



Forestry Department

Food and Agriculture Organization of the United Nations

**GLOBAL FOREST RESOURCES
ASSESSMENT**

COUNTRY REPORTS

ZIMBABWE

FRA2005/037
Rome, 2005



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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The Global Forest Resources Assessment 2005 Country Report Series is designed to document and make available the information forming the basis for the FRA 2005 reports. The Country Reports have been compiled by officially nominated country correspondents in collaboration with FAO staff. Prior to finalisation, these reports were subject to validation by forestry authorities in the respective countries.

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1 Table T1 – Extent of Forest and Other wooded land

1.1 FRA 2005 Categories and definitions

Category	Definition
Forest	Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds <i>in situ</i> . 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 <i>in situ</i> ; 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	Source Number
Millington, A., and Townsend, J. (eds.) 1989. Biomass assessment. Woody biomass in the SADC region. Earthscan Publication Ltd. London. UK	H	Definition and Land use cover	1985		1
Kwasha, D. & Dreiser, D. 1997, Vegetation mapping in Zimbabwe – VEGRIS		Land use types	1992		2

1.2.2 Classification and definitions

The classification system for 1985 data (Millington and Townsend (1989)) is different from the classification system used for the visual interpretation and mapping of land cover from Landsat 5 satellite imagery for the 1992 data by **Kwasha, D. & Dreiser, D. 1997**. Different data sets will therefore be presented, analysed and reclassified for each classification system.

Classification and definitions for the 1985 data obtained from Millington and Townsend (source 1)

Zimbabwe is divided into nine biomass classes. This division is based on the interpretation of NOAA-7 AVHRRGAC data and reference to previous botanical and forestry studies (Government of Zimbabwe, 1985)

Dense Savannah Woodlands	This type of woodlands is found in moist, undisturbed conditions on well-drained soils, generally above 1 350 masl, but at slightly lower altitudes in the south. The canopy, which is dominated by <i>Brachystegia spiciformis</i> and <i>Julbernardia</i> , varies between 6 and 13m in height. Tree canopy cover is high, generally over 80% but the shrub and grass cover is poorly developed and open, usually below 50%. The woodlands exhibit less disturbance than the surroundings woodland and there are few, if any, of the grass and savannah areas that are found in the other types of savannah woodland in Zimbabwe.
Open Savannah and Baikiaea Woodland	Montane vegetation is also included in this class and is mainly found in mountainous areas along the Mozambique border, in Manicaland Province. The canopy is 6-13 m tall and is dominated by <i>Brachystegia spiciformis</i> and <i>Julbernardia globiflora</i> . The tree canopy varies between 50-80%, shrub cover is open and is usually below 50% and grass cover ranges from 50-80%.
Seasonal Savannah Woodlands	This form of Savanna Woodland is intermediate between the open and dry phases. It occurs mainly at the edges of Open Savannah or Montane Woodland and is representative of slightly drier conditions. This is similar to the Open Savannah Woodlands and significantly higher than the Dry Savanna Woodlands. Structurally, the woodland is intermediate between the other types of Savannah Woodland. In less degraded and in moister areas the canopy trees reach 8-10m, but due to the seasonality, are more open than Open Savanna Woodlands. The canopy cover varies between about 50 and 80%, and the shrub and grass cover is relatively well developed. Shrubs and smaller trees such as <i>Diospyros kirkii</i> , <i>Faurea saligna</i> , <i>Protea gaguedi</i> , <i>Pseudolachnostylis maprouneifolia</i> and <i>Psorospermum febrifugum</i> dominate the under-storey.
Dry Savannah Woodlands	Dry savannah occurs mainly at altitudes of between 1000 and 1300 masl, on the Highveld. Scattered amongst the canopy are smaller trees mainly <i>Diospyros kirkii</i> , <i>Faurea saligna</i> , <i>Protea gaguedi</i> , <i>pseudodolachnostylis maprouneifolia</i> and <i>psorospermum febrifugum</i> . The underlying shrub and grass layers are poorly developed. Below 1000m, the <i>Brachystegia</i> woodland gives way to a lower canopy woodland (7-13m) which is dominated by <i>Julbernardia globiflora</i> . Although the canopy of Dry Savanna Woodland often reaches between 10-13m, it can be restricted to as little as 3m as it becomes drier and more disturbed. If this happens, it takes the form of an open shrubby savannah. In such situations, the canopy is much disrupted, many shrubs invade and a grass layer develops of 0.6 to 1.2m in height. In these cases, the main dominant tree is <i>B. boehmii</i> but other small trees and shrubs invade such as <i>B. spiciformis</i> , <i>C. Mopane</i> , <i>J. globiflora</i> , <i>Kirkia acuminata</i> and <i>Sclerocarya caffra</i> .
Mopane Woodland and Escarpment Thicket	Mopane woodlands and Escarpment Thickets are phenologically distinct. The main difference lies in the way in which vegetation die-back commences and the rate at which it proceeds. In Mopane Woodlands die-back starts much earlier and is more steady than in dry Savannah woodlands whereas in Escarpment Thickets, it begins later than in the other thicket vegetation types. The canopy of Mopane Woodland is more open than that of the other Highveld woodlands. In fact, it is open enough to allow large-scale shrub invasion. In the north the canopy can attain heights of between 20-25m, more commonly however, it varies between 10 and 15m. Escarpment thickets occurs along the entire length of the Zambezi Escarpment in northern Zimbabwe. Its vegetation rarely reaches more than 10m and forms a dense mixtures of tree and shrub species
Dry Bushy Savanna	Dry Bushy Savanna is a very important biomass class in Southern Zimbabwe. Variation in the vegetation communities reflects both changes in soil texture and fertility, as well as disturbances. The latter can be quiet extensive, as many of these soils are quite fertile and therefore suitable for grazing or cultivation. The ecological communities range from open grassland with scattered shrubs and emergent trees, to almost continuous low scrubland. The open, grassy savannah has a low woody biomass component. This is mainly restricted to scattered

	emergent trees such as <i>Acacia</i> spp., <i>Dichrostachys cinera</i> and <i>schlerocarya caffra</i> , all of which reach heights of about 10m. There are also scattered shrubs which vary in height from 1-3 m and dominated by <i>Grewia flava</i> , <i>Ormocarpum trichocarpum</i> and <i>Zizyphus mucronata</i> . There is a very open savannah of small trees and bushes on the escarpment overlooking the river valleys. The structure varies from dense woody stands reaching 4-8m in height, through a variety of shrubs types, to the most arid form where trees rarely exceeds 3m, and the vegetation is very open with dominant grass and fern layers. On the sandy part of the Highveld, <i>Terminalia</i> sandveld is found. The canopy in these areas is very open, but the trees are taller than those found in the lowland valleys and on the escarpment. The tree canopy is about 8-10 m high and is underlain by a well-developed grass layer with few shrubs. These areas are grazed extensively and in some places show evidence of over grazing which is affecting vegetation structure.
Degraded Bushy Savannah	Within the Shashe, Tuli and Umzingwane Valleys, and to a lesser extent the Limpopo Valley, there are areas where the Dry Bushy Savannah has degraded and it now forms a very low unproductive scrub and grassland community. Some of these areas are related to settlement (e.g. Antelopes and Legion Mines, Kezi, M'phoengs and Tuli); others may either relate to wood exploitation or land clearance, or be due to natural soil and drainage factors. These areas vary in size from about 60 to 400km ² and total 2, 380 km ² . The vegetation is floristically similar to the Dry Bushy savannah, the main differences lying in its lower annual levels of productivity. The Vegetation mainly consists of very low shrubby <i>C.mopane</i> . This is usually 2m tall, although it may reach a height of 5m. It occurs as scattered individuals among a very low shrub ground cover with few grasses.
Wooded Grassland	These are related to intensive land clearance for agricultural activity, fuelwood and timber exploitation. The largest area is found in Manicaland and Mashonaland East Provinces, between the Inyaga Mountains to the south and Shamva to the north. This part of north –east Zimbabwe has been noted as an area at risk from high soil erosion. The vegetation is generally low, shrubby thickets and bushland occurring as isolated shrubs, bushes or thickets in grassland and area of cultivation.
Intensive Commercial Agricultural land	It has a distinct phenology, which is related to crop production, patterns rather than natural vegetation growth.

1.2.3 Original data for 1985 (data source 1)

(a). Data Category according to 1985 national definition and classification obtained from source 1.

National Classes	km ²
	1985
Dense Savannah Woodland	18 907
Open Savannah and <i>Baikiaea</i> Woodland	1 17 790
Seasonal Savannah Woodland	3 144
Dry Savannah Woodland	47 717
Mopane Woodland and Escarpment Thicket	68 565
Dry Bushy Savannah	91 656
Degraded Bushy Savannah	2 380
Wooded Grassland	6 653
Intensive Commercial Agriculture	33 918
Total land area	39 073.0

Source: Millington and Townsend –Source 1

1.3 Analysis and processing of national data 1985 data source from data source 1

1.3.1 Calibration

a. Calibrating 1985 data

Calibration of 1985 data	Area in ha	Calibrating factor
National land area in 1985	39073000	
FAO land area	38685000	0.99007

Results after calibrating 1985 data from source 1

National	Area in 1000 hectares	
	1985	Calibrated 1985
Dense Savannah Woodland	1 891	1 872
Open Savannah and Baikiaea Woodland	11 779	11 662
Seasonal Savannah Woodland	314	311
Dry Savannah Woodland	4 772	4 724
Mopane Woodland and Escarpment Thicket	6 857	6 788
Dry Bushy Savannah	9 166	9 075
Degraded Bushy Savannah	238	236
Wooded Grassland	665	659
Intensive Commercial Agriculture	3 392	3 358
Total land area	39 073	38 685

1.4 Reclassification into FRA 2005 classes (1985 data)

a. Reclassification of national data from source 1 (1985)

It was very difficult to reclassify the 1985 data since the forest cover was not specified for all classes. Shumba (2001) classification of the forests and OWL in the paper written for the international Forestry workshop on integration of Biodiversity in national Forestry Planning Programme” titled, Biodiversity Planning Support Programme , Integrating Biodiversity into the Forestry Sector , was used as guideline to reclassify bushy Savannah, dense savannah woodland, open savannah and Baikiaea. Expert opinion was also used to reclassify other classes.

National Classes	Forest	OWL	OL
Dense Savannah Woodland	100%		
Open Savannah and Baikiaea Woodland	100%		
Seasonal Savannah Woodland	100%		
Dry Savannah Woodland (1)	67%	33%	
Mopane Woodland and Escarpment Thicket (2)	100%		
Dry Bushy Savannah (3)		100%	
Degraded Bushy Savannah (4)			100%
Wooded Grassland (5)			100%
Intensive Commercial Agriculture			100%

Notes:

- (1). Canopy often reaches between 10 and 13m, however, it can be restricted to as little as 3m as it becomes dryer and more disturbed. If this happens, it takes on the form of an open, shrubby savannah. The reclassification of this class was allocated 67% forests and 33% owl.
- 2) Mopane Woodlands have a canopy that can attain heights between 20 and 25m, more commonly it varies between 10 and 15m. Escarpment Thickets has a vegetation structure that rarely reaches more than 10m and forms a dense mixture of tree and shrub species. They were considered 100% forests because the thickets are considered dense and more than 5 m.
3. It is restricted to scattered emergent trees such as *Acacia* sp., there is very open savannah of small trees and bushes on the escarpment overlooking valleys and on the sandy parts of the Highveld, *Terminalia* sandveld is found. The canopy in these areas is very open. 100% OWL because of scattered trees and the presence of *Terminalia* spp.
4. The vegetation is floristically similar to the Dry Bushy Savannah, the main difference lying in its lower annual levels of productivity caused by wood exploitation or land clearance or due to natural soil and drainage factors. *C. Mopane* occurs as scattered individuals among very low shrub ground cover with few grasses.
5. Isolated shrubs bushes or thickets in grassland and area of cultivation.

Reclassification of 1985 data

National Classes	Area in hectares		
	Forests	OWL	OL
Dense Savannah Woodland	1 871 925		
Open Savanna and Baikiaea Woodland	11 662 033		
Seasonal Savannah Woodland	311 278		
Dry Savannah Woodland	3 165 292	1 559 024	
Mopane Woodland and Escarpment Thicket	6 788 414		
Dry Bushy Savannah		9 074 584	
Degraded Bushy Savannah			235 637
Wooded Grassland			658 693
Intensive Commercial Agriculture			3 358 119
Total	23 798 942	10 633 609	4 252 449

Results after reclassification 1985 data

FRA 2005 Categories	Area in hectares
	1985
Forests	23 798 942
OWL	10 633 609
OL	4 252 449
Total land area	38 685 000

Classification and definitions for 1992 data obtained from Source2

(b) Definitions of land cover classification following **Kweshu, D. & Dreiser, D. 1997**, Vegetation mapping in Zimbabwe – VEGRIS

National class	Definition
<u>Forest plantation</u>	About 0.40 of Zimbabwe's land area, i.e. 156 000 hectares. Plantations are mainly of exotic species including pines (69%), eucalyptus (16%) and wattle (15%). Plantations are systematically planted and they include stands of young and mature trees established for commercial timber production, research trials, firebreaks and woodlots.

<u>Natural moist forest</u>	The class consists of moist evergreen and deciduous species with a canopy cover above 80 % and a tree height of more than 15 m. The forest makes up 0.03 % (11 731 hectares) of the total land area. The forest has a multi-canopy strata of upper canopy, sub-canopy and under storey of shrubs.
<u>Woodland</u>	About 53 % (20 725 836 ha) of the total land area. This is a broad class that can be defined as open to dense with a canopy cover 20 -80% and tree height between 5 and 15 meters. Mainly of indigenous tree species growing naturally. Associated with the miombo savannah.
<u>Bushland</u>	About 13 % (4 986 932 ha) of the total land area with a canopy cover 20 -80% and tree height between 1 to 5 meters. Bushland differs from woodland in terms of height. Includes thicket and scrub. The class is of indigenous trees species growing under natural or semi-natural conditions. The class often has multi-stemmed plants.
<u>Wooded grassland</u>	About 3 % (1 204 445 ha) of the total land area with a canopy cover between 2 – 20 % and tree height between 1 – 15 meters. The trees may be scattered or found in clumps.
<u>Grassland</u>	The class covers 1.76 % (688 254) of the total land area. Trees in this class are very scattered or virtually absent. Class includes wetlands that are seasonally or annually waterlogged. Tree cover canopy<2%
<u>Cultivated land</u>	This refers to land where the major land use is agriculture. The class covers 27.47 % (10 742 239 ha) of the total land area. Included in this class are tea, coffee, banana and sugar plantations and orchards. There may be scattered trees in fields, field boundaries, around gardens and homesteads.
<u>Rock outcrop</u>	The class covers 0.2 % (78 211 ha) of the total land area and is devoid of trees.
<u>Settlements</u>	Areas of human habitation, most urban areas
<u>Water body</u>	The class includes large rivers, permanent pans, natural or man made lakes and dams and covers 0.77 % (301 111 ha).

1.4.1 Original data for 1992 (data source 2)

(a). Data Category according to 1992 national definition and classification obtained from source 2.

National Classes	Area in hectares
Natural moist forest	11 324
Plantation	155 063
Woodland	20 919 427
Bushland	4 971 387
Wooded grassland	1 220 228
Grassland	684 555
Cultivation	10 684 332
Rock outcrop	58 654
Settlement	136 905
Total land area	38 841 875

1.5 Analysis and processing of national data (1992 from data Source 2)

1.5.1 Calibration

Calibrating data for 1992 from data source 2

National land area in ha	38 841 875
UN/FAO land Area in ha	38 685 000
Calibrating Factor	0.995961193

Results after calibrations of 1992 data in hectares

National Classes	Area in hectares	Calibrated area in hectares
Natural moist forest	11 324	11 278
Plantation	155 063	154 437
Woodland	20 919 427	20 834 937
Bushland	4 971 387	4 951 308
Wooded grassland	1 220 228	1 215 300
Grassland	684 555	681 790
Cultivation	10 684 332	10 641 180
Rock outcrop	58 654	58 417
Settlement	136 905	136 352
Total land area	38 841 875	38 685 000

1.6 Reclassification into FRA 2005 classes (1992 data)

National Classes	Forest	OWL	OL
Natural moist forest	100%		
Plantation	100%		
Woodland	100%		
Bushland		100%	
Wooded grassland	50%	40%	10%
Grassland			100%
Cultivation			100%
Rock outcrop			100%
Water body			
Settlement			100%

Notes:

¹Wooded grassland (cover classes 2-20%) and height 1-15 m) was allocated to more than one class because the canopy cover and tree height cover all three classes. Note that this definition differs from the one in source 1.

Results after reclassifying 1992 data

National Classes	Area in hectares		
	Forest	OWL	OL
Natural moist forest	11 278		
Plantation	154 437		
Woodland	20 834 937		
Bushland		4 951 308	
Wooded grassland	607 650	486 120	121 530
Grassland			681 790
Cultivation			10 641 180
Rock outcrop			58 417
Settlement			136 352
Total area	21 608 302	5 437 428	11 639 269

1.6.1 Estimation and forecasting

FRA 2005 Categories	Area in hectares				
	1985	1992	1990	2000	2005
Forests	23 798 942	21 608 302	22 234 200	19 104 714	17 539 972
OWL (1)	10 633 608	5 437 428	n/a	n/a	n/a
OL	4 252 449	11 639 269	16 450 800	19 580 286	21 145 028
Total land area	38 685 000	38 685 000	38 685 000	38 685 000	38 685 000

Notes:

- 1) 1990, 2000 and 2005 determined through linear interpolation and extrapolation.

FRA 2005 Categories	Area in hectares		
	1990	2000	2005
Forests	22 234 200	19 104 714	17 539 972
OWL	5 437 428	ID	ID
OL	11 013 372	19 580 286	21 145 028
Inland water	390 000	390 000	390 000
Total area	39 075 000	39 075 000	39 075 000

Notes:

The estimate for 2000 and 2005 includes an unknown area of OWL. The area of Owl from 1992 is used for reporting year 1990.

1.7 Data for National reporting table T1

FRA 2005 Categories	Area (1000 hectares)		
	1990	2000	2005
Forest	22 234	19 104	17 540
Other wooded land	5 437	ID	ID
Other land	11 013	19 580	21 145
...of which with tree cover ¹⁾			
Inland water bodies	390	390	390
TOTAL	39 075	39 075	39 075

1.8 Comments to National reporting table T1

The difference in the area of forest recorded in FRA 2000 and FRA 2005 is due to the definition of woodland and reclassification. In the FRA 2000 report, 67% of the area under woodlands from source 2 (1992 data) was allocated to forests and one-third to other wooded land. FRA 2005, however, allocated the total area to forests in accordance with the definition of this class (canopy cover 20-80%, tree height 5-15m).

It was not possible to do trend analysis for OWL due to differences in classification system. The figure for 1992 has thus been assumed as best estimate available for 1990.

According to Shumba (2001), the only national survey on deforestation that involved a comparative analysis of woodland cover visible on 1:25 000 scale aerial photographs was taken in the early 1960s and early 1970s. The aerial extent of woody cover measured by the Forestry Commission (1996) used satellite imagery taken in 1992 and that identified by Millington and Townsend (1989) in their survey of woody biomass was based on satellite imagery taken in 1985.

The forest cover change between 1990 and 2000 is about 312 949 ha per year or 1.5 % loss per year. The vegetation cover area between 2000 and 2005, though, may need to be adjusted due to deforestation on large-scale commercial farms and some designated state lands due to the land reform programme. By end of 2003, an estimated 11 million ha of the commercial farms had been resettled. Cover change on these farms has not been estimated but it can be assumed that between 2000 and 2003 the deforestation rate may have increased by an 0.1% to 1.6% per annum. There are also chances that the area of inland water bodies increased within the same period due to increased investment in dam construction.

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), government-owned institutions, corporations, or other public bodies including cities, municipalities, villages and communes.
Other ownership	Land that is not classified either as “Public ownership” or as “Private ownership”.

2.2 National data

2.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments	Source No.
Kweshu, D. & Dreiser, D. 1997. Gathering key information about indigenous forests of Zimbabwe.	H	Ownership	1992		

2.2.2 Classification and definitions

National class	Definition
Ownership of Private forest and OWL	refers to woodlands and natural moist forests in small scale and large-scale farms and industrial plantations
Ownership of Public forest and OWL	Refers to natural moist forest and woodlands in national parks, gazetted natural forests, state land, communal and resettlement areas and industrial plantations.

2.2.3 Original data

Original 1992 data from Source Kwesha, D. & Dreiser, D. 1997)

National Classes	Area in hectares				
	Natural moist forest	Plantation	Woodland	Wooded grassland	Bushland
Nat. Parks	6 559	6 559	3 397 633	79 719	1 186 195
Forest land	801	53 006	875 729	534	72 900
State land	0	0	168 186	0	15 887
Communal area	0	1546	6 531 573	41 703	1 495 142
Resettlement area	396	6 729	2 398 319	121 915	449 264
Total public Forest	7 756	67 840	13 371 441	243 871	3 219 388
SSCFA (1)	0	112	566106	23 242	108 573
LSCFA (2)	3 568	86 824	6954228	944 357	1 640 137
Town	0	287	27 652	8 758	3 289
Total private forests	3 568	87 223	7 547 986	976 357	1 751 999
Total	11 324	155 063	20 919 427	1 220 228	4 971 387

Notes:

- 1) Small Scale Commercial Farm Area
- 2) Large Scale Commercial Farm Area

Summary of the Table above (1992)

Ownership	Area in hectares							
	Natural moist forest	Plantation	Woodland	Wooded grassland (1)			Bushland	Total OWL
				of which 50% is Forest	Total Forest	of which 40% is OWL		
Public	7756	67840	13371441	121936	13568972	97154	3206385	3303539
Private	3568	87223	7547986	488179	8126956	388965	1744923	2133889
Total	11324	155063	20919427	610114	21695928	486119	4951308	5437428

2.3 Analysis and processing of national data

2.3.1 Estimation and Forecasting

The proportion of private/public forest ownership to the total area of forest and OWL for 1992 was used to estimate and forecast public and private ownership of forests and OWL for 1990.

Ownership	Forest		OWL	
	ha	%	ha	%
Public Forests	13 568 972	63%	3 303 540	61%
Private	8 126 956	37%	2 133 889	39%
Total	21 695 928	100%	5 437 428	100%

Results after allocating percentages

Applying the above percentages of ownership to the area of forests from T1 generates the following:

Ownership	Forest
	ha
	1990
Public	13 905 615
Private	8 328 584
Total Forests	22 234 200

2.4 Data for National reporting table T2

FRA 2005 Categories	Area (1000 hectares)			
	Forest		Other wooded land	
	1990	2000	1990	2000
Private ownership	8 329	ID	3 303 540	ID
Public ownership	13 906	ID	2 133 889	ID
Other ownership		ID		ID
TOTAL	22 234	ID	5 437 428	ID

2.5 Comments to National reporting table T2

There was no reliable information to estimate ownership for 2000. The recent resettlement scheme has significantly changed land ownership in the country including the ownership of some forests and other wooded lands.

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. Kwesha, D. & Dreiser, D. 1997. Gathering key information about indigenous forests of Zimbabwe.	H	Forests area under different tenure	1992	
2. Shumba, E. M 2001: Biodiversity Planning Support Programme. Integrating Biodiversity into forestry sector. Paper prepared for an international workshop "Integration of Biodiversity in National Forestry Planning Programme" CIFOR HQ, Bogor, Indonesia 13-16 August 2001	H	Production area and forests goods and services	1992	

3.2.2 Classification and definitions

Commercial timber production from indigenous forests and woodlands is based mainly on *Pterocarpus angolensis* and *Baiiaea plurijuga*. Forests with these species are confined to the western part of the country and occupy 5% of the country's total land area. The rest of the country's forests and woodlands have little to no timber of commercial value. The country's indigenous forests and woodlands provides a wide range of products which include fuelwood, small artisan crafts, fodder, fruits, honey, mushrooms, insects, bark for rope, medicines, leaf litter and gum and they are managed for all purpose. Services provided by these forests include watershed conservation, carbon fixation, and the provision of windbreaks, shade, soil stability and wild life habitat.

3.2.3 Original data

Year 1992

	Forest Area (1)	Production area (2)		SSCFA & Towns (3)		Remaining Forests (4)	
	ha	ha	%	ha	%	ha	%
Total	21 695 928	2 143 063	10%	610 158	3%	18 942 707	87%

Notes:

- 1) Data from source 1
- 2) Data from source 2
- 3) Small Scale Commercial Farm Area and trees in towns (Source1)
- 4) (1)- (2+3)

3.3 Analysis and processing of national data

1992 data

FRA 2005 Categories	Forests		Area in ha OWL(2)
	Area in ha	%	
Production	2 143 063	10%	
Protection of soil and water (1)	610 158	3%	57 545
Multiple purpose (2)	18 942 707	87%	5 379 883
Total	21 695 928	100%	5 437 428

- 1) Assumption is that trees in Small Scale Commercial Farm Areas (SSCFA) and Towns are for the protection of soil and water
- 2) Assumption that all remaining forests are designated for multipurpose.

3.3.1 Estimation and forecasting

Applying the above percentages and the total forest and OWL area for 1990, 2000 and 2005 from T1 provides the following:

FRA 2005 Categories	Area in hectares			
	Forests			OWL
	1990	2000	2005	1990
Production	2 200 777	1 906 061	1 762 596	
Protection of soil and water	625 296	537 285	493 280	57 545
Multiple purpose	19 408 127	16 661 368	15 284 096	5 379 883
Total	22 234 200	19 104 714	17 539 972	5 437 428

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	2 201	1 906	1 763			
Protection of soil and water	625	537	493			
Conservation of biodiversity						
Social services						
Multiple purpose	19 408	16 661	15 284	not appl.	not appl.	not appl.
No or unknown function				not appl.	not appl.	not appl.
Total - Forest	22 234	19 105	17 540	not appl.	not appl.	not appl.
Other wooded land						
Production						
Protection of soil and water	57					
Conservation of biodiversity						
Social services						
Multiple purpose	5 380			not appl.	not appl.	not appl.
No or unknown function				not appl.	not appl.	not appl.
Total – Other wooded land	5 437			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

See tables T1 and T3.

4.3 Reclassification into FRA 2005 classes

The following assumptions were made:

National class	FAO Category
Forest plantation	Productive plantation
Natural moist forest	Modified forest
Woodland	Modified forests
Bushland	Modified OWL
Wooded grassland	Modified forest and modified OWL

FRA 2005 categories	Area in hectares			
	Forests			OWL
	1990	2000	2005	1990
Productive plantations (1)	154 437	154 437	154 437	n/a
Modified Forest	22 079 763	18 950 278	17 385 535	5 437 428
Total	22 234 200	19 104 714	17 539 972	

Notes:

1). Calibrated. It is assumed the area of plantation did not change since 1990.

4.4 Data for National reporting table T4

FRA 2005 Categories	Area (1000 hectares)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Primary						
Modified natural	22 079	18 950	17 385	5 437		
Semi-natural						
Productive plantation	154	154	154			
Protective plantation						
TOTAL	22 234	19 104	17 540	5 437		

4.5 Comments to National reporting table T4

All forests and OWL have been classified as modified natural forests, except for plantations, which are all classified as productive plantations. The area of plantations dates from 1992 and it is assumed that it has not changed since then.

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
http://www.savannas.net/savt3.htm	M	Above ground biomass ton/ha for woodlands and Savannah	1996	
Fuller, Ngamo, Sikumi, Umgusa, Bembsi, Gwaai, Inseze, Nyamandhlovu, Lupaka, Mpindo, Pumula, Inkosikazi, Mwenezi, Lake Alice. 2000 : Forest inventories. Forest Commission, Zimbabwe	L	Vol/ha of plantations	2000	

5.2.2 Classification and definitions

Growing stock (total volume)	The total volume comprises the whole tree volume excluding stumps and roots to a tip diameter of 7.5 cm
Commercial growing stock	Volume of species used for industrial purposes (exotic and natural species)

5.2.3 Original data

The only available data on growing stock are for plantations. For the natural forests and woodlands, growing stock is calculated from biomass data in table T6.

Furthermore, there are data on commercial growing stock on the production areas of natural forests and woodlands.

National data on growing stock in plantations

National categories of plantations	Area in ha			Vol/ha m3/ha
	1990	2000	2005	
Pine	105 927	105 927	105 927	93
Other hardwoods	48 510	48 510	48 510	100
Total Plantations (1)	154 437	154 437	154 437	

National data for commercial growing stock in forests and woodlands

Production area from forests and woodlands (2)	2 046 340	1 751 624	1 608 159	5
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National data on biomass in forest and woodlands

Category	AGB	Calibrated area from T3 (hectares)		
	(tons/ha) (3)	1990	2000	2005
Bushland	23.03	5 437 428		
Forest and woodland	46.89	22 079 763	18 950 278	17 385 535

Notes:

- 1). Source **Kweshu, D. & Dreiser, D.** 1997 (T3)
- 2). Production area for natural forests and woodlands from T3 (excludes plantations)
- 3) The data source indicate the values are for above ground biomass

5.3 Analysis and processing of national data**1. Calculating growing stock for plantations**

Growing stock was obtained by multiplying vol/ha with area of production areas, all from the above table.

National Categories	Growing stock of plantations and production areas in m3		
	1990	2000	2005
Pine Plantations	9 798 248	9 798 248	9 798 248
Other hardwoods plantations	4 851 000	4 851 000	4 851 000
TOTAL plantation growing stock	14 649 248	14 649 248	14 649 248

2. Calculating growing stock for bushland, forests and woodlands

Multiplying the biomass per hectare by area, gives the following table:

Category	Aboveground biomass (1000 tonnes)		
	1990	2000	2005
Bushland	125 224		
Forest and woodland	1 035 320	888 579	815 208

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

$$GS = AGB / BEF / WD$$

GS = Growing stock (million m³)

AGB = Above-ground biomass (1000 tons)

BEF = Biomass expansion factor = 2.4

WD = Wood density = 0.58

Calculating growing stock for OWL. The following factors were used

$$GS = AGB / BEF / WD / 1000$$

GS=Growing stock (million m³)

AGB= above ground biomass (100tons)

BEF= Biomass expansion factor=6.1 (average for temperate broadleaved and tropical broadleaved)

Wood density=0.58

3. Calculating total growing stock for all forests generates the following table:

National categories	Growing stock in 1000 cubic meters		
	Forest		
	1990	2000	2005
Forests and woodlands	743 764	638 347	585 638
Plantations	14 649	14 649	14 649
Bushland	35 394		

4. Calculating Commercial growing stock

Commercial growing stock is estimated as Growing stock of plantations + production areas

Growing stock of plantations are taken from the table above. Commercial growing stock of production areas of forests and woodlands is calculated by applying the commercial growing stock per hectare to the areas as presented under original data

Category	1990	2000	2005
TOTAL plantation growing stock (1000 m ³)	14 649	14 649	14 649
Commercial growing stock of forests and woodlands (1000 m ³)	10 232	8 758	8 041
Total commercial growing stock (1000 m³)	24 881	23 407	22 690

5.4 Reclassification

Plantations, forests and woodlands are reclassified as Forest. Bushland is reclassified as Other wooded land

5.5 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	758	653	600	35	ID	ID
Commercial growing stock	25	23	23	N/A	N/A	N/A

Specification of country threshold values	Unit	Value	Complementary information
1. Minimum diameter at breast height of trees included in Growing stock (X)	cm	5	
2. Minimum diameter at the top end of stem (Y) for calculation of Growing stock	cm	7.5	
3. Minimum diameter of branches included in Growing stock (W)	cm	N/a	
4. Minimum diameter at breast height of trees in Commercial growing stock (Z)	cm	5	
5. Volume refers to “Above ground” (AG) or “Above stump” (AS)	AG / AS	AG	AS for plantations.
6. Have any of the above thresholds (points 1 to 4) changed since 1990	Yes/No	No	
7. If yes, then attach a separate note giving details of the change	Attachment	–	

6 Table T6 – Biomass stock

6.1 FRA 2005 Categories and definitions

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

6.2 National data

6.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
http://www.savannas.net/savt3.htm	M	Above and Below ground biomass ton/ha for woodlands and Savannah	1996	

6.2.2 Classification and definitions

No national definitions

6.2.3 Original data

National data on biomass in forest and woodlands

Category	AGB	Calibrated area from T3 (hectares)		
	(tons/ha) (1)	1990	2000	2005
Bushland	23.03	5 437 428		
Forest and woodland (2)	46.89	22 079 763	18 950 278	17 385 535

Notes:

1) The data source indicate the values are for above ground biomass

2).The area of forests and woodlands from T3 excludes plantations

For plantations, biomass was calculated based on growing stock data from table T5.

6.3 Analysis and processing of national data

1. Biomass of forests and woodlands

This was calculated by multiplying area by tons/ha to get above-ground biomass. Then the following conversion factors were used: (Note that plantation areas were excluded)

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

Multiplying above ground biomass by R.R = BGB and living biomass by D/L ratio dead wood biomass generates the following:

FRA 2005 Categories	Above-ground biomass (1000 tons)		
	1990	2000	2005
AGB	1 035 320	888 579	815 208
BGB	279 536	239 916	220 106
Total living biomass	1 314 856	1 128 495	1 035 314
Deadwood	184 080	157 989	144 944
Total biomass	1 498 936	1 286 485	1 180 258

2. Biomass of plantations

In the table below, original data on area and volume per hectare for plantations are presented, as well as conversion factors for estimating biomass.

Type	Area (ha) (1)	Vol/ha (2)	Wood density (3)	BEF (4)	Root-shoot ratio (5)	Dead wood ratio (6)
Pines	106 993	93	0.58	3.31	0.23	0.14
Hardwood	48 070	100	0.58	3.18	0.2	0.14

Note: It is assumed that all hardwoods species will have the same conversion factors.

The calculations give the following table:

FRA 2005 Categories	Biomass of plantations in (1000 tons)		
	1990	2000	2005
AGB = (1) x (2) x (3) x (4)	27 969	27 969	27 969
BGB = AGB x (5)	6 167	6 167	6 167
Total living biomass of plantations (7)	34 136	34 136	34 136
Dead wood biomass (6) x (7)	4 779	4 779	4 779
Total biomass of plantations	38 915	38 915	38 915

3. Summing biomass for plantations, forests and woodlands

Summing the results from steps 1 and 2 above gives:

FRA 2005 Categories	Biomass (1000 metric tonnes oven-dry weight)		
	Forest		
	1990	2000	2005
Above-ground biomass	1 063 289	916 548	843 177
Below-ground biomass	285 703	246 083	226 273
Total living Biomass	1 348 992	1 162 631	1 069 450
Dead wood biomass	188 859	162 768	149 723
TOTAL	1 537 851	1 325 400	1 219 173

4. Biomass for bushland

Applying the biomass/ha to the area of bushland gives the aboveground biomass. The following conversion factors have then been used for calculating the other biomass categories.

Root/shoot ratio	0.48	Tropical Shrubland
Dead/live ratio	0.14	(deciduous forest)

Multiplying above ground biomass with Root-shoot ratio provides below-ground biomass. Multiplying living biomass by Dead-Live ratio provides deadwood biomass

FRA 2005 categories	Biomass of OWL in 1000 tonnes		
	1990	2000	2005
Above-ground biomass	125 224	ID	ID
Below-ground biomass	60 108	ID	ID
Total living Biomass	185 332	ID	ID
Dead wood biomass	25 946	ID	ID
TOTAL	211 278	ID	ID

6.4 Data for National reporting table T6

FRA 2005 Categories	Biomass (million metric tonnes oven-dry weight)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Above-ground biomass	1 063	917	843	125		
Below-ground biomass	286	246	226	60		
Living Biomass	1 349	1 163	1 069	185		
Dead wood biomass	189	163	150	26		
TOTAL	1 538	1 325	1 219	211		

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 fomic and humic layers.
Soil carbon	Organic carbon in mineral and organic soils (including peat) to a specified depth chosen by the country and applied consistently through the time series.

7.2 National data

No original data on carbon is available. Table T6 was used as an input and a 50% factor 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	532	458	422	62.5		
Carbon in below-ground biomass	143	123	113	30.0		
Sub-total: Carbon in living biomass	674	581	535	92.5		
Carbon in dead wood	94	81	75	13.0		
Carbon in litter						
Sub-total: Carbon in dead wood and litter						
Soil carbon to a depth of _____ cm						
TOTAL CARBON	769	663	610	105.5		

7.4 Comments to National reporting table T7

8 Table T8 – Disturbances affecting health and vitality

8.1 FRA 2005 Categories and definitions

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

8.2 National data

8.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Forestry Commission 1984 – 2003. Monthly and annual fire reports.	H	Fire reports in demarcated indigenous forests	1987-1992	Each forest reserve reports on fire incidences during the fire season

8.2.2 Classification and definitions

8.2.3 Original data

A SUMMARY OF THE FOREST AREA BURNT BETWEEN 1987/88 AND 1991/92 FIRES SEASON

FOREST AREA	1987/88	1989/90	1990/91	1991/92	4-year average
					1990
NGAMO/SIKUMI	59780	11465	6736	5521.2	20876
GWAYI/MBEMBESI	16025	31600	10290	200	14529
GWAMPA/L ALICE	400	4500	2675	3100	2669
UMGUSA	100	74	2534	4520	1807
FULLER	1914	0	100	4900	1729
CHESA	-	0	0	68	17
PANDA-MASUIE	8000	13094	1615	24500	11802
INSEZE	-	1052	11527	0	3145
KAZUMA	-	17400	6200	0	5900
UMZIBANI	-	3500	9465	0	3241
MAFUNGABUSI	17753	9600	0	0	6838
TOTAL	103972	92285	51142	42809.2	72552

8.3 Analysis and processing of national data

8.3.1 Estimation and forecasting

Insufficient data to make forecasting for 2000.

8.4 Data for National reporting table T8

FRA-2005 Categories	Average annual area affected (1000 hectares)			
	Forests		Other wooded land	
	1990	2000	1990	2000
Disturbance by fire	73			
Disturbance by insects				
Disturbance by diseases				
Other disturbance				

8.5 Comments to National reporting table T8

Only data for demarcated indigenous forests is available in terms of disturbances by fire. Fire data for areas outside demarcated forests is not normally captured. The fires have not been formally monitored. There is a definite project proposal to do so with effect from 2003 with collaboration with the University of Maryland USA using the MODIS-STAR PRODUCT. We currently have a Forest Officer seconded to the project.

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)	
Forestry Commission. 1980. Indigenous trees of Zimbabwe. Bulletin No 9. (1)	H	Indigenous trees species	1980	
http://www.fao.org/forestry/site/20747/en . IUCN Country-wise list of endangered tree species (2)	H	Endangered species	2000	

9.2.2 Classification and definitions

National class	Definition
Native trees species	Trees species naturally growing in Zimbabwe
Endangered tree species	Tree species on the verge of extinction
Vulnerable tree species	Tree species that can potentially become extinct

9.2.3 Original data

FRA 2005 Categories	Number of species (Year 2000)
Native tree species (1)	1 747
Critically endangered tree species	0
Endangered tree species (2)	2
Vulnerable tree species (2)	12

Notes:

(1). Source 1

(2). Source 2

9.3 Data for National reporting table T9

FRA 2005 Categories	Number of species (year 2000)
Native tree species	1 747
Critically endangered tree species	0
Endangered tree species	2
Vulnerable tree species	12

10 Table T10 – Growing stock composition

10.1 FRA 2005 Categories and definitions

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

10.2 National data

10.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Fuller Ngamo Sikumi Umgusa Bembsi Gwaai Inseze Nyamandhlovu Lupaka Mpindo Pumula Inkosikazi Mwenezi Lake Alice: Forest Inventories		Forest Inventory	2000	

10.2.2 Original data

Year=2000

Species	Growing stock (m ³ /ha)
<i>Brachystegia spiciformis</i> (Msasa)	10.4
<i>Julbernardia globiflora</i> (Munondo)	0.71
<i>Colophospermum mopane</i> (Mopane)	0.26
<i>Baikiaea plurijuga</i> (Zambezi teak)	4.1
<i>Terminalia sericea</i> (Silver terminalia)	0.07
<i>Dichrostachys cinerea</i> (Sickle bush)	0.01
<i>Burkea africana</i> (Red syringa)	0.01
<i>Combretum molle</i> (Velvet bushwillow)	0.15
<i>Pinus patula</i>	92.5
<i>Eucalyptus grandis</i>	100.00

Notes: assumption is that vol/ha is the same in 1990 as in 2000

10.3 Analysis and processing of national data

Species	Growing stock (million m3)	
	1990	2000
<i>Brachystegia spiciformis</i> (Msasa)	231.2	198.7
<i>Baikiaea plurijuga</i> (Zambezi teak)	91.2	78.3
<i>Julbernardia globiflora</i> (Munondo)	15.8	13.6
<i>Pinus patula</i>	9.9	9.9
<i>Colophospermum mopane</i> (Mopane)	57.8	5.0
<i>Eucalyptus grandis</i>	4.8	4.8
<i>Combretum molle</i> (Velvet bushwillow)	3.3	2.9
<i>Terminalia sericea</i> (Silver terminalia)	1.6	1.3
<i>Dichrostachys cinerea</i> (Sickle bush)	0.2	0.2
<i>Burkea africana</i> (Red syringa)	0.2	0.2
Total	416.0	315
Remainder	342	338
Total growing stock	758	653

Notes:

Average vol/ha for 2000 for each species was applied to the total forest area for 1990 and 2000 to calculate growing stock.

10.4 Data for National reporting table T10

FRA 2005 Categories / Species name (Scientific name and common name)		Growing Stock in Forests (million cubic meters)	
		1990	2000
Species	Common Species		
<i>Brachystegia spiciformis</i>	Msasa	231.2	198.7
<i>Baikiaea plurijuga</i>	Zambezi teak	91.2	78.3
<i>Julbernardia globiflora</i>	Munondo)	15.8	13.6
<i>Pinus patula</i>		9.9	9.9
<i>Colophospermum mopane</i>	Mopane	57.8	5.0
<i>Eucalyptus grandis</i>		4.8	4.8
<i>Combretum molle</i>	Velvet bushwillow)	3.3	2.9
<i>Terminalia sericea</i>	Silver terminalia)	1.6	1.3
<i>Dichrostachys cinerea</i>	(Sickle bush)	0.2	0.2
<i>Burkea africana</i>	(Red syringa)	0.2	0.2
Remainder		342	338
Total Growing stocks		758	653

10.5 Comments to National reporting table T10

The growing stock is an estimate from inventories that have been conducted in demarcated indigenous forests plantations and natural forests and woodlands in communal areas resettlement areas and commercial farms.

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
1.FAO forestry series 171, FAO 2001		Wood removal Fuelwood	Averages for 1990 and 2000	
2.Forestry Commission 1999-2004	H	Quantity and value of wood removed from natural forests	1999-2004	Data from monthly progress reports on volumes extracted from natural forests. Wood removed for sawn timber, veneer and plywood.
3.Timber Producers Federation 1996-2003	H	Quantity and value of wood removed from plantations	1996-2003	Annual Timber Industry statistics. Wood removed for sawn timber, veneer and plywood, treated and untreated poles, particle and fibreboard, paper & paper products, wattle extract and matches.

11.2.2 Original data

The following table provides wood removal over bark from woodlands and plantations for industrial purpose

Round wood harvested for	Volume over bark								
	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03
Sawmills	887000	885500	885971	885000	886500	886819	772876	786859	821895
Veneer & plywood	34100	35200	33530	35000	33670	29814	26381	24982	28335
Particle & fibreboard	26600	96400	133650	132453	96800	95800	99430	118328	104004
Pulp & paper	92300	116800	125900	123554	118660	94305	93322	94697	80212
Matches	5400	6100	12000	12000	12000	10009	9179	7543	10031
Poles	62100	67100	88278	71340	95221	97280	80166	77173	76814
Mining timber	-	3600	3807	3330	3546	9775	3536	3800	-
Wattle extract	55000	81000	69833	69000	66142	54568	38500	59476	80776
TOTAL	1162500	1291700	1352969	1331677	1331739	1297570	1137790	1211258	1254867

Notes:

Annual timber industry statistics, plantation forestry, relating to the formal sector. The data is compiled annually from returns made by the members of the Timber Producers Federation.

The following table provides figures for fuelwood removal from 1988 to 2002.

Year	Volume under bark in m3
1988	6260200
1989	6260200
1990	6260200
1991	6260200
1992	6260200
1993	6260200
1994	7000200
1995	7210200
1996	7426200
1997	7649200
1998	7879200
1999	8115200
2000	8115200
2001	8115200
2002	8115200

Source: 1

11.3 Analysis and processing of national data

Multiplying wood fuel (from the table above) by conversion factor of 1.15 to get volume over bark provides the following:

Year	Volume over bark in cubic meters
1988	7199230
1989	7199230
1990	7199230
1991	7199230
1992	7199230
5-year average 1990	7199230
1993	7199230
1994	8050230
1995	8291730
1996	8540130
1997	8796580
5 -year average 1995	8175580
1998	9061080
1999	9332480
2000	9332480
2001	9332480
2002	9332480
5 year average 2000	9278200

The following table provides three-year averages for industrial wood removal from forests

FRA 2005 Category	Volume in cubic meters		
	1995	1998	2001
Industrial Roundwood	1 269 056	1 320 329	1 201 305

11.3.1 Estimation and forecasting

FRA 2005 Category	Volume over bark in cubic meters		
	1990	2000	2005 (2)
Industrial Roundwood (1)	1 353 896	1 240 977	1 184 518
Wood Fuel	7 199 230	9 278 200	10 380 820
Total	8 553 126	10 519 177	11 565 338

Notes: 1) Industrial wood removal obtained for plantations and natural forests;
2) 2005 figures obtained through extrapolation

11.4 Reclassification into FRA 2005 classes

11.5 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	1 353	1 241	1 185			
Wood Fuel	7 199	9 278	10 381			
Total	8 553	10 519	11 565			

11.6 Comments to National reporting table T11

It is not clear whether the volume of wood fuel comes from forests or OWL. Industrial roundwood include timber from natural forests and plantations. The Forests Commission provides the following for timber removal from natural forests, which is already included in the original table.

Wood removal	Timber removal from natural forests in cubic meters				
	1998/99	1999/00	2000/01	2001/02	2002/03
Natural forests	19200	19200	14400	38400	52800

Notes: Figures included in the original table.

12 Table T12 – Value of wood removal

12.1 FRA 2005 Categories and definitions

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

12.2 National data

12.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
FAO forestry series 171, FAO 2001.		Wood removal Fuelwood	Averages for 1990 and 2000	
Forestry Commission 1999-2004		Value of natural wood removed	1999-2004	Data from monthly progress reports on volumes extracted from natural forests. Wood removed for sawn timber, veneer and plywood.
Timber Producers Federation 1996-2003		Value of wood removed from plantations	1996-2003	Annual Timber Industry statistics. Wood removed for sawn timber, veneer and plywood, treated and untreated poles, particle and fibreboard, paper & paper products, wattle extract and matches.

12.2.2 Original data¹

Year	Value of industrial wood from natural Forests ² (ZWD)	Value of industrial wood from plantations (ZWD) ³	Total value
1996	278600000	699653000	978253000
1997	342000000	963616000	1305616000
1998	399000000	986772980	1385772980
1999	576000000	1790554768	2366554768
2000	672000000	3116477000	3788477000
2001	576000000	5068152000	5644152000
2002	1152000000	9586838000	10738838000
2003	2688000000	28346474000	31034474000
2004	6072000000	33554400000	39626400000

Notes:

1. Forestry Commission data.
2. Forestry Commission data. Wood removed for sawn timber, veneer and plywood.
3. Timber Producers Federation data. Wood removed for sawn timber, veneer and plywood, treated and untreated poles, particle and fibreboard, paper & paper products, wattle extract and matches.

12.3 Analysis and processing of national data

FRA 2005 Category	Value in Zim dollars		
	Avg 1996-1998	Avg 1999-2001	Avg 2002-2004
	1997	2000	2001
Industrial roundwood	1 223 213 993	3 933 061 256	27 133 237 333

Notes: With the fluctuating exchange value, it was difficult to make estimation for 1990. In order to get trends, exchange rate for 2000 which was 1US\$=55.07 ZWD was used for all years and a unit value was calculated.

The average value, volume and exchange rate for 2000 was used to calculate the unit price and the following table was generated:

Value	Value in \$ZM	Quantity in cubic meters	Unit price in ZM\$	Unit Price in US\$	Exchange rate
2000	3 933 061 256	1 240 977	3 169	57.55	55.07

12.3.1 Estimation and forecasting

Multiplying unit value in \$US by the respective average volume for 1990, 2000 and 2001 obtained from T11 provide the following:

FRA 2005 Category	Value in US\$		
	1990	2000	2005
Industrial roundwood	94 664 224	70 919 414	59 047 010

Notes:

- 1) 2000 exchange rate was used for all years because of huge currency fluctuation.
- 2) All figures obtained through linear interpolation

12.4 Data for National reporting table T12

FRA 2005 Categories	Value of roundwood removal (1000 USD)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial roundwood	94 664	70 919	59 047			
Woodfuel	ID	ID	ID			
TOTAL for Country						

13 Table T13 – Non-wood forest product removal

No information has been found to support estimates of Non-wood forest product removal

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

No information has been found to support estimates of the value of non-wood forest product removal

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

Zero – policy paper on tourism development. Figures for 1990 – 2000.

Timber Producers Federation. 1985-1990. **Timber Industry Statistics.**

Timber Producers Federation. 1991-2000. **Timber Industry Statistics.**

Forestry Commission. 1985-2000. **Monthly Progress Reports.**

Zimbabwe Tourism Authority. 2004. **Personal communication with Chief Executive Officer.**

National Parks and Wildlife Management Authority. 2004. **Personal communication with Human Resources manager.**

15.2.2 Original data

National	Employment (1000 person-years)	
	1990	2000
Primary production of goods	14.4*	16.0*
Provision of services	ID	ID
Unspecified forestry activities	ID	ID

15.3 Data for National reporting table T15

FRA 2005 Categories	Employment (1000 person-years)	
	1990	2000
Primary production of goods	14.4*	16.0*
Provision of services	ID	ID
Unspecified forestry activities	ID	ID
TOTAL		