Forestry Department
Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT 2010

COUNTRY REPORT

NAMIBIA

FRA2010/142
Rome, 2010

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 2010 (FRA 2010).

The reporting framework for FRA 2010 is based on the thematic elements of sustainable forest management acknowledged in intergovernmental forest-related fora and includes variables related to the extent, condition, uses and values of forest resources, as well as the policy, legal and institutional framework related to forests. More information on the FRA 2010 process and the results - including all the country reports - is available on the FRA Web site (www.fao.org/forestry/fra).

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 2010 is:

Mette Løyche Wilkie
Senior Forestry Officer
FAO Forestry Department
Viale delle Terme di Caracalla
Rome 00153, Italy

E-mail: Mette.LoycheWilkie@fao.org

Readers can also use the following e-mail address: fra@fao.org

Contents

Report preparation and contact persons

The present report was prepared by the following person(s):

Name (FAMILY NAME, First name)	**Institution / address**	**E-mail**	**Fax**	**Tables**
Kanime, Ndapanda	Ministry of Agriculture, Water and Forestry Private Bag 13184 Windhoek, Namibia	ndapanda10@hotmail.com	+264612087802	All tables

Introduction

Forestry sector is managed by the directorate of forestry in partnership with the forestry stakeholders (as articulated by the vision 2030 that stress that stakeholder participation is a key to national development) which comprise of the following two main groups: forest resource users namely local communities, farmers and private sectors; and institutions that provide financial resources. The directorate of forestry is divided into two main divisions, namely, forestry management which is responsible for development of policy and legal framework, protection and management of classified forests, promotion of farm community, and environmental forestry, provision of extension services and maintenance of an efficient sector-wide management information system. The forestry research division is responsible for conducting integrated forestry research including indigenous knowledge and dissemination of forestry research information.

Regarding the status of forestry information availability in Namibia, the forest inventory is not done for the whole country. The main challenge is manpower and resources. Currently only 4 regions are inventoried out of 13 regions. The inventories are carried out in community forests in most of the regions, but these data are not representing the whole regions, thus data are not significant for FAO report. Currently several positions in the Directorate of Forestry are vacant which also contribute to unavailability of information since the current staffs are overloaded with activities. The other main challenge is that some of the data are not recorded, thus makes data difficult to be found.

1 Table T1 – Extent of Forest and Other wooded land

1.1 FRA 2010 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	Edwards (1983), main types of vegetation
4. **Mendelsohn, J. *et al* 2002**. Atlas of Namibia: A portrait of the Land and its People	H	Forest Cover	2002	
5. **Mendelsohn, J. and Obeid, S. 2005**. Forest Woodland of Namibia	H	Forest Cover	2005	
6. http://www.fao.org/forestry	H			

1.2.2 Classification and definitions

The 1992 and 2000 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

Classification and definitions 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.

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**

Original data from source 3: Reference year 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%**

1.3 Analysis and processing of national data

1.3.1 Reclassification into FRA 2010 categories

Reference year 1992

Reclassification is done before estimation and forecasting because each reference year is analysed and processed separately. It follows the one for FRA, 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 central and the north-eastern part of the country, where the majority of the forests are found.

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

Reference year 2000

- Calibration

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

Note that since there were no definitions 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 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

1.3.2 Estimation and forecasting

For 1990, 2005 and 2010, estimation and forecasting are based on linear extrapolation

FRA Categories	Area in hectares			
	1990	2000	2005	2010
Forest	8 762 496	8 032 903	7 661 499	7 290 095
OWL	9 023 187	8 656 501	8 473 158	8 289 815
OL	64 543 317	65 639 596	66 194 343	66 749 090
Inland water	100 000	100 000	100 000	100 000
Total country Area	82 429 000	82 429 000	82 429 000	82 429 000

1.4 Data for Table T1

FRA 2010 categories	Area (1000 hectares)			
	1990	2000	2005	2010
Forest	8 762	8 032	7 661	7 290
Other wooded land	9 023	8 656	8 473	8 290
Other land	64 544	65 641	66 195	66 749
...of which with tree cover	n.a.	n.a.	n.a.	n.a.
Inland water bodies	100	100	100	100
TOTAL	**82 429**	**82 429**	**82 429**	**82 429**

1.5 Comments to Table T1

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Forest		The data used for establishing the trend are not fully comparable, and thus the change rate might be overestimated.
Other wooded land		Linear extrapolation has been adopted, considering that the trend of OWL reduction remains constant.
Other land		
Other land with tree cover		
Inland water bodies		

Other general comments to the table

Expected year for completion of ongoing/planned <u>national</u> forest inventory and/or RS survey / mapping	
Field inventory	Activities are on going and results are not yet available for whole country.
Remote sensing survey / mapping	Ongoing.

2 Table T2 – Forest ownership and management rights

Information on the forest ownership is not available (meaning no data available). The FOSA report for Namibia however notes that land ownership in Namibia is divided into three categories; Private owned land (commercial farms and lands in municipal areas), state land in protected areas such as parks and nature reserves and communal land. Besides, ownership of trees coincides with ownership of the land on which they are situated.

3 Table T3 – Forest designation and management

3.1 FRA 2010 Categories and definitions

Term	Definition
Primary designated function	The primary function or management objective assigned to a management unit either by legal prescription, documented decision of the landowner/manager, or evidence provided by documented studies of forest management practices and customary use.
Protected areas	Areas especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.
Categories of primary designated functions	
Production	Forest area designated primarily for production of wood, fibre, bio-energy and/or non-wood forest products.
Protection of soil and water	Forest area designated primarily for protection of soil and water.
Conservation of biodiversity	Forest area designated primarily for conservation of biological diversity. Includes but is not limited to areas designated for biodiversity conservation within the protected areas.
Social services	Forest area designated primarily for social services.
Multiple use	Forest area designated primarily for more than one purpose and where none of these alone is considered as the predominant designated function.
Other	Forest areas designated primarily for a function other than production, protection, conservation, social services or multiple use.
No / unknown	No or unknown designation.
Special designation and management categories	
Area of permanent forest estate (PFE)	Forest area that is designated to be retained as forest and may not be converted to other land use.
Forest area within protected areas	Forest area within formally established protected areas independently of the purpose for which the protected areas were established.
Forest area under sustain-able forest management	To be defined and documented by the country.
Forest area with management plan	Forest area that has a long-term (ten years or more) documented management plan, aiming at defined management goals, which is periodically revised.

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	conservation	2009	
Proceedings, 2003 Workshop on Tropical Secondary Forest Management in Africa: Reality and Perspectives	M	Community Forests areas		

3.2.2 Original data

Information extracted from the UNEP-WCMC Database

Name	Type	IUCN category	Area in ha
Ai-Ais Hot Springs	Game Park	II	432197.40
Bwabwata	Game Park	Unset	633307.09
Caprivi	Game Park	VI	582750.00
Daan Viljoen	Game Park	II	3909.50
Eastern Caprivi	Forest Reserve	Unset	160000.00
Etosha	National Park	II	2215139.50
Khaudum	Game Park	II	365790.70
Mahango	Game Reserve	II	24 462.00
Mamili	National Park	II	34317.00
Mangetti	Game Reserve	Unset	41 990.00
Mudumu	National Park	II	72624.64
Namib Naukluft	National Park	II	4976800.00
Popa	Game Park	III	1490.00
Skeleton Coast	Game Park	II	1639000.00
Sperrgebiet	National Park	Unset	2600000.00
Waterberg Plateau Park	Game Park	II	39794.60
Twyfelfontein	Communal Area Conservancy	Unset	28600.00

Community Forest Reserves

Name of the area under management	Total area covered in ha
Before 2005	
Okongo Community Forest	75000
Uukwaludhi Community Forest	148441
Ukolonkadhi Community Forest	110417
Ongandjera Community Forest	121826
Oshampula Community Forest	1070
Ohepi Community Forest	5180
Ndiyona Community Forest	60000
Sub-total	***521934***
After 2005	
Ncumcara community forest	15217
Ncaute community forest	12000
Ncamangoro community forest	26322
Mbeyo community forest	41079
Hans kanyinga community forest	27667
Cuma community forest	11500
Likwaterera community forest	13800
Gcwatjinga community forest	32000
Sub-total	**179585**
Total	**701519**

3.3 Analysis and processing of national data

3.3.1 Reclassification into FRA 2010 categories

Based on the expert knowledge, estimates have been made, for the different reserves, about the importance of forest area and its function.

Name	**IUCN category**	**Percentage of forest, and**	**Forest function**	
			Conservation	Multipurpose
Ai-Ais Hot Springs	II	15%	100%	
Bwabwata	Unset	60%		100%
Caprivi	VI	80%		100%
Daan Viljoen	II	25%	100%	
Eastern Caprivi	Unset	85%		100%
Etosha	II	15%	100%	
Khaudum	II	60%	100%	
Mahango	II	45%	100%	
Mamili	II	55%	100%	
Mangetti	Unset	35%		100%
Mudumu	II	50%	100%	
Namib Naukluft	II	0%		
Popa	III	5%	100%	
Skeleton Coast	II	0%		
Sperrgebiet	Unset	0%		
Waterberg Plateau Park	II	10%	100%	
Twyfelfontein	Unset	5%	100%	

Note: 1. Not from UNEP-WCMC Database

Name	**Total area in ha**	**Forest area in ha**	**Forest function**	
			Conservation	Multipurpose
Ai-Ais Hot Springs	432197.40	64829.61	64829.61	
Bwabwata	633307.09	379984.25		379984.25
Caprivi	582750.00	466200.00		466200.00
Daan Viljoen	3909.50	977.38	977.38	
Eastern Caprivi	160000.00	136000.00		136000.00
Etosha	2215139.50	332270.93	332270.93	
Khaudum	365790.70	219474.42	219474.42	
Mahango	24462.00	11007.90	11007.90	
Mamili	34317.00	18874.35	18874.35	
Mangetti	41990.00	14696.50		14696.50
Mudumu	72624.64	36312.32	36312.32	
Popa	14.90	0.75	0.75	
Waterberg Plateau Park	39794.60	3979.46	3979.46	
Twyfelfontein	28600.00	1430.00	1430.00	
Total		**1686037.87**	**689157.12**	**996880.75**

3.3.2 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.

Regarding the multiple-use forest, in addition to the 996 880 ha of reserves (based on the UNEP-WCMC Database source), it should also be considered the Community forest reserves.
In 1990, the latter were not available; but
From 2000 to 2005, they represented 521934 ha, of which 85 % are forest (443 644 ha);
After 2005, their area is 701519, of which 85 % are forest (596 291 ha)
Therefore

FRA Categories	Area in hectares			
	1990	2000	2005	2010
Multi-purpose	996 880	1 440 524	1 440 524	1 593 171

FRA Categories	Area in hectares			
	1990	2000	2005	2010
Conservation	689	689	689	689
Multi-purpose	997	1 441	1 441	1 593
Unknown	7 076	5 902	5 531	5 008
Total Forest	**8 762**	**8 032**	**7 661**	**7 290**

3.4 Data for Table T3

Table 3a – Primary designated function

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Production	0	0	0	0
Protection of soil and water	0	0	0	0
Conservation of biodiversity	689	689	689	689
Social services	0	0	0	0
Multiple use	997	1 441	1 441	1 593
Other (please specify in comments below the table)	0	0	0	0
No / unknown	7 076	5 902	5 531	5 008
TOTAL	**8 762**	**8 032**	**7 661**	**7 290**

Table 3b – Special designation and management categories

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Area of permanent forest estate *	136	136	136	136
Forest area within protected areas	689	689	689	689
Forest area under sustainable forest management	n/a	n/a	n/a	n/a
Forest area with management plan	0	444	444	596

*** Note**: it is considered that the Forest reserve of Eastern Caprivi to be a area of permanent forest estate.

3.5 Comments to Table T3

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Production		
Protection of soil and water		
Conservation of biodiversity		
Social services		
Multiple use		
Other		
No / unknown designation		
Area of permanent forest estate		
Forest area within protected areas		
Forest area under sustainable forest management		
Forest area with management plan	It is considered that the Community forest reserves have a management plan.	

Other general comments to the table

4 Table T4 – Forest characteristics

4.1 FRA 2010 Categories and definitions

Term / category	Definition
Naturally regenerated forest	Forest predominantly composed of trees established through natural regeneration.
Introduced species	A species, subspecies or lower taxon, occurring outside its natural range (past or present) and dispersal potential (i.e. outside the range it occupies naturally or could occupy without direct or indirect introduction or care by humans).
Characteristics categories	
Primary forest	Naturally regenerated forest of native species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed.
Other naturally regenerated forest	Naturally regenerated forest where there are clearly visible indications of human activities.
Other naturally regenerated forest of introduced species *(sub-category)*	Other naturally regenerated forest where the trees are predominantly of introduced species.
Planted forest	Forest predominantly composed of trees established through planting and/or deliberate seeding.
Planted forest of introduced species *(sub-category)*	Planted forest, where the planted/seeded trees are predominantly of introduced species.
Special categories	
Rubber plantations	Forest area with rubber tree plantations.
Mangroves	Area of forest and other wooded land with mangrove vegetation.
Bamboo	Area of forest and other wooded land with predominant bamboo vegetation.

4.2 National data

4.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Kamwi, J. M. 2001 Inventory report of the Onankali Eucalyptus Plantation.	H	Forest characteristics	2001	
Chikaputo, C. 1994. Management plan for Eucalyptus plantations in Namibia.	H	Management plans	1994	

4.3 Analysis and processing of national data

4.3.1 Calibration

All forests in Namibia have been reclassified as modified natural forests

4.4 Data for Table T4

Table 4a

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Primary forest	0	0	0	0
Other naturally regenerated forest	8 763	8 032	7 661	7 290
...of which of introduced species	n.a.	n.a.	n.a.	n.a.
Planted forest	0	0	0.045	0.200
...of which of introduced species	0	0	n.a.	n.a.
TOTAL	**8 763**	**8 032**	**7 661**	**7 290**

Table 4b

FRA 2010 Categories	Area (1000 hectares)			
	1990	2000	2005	2010
Rubber plantations (Forest)	0	0	0	0
Mangroves (Forest and OWL)	0	0	0	0
Bamboo (Forest and OWL)	0	0	0	0

4.5 Comments to Table T4

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Primary forest		
Other naturally regenerating forest		
Planted forest	No significant plantation activities have been conducted before 2004. Four years ago, efforts have been started to established new plantations, but the rate is still very low. The result is not yet significant.	
Rubber plantations	Not applicable to Namibia	
Mangroves	Not applicable to Namibia	
Bamboo	Not applicable to Namibia	

Other general comments to the table

5 Table T5 – Forest establishment and reforestation

5.1 FRA 2010 Categories and definitions

Term	Definition
Afforestation	Establishment of forest through planting and/or deliberate seeding on land that, until then, was not classified as forest.
Reforestation	Re-establishment of forest through planting and/or deliberate seeding on land classified as forest.
Natural expansion of forest	Expansion of forests through natural succession on land that, until then, was under another land use (e.g. forest succession on land previously used for agriculture).

5.2 National data

5.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Shikaputo, C. 2008 Extended feasibility study – Tree Planting Project in Southern Part of Oshikoto, Oshana and Omusati Regions .	H	Afforestation	2008	
DoF Annual Reports	H	Afforestation	2006	

5.2.2 Original data

Since 2004, plantation activities are on-going at a low scale. Information is scanty. Data are mixed and not properly recorded.
The data hereby provided by the national correspondent are based on her review and judgement.

5.3 Data for Table T5

FRA 2010 Categories	Annual forest establishment (hectares/year)			...of which of introduced species [1)] (hectares/year)		
	1990	2000	2005	1990	2000	2005
Afforestation	n/a	n/a	25	n/a	n/a	n/a
Reforestation	n/a	n/a	n/a	n/a	n/a	n/a
...of which on areas previously planted	n/a	n/a	n/a	n/a	n/a	n/a
Natural expansion of forest	n/a	n/a	n/a	n/a	n/a	n/a

Note: The figures for the reporting years refer to the averages for the 5-year periods 1988-1992, 1998-2002 and 2003-2007 respectively.

5.4 Comments to Table T5

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Afforestation	The afforestation program in Namibia has started after 2003	
Reforestation		
Natural expansion of forest		

Other general comments to the table
On the current situation, there are several forest plantations or planted woodlots in Namibia. A tree planting project (with native species) is conduct in the Oshikoto, Oshana and Omusati regions. The project started its activities in 2003 with the objective of assessing the institutional and technical viability of trees planting in saline grassland in the mentioned regions. In total, thirteen areas have been planted since 2003 which covers 149.2 ha (using about 39 684 seedlings from 26 different species, out of thirteen species, 13 species is local tree species and 13 are exotics species). Since the total area planted in the country is small in ha, the data are not recommended for the report. In the column for introduced species, the species planted is Eucalyptus.

6 Table T6 – Growing stock

6.1 FRA 2010 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.
Growing stock of commercial species	Growing stock (see def. above) of commercial species.

6.2 National data

6.2.1 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	

6.2.2 Original data

Original Data, reference year : 2000

National Classes	Oshikoto region		Omusati Region		Oshana Region		Sum of 3 regions		
	Area	GS	Area	GS	Area	GS	Area	GS	GS
	ha	m^3	ha	m^3	ha	m^3	ha	m^3	m^3/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	52 633	510 500	154 692	1 599	42 443	376 700	249 768	2 486 200	9.95

woodland				000					
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**

GS stands for growing stock

Common name	**Species**	**All inventoried regions**	
musheshe	*Burkea Africana*	12 916 336	19.98%
	Baikiaea plurijuga	11 877 748	18.38%
mopani	*Colophospermum mopane*	5 973 898	9.24%
mububu	*Combretum collinum*	5 950 639	9.21%
muhonono	*Terminalia sericea*	5 814 672	9.00%
	Guibourtia coleosperma	3 034 092	4.69%
muhoto	*Acacia erioloba*	2 754 805	4.26%
mulumbe	*Pterocarpus angolensis*	2 258 080	3.49%
	Schinziophyton rautaneii	1 392 592	2.15%
	Peltophorum africanum	941 080	1.46%
	Combretum zeyheri	879 075	1.36%
	Dialium engleranum	772 504	1.20%
muzwili	*Combretum imberbe*	653 260	1.01%
	Sclerocarya birrea	552 040	0.85%
mukotoko	*Acacia nigrescens*	515 890	0.80%
	Diospyros mespiliformis	295 155	0.46%
	Acacia mellifera	185 288	0.29%
	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 regions. It does not cover the whole country and is therefore not used to complete table 6b.

6.3 Analysis and processing of national data

6.3.1 Estimation and forecasting

		Area in hectares			
FRA	**Vol/ha**	**1990**	**2000**	**2005**	**2010**
Forests	24.07	8 762 496	8 032 903	7 661 499	7 290 095
OWL	5.23	9 023 187	8 656 501	8 473 158	8 289 815

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

	Growing Stock in Million cubic meters			
Vol/ha in m3	**1990**	**2000**	**2005**	**2010**
Forests	211	193	184	175
OWL	47	45	44	43

6.4 Data for Table T6

Table 6a – Growing stock

FRA 2010 category	Volume (million cubic meters over bark)							
	Forest				Other wooded land			
	1990	2000	2005	2010	1990	2000	2005	2010
Total growing stock	211	193	184	175	47	45	44	43
... of which coniferous	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
... of which broadleaved	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Growing stock of commercial species	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 6b – Growing stock of the 10 most common species

FRA 2010 category / Species name			Growing stock in forest (million cubic meters)		
Rank	Scientific name	Common name	1990	2000	2005
1st					
2nd					
3rd					
4th					
5th					
6th					
7th					
8th					
9th					
10th					
Remaining					
TOTAL					

Note: Rank refers to the order of importance in terms of growing stock, i.e. 1st is the species with the highest growing stock. Year 2000 is the reference year for defining the species list and the order of the species.

Table 6c – Specification of threshold values

Item	Value	Complementary information
Minimum diameter (cm) at breast height[1] of trees included in growing stock (X)	5 cm	
Minimum diameter (cm) at the top end of stem for calculation of growing stock (Y)	-	
Minimum diameter (cm) of branches included in growing stock (W)	-	
Volume refers to "above ground" (AG) or "above stump" (AS)	-	

[1] Diameter at breast height (DBH) refers to diameter over bark measured at a height of 1.30 m above ground level or 30 cm above buttresses if these are higher than 1 m.

6.5 Comments to Table T6

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Total growing stock		
Growing stock of broadleaved / coniferous		
Growing stock of commercial species		
Growing stock composition		

Other general comments to the table

7 Table T7 – Biomass stock

7.1 FRA 2010 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 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	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.

7.2 National data

7.2.1 Original data

No original data exist. Data from table T6 are used as input and conversion factors applied

7.3 Analysis and processing of national data

7.3.1 Estimation and forecasting

Conversion factors applied are the following:

	Density (ton/m3)	BEF	R/S ratio
Forest	0.58	3.40	0.27
OWL	0.58	9.00	0.27

Then, the following formula have been applied:

Above ground biomass (AGB) = Growing stock* wood density * BEF
Below ground biomass (BGB) = AGB * 0.24

Wood density = 0.58 Tons /m³
BEF = 1.2

Forest	Biomass (million tonnes)			
	1990	2000	2005	2010
Aboveground biomass	423.5	388.2	370.3	352.2
Belowground biomass	114.3	104.8	99.9	95.1

OWL	Biomass (million tonnes)			
	1990	2000	2005	2010
Aboveground biomass	246.4	236.4	231.4	226.4
Belowground biomass	66.5	63.8	62.5	61.1

7.4 Data for Table T7

FRA 2010 category	Biomass (million metric tonnes oven-dry weight)							
	Forest				Other wooded land			
	1990	2000	2005	2010	1990	2000	2005	2010
Above-ground biomass	423.5	388.2	370.3	352.2	246.4	236.4	231.4	226.4
Below-ground biomass	114.3	104.8	99.9	95.1	66.5	63.8	62.5	61.1
Dead wood	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
TOTAL	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

7.5 Comments to Table T7

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Above-ground biomass		
Below-ground biomass		
Dead wood		

Other general comments to the table

8 Table T8 – Carbon stock

8.1 FRA 2010 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 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	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 the minimum diameter for dead wood (e.g. 10 cm), lying dead in various states of decomposition above the mineral or organic soil.
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.

8.2 National data

8.2.1 Original data

Tables T1 and T7 have been used as input for the carbon estimations.

8.3 Analysis and processing of national data

8.3.1 Estimation and forecasting

A/- Carbon stock is calculated by multiplying the biomass by 0.47. Carbon stocks of litter and soil have not been estimated.

B/- Carbon in the litter has been estimated, based on the standard factor of 2.8 (Subtropical, broadleaf deciduous), and
- Soil carbon has been estimated, based on the factor of 31 (Tropical, dry with sandy soils).
The biomass/ hectare values are then applied to the forest area values in table T1 to get the results for the reporting years.

	1990	2000	2005	2010
Forest (1000 hectares)	8 762	8 032	7 661	7 290
Carbon in litter (1000 tonnes C)	24 534	22 490	21 451	20 412
Soil carbon (1000 tonnes C)	271 622	248 992	237 491	225 990

	1990	2000	2005	2010
OWL (1000 hectares)	9 023	8 656	8 473	8 290
Carbon in litter (1000 tonnes C)	25 264	24 237	23 724	23 212
Soil carbon (1000 tonnes C)	279 713	268 336	262 663	256 990

8.4 Data for Table T8

FRA 2010 Category	Carbon (Million metric tonnes)							
	Forest				Other wooded land			
	1990	2000	2005	2010	1990	2000	2005	2010
Carbon in above-ground biomass	199.05	182.45	174.04	165.53	115.81	111.11	108.76	106.41
Carbon in below-ground biomass	53.72	49.26	46.95	44.70	31.26	29.99	29.38	28.72
Sub-total: Living biomass	252.77	231.71	220.99	210.23	147.06	141.09	138.13	135.13
Carbon in dead wood	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Carbon in litter	24.53	22.49	21.45	20.41	25.26	24.24	23.72	23.21
Sub-total: Dead wood and litter	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Soil carbon	271.62	248.99	237.49	225.99	279.71	268.34	262.66	256.99
TOTAL	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Soil depth (cm) used for soil carbon estimates	30

8.5 Comments to Table T8

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Carbon in above-ground biomass		
Carbon in below-ground biomass		
Carbon in dead wood		
Carbon in litter		
Soil carbon		

Other general comments to the table

9 Table T9 – Forest fires

9.1 FRA 2010 Categories and definitions

Category	Definition
Number of fires	Average number of vegetation fires per year in the country.
Area affected by fire	Average area affected by vegetation fires per year in the country.
Vegetation fire *(supplementary term)*	Any vegetation fire regardless of ignition source, damage or benefit.
Wildfire	Any unplanned and/or uncontrolled vegetation fire.
Planned fire	A vegetation fire regardless of ignition source that burns according to management objectives and requires limited or no suppression action.

9.2 National data

9.2.1 Original data

The data and number of fires occurred are not known. The National Remote Sensing Centre only measures the sizes of burnt areas. The data available for fire is for 2006 which is 5.164 million ha and presenting 6.2% of Namibia total land surface and for 2007 is 6.919 million ha, and representing 7.4% of Namibia total land surface. The average value of 6.042 million hectares has been used for the reporting table.

Data for Table T9

Table 9a

FRA 2010 category	Annual average for 5-year period					
	1990		2000		2005	
	1000 hectares	number of fires	1000 hectares	number of fires	1000 hectares	number of fires
Total land area affected by fire	n.a.	n.a.	n.a.	n.a.	6042	n.a.
... of which on forest	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
... of which on other wooded land	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
... of which on other land	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Table 9b

FRA 2010 category	Proportion of forest area affected by fire (%)		
	1990	2000	2005
Wildfire			
Planned fire			

Note: The figures for the reporting years refer to the averages of annually affected areas for the 5-year periods 1988-1992, 1998-2002 and 2003-2007 respectively

Comments to Table T9

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Area affected by fire		
Number of fires		
Wildfire / planned fire		

Other general comments to the table

10 Table T10 – Other disturbances affecting forest health and vitality

Data is not available for this table.

11 Table T11 – Wood removals and value of removals

No comprehensive information is available for this table. Based on the Directorate of Forestry annual report (2007), over 180,000 tonnes of firewood and charcoal have been produced, and 317m3 of timber were harvested from the forest.

12 Table T12 – Non-wood forest products removals and value of removals

Data is not available for this table. No comprehensive information is available due to the fact that there are no organized data records. Using for traditional medicine, it should be noted the role of the Devil's craw (*Harpagophytum procumbens*). Between 1992 and 2008, 6 863 478 kg have been harvested for a value of 185 828 000 Namibia dollars.

13 Table T13 – Employment

Data is not available for this table. There were no systems in place in accounting the number of people in a Directorate or Ministry. The Personnel Office has the names of people appointed in a particular year; they however do not share such information.

14 Table T14 – Policy and legal framework

14.1 FRA 2010 Categories and definitions

Term	Definition
Forest policy	A set of orientations and principles of actions adopted by public authorities in harmony with national socio-economic and environmental policies in a given country to guide future decisions in relation to the management, use and conservation of forest and tree resources for the benefit of society.
Forest policy statement	A document that describes the objectives, priorities and means for implementation of the forest policy.
National forest programme (nfp)	A generic expression that refers to a wide range of approaches towards forest policy formulation, planning and implementation at national and sub-national levels. The national forest programme provides a framework and guidance for country-driven forest sector development with participation of all stakeholders and in consistence with policies of other sectors and international policies.
Law (Act or Code) on forest	A set of rules enacted by the legislative authority of a country regulating the access, management, conservation and use of forest resources.

14.2 Data for Table T14

Indicate the existence of the following (2008)			
Forest policy statement with national scope		X	Yes
			No
If Yes above, provide:	Year of endorsement	1996	
	Reference to document	www.mawf.gov.na	
National forest programme (nfp)			Yes
		X	No
If Yes above, provide:	Name of nfp in country		
	Starting year		
	Current status		In formulation
			In implementation
			Under revision
			Process temporarily suspended
	Reference to document or web site		
Law (Act or Code) on forest with national scope		X	Yes, specific forest law exists
			Yes, but rules on forests are incorpo-rated in other (broader) legislation
			No, forest issues are not regulated by national legislation
If Yes above, provide:	Year of enactment	2001(Forest Act No. 12 of 2001)	
	Year of latest amendment	2005 (Forest Act No. 13 of 2005)	
	Reference to document	www.mawf.gov.na Government Gazette of the Republic of Namibia	

In case the responsibility for forest policy- and/or forest law-making is decentralized, please indicate the existence of the following and explain in the comments below the table how the responsibility for forest policy- and law-making is organized in your country.		
Sub-national forest policy statements	X	Yes
		No
If Yes above, indicate the number of regions/states/provinces with forest policy statements	13 regions	
Sub-national Laws (Acts or Codes) on forest	X	Yes
		No
If Yes above, indicate the number of regions/states/provinces with Laws on forests	13 regions	

14.3 Comments to Table T14

Variable / category	**Comments related to data, definitions, etc.**
Forest policy statement with national scope	
National forest programme (nfp)	
Law (Act or Code) on forest with national scope	
Sub-national forest policy statements	
Sub-national Laws (Acts or Codes) on forest	

Other general comments to the table

15 Table T15 – Institutional framework

15.1 FRA 2010 Categories and definitions

Term	Definition
Minister responsible for forest policy-making	Minister holding the main responsibility for forest issues and the formulation of the forest policy.
Head of Forestry	The Head of Forestry is the Government Officer responsible for implementing the mandate of the public administration related to forests.
Level of subordination	Number of administrative levels between the Head of Forestry and the Minister.
University degree	Qualification provided by University after a minimum of 3 years of post secondary education.

15.2 Data for Table T15

Table 15a – Institutions

FRA 2010 Category	2008	
Minister responsible for forest policy formulation : please provide full title	HON. John Mutorwa, Minister of Agriculture, Water and Forestry	
Level of subordination of Head of Forestry within the Ministry		1st level subordination to Minister
		2nd level subordination to Minister
		3rd level subordination to Minister
	X	4th or lower level subordination to Minister
Other public forest agencies at national level	Community Forestry in Namibia, Namibia Nature Foundation, Integrated Community Ecosystem Management.	
Institution(s) responsible for forest law enforcement	Directorate of Forestry	

Table 15b – Human resources

FRA 2010 Category	Human resources within public forest institutions					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Total staff	n/a	n/a	600	n/a	500	n/a
...of which with university degree or equivalent	n/a	n/a	10	n/a	4	n/a

Notes:
1. Includes human resources within public forest institutions at sub-national level
2. Excludes people employed in State-owned enterprises, education and research, as well as temporary / seasonal workers.
3. Estimates from the Personnel Office, Minister of Agriculture, Water and Forestry.

15.3 Comments to Table T15

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Minister responsible for forest policy formulation		
Level of subordination of Head of Forestry within the Ministry		
Other public forest agencies at national level		
Institution(s) responsible for forest law enforcement		
Human resources within public forest institutions		

Other general comments to the table

16 Table T16 – Education and research

16.1 FRA 2010 Categories and definitions

Term	Definition
Forest-related education	Post-secondary education programme with focus on forests and related subjects.
Doctor's degree (PhD)	University (or equivalent) education with a total duration of about 8 years.
Master's degree (MSc) or equivalent	University (or equivalent) education with a total duration of about five years.
Bachelor's degree (BSc) or equivalent	University (or equivalent) education with a duration of about three years.
Technician certificate or diploma	Qualification issued from a technical education institution consisting of 1 to 3 years post secondary education.
Publicly funded forest research centers	Research centers primarily implementing research programmes on forest matters. Funding is mainly public or channelled through public institutions.

16.2 Data for Table T16

FRA 2010 Category	Graduation [1] of students in forest-related education					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Master's degree (MSc) or equivalent	0		0		0	
Bachelor's degree (BSc) or equivalent	0		0		0	
Forest technician certificate / diploma	8		10		1	

FRA 2010 Category	Professionals working in publicly funded forest research centres [2]					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Doctor's degree (PhD)	0		0		0	
Master's degree (MSc) or equivalent	2		2		2	
Bachelor's degree (BSc) or equivalent	0		1		2	

Notes:

1. Graduation refers to the number of students that have successfully completed a Bachelor's or higher degree or achieved a certificate or diploma as forest technician.
2. Covers degrees in all sciences, not only forestry.
3. National correspondent knowledge.

16.3 Comments to Table T16

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Graduation of students in forest-related education		Two students have been considered to initiate a Master's degree.
Professionals working in public forest research centres		

Other general comments to the table

17 Table T17 – Public revenue collection and expenditure

17.1 FRA 2010 Categories and definitions

Category	Definition
Forest revenue	All government revenue collected from the domestic production and trade of forest products and services. For this purpose, forest products include: roundwood; sawnwood; wood-based panels; pulp and paper; and non-wood forest products. As far as possible, this should include revenue collected by all levels of government (i.e. central, regional/provincial and municipal level), but it should exclude the income of publicly owned business entities.
Public expenditure	All government expenditure on forest related activities (further defined below).
Operational expenditure *(sub-category to Public expenditure)*	All government expenditure on public institutions solely engaged in the forest sector. Where the forest administration is part of a larger public agency (e.g. department or ministry), this should only include the forest sector component of the agency's total expenditure. As far as possible, this should also include other institutions (e.g. in research, training and marketing) solely engaged in the forest sector, but it should exclude the expenditure of publicly owned business entities.
Transfer payments *(sub-category to Public expenditure)*	All government expenditure on direct financial incentives paid to non-government and private-sector institutions, enterprises communities or individuals operating in the forest sector to implement forest related activities.
Domestic funding	Public expenditure funded from domestic public financial resources, including: retained forest revenue; forest-related funds; and allocations from the national budget (i.e. from non-forest sector public revenue sources).
External funding	Public expenditure funded from grants and loans from donors, non-governmental organisations, international lending agencies and international organisations, where such funds are channelled through national public institutions.

17.2 National data

17.2.1 Original data

No comprehensive information is available for this table.
It could be noted that the forest revenue has been estimated at 557 842 000 Namibian Dollars for 2007. This value has been used for reporting for year 2005.

17.3 Data for Table T17

Table 17a - Forest revenues

FRA 2010 Categories	Revenues (1000 local currency)	
	2000	2005
Forest revenue	n.a.	557.84

Table 17b - Public expenditure in forest sector by funding source

FRA 2010 Categories	Domestic funding (1000 local currency)		External funding (1000 local currency)		Total (1000 local currency)	
	2000	2005	2000	2005	2000	2005
Operational expenditure						
Transfer payments						
Total public expenditure						

If transfer payments are made for forest management and conservation, indicate for what specific objective(s) - Please tick all that apply.		
		Reforestation
		Afforestation
		Forest inventory and/or planning
		Conservation of forest biodiversity
		Protection of soil and water
		Forest stand improvement
		Establishment or maintenance of protected areas
		Other, specify below

17.4 Comments to Table T17

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Forest revenue		
Operational expenditure		
Transfer payments		

Other general comments to the table