Forestry Department
Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT

COUNTRY REPORTS

ZAMBIA

FRA2005/062
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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).

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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
Millington, A., and Towsend, J. (eds.) 1989. Biomass assessment. Woody biomass in the SADC region. Earth scans Publication Ltd. London. UK	H	Definition and Land use cover	1969	The Fanshawe 1967 -1972 detailed vegetation study was summarised and forms the basis of a set of nine 1:100 000 vegetation maps compiled by Edmonds in 1976. These sources were used extensively to compile the biomass classes and data for 1989using NOAA-7 AVHRR GAC data.
Chakanga M, & de Backer M., 1986 . The forest vegetation of Zambia. Wood Consumption and Resource Survey of Zambia.	H	Definitions and land Cover	1974	Basic analytical inputs were from the years 1973-1975. The validity of the tables depended on the basic material of the "vegetation map of Zambia" which was edited in 1976. Back checking was not possible.

Notes:
A decision to use the above two reference sources for FRA 2005, was taken because most publications base their references on these studies. Secondly, there is a certain degree of alignment in terms of forest description between the various national classes. In addition the two sources based their updates on the 1969 inventory results.

1.2.2 Classification and definitions

DEFINITIONS FOR 1969 DATA

National Classes	Definition
Wet Miombo woodland	The wet Miombo Woodland class is distributed widely throughout Zambia, being found in all provinces. It is the largest biomass class in the country, covering 223, 942 km^2 or 30.9% of the total land area. Wet Miombo is generally two-storey closed semi-evergreen woodland. The main upper-storey dominants are *Brachestegia* spp. *Isoberlinia* spp. *Julbernardia* spp and *Marquesia macroura*. The lower storey is structurally less well defined but is floristically more diverse. Underneath this can be found either a 0.6-1.3 m grass and suffrutex layer or dense evergreen thickets reaching height of 3.5m. A variety of suffrutices is common in miombo woodlands and the grass-cover varies both in density and height according to season. The occurrence of dense, evergreen, thicket under-storey is indicative of the fact that miombo woodlands have replaced dry evergreen forest in many parts of Zambia. It is an invasive woodland type replacing many types of the dry evergreen forests that covered Zambia in wetter periods. The main woody-thickets species are *Canthium burttii*, *Cassipourea* spp and *Chrysophllum magalismontanum*, as well as many shrubs. Often the only dominant miombo woodland overwood tree is *B. speciformis*. The “”hill miombo”is found on the Muchinga Escarpment and the Bwingmfumu Hills. The woody biomass reserves of the wet miombo Woodland are very high, in terms of both growing stock and levels of productivity. It is an aggressive vegetation type that can withstand quiet large-scale exploitation.
Seasonal Miombo Woodland	Seasonal Miombo Woodland is closely related to the Wet Miombo Woodland, the main difference being its market seasonality. This class occurs on the Zambian Plateau, the Zambezi Escarpment, and extensively along Mozambique and Malawi borders. It is the second largest biomass class in Zambia, accounting for 125, 715 km^2 of the country. The Woodland is similar in structure to the Wet Miombo Woodland but the canopy is more open and there is a far greater proportion of deciduous trees. Consequently, species such as *B allenii, B bussei, Burkea african, I.angolensis, J. globiflora and Terminalia sericea* appear with more frequency in the canopy. Extensive areas of “hill miombo”woodland occur in this biomass class and are found particularly on the hills along the border of Zaire, the hills along the Mozambique border in North-Western Province and Zambian extension of Nyika Plateau. In these areas, the trees are under severe drought-stress due to the thin, stony soils. Seasonal Miombo woodland is almost as resilient as Wet Miombo Woodland. The areas of dry evergreen thicket do not occur in this more open miombo woodland because of longer dry-season moisture stress period. The canopy is dominated *by B. glacescens*, *B. microphylla*, *B. taxifolia* and *Cryptosepalum exfoliatum.* . The growing stock is high as are productivity levels.
Dry Miombo and Munga Woodland	The Dry Miombo Woodland component of this biomass class has both natural and disturbed elements. The canopy is dominated *by Erythrophleum africana*, usually combined wi*th B. allenii, B.bussei, Burkea Africana,J. globiflora and Terminalia sericea.* The woodland has a relatively open canopy of widely spaced deciduous trees. Munga woodland is a type of savannah woodland with open, park-like appearance. There are either one or two woody layers, both deciduous, with emergent reaching 18m in height. Sometimes a dense woody understrorey reaching 4.5m is found. The bushes here are diverse or semi-deciduous and , once again, although floristically diverse this under storey is dominated by Acacia spp. and Combretum spp. In some, Munga Woodland areas there are woody thickets.
Degraded Miombo woodlands	Woodlands are generally destroyed by a type of shifting agriculture practiced by the Bemba. Cultivation is mainly based on cassava, cowpea, maize and millet with groundnuts planted in the second year. Three succession phases are identified: i) The field are still dominated by crops but shrubs begin to intrude after the first year ii) Phase two, lasting for 2-6 years after clearance. Shrubs dominate the woody component especially *Euphorbia tirucalli* and *Smilax kraussina*. Other shrubs

	begin to invade and grasses become increasingly important as crops are harvested for up to three years iii) Phase 3, lasting from 6 to 25 years. After 25 years, woody species have gained such hold on the plot that canopy woodland has formed. Shrubs are absent, and only grasses and sedges are found under the trees The overall picture is one of declining miombo woodland species and an invasion of savannah woodland species, especially those related to Combretum savannah. Woodlands found in the degraded Miombo Woodlands include Itigi Forests, *Lake Basin Chipya* Woodland, and Grassland and termirminitary Vegetation associated with highland areas. The grassland in the Northern Province is pure stand grassland with no tree – cover. The only woody biomass in theses large grassland areas in Northern Province is associated with old termite mounds With the exception of the grassland, this biomass class has high woody-biomass growing stock and moderates of productivity.
Dry Evergreen Forest	They are well developed with three tiers. A closed evergreen canopy 25-27m tall, with emergent and dense evergreen shrub scrambler thickets of 1.5-6m in height. Three types have been identified: 1. *Parinari* forest is found on the Zambian Plateau and has two main canopy trees, *Parinari excelsa and Syzygium guineese. Common under-storey trees are Aidia micrantha, Olea capensis and Teclea nobilis* 2. Marquesia forest is found in the lake Bengweulu Basin. 3. *Cryptosepalum* forest
Kalahari Woodland	Two types of woodland: Guibourtia woodland is two-storey open woodland with deciduous to semi –deciduous floristically-rich upper canopy of 18-24 tall which includes *G. coleosperma, a* variety of deciduous trees and invasive miombo woodland species. The under story is composed of a thicket, 1.3-2.6 m high, of small trees and shrubs The other types of Kalahari Sand vegetation are dealt with in the Scrub Woodland Class.
Mopane Woodland	Mopane is a single storey woodland of 6-18m tall with an open deciduous nature. The dominant tree is *Colophospermum Mopane.* Lower trees, shrubs are usually absent, and grass and herb cover is dominant only locally.
Scrub woodland	Scrub Woodland is restricted to the tributaries of the Zambezi on the Angolan border and has equivalents in the *Chanas da borracha g*rassland in Angola. Elsewhere it probably represents small isolated areas of scrubby thickets. Three elements related to the Scrub Woodland: 1. The Burkea-Diplorhynchus Scrub is a 4.5-6 metre –high, open woody scrubland dominated by *B.africana* and *D.condylocarpon*. It occurs on the highest ground in the river valleys 2. At slightest lower elevations, *diplorhynchus* Scrub is found. This reaches 2m in height and is very open with about 12-25 scrubby trees per hectare 3. The final category is Pariniri suffrutex savannah. This is a ground carpet of suffutices reaching 30 cm in height with no emergent trees. In other areas, along the river valleys, the biomass classes represent grassland and to a lesser extent, scrubby thickets. The grassland is generally floristically diverse but is without woody species. They are usually controlled by flooding, poor soil or burning. The biomass class has very low growing stock and low productivity levels, fuelwood resources are minimal.
Swamp and lake vegetation	Swamp and Lake Vegetation is found along the shores of the main lakes-Bengweulu, Kariba, Mweru and Tanzania-and in the large swamps typical of the Zambian Plateau. In many areas, the swamp and lakeside vegetation is grassland with few or no woody plants; however, some areas of swamp forest do occur. These are mainly three storey closed evergreen forest with a canopy that reaches 27m and is dominated by *Ilex mitis*, Syzygium spp. and Xylopia spp. It is underlain by a discontinuous evergreen under story, 9-18m high, and a dense evergreen shrub layer, which reaches 4.5m. The forest floor is either bare or covered by herb stands. All swamps are controlled by high ground water levels. They are also small in extent, varying from1 to 120 ha. Fanshawe (1969) estimated that only 380km^2 of swamp forest in Zambia.

1.2.3 Original data

Original Data for 1969

	Area in km2
Wet Miombo woodland	223 942
Dry Miombo and Munga Woodland	53 085
Seasonal Miombo Woodland	125 715
Dry Evergreen Forest	9 798
Degraded Miombo woodlands	110 161
Mopane Woodland	69 000
Scrub woodland	9 800
Swamp and lake vegetation	46 140
Kalahari Woodland	79 212
Others	16 537
Total	**743 390**

1.3 Analysis and processing of national data

Multiplying by 100 to convert to hectares gives:

National Category	**Area in hectares**
Wet Miombo woodland	22 394 200
Dry Miombo and Munga Woodland	5 308 500
Seasonal Miombo Woodland	12 571 500
Dry Evergreen Forest	979 800
Degraded Miombo woodlands	11 016 100
Mopane Woodland	6 900 000
Scrub woodland	980 000
Swamp and lake vegetation	4 614 000
Kalahari Woodland	7 921 200
Others	1 653 700
Total land area	74 339 000

Reclassifying 1969 data

National Classes	**Forests**	**OWL**	**OL**
Wet Miombo woodland	100%		
Dry Miombo and Munga Woodland (1)	67%	33%	
Seasonal Miombo Woodland (2)	80%	20%	
Dry Evergreen Forest	100%		
Degraded Miombo woodlands (3)	60%	10%	30%
Mopane Woodland (4)	100%		
Scrub woodland (5)			100%
Swamp and lake vegetation (6)	1%		99%
Kalahari Woodland	100%		
Others			100%

Notes:

1. The woodland has a relatively open canopy of widely spaced deciduous trees. A dense woody under-storey reaching 4.5 m is found. Bushes are deciduous or semi deciduous. In some Munga Woodlands, there are woody thickets. The more aggressive Munga Woodland increases the woody component of alluvial grassland but in other cases replaces more closed woodland with wooded grassland. 67% was allocated to forests and 33% to bushes and thickets.
2. The woodland is similar in structure to the Wet Miombo Woodland but the canopy is more open and there is far greater proportion of deciduous trees. The shrub and grass layers may be better developed and are floristically different. Extensive areas of "hill Miombo"occur in this biomass class and are found in hills. This was assumed to be open forest (80%) and 20% shrubs.
3. Vegetation found are Itigi forests, Lake Basin Chipya Woodland, grassland and Terminitary vegetation associated with highland areas. In the Northern province, there is mainly pure stands grassland with no tree cover. Itigi forest and Lake Basin Chipya woodlands were allocated 60% forests, Terminitary species were allocated 10% OWL and the Northern Province grassland with no tree cover was allocated 30% other land.
4. Mopane woodland allocated 100% as in the Zimbabwean classification
5. It is equivalent to Chanas da borracha grassland in Angola. The biomass class represent grassland and to a lesser extent scrubby thickets=100% other land.
6. In many areas Swamp and lakeside, vegetation is grassland with few or no woody plants. It is estimated that only 380 00 ha (out of 4614000 swamp and lake side vegetation) of swamp forest exist in Zambia. 1% was allocated to forests and 99% other land.

1.3.1 Calibration

No calibration for 1969 data was necessary

1.4 Reclassification into FRA 2005 classes

Results after reclassifying 1969 data

National Classes	Area in hectares		
	Forest	**OWL**	**OL**
Wet Miombo woodland	22 394 200		
Dry Miombo and Munga Woodland	3 556 695	1 751 805	
Seasonal Miombo Woodland	10 057 200	2 514 300	
Dry Evergreen Forest	979 800		
Degraded Miombo woodlands	6 609 660	1 101 610	3 304 830
Mopane Woodland	6 900 000		
Scrub woodland			980 000
Swamp and lake vegetation	46 140		4 567 860
Kalahari Woodland	7 921 200		
Others			1 653 700
Total	**58 464 895**	**5 367 715**	**10 506 390**

DEFINITIONS FOR 1974 DATA

National class	Definition
1. Parinari Forest	Canopy dominants restricted to *Parinari excelsa* & *Syzygium quineense* spp. *afromontanum* with the old emergent *Entandrophragma delevoyi*. *Marquesia macroura* and *Erythrophleum suaveolens* are occasional canopy associates.
2. Marquesia Forest	Canopy dominants restricted to *Anisophyllea pomifera* locally and *Syzygium guineense spp. Afromontanum*.
3. Lake Basin Chipya	Three-storeyed woodland with an open evergreen to deciduous canopy 21 to 27 metres high characterised by *Albizia antunesiana, Burkea africana, Combretum collinum, Erythrophleum africanum, Parinari curatellifolia, Pericopsis angolensis Pterocarpus angolensis,* and *Terminalia sericea.* Bracken, *Aframomum* and *Smilax* are characteristic of the forest floor.
4. Cryptosepalum Forest	Canopy dominants are restricted to *Cryptosepalum exfoliatum spp. Pseudotaxus* and *Guibourtia coleosperma* in the lower rainfall areas of Zambezi, Kabompo and Kaoma Districts but associated with *Marquesia acuminata, M. macroura, Parinari excelsa,* and *Syzygium guineense spp afromontanum* in the higher rainfall of Mwinilunga.
5. Kalahari Sand Chip a	Canopy species are *Burkea africana, Combretum collinum, Dialium engleranum, Erythrophleum africanum, Guibourtia coleosperma, Peltophorum africanum, Pterocarpus angolensis, Terminalia sericea,* and there is a dense growth of *Aframomum* and Bracken on the forest floor.
6. Baikiaea Forest	Two-storeyed forest with an open or closed, usually deciduous canopy 9 to 18 metres high composed of *Baikiaea plurijuga and Pterocarpus antunesii* in varying proportions. Invasive *Acacia giraffae and Combretum collinum* are widespread. *Entandrophragma caudatum* is a local emergent. Below the canopy is a well-defined deciduous thicket composed of shrubs and scramblers 3 to 6 metres high.
7. Itigi Forest	Two-storeyed forest with a very open overwood of deciduous or semi-deciduous emergent 6 to 12 metres high characterised by *Baphia massaiensis spp. Floribunda, Boscia angustifolia, Burttia prunoides, Bussea massaiensis, Diospyros mweroensis* and the succulent cactus-like *Euphorbia candelabrum.* Trees are often encrusted with lichens.
8. Montane Forest	Tree-storeyed forest with a closed evergreen canopy about 27 metres high without any clear-cut dominants but with *Aningeria spp., Cola greenwayi, Myrica salicifolia, Nuxia spp., Olinia usambarensis, Parinari excelsa, Podocarpus milanjianus, Rapanea melanophloea* and *Trichilia prieuriana* as the most abundant species. Ground between forest patches covered by fire derived upland grasslands dotted with gnarled *Protea madiensis* shrubs.
9. Swamp Forest	Three-storeyed forest with a closed evergreen canopy about 27 metres high characterised by *Ilex mitis, Mitragyna stipulosa, Syzygium cordatum, S. owariense*, *Xylopia aethiopica, and X. rubescens.* (Delta swamp, Seepage swamp or Seasonal Swamp).
10. Riparian Forest	Three-storeyed forest with a closed, evergreen canopy 21 metre high characterised by *Diospyros mespiliformis, Khaya nyasica, Parinari excelsa, Syzygium cordatum,* associated with *Madina microcephala, Bridelia micrantha,* and *Cleistanthus milleri. Faurea saligna, Homalium africanum, Ilex mitis, Manilkara obovata, Raphia palms.* The composition varies from a northern evergreen element and a southern deciduous element. Most riparian forests are secondary.
11. Miombo Woodland	Two-storeyed woodland with an open or partially closed canopy of semi-evergreen trees 15 to 21 metres high characterised by species of *Brachystegia, Isoberlinia, Julbernardia,* and *Marquesia macroura* with *Erythrophleum africanum, Parinari curatellifolia* and *Pericopsis angolensis* as frequent associates. The forest floor is covered by a more or less dense grass cover.
12. Hill Woodland	Similar to Miombo above but where there is more rock than soil on hills the *Brachystegias* and their allies almost die out except for *B. microphylla* in the north and *B. glaucescens* in the south and their place is taken by characteristic hill shrubs such as *Aeschynomene rubrofrarinacea* and *A. semilunaris, Euphorbia ussanguensis* and *E. griseola, Myrothamnus flabellifolius, Pentas nobilis, Vellozia equisetoides* and *V. tomentosa* and *Vernonia bellinghamii.*
13. Kalahari Woodland	Derived from destruction of Baikiaea forest, is a two-storeyed woodland with an open or partially closed, deciduous or semi deciduous overwood 18 to 24 metres high characterised by *Amblygonocarpus andongensis, Burkea africana, Combretum collinum, Cryptosepalum exfoliatum ssp. Pseudotaxus, Dialium engleranum, Erythrophleum africanum, Guibourtia coleosperma, Parinari*

	curatellifolia, and *Terminalia sericea.*
14. Mopane Woodland	One-storeyed woodland with an open deciduous canopy 6 to 18 metres high. The dominant *Colophospermum mopane* is pure or almost pure. Scattered elements of Munga woodland occur here and there represented chiefly by *Acacia nigrescens, Adansonia digitata, Combretum imberbe, Kirkia acuminata, and Lannea stuhlmannii.* The *python vine Fockea multiflora* is usually present.
15. Munga Woodland	Coined term for Savanna woodland is an open park-like 1 to 2 storeyed deciduous woodland with scattered or grouped emergents to 18 metres high characterised particularly by *Acacia, Combretum, and Terminalia species.* Occasionally it has a deciduous or semi-deciduous thicket under storey. It is varied into upper valley, lower valley and Kalahari sites.
16. Termitary Vegetation & Bush Groups	All types of vegetation, i.e. forest, woodland, thicket, scrub, and grassland that can be found on or at the bases of termitaria. They have been classified by habitat rather than by vegetation type, because to some extent one limits the other.
17. Treeless Grassland	All areas dominated by grass with very few scattered or no trees
18. Inland Water	All streams, river, s swamps, dams and lakes

Original Data for 1974

National Classes	**Area in 1000 ha**
1. *Parinari*	42
2. *Marquesia*	43
3. Lake basins (*Chipya*)	1 625
4. *Cryptosepalum*	1 764
5. Kalahari Chipya	142
6. *Baikiae*	843
7. *Itigi*	155
8. *Montane*	4
9. *Swamp*	153
10. *Riparian*	92
11. Miombo	35 286
12. Hill Woodland	366
13. Kalahari	9 761
14. Mopane	4 428
15. Munga	3 727
16. Termitaria vegetation and groups	2 773
17. Treeless grasslands	13 016
Total country area	**74 220**

Calibration

National land area in 1000 ha	74 220
FAO stats in 1000 ha	74 339
Calibrating factor	1.001603341

National Classes	Calibrated area in 1000 ha
1. *Parinari*	42 067
2. *Marquesia*	43 069
3. Lake basins (*Chipya*)	1 627 605
4. *Cryptosepalum*	1 766 828
5. Kalahari Chipya	142 228
6. *Baikiae*	844 352
7. *Itigi*	155 249
8. *Montane*	4 006
9. *Swamp*	153 245
10. *Riparian*	92 148
11. *Miombo*	35 342 576
12. Hill Woodland	366 587
13. *Kalahari*	9 776 650
14. *Mopane*	4 435 100
15. *Munga*	3 732 976
16. *Termitaria vegetation and bush groups*	2 777 446
17. *Treeless grasslands*	13 036 869
Total	74 339 000

Reclassifying 1974 data

		OWL	OL
1. *Parinari*	100%		
2. *Marquesia*	100%		
3. Lake basins (*Chipya*)	100%		
4. *Cryptosepalum*	100%		
5. Kalahari Chipya	100%		
6. *Baikiae*	100%		
7. *Itigi*	100%		
8. *Montane*	100%		
9. *Swamp*	100%		
10. *Riparian*	100%		
11. *Miombo*	100%		
12. Hill Woodland (1)	88%	12%	
13. *Kalahari*	100%		
14. *Mopane*	100%		
15. *Munga (2)*	40%	60%	
16. *Termitaria vegetation and bush groups*		100%	
17. *Treeless grasslands*			100%

Notes:
1. Classification as in FRA 2000. 88% Forest and 12% OWL where forest are taken by shrubs.
2. An open park like 1 to 2 storeyed deciduous woodland with scattered or grouped emergent with scattered or group emergent to 18m high characterised particularly by Acacia, Combretum and Terminalia species was allocated 40% Forests and 60% OWL.

Results after reclassifying 1974 data

National Classes	Area in hectares		
	Forests	**OWL**	**OL**
1. *Parinari*	42 067		
2. *Marquesia*	43 069		
3. Lake basins (*Chipya*)	1 627 605		
4. *Cryptosepalum*	1 766 828		
5. Kalahari Chipya	142 228		
6. *Baikiae*	844 352		
7. *Itigi*	155 249		
8. *Montane*	4 006		
9. *Swamp*	153 245		
10. *Riparian*	92 148		
11. *Miombo*	35 342 576		
12. Hill Woodland	322 596	43 990	
13. Kalahari	9 776 650		
14. Mopane	4 435 100		
15. *Munga (1)*	1 493 190	2 239 785	
16. Termitaria vegetation and bush groups		2 777 446	
17. *Treeless grasslands*			13 036 869
Total land area	**56 240 909**	**5 061 222**	**13 036 869**

Summary of 1969 and 1974 data

FRA 2005 Categories	Area in hectares	
	1969	**1974**
Forests	58 464 895	56 240 909
OWL	5 367 715	5 061 222
OL	10 506 390	13 036 869
	74 339 000	74 339 000

1.4.1 Estimation and forecasting

FRA 2005	Area in hectares		
	1990	**2000**	**2005**
Forests	49 124 154	44 676 182	42 452 196
OWL	4 080 444	3 467 458	3 160 965
OL	21 134 402	26 195 360	28 725 839
Inland water	922 000	922 000	922 000
Total country area	75 261 000	75 261 000	75 261 000

1.5 Data for National reporting table T1

FRA 2005 Categories	Area (1000 hectares)		
	1990	**2000**	**2005**
Forest	49 124	44 676	42 452
Other wooded land	4 081	3 468	3 161
Other land	21 134	26 195	28 726
...of which with tree cover [1)]			
Inland water bodies	922	922	922
TOTAL	75 261	75 261	75 261

1.6 Comments to National reporting table T1

Zambia lacks up to date forest resources inventories as a result, different estimates of forest cover have been quoted in a number of publications. The last national inventory was done in late 1969s, followed by the Southern African biomass study by Millington *et al.* the 1989 and the wood consumption and resource survey by de Backer and Chakanga published in 1986. Both sources used the 1969 inventory and the 1974 update to estimate the change in forest cover over time. Other figures on forest cover are estimates and assumptions based on what has changed over the last 40 years. These estimates, particularly of the land cover are not very reliable. The 1978-weighted average forest cover estimated for FRA 2000 was 53.48 million ha. Using the figure in table 1.5 and extrapolating back in time, the estimate for 1978 would be 54.46 million ha.

The annual deforestation rate, based on table 1.5, is 444 800 ha. This differs from the deforestation rate reported for FRA 2000 (850 823 ha) but is close to the deforestation rate calculated using the 1978 area weighted average of 53.48 million ha and the outlook study for 1997 of 44.6 million ha, which would result in an average annual deforestation rate of 467 368 ha.

Note that the estimated deforestation rate in FRA 2000 was based on the extrapolated figures of an update information undertaken in 1974 and the weighted average of an inventory report of three provinces in 1993.

A National Forest Assessment is currently being undertaken in Zambia with the support of FAO.

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

Data from T1 will be used.

2.2.2 Original data

All Land in Zambia is vested in the President of the Republic of Zambia and is owned by the State. All Forest Reserves and National Parks are under the Jurisdiction of the State. Therefore they have been classified as Public owned. All other wooded areas have been classified as customary areas.

2.3 Data for National reporting table T2

FRA 2005 Categories	Area (1000 hectares)			
	Forest		Other wooded land	
	1990	2000	1990	2000
Private ownership				
Public ownership	49 124	44 676		
Other ownership (1)			4 081	3 468
TOTAL	**49 124**	**44 676**	**4 081**	**3 468**

Notes:
1) Customary ownership

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 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
1.Mulombwa J., Woodfuel review and assessment in Zambia. FA partnership Programme (1998-2002) Project GCP/INT/679/EC	M	Percentages of production and protection areas	1997	
2.Chilese A., 2001 FOSA Country Report – Zambia: Forests Outlook Studies Ministry of Natural Resources and Tourism Zambia	M	Protected areas	1992	

3.2.2 Original data

There was no second data set available for this table. Percentages will be used to estimate the area under production and protection for 1990, 2000 and 2005.

Forests reserves are designated as follows:

Forest Reserves	% allocation
Production	44%
Protection of soil and water	26%
Multipurpose	30%
Total	100%

Source 1

Year 1992

National Classes	Area in Million ha	Percentages
Forest Reserves (1)	7.21	16%
National Parks	6.35	14%
Game Management Areas	15.64	35%
Customary / Traditional Land	15.35	34%
Total	44.55	100%

Source: 2

Notes:

1. Includes plantations

3.2.3 Analysis and processing of national data

3.2.4 Estimation and forecasting

Applying the above percentages to total forest area obtained from T1

National Classes	Area in hectares		
	1990	2000	2005
Forest Reserves (1)	7 950 284	7 473 635	6 870 490
National Parks	6 350 000	6 350 000	6 350 000
Game Management Areas	15 640 000	15 640 000	15 640 000
Customary / Traditional Land (2)	19 183 870	15 212 547	13 591 706
Total	**49 124 154**	**44 676 182**	**42 452 196**

Notes

1. Encroachment into the forest reserves has occurred, but no statistical figures on the extent of the encroachment are available

3.3 Reclassification into FRA 2005 classes

Forest	Production	Protection of Soil and water (3)	Conservation of biodiversity	Social	multipurpose
Forest Reserves (1)	44%	26%			30%
National Parks (2)			100%		
Game Management Areas (3)					100%
Customary / Traditional Land (4)					100%

Notes:
1. Forest Reserves mainly function as protection and production forests. Percentages from source 1.
2. National Parks are the only forests set aside for the primary function of biological diversity conservation..
3.Forests that were originally set-aside, as Protection Forests "Protected Forest Areas or PFAs" are no longer functioning as such Timber licences have been issued in the same areas.
4. Open Forests, which are controlled by the Traditional authorities, are multifunctional in status.

Results after reclassification of 2005 data

National Classes	**Production**	**Protection of soil and water**	**Conservation**	Multipurpose
Forest Reserves	3 288 399	1 943 145	0	2 242 091
National Parks			6 350 000	
Game Management Areas	0		0	15 640 000
Customary / Traditional Land				15 212 547
Total	**3 288 399**	**1 943 145**	**6 350 000**	**33 094 638**

	Area in hectares		
National Classes	**1990**	**2000**	**2005**
Production	3 498 125	3 288 399	3 023 016
Protection of soil and water	2 067 074	1 943 145	1 786 327
Conservation of biodiversity	6 350 000	6 350 000	6 350 000
Social			
Multipurpose	37 208 955	33 094 638	31 292 853
Total Forest Area	**49 124 154**	**44 676 182**	**42 452 196**

Notes: All OWL are for multi purpose

3.4 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						
Production	3 498	3 289	3 023			
Protection of soil and water	2 067	1 943	1 786			
Conservation of biodiversity	6 350	6 350	6 350	10 260	10 260	10 260
Social services						
Multiple purpose	37 209	33 094	31 293	not appl.	not appl.	not appl.
No or unknown function	**49 124**	**44 676**	**42 452**	not appl.	not appl.	not appl.
Total - Forest				**not appl.**	**not appl.**	**not appl.**
Other wooded land						
Production						
Protection of soil and water						
Conservation of biodiversity						
Social services						
Multiple purpose	4 081	3 468	3 161	not appl.	not appl.	not appl.
No or unknown function				not appl.	not appl.	not appl.
Total – Other wooded land	**4 081**	**3 468**	**3 161**	**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

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
MENR 1998(a). Zambia Forestry Action Plan. Ministry of Environment and Natural Resources	M	Plantation area	1992	
MENR 1998(b): Country report submitted to the 11th session of Africa Wildlife Commission	M	Program of new plantation establishment	2000	

4.2.2 Original data

Plantation area in 1992: 60,000 ha (Source 1)

Annual planting rate: 1 900 ha (Source 2)

4.2.3 Analysis and processing of national data

4.3 Estimation and forecasting

The plantation area in 1990 is assumed to be the same as in 1992 (60,000 ha).

The MENR (1998a) presents a program of new plantations with a target figure. From this the annual planting rate is assumed be 1 900 ha. Applying this to the 1992 area, the total area of plantations as of 2000 is estimated to be 75 200 ha.

It is assumed there has been no further afforestation since 2000. The assumption is based on the FOSA report that the size of the plantations has been declining every year, as there are no deliberate replanting programmes. Due to lack of other information, the area of plantations for 2005 has thus been assumed to be the same as in 2000.

4.4 Reclassification into FRA 2005 classes

All plantations have been reclassified as productive plantations.

All natural forests have been reclassified as modified natural forests.

FRA 2005 Categories	Area in hectares		
	1990	**2000**	**2005**
Primary			
Modified	49 064 154	44 600 982	42 376 996
Productive plantation	60 000	75 200	75 200
Protective plantation			
Total	**49 124 154**	**44 676 182**	**42 452 196**

4.5 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	49 064	44 601	42 377	4 081	3 468	3 161
Semi-natural						
Productive plantation	60	75	75			
Protective plantation						
TOTAL	49 124	44 676	42 452	4 081	3 468	3 161

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
Millington, A., and Towsend, J. (eds.) 1989. Biomass assessment. Woody biomass in the SADC region. Earth scan Publication Ltd. London. UK	M	Biomass	1969	

5.2.2 Original data

As no growing stock data are available. Table 6 will be used as an input.

5.3 Analysis and processing of national data

Table T6 presents the following values on aboveground biomass

	Forest	OWL
Above-ground biomass (tons/ha)	42.88	19.29

Growing stock has been estimated from the aboveground biomass figures in T6 by using the following formula and applying default conversion factors.

GS = AGB / BEF / WD
GS = Growing stock (m3/ha)
AGB = Above-ground biomass (tons/ha)
BEF = Biomass expansion factor = 2.4
WD = Wood density = 0.58

	Forest	OWL
Growing stock (m3/ha)	30.81	13.86

The growing stock per hectare is then applied to total area for estimating growing stock and to production area for estimating commercial growing stock.

The result of the calculations are presented in the table below which will be used as input to the final reporting table:

Category	Forest			Other wooded land		
	1990	**2000**	**2005**	**1990**	**2000**	**2005**
Total area (from table T1)	49 124 154	44 676 182	42 452 196	4 080 444	3 467 458	3 160 965
Production area (from table T3)	3 498 125	3 288 399	3 023 016	0	0	0
Growing stock (million m3)	1513.4	1376.4	1307.9	56.6	48.1	43.8
Commercial growing stock (mill m3)	107.8	101.3	93.1			

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	1 513.4	1 376.4	1 307.9	56.6	48.1	43.8
Commercial growing stock	107.8	101.3	93.1			

Specification of country threshold values	Unit	Value	Complementary information
1. Minimum diameter at breast height of trees included in Growing stock (X)	cm		
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 either in the litter, 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

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Millington, A. & Townsend, T. 1989. Biomass assessment: Woody biomass in the SADCC Region. London, Earth scan Publications	H	Biomass	1969	

6.2.2 Original data

Year 1969

National Class	Area (ha)	Mill. tons
Wet Miombo woodland	22 394 200	1 594.6
Dry Miombo and Munga Woodland	5 308 500	50.1
Seasonal Miombo Woodland	12 571 500	249.5
Dry Evergreen Forest	979 800	69.8
Degraded Miombo woodlands	11 016 100	369.6
Mopane Woodland	6 900 000	255.1
Scrub woodland	980 000	22.9
Swamp and lake vegetation	4 614 000	0.0
Kalahari Woodland	7 921 200	133.0
Others	1 653 700	0.0
Total land area	**74 339 000**	**2 744.6**

Although not specified in the data source, it is assumed that the biomass figures refer to above-ground biomass.

6.3 Reclassification into FRA 2005 classes

National Class	Forests	OWL	OL
Wet Miombo woodland	100%		
Dry Miombo and Munga Woodland	67%	33%	
Seasonal Miombo Woodland	80%	20%	
Dry Evergreen Forest	100%		
Degraded Miombo woodlands	60%	10%	30%
Mopane Woodland	100%		
Scrub woodland			100%
Swamp and lake vegetation	1%		99%
Kalahari Woodland	100%		
Others			100%
Total land area			

Biomass data after reclassification

	Above-ground biomass	
	million tons	
National Class	**Forest**	**OWL**
Wet Miombo woodland	1 594.6	0
Dry Miombo and Munga Woodland	33.4	16.7
Seasonal Miombo Woodland	199.6	49.9
Dry Evergreen Forest	69.8	0
Degraded Miombo woodlands	221.76	36.96
Mopane Woodland	255.1	0
Scrub woodland	0	0
Swamp and lake vegetation	0	0
Kalahari Woodland	133	0
Others	0	0
Total land area	2 507.26	103.56

6.4 Analysis and processing of national data

	Forest	OWL
Total above-ground biomass (million tons)	2507.26	103.56
Area from table T1 (hectares)	58 464 895	5 367 715
Above ground biomass (tons/ha)	42.88	19.29

Assuming the tons/ha did not change since 1969, the biomass figures in tons/ha were applied to areas for 1990, 2000 and 2005.

Category	Forest			Other wooded land		
	1990	**2000**	**2005**	**1990**	**2000**	**2005**
Area (hectares) from T1	49 124 154	44 676 182	42 452 196	4 080 444	3 467 458	3 160 965
Above-ground biomass (million tons)	2 106.7	1 915.9	1 820.6	78.7	66.9	61.0

Applying the conversion factors below, the estimates of below-ground biomass and dead wood biomass were obtained.

Root/shoot ratio	0.27	(tropical/subtropical dry forest)
Dead/live ratio	0.14	(deciduous forest)

6.5 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	2 106.7	1 915.9	1 820.6	78.7	66.9	61.0
Below-ground biomass	568.8	517.3	491.6	21.3	18.1	16.5
Dead wood biomass	374.6	340.7	323.7	14.0	11.9	10.8
TOTAL	**3 050.1**	**2773.9**	**2635.8**	**114.0**	**96.9**	**88.3**

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 Analysis and processing of national data

Data from reporting table T6 were used as input to this table. A carbon content of 50% was used.

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	1 053.3	958.0	910.3	39.4	33.4	30.5
Carbon in below-ground biomass	284.4	258.7	245.8	10.6	9.0	8.2
Sub-total: Carbon in living biomass	**1 337.7**	**1 216.6**	**1 156.1**	**50.0**	**42.5**	**38.7**
Carbon in dead wood	187.3	170.3	161.8	7.0	5.9	5.4
Carbon in litter						
Sub-total: Carbon in dead wood and litter						
Soil carbon to a depth of _____ cm						
TOTAL CARBON	**1 525.0**	**1 386.9**	**1 317.9**	**57.0**	**48.4**	**44.1**

8 Table T8 – Disturbances affecting health and vitality

No data is available for this reporting table.

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.Sekeli P.M., Phiri M., 2002. **The** SADC Regional Workshop on Forest and Tree Genetic Resources 5-9 June 2000, Arusha, Tanzania		Number of species	1971	No latest inventory
2.UNEP-WCMC Conservation Data. http://www.unep-wcmc.org.		Threatened and vulnerable species		

9.2.2 Original data

Vegetation types	Number of tree species (1)					
	Canopy species	**Under-storey species**	**Shrubs**	**Thickets**	**Climbers**	**Total**
Dry evergreen forest	12	19	56	-	22	109
Lake basin (Chipya)	40	38	114	-	8	200
Baikiaea forest	21	-	20	43	8	92
Itigi Forest	28	-	51	-	13	92
Montane forest	38	35	41	-	23	137
Swamp forest	23	13	31	-	12	79
Riparian forest	46	35	63	-	30	174
Miombo woodland	23	34	83	-	3	143
Kalahari woodland	20	23	102	-	9	154
Mopane woodland	16	26	38	-	8	88
Munga woodland	51	46	110	-	23	230
Termitaria	47	31	89	-	41	208
Total inventoried species						**1706**
Total number of species (2)						**2 621**
Threatened species (3)						11
Vulnerable (3)						14

Notes:
1. Source 1
2. Source 1
3. Source 2

9.3 Data for National reporting table T9

FRA 2005 Categories	Number of species (year 2000)
Native tree species	665
Critically endangered tree species	
Endangered tree species	11
Vulnerable tree species	14

9.4 Comments to National reporting table T9

List of endangered and vulnerable tree species is not available.

10 Table T10 – Growing stock composition

No data is available for this reporting table.

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

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
FAO Forestry Statistics Series 171; FAO 2001		Industrial wood Fuelwood	1993-2002	

11.2.2 Original data

Year	Volume under bark in cubic meters	
	Industrial Roundwood	Wood Fuel
1988	546 000	5 775 000
1989	576 000	6 192 000
1990	676 000	6 398 000
1991	733 000	6 604 000
1992	792 000	6 809 000
1998	823 000	7 219 000
1999	834 000	7 219 000
2000	834 000	7 219 000
2001	834 000	7 219 000
2002	834 000	7 219 000

11.3 Analysis and processing of national data

Multiplying the above table by 1.15 to covert to volume over bark and taking five-year averages gives:

	Volume over bark in cubic meters	
Year	**Industrial Roundwood**	**Fuelwood**
1988	627 900	6 641 250
1989	662 400	7 120 800
1990	777 400	7 357 700
1991	842 950	7 594 600
1992	910 800	7 830 350
5-year average (1990)	**764 290**	**7 308 940**
1998	946 450	8 301 850
1999	959 100	8 301 850
2000	959 100	8 301 850
2001	959 100	8 301 850
2002	959 100	8 301 850
5-year average (2000)	**956 570**	**8 301 850**

11.3.1 Estimation and forecasting

	Volume over bark in cubic meters		
	1990	**2000**	**2005**
Industrial Roundwood	764 290	956 570	1 052 710
Wood Fuel	7 308 940	8 301 850	8 798 305
Total	**8 073 230**	**9 258 420**	**9 851 015**

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	764	957	1 053			
Woodfuel	7 309	8 302	8 798			
TOTAL for Country	**8 073**	**9 258**	**9 851**			

12 Table T12 – Value of wood removal

No data is available for this reporting table.

13 Table T13 – Non-wood forest product removal

13.1 FRA 2005 Categories and definitions

The following categories of non-wood forest products have been defined:

Category
Plant products / raw material
1. Food
2. Fodder
3. Raw material for medicine and aromatic products
4. Raw material for colorants and dyes
5. Raw material for utensils, handicrafts & construction
6. Ornamental plants
7. Exudates
8. Other plant products
Animal products / raw material
9. Living animals
10. Hides, skins and trophies
11. Wild honey and bee-wax
12. Bush meat
13. Raw material for medicine
14. Raw material for colorants
15. Other edible animal products
16. Other non-edible animal products

13.2 National data

13.2.1 Data sources

References to sources of information	**Quality (H/M/L)**	**Variable(s)**	**Year(s)**	**Additional comments**
Mulombwa J., Non-wood Forest Products in Zambia. EC – FAO Partnership Program (1998-2001)	H	Honey and Bee wax	1987-1992	

13.2.2 Original data

	Honey production		**Bee Wax**	
	Quantity kg	**Value $US**	**Quantity kg**	**Value $US**
1987	165 757		17 292	
1988	180 782	180 780	14 765	38 393
1989	95 000	95 000	19 894	51 730
1990	205 305	203 300	56 395	146 630
1991	95 714	10 014	24 633	64 050
1992	90 000	171 850	28 000	74 140

13.3 Analysis and processing of national data

13.3.1 Estimation and forecasting

Three-year averages and extrapolating for 2000 and 2005

Category	1988-1992 kg
Honey	666 801
Bee wax	143 687
Total	810 488
5 –year Average (Honey and bees)	162 098

13.4 Reclassification into FRA 2005 classes

13.5 Data for National reporting table T13

FRA 2005 Categories	Scale factor	Unit	NWFP removal		
			1990	2000	2005
Plant products / raw material					
1. Food					
2. Fodder					
3. Raw material for medicine and aromatic products					
4. Raw material for colorants and dyes					
5. Raw material for utensils, handicrafts & construction					
6. Ornamental plants					
7. Exudates					
8. Other plant products					
Animal products / raw material					
9. Living animals					
10. Hides, skins and trophies					
11. Wild honey and bee-wax		tons	162	n/a	n/a
12. Bush meat					
13. Raw material for medicine					
14. Raw material for colorants					
15. Other edible animal products					
16. Other non-edible animal products					

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

14.1 FRA 2005 Categories and definitions

The following categories of non-wood forest products have been defined:

Category
Plant products / raw material
1. Food
2. Fodder
3. Raw material for medicine and aromatic products
4. Raw material for colorants and dyes
5. Raw material for utensils, handicrafts & construction
6. Ornamental plants
7. Exudates
8. Other plant products
Animal products / raw material
9. Living animals
10. Hides, skins and trophies
11. Wild honey and bee-wax
12. Bush meat
13. Raw material for medicine
14. Raw material for colorants
15. Other edible animal products
16. Other non-edible animal products

14.2 National data

14.2.1 Data sources

Same as in T 13

14.2.2 Original data

From T13:

	Value in $US						
Category	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**5 year average**
Honey		180 780	95 000	203 300	10 014	171 850	132 189
Bee Wax		38 393	51 730	146 630	64 050	74140	74 989
Total		219 173	146 30	349 930	74 064	245 990	207 177

14.3 Data for National reporting table T14

FRA 2005 Categories	Value of the of NWFP removed (1000 USD)		
	1990	2000	2005
Plant products / raw material 1. Food			
2. Fodder			
3. Raw material for medicine and aromatic products			
4. Raw material for colorants and dyes			
5. Raw material for utensils, handicrafts & construction			
6. Ornamental plants			
7. Exudates			
8. Other plant products			
Animal products / raw material 9. Living animals			
10. Hides, skins and trophies			
11. Wild honey and bee-wax	207	n/a	n/a
12. Bush meat			
13. Raw material for medicine			
14. Raw material for colorants			
15. Other edible animal products			
16. Other non-edible animal products			
TOTAL			

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.

15.2 National data

15.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Trends and current status of the contribution of the forest sector to national economies"(FAO, 2003)	L	Employment in primary production of goods	1990 and 2000	No country information was available

15.2.2 Classification and definitions

15.3 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

15.4 Comments to National reporting table T15

No country information was available, however "trends and current status of the contribution of the forest sector to national economies"(FAO, 2003 estimate that 1 864 persons and 2 036 persons were employed in th forestry, logging and related services in 1990 and 2000 respectively.