.8105
8	-18.254	17.8581
9	-18.268	17.8581
10	-18.2812	17.858
11	-18.2952	17.8579
12	-18.309	17.858
13	-18.3225	17.858
14	-18.3362	17.8581
15	-18.3791	17.8318
16	-18.3926	17.832
17	-18.4065	17.8322
18	-18.4202	17.8323
19	-18.4339	17.8324
20	-18.4473	17.8324
21	-18.4609	17.8328
22	-18.3783	17.8794
23	-18.3924	17.8795
24	-18.4059	17.8796
25	-18.4194	17.8799
26	-18.433	17.8799
27	-18.4467	17.8802
28	-18.4603	17.8802
29	-18.3776	17.9271
30	-18.3915	17.927
31	-18.4049	17.9272
32	-18.4187	17.9273
33	-18.4326	17.9274
34	-18.4463	17.9276
35	-18.4599	17.9274
36	-18.0039	17.4449
37	-18.0175	17.445
38	-18.0312	17.4449
39	-18.0449	17.445
40	-18.0585	17.4449
41	-18.0721	17.4451
42	-18.0858	17.4448
43	-18.004	17.4925
44	-18.0176	17.4925
45	-18.0311	17.4924
46	-18.045	17.4923
47	-18.0587	17.4925
48	-18.0858	17.4924
49	-18.0993	17.4919
50	-18.1128	17.4916
51	-18.1265	17.4919
52	-18.1399	17.4914
53	-18.1679	17.3685
54	-18.1818	17.3683
55	-18.1953	17.3686
56	-18.2087	17.3684
57	-18.2228	17.3685
58	-18.2362	17.3682
59	-18.1678	17.4157
60	-18.1813	17.4159
61	-18.1951	17.4155
62	-18.2087	17.4158
63	-18.2225	17.4157
64	-18.2359	17.4158
65	-18.1674	17.4632
66	-18.1819	17.4633
67	-18.195	17.4632
68	-18.2089	17.4629
69	-18.2225	17.4628
70	-18.2363	17.4628
71	-18.2589	17.0608
72	-18.2731	17.0609
73	-18.2864	17.0614
74	-18.3001	17.0616
75	-18.3138	17.0621
76	-18.3277	17.0623
77	-18.3413	17.0625
78	-18.258	17.1034
79	-18.2717	17.1038
80	-18.2856	17.104
81	-18.299	17.1045
82	-18.3126	17.1048
83	-18.3266	17.1051
84	-18.3402	17.1049
85	-18.3788	17.1079
86	-18.3929	17.1079
87	-18.406	17.1081
88	-18.42	17.108
89	-18.4334	17.1082
90	-18.4468	17.1084
91	-18.4606	17.1084
92	-18.3784	17.1552
93	-18.3921	17.1553
94	-18.4058	17.1554
95	-18.4193	17.1555
96	-18.4333	17.1556
97	-18.4465	17.1555
98	-18.4602	17.1556
99	-18.3785	17.2032
100	-18.3923	17.2031
101	-18.4056	17.2032
102	-18.4193	17.2031
103	-18.4331	17.2032
104	-18.4469	17.2027
105	-18.4603	17.2025
106	-18.0594	16.7615
107	-18.0601	16.7769
108	-18.0606	16.7907
109	-18.0602	16.805
110	-18.0603	16.8191
111	-18.0603	16.8335
112	-18.0595	16.8478
113	-18.1059	16.7762
114	-18.1058	16.7907
115	-18.1056	16.8049
116	-18.1055	16.8192
117	-18.1052	16.8336
118	-18.1053	16.8481
119	-18.1051	16.8623
120	-18.147	16.896
121	-18.147	16.9102
122	-18.1469	16.9244
123	-18.1466	16.9386
124	-18.1464	16.9526
125	-18.1462	16.9669
126	-18.1467	16.9809
127	-18.1915	16.8951
128	-18.1918	16.9097
129	-18.1918	16.9241
130	-18.192	16.9382
131	-18.1921	16.9526
132	-18.1923	16.967
133	-18.192	16.9815
134	-18.2372	16.895
135	-18.2369	16.9091
136	-18.2368	16.9236
137	-18.237	16.9377
138	-18.2371	16.952
139	-18.2375	16.9664
140	-18.2373	16.9806
141	-18.2838	16.6559
142	-18.2836	16.671
143	-18.2836	16.6852
144	-18.283	16.6993
145	-18.2828	16.7133
146	-18.2824	16.728
147	-18.2822	16.7417
148	-18.3293	16.6576
149	-18.3294	16.6719
150	-18.3287	16.6861
151	-18.328	16.7005
152	-18.3276	16.7148
153	-18.327	16.7292
154	-18.3268	16.7427
155	-18.3744	16.6587
156	-18.3735	16.6732
157	-18.3738	16.6874
158	-18.3734	16.7019
159	-18.3729	16.7161
160	-18.373	16.7306
161	-18.3724	16.7441
162	-18.3775	16.5036
163	-18.3766	16.5178
164	-18.3765	16.5309
165	-18.3765	16.547
166	-18.3766	16.5598
167	-18.3764	16.5748
168	-18.3761	16.5883
169	-18.4227	16.5045
170	-18.423	16.5185
171	-18.4228	16.5329
172	-18.4224	16.5472
173	-18.4224	16.5612
174	-18.4219	16.5753
175	-18.4215	16.59
176	-18.0375	16.0721
177	-18.0377	16.0862
178	-18.0372	16.1002
179	-18.0373	16.1149
180	-18.0373	16.1288
181	-18.0365	16.1432
182	-18.0369	16.157
183	-18.0836	16.0725
184	-18.0827	16.0871
185	-18.0828	16.1013
186	-18.0826	16.1153
187	-18.0822	16.1297
188	-18.0823	16.1437
189	-18.0817	16.1582
190	-18.1281	16.1298
191	-18.1282	16.1439
192	-18.1275	16.1581
193	-18.1273	16.1726
194	-18.1278	16.1864
195	-18.1273	16.2007
196	-18.2787	16.3922
197	-18.2784	16.4067
198	-18.2787	16.4215
199	-18.2785	16.4356
200	-18.2785	16.4492
201	-18.2781	16.4642
202	-18.3235	16.3779
203	-18.3233	16.3921
204	-18.3234	16.4064
205	-18.3239	16.4211
206	-18.3234	16.4355
207	-18.323	16.4494
208	-18.3233	16.4638
209	-18.3692	16.3778
210	-18.3696	16.3919
211	-18.3696	16.4065
212	-18.3692	16.4207
213	-18.3692	16.435
214	-18.3696	16.4492
215	-18.369	16.4639
216	-18.423	16.3562

Appendix 11: Vegetation Structural Types (Edwards 1983)

1a Tree cover > 0.1%	forest and woodland
2a shrub cover < 10%, if > 1m high	forest
3a tree cover > 75%	high forest
4a tree height > 20m	tall forest
4b tree height 11-20m	short forest
4c tree height 5-10m	low forest
4d tree height < 5m	closed woodland
3b tree cover 11 - 75%	high closed woodland
5a tree height > 20m	tall closed woodland
5b tree height 11-20m	short closed woodland
5c tree height 5-10m	low closed woodland
5d tree height < 5m	open woodland
3c tree cover 1 - 10%	high open woodland
6a tree height > 20m	tall open woodland
6b tree height 11-20m	short open woodland
6c tree height 5-10m	low open woodland
6d tree height < 5m	sparse woodland
3d tree cover < 1%	high sparse woodland
5a tree height > 20m	tall sparse woodland
5b tree height 11-20m	short sparse woodland
5c tree height 5-10m	low sparse woodland
5d tree height < 5m	thicket and bushland
2b shrub cover > 10% and > 1 m high	thicket
8a tree cover > 10%	short thicket
9a tree height > 5m	low thicket
9b tree height < 5m	bushland
8b tree cover < 10%	short bushland
10a tree height > 5m	low bushland
10b tree height < 5m	
1b Tree cover < 0.1%	shrubland
11a shrub cover >0.1%	closed shrubland
12a shrub cover > 10%	high closed shrubland
13a shrub height > 2m	tall closed shrubland
13b shrub height 1-2m	low closed shrubland
13c shrub height < 1m	open shrubland
12b shrub cover 1 - 10%	high open shrubland
14a shrub height > 2m	tall open shrubland
14b shrub height 1-2m	low open shrubland
14c shrub height < 1m	open shrubland
12c shrub cover < 1%	high sparse shrubland
15a shrub height > 2m	tall sparse shrubland
15b shrub height 1-2m	low sparse shrubland
15c shrub height < 1m	grassland and herbland
11b shrub cover < 0.1 %	

Appendix 13: List of tree/shrub species volume model number for Oshikoto region

Number = index for the model applied to calculate volume: 1= ACACIAS (v model=TERSE) 2=BAIPL 3=BURAF 4=COLMO 5=COMAN (v model=COMCO) 6=COMCO 7=LONNE 8=PTEAN 9=TERSE (Refer to models in Appendix 5, on page 36 above)

Code	Species	Index to volume model
ACAAT	Acacia ataxacantha	1
ACAER	Acacia erioloba	1
ACAFL	Acacia fleckii	1
ACAPO	Acacia polyacantha	9
ACASC	Acacia schweinfurthii	1
ANCBA	Ancylanthos baniesii	9
BAIPL	Baikiaea plurijuga	2
BAIWU	Baissea wulfhorstii	9
BAPMA	Baphia massaiensis	9
BAUPE	Bauhia petersiana	9
BOSAL	Boscia albitrunca	8
BURAF	Burkea africana	3
COMAA	Combretum apiculatum (apiculatum)	9
COMAF	Commiphora africana	5
COMAN	Commiphora angolensis	5
COMCO	Combretum collinum	6
COMEL	Combretum elaeagnoides	6
COMEN	Combretum engleri	6
COMPS	Combretum psidioides (psidioides)	6
COMZE	Combretum zeyheri	6
CROGG	Croton gratissimus	9
DIAEN	Dialium engleranum	9
DICCA	Dichrostachys cinerea (Africana)	9
DICCS	Dichrostachys cinerea (Setulosa)	9
DICCY	Dichapetalum cymosum	9
DIPCO	Diplorhynchus condylocarpon	9
DOMRO	Dombeya rotandifolia	9
ERYAF	Erythrophleum africanum	3
GREAV	Grewia avellana	9
GREBI	Grewia bicolor	9
GREFL	Grewia flava	9
GRERE	Grewia retinervis	9
GUICO	Guibourtia coleosperma	8
LONNE	Lonchocarpus nelsii	7
MARAC	Markhamia acuminata	3
MUNSE	Mundulea sericea	9
OCHPU	Ochna pulchra	8
OZOIN	Ozoroa insignis	9
OZOLO	Ozoroa longipes	9
OZOPA	Ozoroa paniculosa	9
OZOSC	Ozoroa schinzii	9
PAVZE	Pavetta zeyheri	9
PELAF	Peltophorum africanum	8
PSEMA	Pseudolachnostylis maprouneifolia	9
PTEAN	Pterocarpus angolensis	8
RHIBR	Rhigoszum brevispinosum	9
RHUTE	Rhus tenuinervis	9
SCHRA	Schinziophyton rautanenii	3
SECLO	Securidaca longepedunculata	8
STEAR	Steganotaenia araliacea	8
STRCO	Strychnos cocculoides	9
STRPU	Strychnos pungens	9
TERSE	Terminalia sericea	9
VANIN	Vangueria infausta	8
XXXXX	Unknown2	8