Forestry Department
Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT

COUNTRY REPORTS

NAMIBIA

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The Forest Resources Assessment Programme

Sustainably managed forests have multiple environmental and socio-economic functions important at the global, national and local scales, and play a vital part in sustainable development. Reliable and up-to-date information on the state of forest resources - not only on area and area change, but also on such variables as growing stock, wood and non-wood products, carbon, protected areas, use of forests for recreation and other services, biological diversity and forests' contribution to national economies - is crucial to support decision-making for policies and programmes in forestry and sustainable development at all levels.

FAO, at the request of its member countries, regularly monitors the world's forests and their management and uses through the Forest Resources Assessment Programme. This country report forms part of the Global Forest Resources Assessment 2005 (FRA 2005), which is the most comprehensive assessment to date. More than 800 people have been involved, including 172 national correspondents and their colleagues, an Advisory Group, international experts, FAO staff, consultants and volunteers. Information has been collated from 229 countries and territories for three points in time: 1990, 2000 and 2005.

The reporting framework for FRA 2005 is based on the thematic elements of sustainable forest management acknowledged in intergovernmental forest-related fora and includes more than 40 variables related to the extent, condition, uses and values of forest resources. More information on the FRA 2005 process and the results - including all the country reports - is available on the FRA 2005 Web site (www.fao.org/forestry/fra2005).

The Global Forest Resources Assessment process is coordinated by the Forestry Department at FAO headquarters in Rome. The contact person for matters related to FRA 2005 is:

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Contents

1 Table T1 – Extent of Forest and Other wooded land

1.1 FRA 2005 Categories and definitions

Category	Definition
Forest	Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds *in situ*. It does not include land that is predominantly under agricultural or urban land use.
Other wooded land	Land not classified as "Forest", spanning more than 0.5 hectares; with trees higher than 5 meters and a canopy cover of 5-10 percent, or trees able to reach these thresholds *in situ*; or with a combined cover of shrubs, bushes and trees above 10 percent. It does not include land that is predominantly under agricultural or urban land use.
Other land	All land that is not classified as "Forest" or "Other wooded land".
Other land with tree cover (Subordinated to "Other land")	Land classified as "Other land", spanning more than 0.5 hectares with a canopy cover of more than 10 percent of trees able to reach a height of 5 meters at maturity.
Inland water bodies	Inland water bodies generally include major rivers, lakes and water reservoirs.

1.2 National data

1.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
1.Holm, D. and Graz, P. 1992. Forest Cover Mapping Northern Namibia Phase I II, Vol I II	H	Forest Cover	1992	
2. Selanniemi T., *et al*	H	Vegetation structural types	1983	Edwards (1983)
3.Forest Policy In Namibia, 2001	H	Forest Cover	2000	

1.2.2 Classification and definitions

The 1992 and 2001 national classes and definitions are different. Data for different years will be analysed and processed separately.

Classification and definitions for reference year 1992:

National class	Definition
Cultivation within forest	No description by author
Cultivation within savannah	No description by author
Dense Forest	>70% crown cover, tree height >5m
Dense Savannah	> 70% shrub cover, <2m
Medium Forest	Crown cover 40-70%, tree height > 5m
Medium savannah	40-70% bush cover, 2-5m
Medium Savannah	40-70% shrub cover, < 2m
Open Forest	Crown cover 10-40% , tree height >5m
Open savannah	10-40% bush cover, 2-5m
Open savannah	10-40% shrub cover, <2m
Other land area	No description by author
Very open Forest	Crown cover 2-10%, tree height >5m

1.2.3 Original data

Original data from source 1: Reference year 1992

	Area in hectares									
National Classes	**Kavango**	**Caprivi**	**Kunene**	**Ohan gwena**	**Omusati**	**Oshana**	**Oshikoto**	**Groot fontein**	**Tsumkwe**	**Total of rows**
Dense Forests	299	202	126	48	0	0	39	55	45	814
Medium Forest	1427	619	236	253	3	0	238	81	294	3 151
Open Forest	1045	502	32	156	0	0	175	100	262	2 272
Very open Forests	241	212	12	53	0	0	183	33	99	833
Dense Savanna	0	0	136	3	1	0	17	52	5	214
Dense savanna	46	2	254	56	43	2	189	196	65	853
Medium savanna	97	0	1243	3	134	17	165	229	131	2 019
Medium savanna	463	3	358	16	283	30	668	820	476	3 117
Open Savanna	31	0	727	0	159	22	75	320	111	1 445
Open savanna	256	6	1382	25	104	27	311	523	225	2 859
Cultivation within forest	113	82	0	0	0	2	145	0	0	342
Cultivation within savanna	81	3	0	0	394	19	170	3	0	670
Other land area	192	352	1152	454	270	392	283	83	270	3 448
Total	**4291**	**1983**	**5658**	**1067**	**1391**	**511**	**2658**	**2495**	**1983**	**22 037**

Source: 1

1.3 Analysis and processing of national data

1.4 Reclassification into FRA 2005 classes

Reclassification is done before estimation and forecasting because each reference year is analysed and processed separately. It follows the one for FRA 2005, except that "cultivation within forest" has been reclassified as Other Land with Tree Cover (OLWTC)" since the primary use is agriculture and cultivation within Savannah has been classified as other land for the same reason.

National Classes	Forests	OWL	OL	OLWTC
Dense Forests	100%			
Medium Forest	100%			
Open Forest	100%			
Very open Forests		100%		
Dense Savannah		100%		
Dense savannah	35%	65%		
Medium savannah		100%		
Medium savannah	35%	65%		
Open Savannah		100%		
Open savannah	35%	65%		
Cultivation within forest				100%
Cultivation within savannah			100%	
Other land area			100%	

The huge difference between the total land area in source 1 (22 037 00ha) and FAO STAT (82 329 000ha) has been considered as other land since this forest inventory covered only the north-eastern part of the country, where the majority of the forests are found.

Reference year: 1992

FRA 2005 Categories	Area in hectares
Forest	8 627 150
OWL	9 961 850
OL	63 740 000
Total land Area	82 329 000

Data for reference year :2000

The main vegetation structural types in Namibia (Edwards 1983):

National class	Definition
Forest	Are those areas where trees dominate and where the canopy cover is >75%.
Woodland	Are those areas where trees dominates the landscape and cover is <75%
Shrubland	Are those areas where shrubs (<3m in height) dominates the landscape and there are few trees.
Grassland	Is an area with predominant grass cover with <2% woody vegetation cover. Grasslands with >2% vegetation cover belong to the very open forest or

	very open Savanna/Bushland class.
Savanna/Bushland	Is an area with shrubs and bushes but with most trees >5m in height.
Water	Is an area which includes major inland water bodies such as dams, river, pans, Oshana, Omuramba and, except for the river, vegetation associated with water courses.

Original data for 2000

Land cover description	Area (ha)	%
Shrubland	43 601 971	52.8
Forest	99 820	0.1
Grassland	7 243 681	8.8
Riverine woodland	348 001	0.4
Salt pans	540 016	0.7
Shrubland-Woodland mosaic	14 257 827	17.3
Sparse grassland and Shrubland	3 588 579	4.3
Woodland	12917440	15.6
Total land area	**82597335**	**100%**

Calibration	Area in hectares	Calibrating factor
Land area	82 597 335	
Fao	82 329 000	0.996751287

Land cover description	Calibrated area in hectares
Shrubland	43 460 321
Forest	99 496
Grassland	7 220 148
Riverine woodland	346 870
Salt pans	538 262
Shrubland-Woodland mosaic	14 211 507
Sparse grassland and Shrubland	3 576 921
Woodland	12 875 475
Total	**82 329 000**

Reclassification of 2000 data

Note that since there were no definition of some of these classes, Edward (1983) structural vegetation classes were used to reclassify Shrubland and woodland. An expert opinion was used to reclassify shrublands-woodland mosaic.

National Classes	Forests	OWL	OL
Shrubland			100%
Forest	100%		
Grassland			100%
Riverine woodland (1)	60%	30%	10%
Salt pans			100%
Shrubland-Woodland mosaic		33%	67%
Sparse grassland and shrubland			100%
Woodland (1)	60%	30%	10%

Notes:
1.Expert Estimate. There are three types of woodlands in Namibia: Closed woodland (11-75%), Open woodland (1-10%) and Sparse woodland <1%.

Summary 1992 and 2000 data

FRA 2005 Categories	Area in hectares	
	1992	2000
Forest	8 627 150	8 032 903
OWL	8 949 850	8 656 501
OL	64 752 000	65 639 596
Total land Area	82 329 000	82 329 000

1.4.1 Estimation and forecasting

FRA 2005 Categories	Area in hectares		
	1990	2000	2005
Forest	8 762 496	8 032 903	7 661 499
OWL	9 023 187	8 656 501	8 473 158
OL	64 543 317	65 639 596	66 194 343
Inland water	100 000	100 000	100 000
Total country Area	82 429 000	82 429 000	82 429 000

Notes:
Estimation and forecasting based linear extrapolation

1.5 Data for National reporting table T1

FRA 2005 Categories	Area (1000 hectares)		
	1990	2000	2005
Forest	8 762	8 032	7 661
Other wooded land	9 023	8 656	8 473
Other land	64 543	65 640	66 194
...of which with tree cover [1)]			
Inland water bodies	100	100	100
TOTAL	**82 429**	**82 429**	**82 429**

1.6 Comments to National reporting table T1

Estimates for FRA 2000 were made by linear extrapolation of the change between 1980 and 1992 to 2000. Estimation for FRA 2005 was by extrapolating changes between 1992 and the latest 2000 inventory. The estimates above are based on information from 9 regions in 1992 and 7 regions in 2000. Although the remaining regions contain a very small area of forests and OWL, these figures may be under estimates.

2 Table T2 – Ownership of Forest and Other wooded land

2.1 FRA 2005 Categories and definitions

Category	Definition
Private ownership	Land owned by individuals, families, private co-operatives, corporations, industries, religious and educational institutions, pension or investment funds, and other private institutions.
Public ownership	Land owned by the State (national, state and regional governments) or government-owned institutions or corporations or other public bodies including cities, municipalities, villages and communes.
Other ownership	Land that is not classified either as "Public ownership" or as "Private ownership".

2.2 National data

2.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
UNEP-**WCMC** Conservation Databases www.**wcmc**.org.uk/cis/ -	M	Protected areas in Namibia		
Proceedings, 2003 Workshop on Tropical Secondary Forest Management in Africa: Reality and Perspectives	M	Community Forests areas		

2.2.2 Classification and definitions

No national definitions.

2.2.3 Original data

Information on forest ownership is not available. The FOSA report for Namibia, however notes that Land ownership in Namibia is divided in to three types namely: Private owned land (commercial farms and lands in municipal areas), state land in the protected areas such as parks and nature reserves, and communal lands. No information was available for forests under private ownership. This table will only present information on protected areas and communal ownership.

Protected areas in Namibia

Category	**2000**
Forest Reserve	Area in hectares
Eastern Caprivi	160 000
Game Park	
Caprivi	582 750
Khaudum	365 791
Waterberg Plateau Park	2 215 140
National Park	
Mamili	34 317
Mudumu	72 625
Reserve	
Mahango Game Reserve	24 462
Mangetti Game Reserve	41 990
Total	**3 497 075**

Notes: It is not clear whether these are OWL or Forests

Community Forest Reserves

Name of the area under management	**Total area covered, ha**
Okongo Community Forest	75 000
Uukwaludhi Community Forest	148 441
Ukolonkadhi Community Forest	110 417
Ongandjera Community Forest	121 826
Oshampula Community Forest	1 070
Ohepi Community Forest	5 180
Ndiyona Community Forest	60 000
Total	**521 934**

Notes: It is not clear whether these are OWL or Forests

2.3 Analysis and processing of national data

2.4 Reclassification into FRA 2005 classes

2.4.1 Estimation and forecasting

2.5 Data for National reporting table T2

FRA 2005 Categories	**Area (1000 hectares)**			
	Forest		**Other wooded land**	
	1990	**2000**	**1990**	**2000**
Private ownership	ID	ID	ID	ID
Public ownership	ID	ID	ID	ID
Other ownership	ID	ID	ID	ID
TOTAL	ID	ID	ID	ID

2.6 Comments to National reporting table T2

There are 3.5 million hectares of protected areas which are all owned by government and 522 000 ha of community reserves. Ownership for the rest of the forest and OWL is unknown, thus insufficient data reported.

3 Table T3 – Designated function of Forest and Other wooded land

3.1 FRA 2005 Categories and definitions

Types of designation

Category	Definition
Primary function	A designated function is considered to be primary when it is significantly more important than other functions. This includes areas that are legally or voluntarily set aside for specific purposes.
Total area with function	Total area where a specific function has been designated, regardless whether it is primary or not.

Designation categories

Category / Designated function	Definition
Production	Forest / Other wooded land designated for production and extraction of forest goods, including both wood and non-wood forest products.
Protection of soil and water	Forest / Other wooded land designated for protection of soil and water.
Conservation of biodiversity	Forest / Other wooded land designated for conservation of biological diversity.
Social services	Forest / Other wooded land designated for the provision of social services.
Multiple purpose	Forest / Other wooded land designated to any combination of: production of goods, protection of soil and water, conservation of biodiversity and provision of social services and where none of these alone can be considered as being significantly more important than the others.
No or unknown function	Forest / Other wooded land for which a specific function has not been designated or where designated function is unknown.

3.2 National data

3.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
UNEP-**WCMC** Conservation Databases www.**wcmc**.org.uk/cis/ -	M		2000	

3.2.2 Original data

Forest Reserve	**Area**	**IUCN Category**
Eastern Caprivi	160 000	Unset
Game Park		
Caprivi	582 750	VI
Khaudum	365 791	II
Waterberg Plateau Park	2 215 140	II
National Park		
Mamili	34 317	II
Mudumu	72 625	II
Reserve		
Mahango Game Reserve	24 462	II
Mangetti Game Reserve	41 990	Unset
Total	**3 497 075**	**State**

Community Forests reserve areas as in T2

3.3 Analysis and processing of national data

3.4 Reclassification into FRA 2005 classes

Year : 2000

Name	**Area in ha**	**IUCN category**	**Conservation**	**Multi-purpose**	**Unknown designation**
Eastern Caprivi	160,000	Unset		100%	
Caprivi	582,750	VI		100%	
Khaudum	365,791	II	100%		
Waterberg Plateau Park	2,215,140	II	100%		
Mamili	34,317	II	100%		
Mudumu	72,625	II	100%		
Mahango Game Reserve	24,462	II	100%		
Mangetti Game Reserve	41,990	Unset	100%		
Community Forests Reserves (1)	521,934	None		100%	
Remaining (1)	13,968,379	None			100%

Notes: 1. Not from WCMC

Results after reclassification

Name	Conservation	Multi-purpose	Unknown designation
Eastern Caprivi		160 000	
Caprivi	0	582 750	
Khaudum	365 791		
Waterberg Plateau Park	2 215 140		
Mamili	34 317		
Mudumu	72 625		
Mahango Game Reserve	24 462		
Mangetti Game Reserve	41 990		
Community Forests Reserves		521 9340	
Remaining			13968379
Total Forest and OWL	2 914 325	1 264 684	13968379

3.4.1 Estimation and forecasting

Due to lack of other information, it is assumed that all the forests reserves, protected areas listed in 3.2.2 were established before 1990 and that the total area of forest designated for conservation purpose has remained constant. The area of community reserves is assumed to have remained constant for 2000 and 2005 and was zero in 1990.

FRA 2005 Categories	Area in hectares		
	1990	2000	2005
Conservation	2 754 325	2 754 325	2 754 325
Multi-purpose	582 750[1]	1 264 684	1 264 684
Unknown	14 448 608	12 670 395	12 115 648
Total Forest and OWL	17 785 683	16 689 404	16 134 657

Notes: Community reserves were not available in the 1990's

3.5 Data for National reporting table T3

FRA 2005 Categories / Designated function	Area (1000 hectares)					
	Primary function			Total area with function		
	1990	2000	2005	1990	2000	2005
Forest and woodland						
Production						
Protection of soil and water						
Conservation of biodiversity	2 754	2 754	2 754			
Social services						
Multiple purpose	583	1 265	1 265	not appl.	not appl.	not appl.
No or unknown function	14 448	12 670	12 115	not appl.	not appl.	not appl.
Total – Forest and OWL	17 785	16 689	16 134	**not appl.**	**not appl.**	**not appl.**

4 Table T4 – Characteristics of Forest and Other wooded land

4.1 FRA 2005 Categories and definitions

Category	Definition
Primary	Forest / Other wooded land of native species where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed.
Modified natural	Forest / Other wooded land of naturally regenerated native species where there are clearly visible indications of human activities.
Semi-natural	Forest / Other wooded land of native species established through planting seeding or assisted natural regeneration.
Productive plantation	Forest / Other wooded land of introduced species and in some cases native species established through planting or seeding mainly for production of wood or non wood goods.
Protective plantation	Forest / Other wooded land of native or introduced species established through planting or seeding mainly for provision of services.

4.2 National data

4.2.1 Data sources

From T1

4.3 Reclassification into FRA 2005 classes

All forests and OWL in Namibia have been reclassified as modified natural forests/OWL.

	Area in 1000 ha		
FRA 2005 Categories	**1990**	**2000**	**2005**
Modified forests	8 763	8 032	7 661,
Modified OWL	9 023	8 656	8 473

4.4 Data for National reporting table T4

FRA 2005 Categories	Area (1000 hectares)					
	Forest			Other wooded land		
	1990	**2000**	**2005**	**1990**	**2000**	**2005**
Primary						
Modified natural	8 763	8 032	7 661	9 023	8 656	8 473
Semi-natural						
Productive plantation						
Protective plantation						
TOTAL	**8 763**	**8 032**	**7 661**	**9 023**	**8 656**	**8 473**

4.5 Comments to National reporting table T2

FRA 2000 reports 300 ha of Eucalyptus, however, no information on plantation area was made available for FRA 2005.

5 Table T5 – Growing stock

5.1 FRA 2005 Categories and definitions

Category	Definition
Growing stock	Volume over bark of all living trees more than X cm in diameter at breast height (or above buttress if these are higher). Includes the stem from ground level or stump height up to a top diameter of Y cm and may also include branches to a minimum diameter of W cm.
Commercial growing stock	The part of the growing stock of species that are considered as commercial or potentially commercial under current market conditions and with a diameter at breast height of Z cm or more.

5.2 National data

5.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Angombe S T. and Laamanen R. 2002 Inventory Report on the Woody Resources in Oshikoto Region	H	Growing stock for Oshikoto region	2000	
Chakanga M *et al.* *1998* Forest Inventory Report of Caprivi Region	H	Average Vol/ha for Caprivi region	2000	
Selanniemi T *et al.* 2000 Inventory Report on the Woody Resources in the Omusati Region	H	Growing stock for Omusati Region	2000	
Selanniemi T *et al.* 2000 Inventory Report on the Woody Resources in the Oshana Region	H	Growing stock for Oshana region	2000	

5.2.2 Original data

Original Data (data year 2000)

National Classes	Oshikoto region		Omusati Region		Oshana Region		Sum of 3 regions		
	Area	GS	Area	GS	Area	GS	Area	GS	GS
	ha	m3	ha	m3	ha	m3	ha	m3	m3/ha
Forest	15 825	834 800					15 825	834 800	52.75
Closed Woodland	164 545	5 015 200	91 607	667 000	7 683	21 000	263 835	5 703 200	21.62
Thickets	408 108	10 840 000	51 289	412 400			459 397	11 252 400	24.49
Total FOREST							**739 057**	**17 790 400**	**24.07**
Open woodland	52 633	510 500	154 692	1 599 000	42 443	376 700	249 768	2 486 200	9.95
Closed Shrubland	19 844	171 700	421 600	210 800	110 330	17 700	551 774	400 200	0.73
Open shrubland			14 260 566	75 581 000			14 260 566	75 581 000	5.30
Bushland	191 096	1 461 100	93 541	372 700	3 624	6 900	288 261	1 840 700	6.39
Total OWL							**15 350 369**	**80 308 100**	**5.23**

5.3 Analysis and processing of national data

FRA 2005	Vol/ha	Area in hectares		
		1990	2000	2005
Forests	24.07	8 762 496	8 032 903	7 661 499
OWL	5.23	9 023 187	8 656 501	8 473 158

5.3.1 Estimation and forecasting

The average volume per hectare for forest and for OWL in 5.2.2 have been applied to the areas of forest and of OWL from T1.:

Vol/ha in m3	Growing Stock in Million cubic meters		
	1990	2000	2005
Forests	211	193	184
OWL	47	45	44

5.4 Data for National reporting table T5

FRA 2005 Categories	Volume (million cubic meters over bark)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Growing stock	211	193	184	47	45	44
Commercial growing stock	N/A	N/A	N/A	N/A	N/A	N/A

Specification of country threshold values	**Unit**	**Value**	**Complementary information**
1. Minimum diameter at breast height of trees included in Growing stock (X)	cm	5	
2. Minimum diameter at the top end of stem (Y) for calculation of Growing stock	cm		
3. Minimum diameter of branches included in Growing stock (W)	cm		
4. Minimum diameter at breast height of trees in Commercial growing stock (Z)	cm		
5. Volume refers to "Above ground" (AG) or "Above stump" (AS)	AG / AS		
6. Have any of the above thresholds (points 1 to 4) changed since 1990	Yes/No		
7. If yes then attach a separate note giving details of the change	Attachment		

6 Table T6 – Biomass stock

6.1 FRA 2005 Categories and definitions

Category	Definition
Above-ground biomass	All living biomass above the soil including stem stump branches bark seeds and foliage.
Below-ground biomass	All living biomass of live roots. Fine roots of less than 2mm diameter are excluded because these often cannot be distinguished empirically from soil organic matter or litter.
Dead wood biomass	All non-living woody biomass not contained in the litter either standing lying on the ground or in the soil. Dead wood includes wood lying on the surface dead roots and stumps larger than or equal to 10 cm in diameter or any other diameter used by the country.

6.2 National data

6.2.1 Data sources

No original data exist. Data from table T5 are used as input and conversion factors applied

6.2.2 Original data

Forest cover from T1

	Area in hectares		
FRA 2005	**1990**	**2000**	**2005**
Forests	8 762	8 033	7 661
OWL	9 023	8 657	8 473

6.3 Analysis and processing of national data

	Stem vol.	Density	Stem wood		R/S		
	m3/ha	ton/m3	ton/ha	BEF	ratio	D/L ratio	Tons/ha
Forest	24.07	0.58	14.22	3.40	0.27	0.14	48.33
OWL	5.23	0.58	3.034	9.00	0.27	0.14	27.31

BEF calculated using formula from FAO Forestry Paper 134
Wood density: Average for Africa (FAO Forestry Paper 134)
R/S ratio: Appendix 5 of Guidelines
D/L ratio: Appendix 5 of Guidelines

Forest	Biomass (million tonnes)		
	1990	**2000**	**2005**
Aboveground biomass	416.0	381.3	363.7
Belowground biomass	112.3	103.0	98.2
Living biomass	528.3	484.3	461.9
Dead wood biomass	74.0	67.8	64.7
Total biomass	602.2	552.1	526.5

OWL	Biomass in Million Tons		
	1990	**2000**	**2005**
Aboveground biomass	246.4	236.4	231.4
Belowground biomass	66.5	63.8	62.5
Living Biomass	312.9	300.2	293.9
Dead wood biomass	43.8	42.0	41.1
Total biomass	**356.8**	**342.3**	**335.0**

6.4 Data for National reporting table T6

FRA 2005 Categories	Biomass (million metric tonnes oven-dry weight)					
	Forest			Other wooded land		
	1990	**2000**	**2005**	**1990**	**2000**	**2005**
Above-ground biomass	416.0	381.3	363.7	246.4	236.4	231.4
Below-ground biomass	112.3	103.0	98.2	66.5	63.8	62.5
Dead wood biomass	74.0	67.8	64.7	43.8	42.0	41.1
TOTAL	**602.2**	**552.1**	**526.5**	**356.8**	**342.3**	**335.0**

Thresholds used by the country are the following:

7 Table T7 – Carbon stock

7.1 FRA 2005 Categories and definitions

Category	Definition
Carbon in above-ground biomass	Carbon in all living biomass above the soil including stem stump branches bark seeds and foliage.
Carbon in below-ground biomass	Carbon in all living biomass of live roots. Fine roots of less than 2 mm diameter are excluded because these often cannot be distinguished empirically from soil organic matter or litter.
Carbon in dead wood biomass	Carbon in all non-living woody biomass not contained in the litter either standing lying on the ground or in the soil. Dead wood includes wood lying on the surface dead roots and stumps larger than or equal to 10 cm in diameter or any other diameter used by the country.
Carbon in litter	Carbon in all non-living biomass with a diameter less than a minimum diameter chose by the country for lying dead (for example 10 cm) in various states of decomposition above the mineral or organic soil. This includes the litter fumic and humic layers.
Soil carbon	Organic carbon in mineral and organic soils (including peat) to a specified depth chosen by the country and applied consistently through the time series.

7.2 National data

7.2.1 Original data

No original data exist. Table 6 was used as an input and a conversion factor of 50% was applied.

7.3 Data for National reporting table T7

FRA 2005 Categories	Carbon (Million metric tonnes)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Carbon in above-ground biomass	207.98	190.66	181.84	123.2	118.2	115.7
Carbon in below-ground biomass	56.15	51.48	49.10	33.3	31.9	31.2
Sub-total: Carbon in living biomass	264.1	242.1	230.9	156.5	150.1	146.9
Carbon in dead wood	36.98	33.90	32.33	21.91	21.02	20.57
Carbon in litter						
Sub-total: Carbon in dead wood and litter						
Soil carbon to a depth of _____ cm						
TOTAL CARBON	**301.1**	**276.0**	**263.3**	**178.4**	**171.1**	**167.5**

8 Table T8 – Disturbances affecting health and vitality

8.1 FRA 2005 Categories and definitions

Category	Definition
Disturbance by fire	Disturbance caused by wildfire independently whether it broke out inside or outside the forest/OWL.
Disturbance by insects	Disturbance caused by insect pests that are detrimental to tree health.
Disturbance by diseases	Disturbance caused by diseases attributable to pathogens such as a bacteria fungi phytoplasma or virus.
Other disturbance	Disturbance caused by other factors than fire insects or diseases.

8.2 National data

8.2.1 Data sources

Partial Information available

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Angombe S T. and Laamanen R. 2002 Inventory Report on the Woody Resources in Oshikoto Region	H	Damage	2000	
Chakanga M *et al.* *1998* Forest Inventory Report of Caprivi Region	H	Damage	2000	
Selanniemi T *et al.* 2000 Inventory Report on the Woody Resources in the Omusati Region	H	Damage	2000	
Selanniemi T *et al.* 2000 Inventory Report on the Woody Resources in the Oshana Region	H	Damage	2000	
Kanime N., 2003 Woody Report of Ncamangoro Community Forest	H	Damage	2000	

8.2.2 Original data

Damaging agent	Area in hectares						
	Oshana	Otjituu	Caprivi Region	Oshikoto	Omusati	Ncamangoro community forestry	**Total**
Forest Fire	N/A	N/A	410 069	24 515		3 984	438 568
Storm	N/A	N/A		2 559			2 559
Mammals wild	N/A	N/A				976	976
Total	N/A	N/A	**410069**	**41806**	**97133**	**4960**	**553968**

8.3 Analysis and processing of national data

8.4 Data for National reporting table T8

FRA-2005 Categories	Average annual area affected (1000 hectares)			
	Forests		Other wooded land	
	1990	2000 (1)	1990	2000
Disturbance by fire		438		
Disturbance by insects				
Disturbance by diseases				
Other disturbance (2)		3.5		

Notes: 1. Data for one year (2000)
2. Storm; wild Mammals

8.5 Comments to National reporting table T7

The above figures are minimum value based on information from three regions and a community forest. Other disturbance includes disturbance by storms and by wild mammals.

9 Table T9 – Diversity of tree species

9.1 FRA 2005 Categories and definitions

Category	Definition
Number of native tree species	The total number of native tree species that have been identified within the country.
Number of critically endangered tree species	The number of native tree species that are classified as "Critically endangered" in the IUCN red list.
Number of endangered tree species	The number of native tree species that are classified as "Endangered" in the IUCN red list.
Number of vulnerable tree species	The number of native tree species that are classified as "Vulnerable" in the IUCN red list.

9.2 National data

9.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
1.Craven P. (ed.) 1999. Checklist of Namibian plant species. Southern African botanical diversity network report no. 7. SABONET Windhoek.	M	Number of tree species	1999	
2. IUCN 2004. *2004 IUCN Red List of Threatened Species.* www.redlist.org	H	Critically endangered, Endangered and Vulnerable species	2000	

9.2.2 Original data

9.3 Data for National reporting table T9

FRA 2005 Categories	Number of species (year 2000)
Native tree species (1)	>200
Critically endangered tree species	2
Endangered tree species	2
Vulnerable tree species	7

Notes:1. Source1

9.4 Comments to National reporting table T9

The IUCN Red list includes the following endangered and vulnerable tree species for Namibia:

Critically endangered tree species

1. *Aloe pillansii* BASTARD QUIVER TREE (E)
2. *Gazania thermalis*

Endangered tree species

1. *Aloe erinacea*
2. *Elephantorrhiza rangei*

Vulnerable tree species

1. *Aloe ramosissima* MAIDEN'S QUIVER TREE (E)
2. *Antimima eendornensis*
3. *Conophytum halenbergense*
4. *Euphorbia leistneri*
5. *Euphorbia namuskluftensis*
6. *Euphorbia otjipembana*
7. *Leucoperichaetium eremophilum*

10 Table T10 – Growing stock composition

10.1 FRA 2005 Categories and definitions

List of species names (scientific and common names) of the ten most common species.

10.2 National data

10.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Angombe S T. and Laamanen R. 2002 Inventory Report on the Woody Resources in Oshikoto Region. Namibia-Finland Forestry Programme Windhoek	H	Growing stock by species for Oshikoto region	2000	
Chakanga M *et al.* *1998* Forest Inventory Report of Caprivi Region. Namibia-Finland Forestry Programme Windhoek	H	Growing stock by species for Caprivi region	2000	
Selanniemi T *et al.* 2000 Inventory Report on the Woody Resources in the Omusati Region. Namibia-Finland Forestry Programme Windhoek	H	Growing stock by species for Omusati Region	2000	
Selanniemi T *et al.* 2000 Inventory Report on the Woody Resources in the Oshana Region. Namibia-Finland Forestry Programme Windhoek	H	Growing stock by species for Oshana region	2000	
Kanime N. 2002 Inventory report for Ohepi Oshaampula and Ekolola Forests. Namibia-Finland Forestry Programme Windhoek October 2002	H	Growing stock by species for Ohepi Oshaampula and Ekolola	2000	
Pieters I and Laamanen R. 2002. Inventory Report for Rehoboth Acacia Park	H	Growing stock by species for Rehoboth Acasia park		

10.2.2 Original data

Common name	Species	All inventoried regions	
	Baikiaea plurijuga	11 877 748	18.38%
musheshe	*Burkea Africana*	12 916 336	19.98%
muhononо	*Terminalia sericea*	5 814 672	9.00%
mopani	*Colophospermum mopane*	5 973 898	9.24%
muhoto	*Acacia erioloba*	2 754 805	4.26%
	Guibourtia coleosperma	3 034 092	4.69%
	Dialium engleranum	772 504	1.20%
mububu	*Combretum collinum*	5 950 639	9.21%
	Acacia mellifera	185 288	0.29%
	Schinziophyton rautaneii	1 392 592	2.15%
mulumbe	*Pterocarpus angolensis*	2 258 080	3.49%
	Combretum zeyheri	879 075	1.36%
	Sclerocarya birrea	552 040	0.85%
	Diospyros mespiliformis	295 155	0.46%
	Peltophorum africanum	941 080	1.46%
mukotoko	*Acacia nigrescens*	515 890	0.80%
muzwili	*Combretum imberbe*	653 260	1.01%
	Total	**56 767 153**	
	Remaining species	7 871 310	12.18%
	Total all species	**64 638 463**	100.00%

Note: The information is from: Caprivi; Ncamangoro;Ekolola;Mashare; Rehoboth; Omatendeka; Ohepi; Oshaampula; Oshikoto;Omusati and Oshana region.

10.3 Analysis and processing of national data

10.4 Data for National reporting table T10

FRA 2005 Categories / Species name (Scientific name and common name)		Growing Stock in Forests (million cubic meters)
		2000
Musheshe	*Burkea Africana*	13
	Baikiaea plurijuga	12
Mopani	*Colophospermum mopane*	6
Mububu	*Combretum collinum*	6
Muhononо	*Terminalia sericea*	6
	Guibourtia coleosperma	3
Muhoto	*Acacia erioloba*	3
Mulumbe	*Pterocarpus angolensis*	2
	Schinziophyton rautaneii	1
	Peltophorum africanum	0.9
	Remaining inventoried species	12
	Total	65

10.5 Comments to National reporting table T7

Inventory was not undertaken in Okavango and Kunene regions due to security reasons. The growing stock presented above is only from 5 regions and 7 community forests. Since almost 50% of the available forests in Namibia were not inventoried, it was decided to only present the above partial information and not apply the percentages to the total growing stock in T5 as this may distort the extent of biodiversity in the country.

11 Table T11 – Wood removal

11.1 FRA 2005 Categories and definitions

Category	Definition
Industrial wood removal	The wood removed (volume of roundwood over bark) for production of goods and services other than energy production (woodfuel).
Woodfuel removal	The wood removed for energy production purposes regardless whether for industrial commercial or domestic use.

11.2 National data

11.2.1 Data sources

No data was available

11.3 Analysis and processing of national data

11.3.1 Estimation and forecasting

11.4 Data for National reporting table T11

FRA 2005 Categories	Volume in 1000 cubic meters of roundwood over bark					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial roundwood	ID	ID	ID	ID	ID	ID
Woodfuel	ID	ID	ID	ID	ID	ID
TOTAL for Country	ID	ID	ID	ID	ID	ID

12 Table T12 – Value of wood removal

12.1 FRA 2005 Categories and definitions

Category	Definition
Value of industrial wood removal	Value of the wood removed for production of goods and services other than energy production (woodfuel).
Value of woodfuel removal	Value of the wood removed for energy production purposes regardless whether for industrial commercial or domestic use.

12.2 National data

12.2.1 Data sources

No data

12.2.2 Original data

No data was available for this Table.

FRA 2005 Categories	Value of roundwood removal (1000 USD)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial roundwood	ID	ID	ID	ID	ID	ID
Woodfuel	ID	ID	ID	ID	ID	ID
TOTAL for Country	ID	ID	ID	ID	ID	ID

13 Table T13 – Non-wood forest product removal

13.1 FRA 2005 Categories and definitions

13.2 Data for National reporting table T13

No data is available

14 Table T14 – Value of non-wood forest product removal

14.1 FRA 2005 Categories and definitions

14.2 Data for National reporting table T14

No data was available

15 Table T15 – Employment in forestry

15.1 FRA 2005 Categories and definitions

Category	Definition
Primary production of goods	Employment in activities related to primary production of goods like industrial roundwood woodfuel and non-wood forest products.
Provision of services	Employment in activities directly related to services from forests and woodlands.
Unspecified forestry activities	Employment in unspecified forestry activities.

15.1.1 Original data

No original data available

15.2 Data for National reporting table T15

FRA 2005 Categories	Employment (1000 person-years)	
	1990	2000
Primary production of goods	ID	ID
Provision of services	ID	ID
Unspecified forestry activities	ID	ID
TOTAL	ID	ID

15.3 Comments to National reporting table T15

There was no original data for this table however ("Trends and current status of the contribution of the forest sector to national economies"(FAO 2003)) report that 103 and 284 persons were employed in forestry logging and related services in 1990 and 2000 respectively.

16 Thematic reporting tables

If countries would like to submit additional reporting tables these should be included here. (See the chapter on thematic reporting in the Guidelines for Country Reporting).