



Forestry Department

Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT UPDATE 2005

– FRA 2005 –

PILOT STUDY FOR COUNTRY REPORTING: SOUTH AFRICA

Rome, 2003



The Forest Resources Assessment Programme

Forests are crucial for the well being of humanity. They provide foundations for life on earth through ecological functions, by regulating the climate and water resources and by serving as habitats for plants and animals. Forests also furnish a wide range of essential goods such as wood, food, fodder and medicines, in addition to opportunities for recreation, spiritual renewal and other services.

Today, forests are under pressure from increasing demands of land-based products and services, which frequently leads to the conversion or degradation of forests into unsustainable forms of land use. When forests are lost or severely degraded, their capacity to function as regulators of the environment is also lost, increasing flood and erosion hazards, reducing soil fertility and contributing to the loss of plant and animal life. As a result, the sustainable provision of goods and services from forests is jeopardized.

FAO, at the request of the member nations and the world community, regularly monitors the world's forests through the Forest Resources Assessment Programme. The Global Forest Resources Assessment 2000 (FRA 2000) reviewed the forest situation by the end of the millennium. FRA 2000 included country-level information based on existing forest inventory data, regional investigations of land-cover change processes and a number of global studies focusing on the interaction between people and forests. The FRA 2000 Main report is published in print and is available on the World Wide Web.

The Global Forest Resources Assessment update 2005 (FRA 2005) has been requested by the FAO Committee on Forestry in 2003. The FRA 2005 will use common thematic areas of the Criteria for Sustainable Forest Management as a reporting framework. FRA 2005 will also focus on the specific conditions and issues in each country.

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Summary

(This is a draft version of the working paper. The summary will be provided in the final version)

Abbreviations

AG	Advisory Group to FRA
C&I	Criteria and Indicators (for Sustainable Forest Management)
COFO	Committee on Forestry, the main statutory body of the FAO Forestry Department, meeting every second year in Rome
FAO	Food and Agriculture Organization of the United Nations
FRA	The FAO-led Global Forest Resources Assessment
FRA 2000	Global Forest Resources Assessment 2000, see www.fao.org/forestry/fra2000report
FRA 2005	Global Forest Resources Assessment update 2005, see www.fao.org/forestry/fra2005
NC	National Correspondent to FRA
SFM	Sustainable Forest Management

1. Introduction

This section introduces the purposes of the document, provides background of global Forest Resource Assessments, presents objectives of country report and finally the process of development of information at national level.

1.1 Purpose of this document

This working paper presents country report of South Africa as a part of input to global Forest Resource Assessment (FRA) process of FAO especially to FRA 2005, an update to FRA 2000 (FAO, 2001). It contains complete information on all the sixteen global reporting tables and on the six thematic areas following “Guidelines for Country Reporting” (FRA Working Paper No. 71a).

1.2 Background to FRA 2005

Global forest resources assessments have been carried out by FAO since 1948 that is practically since FAO was created. The mandate for such assessments stems both from the basic statutes of FAO (FAO 2003a), and to specific guidance given by member countries, most significantly at sessions of the Committee on Forestry “COFO” (FAO 2003a).

The Kotka IV expert consultation in July 2002 (FAO 2003b) defined the scope and approach of future FRAs and recommended that they should be structured along the framework of “Criteria” common to the nine regional processes on Criteria and Indicators (C&I) for Sustainable Forest Management (SFM). This recommendation has been reinforced by the international conference on C&I for SFM in February 2003 (CICI, 2003) and COFO 2003 (FAO 2003b). This development represents a strong move to establish linkages between politically defined C&I and technically specified FRA. This helps to define the objective of the global FRA more clearly to make it possible to review sustainability of forests at the global level.

1.3 Objectives of country reporting in FRA 2005

The objective for the country reporting in FRA 2005 are three fold. First is to produce by 2005 a comprehensive update and refinement of FRA 2000, structured around the core set of global variables and the six common thematic areas (criteria) for sustainable forest management focussing on the trend information. The second is to involve national institutions, experts and other stakeholders in the collection, analyses and validation of national information to secure national ownership of results. The third is to report all information transparently and with complete documentation and analyses of the source data. Accordingly, this country report follows the format of a working paper as suggested by FAO in its “Guidelines for Country Reporting”(FRA Working Paper 71a) and has following two distinct elements and associated reporting steps.

Table 2: Two Steps in Country Reporting

Reporting step	Contents
1. National data for Global tables	National Reporting Tables containing national data, transformation of national data to global data tables, preferably electronic, containing source references, source data, and reclassifications leading into estimates for the country for each global table.
2. Country report by Thematic Areas	Short report following a predefined outline that builds on the defined Thematic Areas (Criteria) of SFM. The report shall contain additional information relevant in the country for each Theme.

1.4 National Information Development Process

The principle to combine sustainable development and management of forest with their conservation in South Africa is enshrined within the National Forest Act (NFA No.84 of 1998). The Act mandates the Minister to monitor the forest according to national Criteria and Indicators and report every three years to Parliament on matters derived from monitoring. Reporting obligations are not only confined to monitoring forests for sustainable management and policy review, but extend to other obligations such as the Human Rights Commission, National Environmental Management Act, global FRA and climate change.

The Department of Water Affairs and Forestry initiated the first National Forest Inventory, National Classification Systems for woodlands and natural forest as well as development of criteria and indicators for sustainable forest management in 2000. National data for natural forest was obtained through satellite images procured from different sources whilst data for woodlands was obtained from the National Land Cover survey. Information on plantations has been collected, through the use of questionnaires, annually over a number of years. This commercial round wood timber statistics is published annually by the Department.

This National Reporting Table first presents global terms and definitions followed by the national terms and definitions, national data and then transformation to match global specification for four classes (Forest, Other Wooded land, Other Land with Trees, other Land) as defined by global FRA.

2. National reporting tables

Table 3 National Reporting Tables

No.	Title of the Table	Unit of data	Global Variables (Number of Variables)
1	Extent of Forests	000 ha	Forests, Other Wooded Land, Other land with Trees, Other Land, Inland Water. (5)
2	Ownership	000 ha	Public, Private , Other or unspecified (3)
3	Designation	000 ha	Production Forests, Protective forests, Conservation Forests, Social Services Forests, Multiple Objective Forests, Protective other Wood Lands, Conservation Other Wooded Lands, Social Services Other Wooded lands, Multiple Objective Other Wooded Lands. (9)
4	Characteristics	000 ha	Primary Forests, Modified Forests, Semi-natural Forests, Productive Forest Plantation, Protective Forest Plantation, Primary “Other Wooded Land, Modified “Other Wooded Land”, Semi-natural “Other Wooded Land”, Protective “Other Wooded Land” Plantation. (9)
5	Forest Growing Stock	million Cubic M	Growing Stock, Commercial Growing Stock .(2)
6	Forest Biomass	million Metric T (Oven Dry)	Woody Biomass, Above Ground Tree Biomass, Below Ground Tree Biomass. (3)
7	Forest Carbon	million Metric T	Carbon in Woody Biomass, Carbon in Above Ground Tree Biomass, Carbon in Below Ground Tree Biomass, Soil Carbon (4)
8	Disturbances to Health and Vitality of Forests	000 ha	Forest Fires, Forest Insects, Forest Diseases. (3)
9	Forest Tree Species	Number	Inventoried Forest Tree Species, Endangered Forest Tree Species (2)
10	Forest Composition	million Cub M	Growing stock of each of the ten most frequent species and combined growing stock of the rest. (11)
11	Wood Removal	000 Cubic M	Industrial Round Wood, Wood Fuel. (2)
12	Value of Primary Wood Supply	National Currency	Value of Industrial Round Wood, Value of Wood Fuel. (2)
13	NWFP Removal	Metric T	NWFP removal under each of the 18 groups of NWFP (1)
14	Value of NWFP	National Currency	Value of NWFP supply under 18 groups of NWFP (1)
15	Sites for Social Functions	Number in 000	Sites for Social Function, Visitors. (2)
16	Employment through Primary Activities	Million Person Years	Employment through Industrial Round Wood Supply, Wood Fuel Supply, NWFP Collection, Silvicultural Activities, Other Primary Activities (5)

T1. Extent of Forests and Other Wooded Lands

The information on “extent of forests” is necessary for assessment of state and change in forest resources (including goods and services provided by forests) on a global basis. It helps to develop trends of expansion or deforestation of forests and review the sustainability of forests. It facilitates establishing links between national and global classification of extent of forests.

A. Global Classification and Definitions (FRA 2005)

Forest	Land under forestry or no land use, 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> .
Other Wooded Land	Land under forestry or no land use, 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.
Other Land with Tree Cover	The lands primarily not under forests having more than 0.5 hectares with a canopy cover of more than 10 percent of trees able to reach a height of 5 m at maturity. It includes trees outside forests.
Other Land	Land not classified as “forest”, “other wooded land” or “other land with tree cover”.
Inland Water bodies	Inland water bodies generally include major rivers and lakes.

Source: FAO. 2004. Terms and Definition FRA-2005. FRA Working paper 73. Rome

B. National Data Sources

Reference of the Source Information	Reliability* (H/M/L)	Variables	Years
Low, A.R. & Rebelo, A.G. 1996. Vegetation of South Africa, Lesotho and Swaziland. A companion to the vegetation map of South Africa, Lesotho and Swaziland. Dept. of Environmental Affairs & Tourism, Pretoria.	Vegetation map	Woodlands; Natural Forest and Plantations	1996
C.M., Cawe, S.G. & Geldenhuys, C.J. 1999. Review of the definitions and classifications of South African indigenous forests and woodlands. Report ENV-P-C 99007, CSIR, Pretoria. 33 pp.	References	Woodlands and natural forests	
Von Maltiz G. 2002. Classification System for South African Indigenous Forests Department of Water Affairs and Forestry.	National Land Cover Map	Natural Forests	1999
Willis, C. 2002 National woodland Classification. Department of Water Affairs and Forestry.	National Land Cover Map	Woodlands	1999
Thompson, M.W. 1999. South African National Land-Cover Database Project. Data Users Manual. Final Report (Phases 1, 2 and 3). CSIR Report No. ENV/P/C 98136. 88 pp.	National Land Cover Map	Natural forests; Woodlands; Plantations	1999

(from previous)

Source	Reliability	Variable	Year
Department of Water Affairs and Forestry. 2000. Revised commercial timber resources and round wood processing in SA 1990/91 and commercial timber resources and round wood processing in SA 2000/01. Department of Water Affairs and Forestry, Pretoria.	H	Plantations	Annual
National Forest Act. 1998. Government Gazette No.84, Republic of South Africa.			
Department of Water Affairs and Forestry. 2002. National Forest Inventory	H	Natural Forest	2000
Department of Water Affairs and Forestry. 2002. Unpublished state of the forest report for South Africa.	H	Natural Forest, woodlands, plantation and policy and legislation	Available information at the time of compiling
Department of Agriculture. 2001 Trends in the Agricultural Sector. Department of agriculture.	H		2001
Department of Environment Affairs. 1986/87. Annual Report: Cape & Transvaal Printers (Pty) Ltd, Cape Town for the Government Printer, Pretoria.	H	Commercial and indigenous forest statistics	1986/87
Le Roux, P.J. 1979. Supply of fuelwood for rural populations in South Africa. (Paper presented by G.N Wagener at the seventh meeting of the SARCCUS standing Committee for Forestry)	H	Fuelwood	1979
South African Journal of Science. February 2000. Vol. 96. National Research Council, Pretoria.	H	Land use area in South Africa	2000
Thompson, M. 1999. A standard land-cover classification scheme for remote sensing application in South Africa. Forestek. CSIR, Pretoria.	H	Forest definitions	2000
South African Journal of Science. February 2000. Vol. 96 of 2. National Research Council, Pretoria.	H		

C. National Classification and Definitions

Definition of Forest and Woodlands	All wooded areas with greater than 10% tree canopy cover ¹ , where the canopy is composed of mainly self-supporting single stemmed ² , woody plants >5m in height. Essentially indigenous tree species ³ growing under natural or semi-natural conditions (although it may include some localised areas of self-seeded exotic species. Excludes planted forests (and woodlots). Typically associated with Forests and Savannah biomes in South Africa.
Definition of Forest	Tree canopy>70%. A multi-strata community, with interlocking canopies, composed of canopy, sub canopy, shrub and herb layers
Definition of Woodland	Tree canopy cover between 40-70%. A closed-to-open canopy community, typically consisting of a single tree canopy layer and a herb (grass)layer
Definition of Wooded Grassland	Tree canopy cover between 10-40%. An open-to-sparse canopy community, typically consisting of a single tree canopy layer and a herb (grass layer)
Definition of Thicket, Bush land, scrub Forest and High Fynbos	Communities typically composed of tall, woody self-supporting, single and multi-stemmed plants (branching at or near ground), with, in most cases no clearly definable structure. Total canopy cover>10%, with canopy height between 2-5m.

¹ Canopy cover refers in all cases to projected canopy cover.

² Or a few definitive trunks branching above ground level.

³ Indigenous refers to all cases to plant species that occur naturally within southern Africa.

(from previous)

Thickets	Areas of densely interlaced trees and shrub species (often forming an impenetrable community). Composed of multi-stemmed plants with no clearly definable structure or layers, with >70% cover. A typical example would be Valley Bushveld and tall Fynbos. Dense bush encroachment areas would included in this category
Definition of Bush land	Similar to “thicket, but more open in terms of canopy cover levels. Composed of multi-stemmed plants with no definable structure or layers, and with <70% cover. An example would be Mopane Bush.
Definition of Herb land	Communities dominated by low, non-woody, self-supporting, non-grass like plants, between 0.2-2m in height. Total tree cover <10%. Typical Vegetation examples are found in Namaqualand, and weed ‘dominated degraded areas.
Definition of Grassland	All area of grassland with less than 10% tree and/or shrub canopy cover, and greater than 0.1% total vegetation cover. Dominated by grass-like non-woody, rooted herbaceous plants. Typically associated with the Grassland and Savannah Biomass.
Definitions of Forest Plantations	All areas of systematically planted, man-managed tree resources composed of primarily exotic species (including hybrids). Category includes both young and mature plantations that have been established for commercial timber production, seedling trials, and woodlots/windbreaks of sufficient size to be identified on satellite imagery. Unless otherwise sated, Levels 1 & 2 includes clear felled stands within plantations. Excludes all non-timber based plantations such as tea and sisal, as well as orchards used in production of citrus or nut crops. Level 1 category will include associated land-cover/use such as roads, fire-breaks and building infrastructure if these are too small to be clearly mapped off the satellite imagery.
Definitions of wetlands	Natural or artificial areas where the water level is at (or very near the land surface) on a permanent or temporary basis, typically covered in either herbaceous or woody vegetation cover. The category includes fresh, brackish and salt water conditions.
Degraded Land	Permanent or seasonal man-induced areas of very low vegetation cover (i.e. removal of tree, bush and /or herbaceous cover) in comparison to the surrounding natural vegetation cover. Category includes major erosion scars (i.e. sheet and gully erosion) (included under agricultural land)
Definition of Cultivated Land	Areas of land that is ploughed and/or prepared for raising crops (excluding timber production). The category includes areas currently under crop, fallow land and land being prepared for planting
Others	
Definitions of Water bodies	Areas of (generally permanent) open water. The category includes natural and man-made water bodies, which are either static or flowing, and fresh, brackish and salt water conditions
Definition of mines and quarries	Areas in which mining activity has been done or is being done. Includes opencast mines and quarries, as well as surface infrastructure, mine dumps etc, associated with underground mining activities.
Definitions of Barren Lands	Non-vegetated areas, or areas of very little vegetation cover (excluding agricultural fields with no crop cover, and open cast mines and quarries), where the substrate or soil exposure is clearly apparent.
Definition of Forest	Includes: (a) a natural forest, a woodland and a plantation; (b) the forest produce in it; (c) the ecosystem which it makes up.
Definition of a natural Forest	A group of indigenous trees whose crowns are largely contiguous: or which has been declared by the Minister to be a natural forest under section 7(2).

D. National Data

Table: National data for 1987

Name of variable	1987 ⁴	1987 ⁵	Reclassification National Classes (in ha)
Indigenous Forest	507,492	8,552,892	Forest and woodlands
Woodlands (1979)	32,422,152	24,376,752	Woodlands
Plantations	1,182,476	1,182,476	Plantations
Arable land	1,182,476	73,843,780	Agricultural land
Permanent	830,000	13,944,100	Other land
Permanent pasture	67,490,404	121,900,000	Total
Other land (1993)	18,285,000		
Total land area	121,900,000		

Table: National data for 2000

Name of variable	2000	Reclassification ⁶ (in ha)	2000
Forest and Woodlands	7,460,300	Forest and woodlands	7,460,300
Thickets and bush land	21,524,800	Woodlands	21,524,800
Scrubland and low fynbos + grassland	44,999,940	Plantations	1,351,760
Herb land	244,600	Agriculture +urban built +wetlands	78,115,200
Forest plantation	1,351,760	Other land	13,847,940
Cultivated lands	14,920,600	Total	122,300,000
Degraded lands	6,115,000		
Other land	25,683,000		
Total	122,300,000		

Data for the National Forestry Inventory was derived from different data sources. Field verification was done for most provinces except the Eastern Cape.

E. Calibration

National Classes	1987	2000
Forest and woodlands	8,567,205	7,448,344
Woodlands	24,417,546 ⁷	21,490,304
Plantations	1,184,455	1,349,594
Agriculture +urban built	73,967,358	77,990,011
Other land	13,967,435	13,825,747
Total	122,104,000	122,104,000

⁴ Annual Report (DEAT).

⁵ 1987 reclassified according to CSIR definitions.

⁶ CSIR data slightly reorganised to summarise agricultural data and other land.

⁷ Estimation obtained from Le Roux paper in 1979.

F. Estimation and Forecasting

	1990 ⁸	2000	2005
Forest and woodlands	8,309,013	7,448,344	7,018,019
Woodlands	23,742,029	21,490,304	20,364,442
Plantations	1,184,455	1,349,594	1,413,104
Agricultural land +urban built	74,933,765	76,129,068	79,537,184
Other land	13,934,738	13,825,747	13,771,251
Total	122,104,000	122,104,000	122,104,000

G. Reclassification into FRA 2005 Classes

Table: Reclassification (percentage allocation) into FRA 2005 classes

Reclassification	Forest	Other wooded lands	Other lands with tree cover	Other lands	Inland Water
Forest and woodlands	100%				
Woodlands		100%			
Plantations	100%				
Agricultural land +urban built			100%		
Other land				99.96%	0.4%

H. National Information for FRA 2005 Global Tables

Table: Input to Global Reporting Table T1

FRA 2005 Classes (in ha)	1990	2000	2005
Forest	9,493,467	8,797,938	8,431,123
Other wooded land	23,742,029	21,490,304	20,364,442
Other wooded land with tree cover	74,933,765	77,990,011	80,025,148
Other land	13,446,773	13,337,782	12,795,322
Inland Water	487,965	487,965	487,965
Total	122,104,000	122,104,000	122,104,000

⁸ Estimation obtained from 1986/87 DEAT annual report and FAO year book.

T2. Ownership of Forests and Other Wooded Lands

The information on “ownership” is important for policy, institutional and management purposes. It basically defines the boundaries and location of the authority and control over forest and tree resources.

A. Global Classification and Definitions (FRA 2005)

Public Ownership	The ownership of State (national, state and regional governments) or government-owned institutions or corporations or other public bodies including cities, municipalities, villages and communes.
Private Ownership	The right of “ownership” of “Forests” and “Other Wooded Lands” with individuals, families, private co-operatives, corporations, industries, religious and educational institutions, pension or investment funds, and other private institutions.
Other or Unspecified Ownership	The “Other” or “Unspecified ownership” is one that is not classified either as “public ownership” or as “private ownership”.

Source: FAO. 2004. Terms and Definition FRA-2005. FRA Working paper 73. Rome

B. National Data Sources

No data available

C. National Classification and Definitions

Table: National classification and definitions of Ownership

Definition of a “registered owner”	
1998	means an owner as defined in section 102 of the Deeds Registries Act, 1937 (Act No.47 of 1937)
Definition of state forest	
1998	(i) State land, other than trust forests, acquired or reserved for forestry in terms of the Act or any previous legislation, unless it has been released under section 50 (3) , (ii) designated as demarcated State forests or similar designation in terms of any previous legislation, unless it was withdrawn from demarcation and is no longer used for forestry and trust forests This includes State plantation, State sawmills and State timber preservation plants, land controlled and managed by the Department for research purpose or tree nursery, State land set aside by previous legislation for the prevention of soil erosion or sand drift and area referred to in this paragraph whereby the ownership or control of which is transferred to a person or organ of State contemplated in Section 53(2)(g) (i)
Prior 1998	State conservation areas and indigenous state forests
Definition of Private ownership	
1998	A registered owner as defined in section 102 of the Deeds Registered Owner and who is not State” nor communal”
Prior 1999	Private individuals and companies, as well as urban land
Definition of Communal ownership	
Prior 1999	Areas previously within homelands

D. National Data

National Class (in ha)	State		Private		Communal	
	1986/87	2000	1986/87	2000	1986/87	2000
Forest	507,496 ⁹	287,845	0	120,901	?	124,923
Woodlands	5 270,784 ¹⁰	6,956,152	2,067,574 ¹¹	20,813,568	?	1,532,596
Plantations	332,860	380,663	849,616	971,099	?	

E. Calibration

National Class (in ha)	State ownership		Private Ownership		Communal ownership	
	1986/87	2000	1986/87	2000	1986/87	2000
Forest	508,343	287,384	0	124,722.8	?	120,707.2
Woodlands	5,279,605	6 945,004	2,071,034	20,780,212.0	?	1,530,140.0
Plantations	333,417	380,663	851,038	971,098.0	?	

F. Estimation and Forecasting

	1986/87		2000	
	Public	Private	Public	Private
Forest	508,345	0	408,746	124,923
Woodlands	8,475,144 ¹²	20,780,212	8,475,144 ¹³	20,780,212
Plantations	343,161	952,370	343,161	971,098

G. Reclassification into FRA 2005 Classes

Table: Reclassification (Percentage allocation) into FRA 2005 classes

	Public ownership ¹⁴	Private Ownership ¹⁵
Forest	79%	21%
Woodlands	30%	70%
Plantations	28%	72%

H. National Information for FRA 2005 Global Tables

Table: Input for Global Reporting Table 2

Ownership	Area in 000 ha			
	1990		2000	
	Forest	OWL	Forest	OWL
1. Under Public Ownership	7,457	7,122	6,686	6,447
2. Under Private Ownership	2,035	16 619	2 ,111	15,043
Total	9,493	23,742	8,797	21,490

⁹ Figure includes State forest nature reserves 112,727 ha and Wilderness areas = 258,441 ha.

¹⁰ Department of Environment annual report: protected areas in South Africa fig. 3, mountain catchments areas excluded.

¹¹ Private areas.

¹² Estimates.

¹³ Figure includes woodlands under communal areas =1532596 ha.

¹⁴ Percentage derived from unpublished state of the forest report in South Africa.

¹⁵ Percentage derived from unpublished state of the forest report in South Africa.

T3. Designation of Forests and Other Wooded Lands

The information on “designation” or current management objective is essential for development of efficient planning, design and assessment of cross-sect oral impacts, and implementation of forest policy. The “designation” defines boundaries for planned interference in context of the conditions in which “Forests” and “Other Wooded land” reside.

A. Global Classification and Definitions (FRA 2005)

Protective Forest	Forests where service of protection to soil and water is the predominant management objective.
Conservation Forest	The “Forests” with predominant management objective of “conservation of biodiversity”.
Social Services Forest	The “forests” where provision of social services (recreation, spiritual, and cultural) is the predominant management objective.
Multiple Objective Forest	The “forests” where a combination of production of goods, protection of soil and water, conservation of biodiversity and provision of social services is the predominant management objective.
Protective “Other Wooded Lands”	The “Other Wooded Land” with predominant management objective of providing service of protection to soil and water.
Conservation “Other Wooded lands”	The “Other Wooded Lands” with predominant management objective of “conservation of biodiversity”.
Social Service “Other Wooded lands”	The “Other Wooded Land” with predominant management objective of providing social services (recreation, spiritual, and cultural).
Multiple Objective “Other Wooded lands”	The “Other Wooded Land” where a combination of production of goods, protection of soil and water, conservation of biodiversity and provision of social services is the predominant management objective.

Source: FAO. 2004. Terms and Definition FRA-2005. FRA Working paper 73. Rome

B. National data Sources

Source	Reliability	For	Year
Bailey et al. 1999. <i>Guide to and summary of the meta database pertaining to selected attributes of South African Indigenous Forest and Woodlands</i> , Department of water Affairs and Forestry unpublished report, South Africa.	Reliable	Designation for woodlands	1999
Vermeulen, W.J. 1999. Management classification of Southern cape and Tsitsikama forest, South Africa.	Reliable	Classification of forest	1999

C. National Classification and Definitions

There are no national classification and definition. The definitions used nationally, are the same as IUCN (below).

<p>Category I: Strict nature reserves/ Wilderness areas (Scientific Reserves)</p>	<p>Protected area managed mainly for science or wilderness protection. A scientific reserve is an area of land and/ or sea possessing some outstanding or representative ecosystems, natural features and/ or species of flora and/ or fauna and/ or cultural resources of scientific importance, available primarily for scientific research and/ or environmental monitoring (IUCN, 1994). They often contain fragile ecosystems or life forms, areas of important biological or geological diversity, or areas of particular importance to the conservation of genetic resources. Public access is generally not permitted. Natural processes are allowed to take place in the absence of any direct human interference, tourism and recreation (FRA 2000). A wilderness area is a large area of unmodified land, or land and water, retaining its natural character and influence, without permanent physical structures or significant habitation, which is protected and managed to preserve its natural conditions. The area may contain ecological, geological, cultural or other features of scientific, educational, scenic or historic value (IUCN, 1994).</p>
<p>Category II: National Parks and equivalent reserves</p>	<p>Protected area managed mainly for ecosystem protection and recreation. A national park or equivalent reserve is a relatively large, outstanding natural area of land and/ or sea designated to protect the ecological integrity of one or more ecosystems for this and future generations to exclude exploitation or intensive occupation of the area and to provide a foundation for spiritual, scientific, educational, recreational and cultural opportunities for visitors (IUCN, 1994).</p>
<p>Category III: Natural monument and areas of cultural significance</p>	<p>Protected area managed mainly for conservation of specific natural features. A natural feature or a feature of cultural significance or both or an area of outstanding or unique scenic, scientific, educational or inspirational value (IUCN, 1994). This category normally contains one or more natural features of outstanding national interest being protected because of their uniqueness or rarity. The areas should be managed to remain relatively free of human disturbance, although they may have recreational and touristy value (FRA 2000).</p>
<p>Category IV: Habitat and Wildlife management areas</p>	<p>Protected area managed mainly for conservation through management intervention. The areas covered may consist of nesting areas of colonial bird species, marshes or lakes, estuaries, forest or grassland habitats, or fish spawning or sea grass feeding beds for marine animals. The production of harvestable renewable resources may play a secondary role in the management of the area (FRA 2000). Habitat and wildlife management areas are subject to human intervention, based on research into the requirements of specific species for nesting, feeding and survival. Maintaining sustainable plant population as well as protecting rare and threatened species, is an integral function (IUCN, 1994).</p>
<p>Category V: Protected landscape/ seascapes</p>	<p>Protected areas managed mainly for landscape/seascape conservation and recreation. The diversity of areas falling into this category is very large (FRA 2000). Areas which are a product of the harmonious interaction of people and nature. They may demonstrate cultural manifestations such as customs, beliefs, social organization or material traits as reflected in use patterns. These areas are often scenically attractive or aesthetically unique patterns of human settlement. Traditional practices associated with agriculture, grazing or fishing are evident (IUCN, 1994).</p>
<p>Category VI: Sustainable use area/Managed resource protection area</p>	<p>Protected area managed mainly for the sustainable use of natural ecosystems. These areas normally cover extensive and relatively isolated and uninhabited areas having difficult access, or regions that are relatively sparsely populated but are under considerable pressure for colonization or greater utilization (FRA 2000). It is a predominantly natural area and/ or sea, designated and managed to ensure the long-term protection and maintenance of its biological diversity, while providing a sustainable flow of natural products (IUCN, 1994).</p>

D. National Data¹⁶

National Class (in ha)	1986/87
Production Forest (natural forest in Knysna) ¹⁷	45,868
(Production Forest)Plantations	1,184,455
Nature reserves/wilderness areas	112,727
Conservation forest	258,441
Nature conservation under state control	4,651,905
Private area with conservation purpose	2,067,574
Unknown	1,414,398
Total all forest and woodlands	9,735,368
Multi-purpose area	1,198,879
Unknown	2,321,661
Total woodlands	24,376,752

Table: Designation in 2000

National classes (in ha)	2000
(Production Forest) natural forest (Knysna)	35,706
(Production Forest) Plantations	1,349,594
Nature reserves/wilderness areas	112,727
Conservation forest	258,441
Category I: Strict nature reserves	3,257,214
Category II: National Parks and equivalent	2,875,434
Category III: Natural monument and areas of cultural significance	76,080
Category IV: Habitat and Wildlife Management	757,596
Category V: Protected landscape/seascape	0
Category VI: Sustainable use area/Managed resource protection area	75,146
Total Forest and Woodlands	8,797,938
Total woodlands	21,490,304

E. Calibration

Table: Calibration for 1987 (in ha)

1987	Area in ha
Production Forest(Knysna) ¹⁸	45,945
Production Forest(Plantation)	1,186,437
Nature reserves	112,916
Wilderness area	258,874
Nature conservation under state control	4,659,690
Private area with conservation purpose	2,071,034
Unknown	1,412,131
Total all forest and woodlands	9,747,026
Other wooded lands	
Multi-purpose area	24,417,546

¹⁶ Figures includes total area protected

¹⁷ Timber production 9,271ha; Protection 16,033 ha; Nature reserve 9,879 ha; recreation 127 ha, research 441 ha (figures from Vermeulen, W.J. 1999.)

¹⁸ Annual report DEAT 1986/87.

Table: Calibration for 2000 (in ha)

2000	Area in ha
Production Forest (Knysna)	35,649
Production Forest (Plantations)	1,347,431
Nature reserves	112,916
Wilderness area	258,874
Other wooded lands	
Category I: Strict nature reserves	3,257,214
Category II: National Parks and equivalent	2,875,434
Category III: Natural monument and areas of cultural significance	76,080
Category IV: Habitat and Wildlife Management	756,382
Category VI: Sustainable use area/Managed resource protection area	75,146
Total Forest and Woodlands	8,797,938
Total woodlands	21,455,863

G. Reclassification into FRA 2005 Classes

Table: Reclassification (percentage allocation) into FRA 2005 classes

Designation	Production Forest	Protective Forest	Conservation forest	Multiple Objective forest
Natural forest (Knysna)	26%	46%	28%	0.30%
Plantations	100%			
Nature reserves/wilderness areas			70%	30%
National parks and equivalent			60%	40%
Natural monument and areas of cultural significance			20%	80%
Habitat and wildlife Management			10%	90%
Sustainable use area				100%
Unknown				

H. National Information for FRA 2005 Global Tables

Table: Reclassification of 1987 National Classes into GFRA

National class 1987 (in ha)	Production Forest	Protective Forest	Conservation forest	Multiple Objective forest
Production Forest	1,1945.7	21,134.7	12,864.6	137.835
Plantation	1,186437			
nature reserves(State forest)			79,041.2	45,166.4
Wilderness area(State Forest)			181,211.8	77,662.2
Nature conservation under state control			3,261,783	1,397,907
Private area with conservation purpose			1,242,620.4	828,413.6
Unknown status of Forests				1,412,131
Sustainable use				24,417,546
Total	1,198,382.7	21,134.7	4,777,521	2,349,287.035

Table: Reclassification of 2000 National Classes into GFRA

National Classes 2000	Production Forest	Protective Forest	Conservation forest	Multiple Objective forest
Production Forest	9,268.74	16,398.54	9,981.72	106,947
Plantation	1,347,431			
nature reserves(State forest)			79,041.2	33,874.8
Wilderness area(State Forest)			181,211.8	77,662.2
Strict Nature reserves (OWL)			2,280,049.8	977,164.2
National parks and equivalent			1,725,260.4	1,150,173.6
Natural monument and areas of cultural significance			15,216	60,864
Habitat and wildlife Management			75,638.2	680,743.8
Sustainable use				75,146
Unknown				
Total	1,356,699.74	16,398.54	4,366,399.12	3,055,735.54 7

Table: Transformation into GFRA Tables

GFRA Classes	1990	2000	2005
Production Forest	1,198,382.7	1,356,699.74	1,435,850.24
Protective Forest	21,134.7	16,398.54	14,022.44
Conservation forest	4,777,521	4,366,399.12	4,160,834.17
Multiple Objective forest	3,761,418.035	3,055,735.55	2,702,891.9
Total Forest and woodlands	9,758,456.435	8,795,232.95	8,313,598.75
Unknown status OWL	23,734,079.16	21,455,863	20,316,746.9

T4. Characteristics of Forests and Other Wooded Lands

The information on “forest characteristics” is essential for development of appropriate efficient silvicultural and management practices to ensure and promote sustainability of forest resources. These practices will define the future structure and composition of forest resources and their ability to provide goods and services.

A. Global Classification and Definitions (FRA 2005)

Primary Forests	Forests of native species, where ecological processes are undisturbed by human activities. Forest management plan may or may not exist.
Modified Natural Forests	Forests of native species or naturally regenerating introduced species, where ecological processes have been disturbed by human activities and it includes forests established through natural and or assisted natural regeneration. Forest management plan may or may not exist
Semi-Natural Forests	The “Forests” of native species or naturally regenerating introduced species established through natural or assisted natural regeneration. The forests are under intensive forest management.
Production Plantations in Forests	The “Forests” of “introduced species”, established through planting or seeding mainly for production of wood or non wood goods.
Protective Plantation in Forests	The “Forests” of introduced species, established through planting or seeding mainly for provision of forest services, e.g. soil and water conservation, pest control, and conservation of (habitat) biological diversity.
Primary “Other Wooded Land”	The “Other Wooded lands” of native species, where ecological processes are undisturbed by human activities. Forest management plan may or may not exist.
Modified “Other Wooded Land”	The “Other Wooded land” of native species or naturally regenerating introduced species, where ecological processes have been disturbed by human activities and it includes “Other Wooded Land” established through natural and or assisted natural regeneration.
Semi-Natural “Other Wooded Land”	The “Other Wooded Land” of native species or naturally regenerating introduced species established through natural or assisted natural regeneration. Such “Other wooded lands” are under intensive management although a formal management plan may or may not exist.
Protective Plantation in “Other Wooded Lands”	The “Other Wooded Lands” of “introduced species”, established through planting or seeding mainly to provide service of protection to soil and water resources.

Source: FAO. 2004. Terms and Definition FRA-2005. FRA Working paper 73. Rome

B. National Data Sources

As in T1

C. National Classification and Definitions

No appropriate national definition exist, especially for indigenous forest however, in order to fill in this table, some correlation between some of the national definition as defined under the national classification system by the CSIR and the GFRA definitions was done.

FRA 2005 classes	Assumption	Definitions
Primary Forest	Nature reserves and Wilderness areas	Same as in T3
Semi-Natural forest	Forest and Woodlands	As in T1
Production Plantations in forest	Plantations	As in T1
Protective plantations in Forest	Special Management Zones	Riparian areas which are kept clear of weeds and managed as Special Management Zones - no trees are planted in them and they are managed for the conservation of water and biodiversity ¹⁹
Primary Other wooded land	Strict nature reserves / Wilderness areas (Scientific Reserves) for woodlands	As in T3
	Thicket, Bush land, Scrub forest and high fynbos	As in T1

D. National Data

National Classes (in ha)	1987	2000
Nature reserves	112,727	112,727 ²⁰
Wilderness area	258,441	258,441 ²¹
Forest and woodland	8,134,315	7,039,278
Plantations	1,182,476	1,351,760
Total Forest	9,735,368	8,812,060
Strict nature reserves	3,710,722	3,271,336
Thickets, Bush land, scrub forest and high fynbos	20,666,029	18,218,968
Total woodlands	24,376,752	21,490,304

E. Calibration

National Classes (in ha)	1987	2000
Nature reserves	112,727	112,727
Wilderness area	258,441	258,441
Forest and Woodland	8,134,315	7,072,840
Plantations in forest	1,183,309	1,353,930
Total Forest	9,719,103	8,826,205
Strict nature reserves	3,704,522	3,276,587
Thickets, Bush land, scrub forest and high fynbos	20,631,503	18,248,213
Total woodlands	24,336,025	21,524,800

¹⁹ Forest South Africa expert opinion 500,000 to 600,000 hectares of land which, by law, cannot be planted (in terms of planting permits conditions).

²⁰ Assuming no change in status.

²¹ Same as footnote 20.

F. Estimation and Forecasting

National Classes (in ha)	1990	2000	2005
Nature reserves	112,727	112,727	112,727
Wilderness areas	258,441	258,441	258,441
Forest and Woodlands	8,134,315	7,072,840	6,690,996
Plantations	1,220,516	1,353,930	1,420,627
Total Forest	9,493,468	8,797,938	8,482,791
Strict nature reserves ²²	3,605,768	3,276,587	3,111,996
Thickets, Bush land, scrub forest and high fynbos	20,081,509	18,248,213	17,331,559
Total woodlands	23,687,277	21,524,800	20,443,555

G. Reclassification into FRA 2005 Classes

Table: Reclassification (Percentage allocation) into FRA 2005 classes

National Classes	Primary Forest	Semi-nat. Forest	Production Plantations	Primary OWL	Semi-nat. OWL
Strict nature reserves/wilderness area	100%				
Conservation Woodlands				100%	
Plantations in forest			100%		
Thickets, Bush land, scrub forest and high fynbos					100%

H. National Information for FRA 2005 Global Tables

National Classes (in ha)	1990	2000	2005
Primary Forest	371,168	371,168	371,168
Primary other wooded land	8,225,012	7,394,074	7,011,218
Production Plantation	1,220,516	1,353,930	1,420,627
Total Forest	9,493,468	8,797,793	8,482,791
Semi-natural Other wooded lands	23,687,277	21,524,800	20,443,555

²² Percentage from Bailey Report.

T5. Growing stock

The information on “growing stock” is essential to understand dynamics of forest stands, their productive capacity and to manage their use within limits of sustainability defined by their dynamics of growth.

A. Global Classification and Definitions (FRA 2005)

Growing Stock	Volume of all living trees more than X cm in diameter at breast height (or above buttress if these are higher) measured over bark from ground or stump height to a top stem diameter of Y cm, excluding or including branches to a minimum diameter of Z cm. Excludes: smaller branches, twigs, foliage, flowers, seeds, stump and roots.
Commercial Growing Stock	The part of the growing stock of species, considered as actually or potentially commercial under current market conditions, measured above a minimum say “X cm” diameter at breast height. Includes: all potentially commercial (merchantable) species for domestic or international markets.

Source: FAO. 2004. Terms and Definition FRA-2005. FRA Working paper 73. Rome

B. National Data Sources

Reference	Reliability* (H/M/L)	Variables	Years
GELDENHUYS, C.J. 1999. The need for monitoring recruitment, growth and mortality in the indigenous forests: Example from Northern Province, South Africa			
GELDENHUYS, C.J. 1998. Growth, in growth and mortality patterns over stands and species in the Groenkop forest study site, George. Report ENV/P/C 98001, Division of Water, Environment & Forestry Technology, CSIR, Pretoria. 58 pp.	Reliable	Growing stock by species in Groenkop	1980-1997
Expert opinion for 2000 used for 1990			

C. National Classification and Definitions

No national definitions available

D. National Data

National classes	1990			2000		
	Area '000' ha	Tot. vol. Mm ³	Vol/ha m ³	Area '000' ha	Vol. Mm ³	Vol/ha
Natural forests	8,309	324	39	7,448	290	39
Total plantations	1,241	449	350	1,349	472	350
Total growing stock	9,550	758		8,797	762	
Mean volume			76.8226			86.69

F. Estimation and Forecasting

National class	1990	2000	2005
Growing stock forest	324 Mm ³	290 Mm ³	273 Mm ³
Commercial Growing stock	434Mm ³	472 Mm ³	491 Mm ³
Total growing stock	758 Mm ³	762 Mm ³	764Mm ³

G. Reclassification into FRA 2005 Classes

Table: Percentage allocation into FRA 2005 classes

FRA 2005 classes	Growing stock
Forest	38%
Plantations	62%

H. National Information for FRA 2005 Global Tables

Table: Input for FRA 2005

FRA 2005 class	1990	2000	2005
Growing stock forest	324 Mm ³	290 Mm ³	273 Mm ³
Commercial Growing stock	434Mm ³	472 Mm ³	491 Mm ³
Total growing stock	758 Mm ³	762 Mm ³	764Mm ³

T6. Biomass Stock of Forests

The information on “biomass stocks” is essential to assess the total and the annual capacity of “forests” and Other Wooded Land” to sequester carbon. The annual growth (capacity) defines their sustenance limits of use and management needs and opportunities.

A. Global Classification and Definitions (FRA 2005)

Above Ground Tree Biomass	The mass, expressed as oven-dry weight (including or excluding bark), of the woody parts (stem, bark, branches and twigs) of all living trees excluding stump and roots.
Below Ground Tree Biomass	The mass, expressed as oven-dry weight of below ground woody parts (includes all roots greater than 2 mm in diameter) of all living trees.
Woody Biomass Stock	The mass expressed as oven-dry weight (including bark) of the woody parts (stem, bark, branches and twigs) of all trees, alive and dead, shrubs and bushes, including stumps, roots, deadwood and litter.

Source: FAO. 2004. Terms and Definition FRA-2005. FRA Working paper 73. Rome

B. National Data Sources

No data available

C. National Classification and Definitions

Used density figures from FRA 2000

D. National Data

National	Million tons		
	1990	2000	2005
Tot bio	1,840	1,775	1,692

E. Calibration

No data available

F. Estimation and Forecasting

No data available

G. Reclassification into FRA 2005 Classes

No data available

H. Information for FRA 2005 Global Tables

Table: Input to Global Reporting Tables

National	Million tons		
	1990	2000	2005
Tot bio	1,840	1,775	1,692

T7. Carbon Stock in Forests

The information on “Carbon stock” indicate the contribution of “Forest” and Other Wooded Land” to carbon cycle and is required in international process related to mitigation of climate change like UNFCCC.

A. Global Classification and Definitions (FRA 2005)

Carbon in Woody Biomass	The carbon content in the “Woody Biomass”.
Carbon in Above Ground Tree Biomass	The carbon content in the “Above Ground Tree Biomass”.
Carbon in Below Ground Tree Biomass	The carbon content in the “Below Ground Tree Biomass”.
Soil Carbon	The carbon content in the soil (mineral and organic) material at the depth or layer (X cm) of the soil with bulk density (Y Mg m ⁻³) in “Forest and “Other Wooded Land”.

Source: FAO. 2004. Terms and Definition FRA-2005. FRA Working paper 73. Rome

B. National Data Sources

Estimates used

C. National Classification and Definitions

IPCC definitions used

D. National Data

No data available

E. Calibration

No data available

F. Estimation and Forecasting

No data available

G. Reclassification into FRA 2005 Classes

No data available

H. Information for FRA 2005 Global Tables

Table: Above ground biomass

National	Million		
	1990	2000	2005
Carbon stock above ground biomass	920	887	846

T8. Disturbances affecting Health and Vitality of Forests and Other Wooded Lands

The understanding of the “disturbances” (mainly fire, insects and diseases) is essential to develop appropriate management regimes to contain them and their impact on health and vitality of “Forest” and “Other Wooded lands”.

A. Global Classification and Definitions (FRA 2005)

Forest Fire	An unplanned fire in the “Forest” and or “Other Wooded Land”, whether it broke out inside or outside the “Forest” or the “Other Wooded Land”.
Forest Insect	A forest insect is an animal belonging to the class Hexapoda with its habitat in “Forest” and “Other Wooded Land”.
Forest Disease	A condition caused by living organisms or environmental changes that impairs the normal functions of tree or Forest.

Source: FAO. 2004. Terms and Definition FRA-2005. FRA Working paper 73. Rome

B. National Data Sources

As in T1

C. National Classification and Definitions

No national definitions available

D. National Data

Years	Area in hectares			
	1986/87	1999/00	2000/01	2001/02
Insects	202	41	165	470
Diseases	200	51	202	134
Fire	32,037	20,221	17,266	16,727

E. Calibration

No data available

F. Estimation and Forecasting

National class (in ha)	1990	2000	latest
Insects	202	165	470
Diseases	200	202	134
Fire	32,037	17,266	16,727

G. Reclassification into FRA 2005 Classes

Table: Disturbances (Percentage allocation)

National class (in ha)	Forest	OWL
Insects	100%	
Diseases	100%	
Forest Fire	100%	

H. National Information for FRA 2005 Global Tables

Table: Average area affected by fire (000 ha)

	1990	2000	latest
Forest Fire	32	17	16.7
Other	0.402	0.367	0.604

T9. Forest Tree Species

The information on forest tree species provides much needed information on tree species distribution for addressing many critical issues relating to conservation of biodiversity in Forests. It helps to meet some of the national and international reporting requirements of biodiversity.

A. Global Classification and Definitions (FRA 2005)

Inventoried Forest Tree Species	A “forest tree” species in “Forest” or “Other Wooded Land”, which is measured and recorded separately in a forest inventory.
Endangered Forest Tree Species	A tree species facing a high risk of extinction in “Forest” and “Other Wooded Land” in the near future and included in IUCN list of endangered species.

Source: FAO. 2004. Terms and Definition FRA-2005. FRA Working paper 73. Rome

B. National Data Sources

Source	Reliability	Type of Info.	Year
Southern African Plant Red Data List project. www.sabonet.org/reddatalist/graphic03.html		Threatened species	2000
World Resources. 2000-2001: Forest Ecosystems and threatened Tree Species		Threatened species	1990

C. National Classification and Definitions

Yield regulations	A “forest tree” species in “Forest” or “Other Wooded Land”, which is measured and recorded separately in a forest inventory.
Endangered Forest Tree Species	A tree species facing a high risk of extinction in “Forest” and “Other Wooded Land” in the near future and included in IUCN list of endangered species.

D. National Data

	1987-1993	1995-2000
Number of inventoried species from study growth sites	381	465
	1990	2000
Number of threatened tree species	37	65

E. Calibration

No data available

F. Estimation and Forecasting

No data available

G. Reclassification into FRA 2005 Classes

Table: Reclassification (Percentage allocation) into FRA 2005 classes

Forest Tree Species	Total Number (type) of species	
	1990	2000
Inventoried Forest Tree Species from study growth sites	381	465
Endangered Forest Tree Species	37	65

H. National Information for FRA 2005 Global tables

Forest Tree Species	Total Number (type) of species	
	1990	2000
Inventoried Forest Tree Species	381	465
Endangered Forest Tree Species	37	65

T10. Forest composition

The information on “Forest Composition” is required for understanding dynamics of composition of forests that addresses some critical issues relating to conservation of biodiversity. It also helps in developing efficient management plan for their sustenance in addition to satisfying needs of national and international reporting relating to biodiversity.

A. Global Classification and Definitions (FRA 2005)

Forest Composition	The composition of “growing stock” in “Forest” and “Other Wooded land” by each “inventoried forest tree species”.
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Source: FAO. 2004. Terms and Definition FRA-2005. FRA Working paper 73. Rome

B. National Data Sources

Reference of the Source Information	Reliability* (H/M/L)	For following Variables	For Years
Anonymous: Cost and benefit for carbon sink in Transkei	H	Carbon sink	?

C. National Classification and Definitions

No data available

D. National Data

No information is available for woodlands and indigenous forest at national level

Table: Plantations species mean I increments by 5 cm DBH class

Years	10	15	20	25	30	31	32	33
<i>P.Elliotta</i>	11.25	12.89	13.51	13.46	13.04	12.93	12.82	12.71
<i>P.Taeda</i>	19.2	21.82	22.79	22.7	21.99	21.82	21.65	21.48
<i>P.Patula</i>	16.11	18.56	19.65	19.83	19.47	19.37	19.27	19.17
<i>E.Grandis</i>	21.1	24.8	25.3	24.7	23.6	23.3	23.0	22.7

E. Calibration

No data available

F. Estimation and Forecasting

No data available

G. Reclassification into FRA 2005 Classes

Plantations	Volume/ha	Volume/ha m³/ha
<i>E. grandis</i>	401	638
<i>P. taeda</i>	353.92	587.34
<i>P. patula</i>	301.92	514.54
<i>E. elliotii</i>	209.28	348.4

T11. Wood removal

The table provides information on actual supply of “Round Wood” from “Forests”, “Other Wooded Lands” and “Other Land with Trees” (including Trees Outside Forests). It indicates the economic and social potential and utility of forest tree species in national economy and dependent local communities. It helps to monitor sustained use of tree resources by comparing actual supply with sustainable potential.

A. Global Classification and Definitions (FRA 2005)

Industrial Round Wood Removal	The “round wood” removed (volume in round wood under-bark) from “Forest” or “Other Wooded Land” for production of goods and services other than source of “wood fuel” (“fuelwood”).
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Source: FAO. 2004. Terms and Definition FRA-2005. FRA Working paper 73. Rome

B. National Data Sources

As in T1

C. National Classification and Definitions

No national definitions available

D. National Data

National Classes	Plantation ²³ (vol. in ‘000’ m ³ as round wood under bark)		Indigenous Forest and woodland (vol. in ‘000’ m ³ as round wood under bark)	
	1990	2000	1990	2000
Industrial Round wood removal	13	15		
Firewood	183	187	10,620	12,000
Total	196	202		

E. Calibration

No data available

F. Estimation and Forecasting

Year	Commercial Plantations (1000m ³)			Indigenous and woodlands (1000m ³)		
	1990	2000	2005	1990	2000	2005
Timber	13,962	15,092	15,657			
Firewood	183	187	189	10,620	12,000	12,000

²³ 1979 figure

G. Reclassification into FRA 2005 Classes

Table: Reclassification (Percentage allocation) into FRA 2005 classes

National classes of Round Wood	Percentage of a National Class belonging to FRA 2005 Classes	
	Industrial Round Wood	Wood Fuel (Fuelwood)
Timber harvested	99%	1%
Woodfuel		100%

H. National Information for FRA 2005 Global Tables

Table: Input to Global Reporting Tables

Round Wood Supply	Volume in "million" cubic meters as round wood under bark			
	Forests		Other Wooded land and Trees Outside Forest	
	1990	2000	1990	2000
Industrial Round Wood	14	15		
Wood Fuel (Fuelwood)	0.183	0.187	10.6	12
Total for Country	14.183	15.187	10.6	12

T12. Value of Wood Removal

The value of “Wood Supply” indicates the “economic health” of the “Forest”, “Other Wooded Land” and “Other Lands with Trees” which is basically a function of output and demands of forest products, prices, surplus, employment and other variables. This table deals with the market value (product of price and quantity) of “wood supply”.

A. Global Classification and Definitions (FRA 2005)

Value of Wood Supply	The market value of total annual supply of primary “round wood” (“industrial round wood”, and “wood fuel” or “fuelwood”).
-----------------------------	---

Source: FAO. 2004. Terms and Definition FRA-2005. FRA Working paper 73. Rome

B. National Data Sources

As in T1

C. National Classification and Definitions

No national definitions available

D. National Data

Table: Value of Wood supply (million Rand)

National Class	1990	2000
Industrial Timber	905	2,695

E. Calibration

No data available

F. Estimation and Forecasting

G. Reclassification into FRA 2005 Classes

Table: Percentage of National class belonging/not belonging to FRA 2005 classes

National Class	Belonging to a FRA 2005 Class	Not belonging to a FRA 2005 class
Industrial timber	99.3%	0.07 %

H. National Information for FRA 2005 Global Tables

Table: Value of Round wood supply (million Rand)

Variable	Forests		
	1990	2000	2005
Industrial Round Wood Supply	899	3,243	4,415
Wood Fuel (Fuelwood) Supply ²⁴	12.8	22.9	2,795
Total (Round Wood Supply)	912	3,266	4,443

²⁴ Estimates from Le Roux (1979) and NFAP (1996).

T13. Non Wood Forest Products (NWFP) Removal

The information on “Non Wood Forest Products (NWFP) Supply” demonstrates the potential of forests in providing NWFP and indicates the priority NWFPs deserve in development of management strategies to conserve resources and to sustain and promote livelihoods of local and indigenous people dependent on them.

A. Global Classification and Definitions (FRA 2005)

Non Wood Forest Products Supply	Annual removal of a Non Wood Forest Product (NWFP) from “Forest” and “Other Wooded Land”.
--	---

Source: FAO. 2004. Terms and Definition FRA-2005. FRA Working paper 73. Rome

B. National Data Sources

Reference	Reliability* (H/M/L)	Variables	For Years
Department of Agriculture. 2001. Trends in the Agricultural Sector. http://www.nda.agric.za/docs/Trends2001/trends.htm	Reliable	Food	1996-2001
Pilot country study-South Africa. http://www.fao.org/docrep/X5325e/x5325e07.htm	pilot study	NWFP	1991

C. National Classification and Definitions

No national definitions available

D. National Data

National Class	Quantity in tons					
	1990	1996/97	1997/98	1998/99	1999/2000	2000/01
Avocados	35,000	499,000	571,000	799,000	689,000	715,000
Mangoes	25,000	316,000	417,000	506,000	408,000	464,000
Guavas	40,000	166,000	286,000	181,000	218,000	238,000
Marula fruit	1,700					
Honey	3,200	3,200				
Fish		536,915	387,414	311,237		
wild fruits						173,999
Total	104,900	1,521,115	1,661,414	1,797,237	1,315,000	1,590,999

G. Reclassification into FRA 2005 Classes

Table: Reclassification (Percentage allocation) into FRA 2005 classes

Reclassification	GLOBAL FRA			
	1	4	7	12
Food(vegetal)	100%			
Food(Faunal)		100%		
Cosmetic& medicinal			100%	

H. National Information for FRA 2005 Global Tables

Table: NWFP Collection (000mt)

	1990	2000	latest
1	358,420	5,372,223	5,843,037
4	15,700	19,500	20,000
7			293,000
12	60		
Total	374,180	5,391,723	6,156,037

T14. Value of Non Wood Forest Products (NWFP) Removal

The value of Non Wood Forest Products (NWFP) derived from the “Forest” is an important component of the economic health of forest resources and support to local communities. This information helps in allocation of resources and in priority setting at national level planning (social, economic, sectoral and regional planning).

A. Global Classification and Definitions (FRA 2005)

Value of NWFP Supply	The market value of total annual supply of all primary Non Wood Forest Products (NWFP).
-----------------------------	---

Source: National Data

B. National Data Sources

No data available

C. National Classification and Definitions

No national definitions available

D. National Data

Table: Value of NWFP supply (000 US\$)

National classes	1990	2000	Latest
Food (Vegetal)	US\$	US\$	US\$
Avocados	36,575	13,899	16,919
Mangoes		76,675	89,288
Guavas		139,204	141,844
Marula fruit			
	36,575	229,778	248,051
Food (Faunal)			
Honey	112	300	
Fish			
Palm wine	147		

E. Calibration

No data available

F. Estimation and Forecasting

No data available

G. Reclassification into FRA 2005 Classes

Table: Value of NWFP supply

National classes	1	4	12	16
Food(vegetal)	100%			
Food(Faunal)		100%		
Cosmetic& medicinal			100%	100%

H. National Information for FRA 2005 Global Tables

Table: Input to Global Reporting T14 (in '000' US\$)

FRA 2005 Class	1990 US\$	2000 US\$	Latest US\$
1	167,054	370,093	378,155
4	282.6	36	
12		370,393	
16		800	

T15. Sites for Social Functions in Forests and Other Wooded land

The information on status and trends on allocation (management) and utility of sites in “Forest” and “Other Wooded Land” for addressing social function helps to understand the state and changes in the bondage between the society and the Forest. It also measures the extent to which forest management recognizes and respects social needs.

A. Global Classification and Definitions (FRA 2005)

Sites for Social Functions	A site or facility designated and or managed for cultural, social (recreation and tourism) and spiritual needs in “Forest” and Other Wooded Land”.
-----------------------------------	--

Source: FAO. 2004. Terms and Definition FRA-2005. FRA Working paper 73. Rome

B. National Data Sources

Source	Reliability	Variables	Year
Annual Report 86/87 :Department Of Environmental Affairs (DEAT) Government printers	Reliable	Access to wilderness areas	1986/87
Expert Opinion: 2001 Department of Water affairs and Forestry	Estimates	Number of sites and visit	2002

C. National Classification and Definitions

No national definitions available

D. National Data

Table: Access to wilderness areas (1986/87) and other recreational facilities (2000)

Year		Number of visitors		Number of sites	
1986/87 ²⁵		516,000		8	
2000 ²⁶					
State forest (Knysna)		Other State managed Forest		Private Forest	
N. of visitors	N. of sites	N. of visitors	N. of sites	N. of visitors	N. of sites
260,000	55	120,000	70	40,000	150

Table: Percentage of a National Class belonging to FRA 2005 class

National Classification	FRA Site for Social Services	Non FRA Site class	Total
Wilderness areas	100%		100
State Forests	100%		100

E. Calibration

No data available

²⁵ Annual Report 1986/87, Department of Environment affairs and relates to access to wilderness areas

²⁶ All figures are estimates from South Africa

F. Estimation and Forecasting

No data available

G. Reclassification into FRA 2005 Classes

No data available

H. National Information for FRA 2005 Global Tables

Table: Input to Global Reporting Tables

	FRA Site for Social Services	
	1990	2000
Sites for Social Function	8	242
Visitors	516,832	420,000

T16. Employment in Forest and Other Wooded lands

The information on employment is useful in identifying trends, especially in the context of public expectations, government policies, industry developments and socio-economic dependence.

A. Global Classification and Definitions

Primary Employment	The employment provided within the “Forest and “Other Wooded Land” by activities relating to primary (raw) production of goods, provision of services, and other primary activities.
Primary Activities	The forestry activities within the “Forest” and “Other Wooded Land”. FRA 2005 classifies forestry activities into three broad classes; activities relating to “Wood Supply”, “Non Wood Forest Product Supply” and “Other Primary Activities”.
Other Primary Activities	The forestry activities, within the “Forest” and “Other Wooded Land”, other than those related to “Wood supply” (including “wood fuel” or “fuelwood” supply) and collection of “NWFP”.

Source: FAO. 2004. Terms and Definition FRA-2005. FRA Working paper 73. Rome

B. National Data Sources

Reference	Reliability	Variables	year
The State of Forestry in South Africa: www.polity.org.za/html/govdocs/green_papers/forest2.html	Estimates	Employment	???
Trends in the agricultural Sector: www.nda.agric.za/docs/Trends2001/trends.htm	Reliable	Employment in the food industry	2001

C. National Classification and Definitions

No national definitions available

D. National Data

Table: State and Private employment data for 1990 and 2000²⁷

Employment	1990		2000	
	State	Private	State	Private
Primary Employment ²⁸	80,000	36,000	40,000	25,000
Primary Activities ²⁹ (Traditional healers and gatherers)			100,000	
Other primary activities ³⁰				
Honey production			2,000	
Beverages			200	
Ornaments			250-300	
Tourism in forest related activities			300,000	
Industrial fisheries	28,000		28,000	

²⁷ Figures for food from Agriculture and Forestry are estimates.

²⁸ Estimates

²⁹ FAO

³⁰ Bailey

E. Calibration

No data available

F. Estimation and Forecasting

No data available

G. Reclassification into FRA 2005 Classes

Table: Percentage of a National Class belonging to FRA 2005 class

Employment	Wood Supply	NWFP Supply	Other activity	Combination	Total
Forest	100%				
Medicinal Plants		100%			
Other primary activities				100	
Tourism			100%		

H. National Information for FRA 2005 Global Tables

Table: Employment (000 person years - full time)

Category of Staff	Primary Activities	Forests			Other Wooded land		
		1990	2000	2005	1990	2000	2005
A. Forest Workers	Wood Supply	116	65				
	NWFP Collection					?	
	Other Primary Activities	28	28				
	Combination of Activities					302	
	Total						
B. Regular Staff	For all above Activities		65			100	
Grand Total						402	

3. Report by Thematic Areas

An increasing number of international and regional processes are requesting forest related information from countries on structure and multiple functions of forests and the civil society is increasingly concerned about forest resources and wants to be informed on sustainability of forests and its goods and services.

The thematic assessment component of FRA 2005 basically attempts to serve the above diverse demands of international process and agencies as well as civil society at large. In doing so, it plans to assess the state of forest resources, their goods and services in a country against six of the seven Thematic Areas or Criteria (CICI, 2003) common to all the nine regional processes of Criteria and Indicators. Such thematic assessment expects to provide comprehensive inputs to develop effective national policies and strategies for sustaining forest resources and to maximize their social, economic and ecological benefits. The example also presents an optional alternative process (integrated assessment) that leads to a review of the sustainability of forest resources in a country.

This section first presents the information collection process for thematic assessment of forest resources, which is followed by an analytical phase indicating changes over time with the help of temporal trends. Finally the section presents national official opinion on the state of forest based on the past and forecasted trends

3.1 Extent of Forest resources and contribution to global carbon cycle

3.1.1 Approach and methods

The National Forest Act (Act No. 84 of 1998) mandates the government, among its other obligation in terms of the forests, to monitor and report on the state of the resources. In response to this requirement, a formalised biogeography-floristic classification of the South African indigenous forest was developed by the Centre for Scientific and Industrial Research (CSIR). This was based on analysis of information from over 4500 plots from 427 forests around the country. The same institution was also commissioned to develop a classification system for woodlands for the purposes of policy, management and monitoring. The new woodland classification, classified woodlands to include those types ranging from wooded grasslands (between 5% and 10% canopy cover) to thickets (vegetation with over 75% canopy cover but which do not meet the other criteria required to be defined as natural forests. The classification derived for woodlands is based upon the dominant structural features of the vegetation, and on the functional characteristics, i.e. the prevailing adaptation among the plants to their environment, as well as the dominant family or genus of trees in the vegetation.

3.1.2 Relevant Variables

National variables
Extent of forest by forest type
Regional variables
Biomass

3.1.3 Sources and Source data

National variable	Source	Reliability	Year
Area Indigenous forests	National mapping, 2000. Department of Water Affairs and Forestry. Pretoria	Reliable	2000
Forest types	Department of Water Affairs and Forestry, 2002 Classification System for South African Indigenous Forests	Reliable	2002
Woodlands types	Unpublished "state of the forest" report	Reliable	2003
Area of woodlands	Le Roux P.J. 1979: Supply of fuelwood for rural population in South Africa: Paper presented at seventh meeting of the SARCCUS Standing Committee for Forestry	Not reliable	
Area of plantation	Commercial Round wood timber Statistics. 2000/01 Department of Water Affairs and Forestry	Reliable	1990, 2000
Regional Variable			
Biomass			

3.1.4 Additional Data

Table: Extent of natural and woodlands forest by type (2000)

Indigenous Forest type	Area (ha)	Actual Woodland classes	Area (ha)
Southern Afrotperate	80,542	High-altitude Acacia	10,234,306
Northern Afro temperate	14,635	Low-altitude Acacia	2,351,012
Northern Mistbelt	65,240	Kuruman	752,674
Southern Misbelt	114,520	Ghaap Plateau	2,163,103
Scarp	177,237	Southern Renosterveld	18,056
Northern Coastal	51,330	Waterberg	1,224,270
Southern Coastal	15,000	Low-altitude Combretum	7,929,347
Lowveld riverine	4,387	Soutpansberg	429,213
Swamp	4,843	Spekboom	801,883
Mangove	673	Northern Succulent	521,366
Licuati sand forest	6,000	Southern succulent	552,637
Total	534,407	Mopane	2,324,449
		Total	29,302,316

Table: Plantations area by species

Type of Species	1985	1990	1995
Softwood species	670,356	671,562	705,227
Eucalyptus species	401,912	538,485	526,248
Wattle species	126,642	115,198	107,944
Other species	8,678	7,991	12,341
Total	1,207,588	1,333,236	1,351,760

Table: Total Forest Area by forest types in South Africa

Forest Type	1990	1995	2000	%
Forest	513,693.97	524,045.87	534,407	0.0193881
Woodlands	31,609,880.65	30,456,095.30	29,302,316	-0.0393750
Plantations	1,200,000.00	1,333,236.00	1,350,000	0.0407407

3.1.5 Temporal Changes in extent of forests

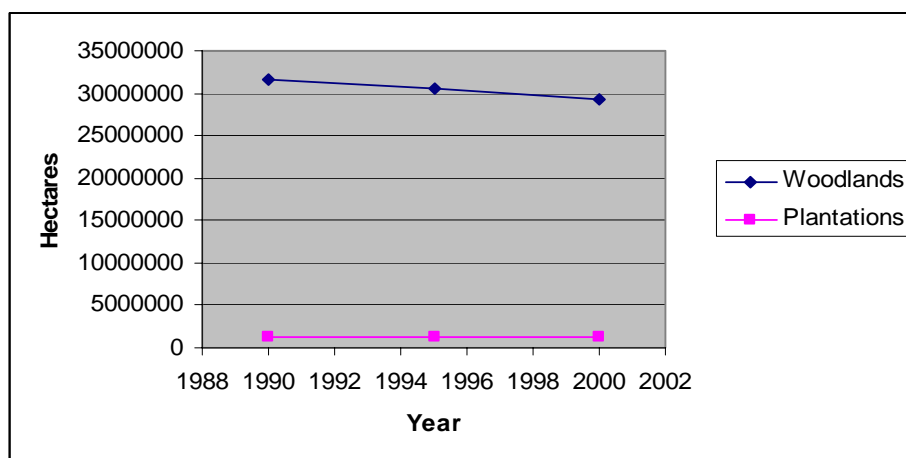


Fig. 1: Temporal changes in plantation and woodlands area from 1986 to 2000

3.1.6 Assessment of State of Forest and their good and services

Comparison between global trends and national trends in terms of forest cover change indicates that forest cover has not changed very much over the past 10 years. For example, indigenous forest area showed an annual increase of about 1.9%, woodlands a decline of 3.9% and plantations about 4%. The increase in area of indigenous forest can be attributed to the fact that area less than 10 hectares are now being accounted for in the National Forest Inventory whilst the decrease in the area under woodlands are due to degradation and conversions into other land use.

3.1.7 Conclusion

The extent of woodlands has declined at an annual rate of 230,000 hectares from 1974 to 2000 suggesting total woodland cover change of almost 20% over the same period. The general trends with regards to indigenous and plantation cover has however remained stable. The slight change in the extent of forest cover in South Africa can mainly be attributed to change in the extent of woodlands

3.2 Forest ecosystem health and vitality

3.2.1 Approach and methods

Pest and disease data for plantations was obtained through questionnaires. Information on extent and condition of forest was obtained through the National Land Cover Project and the indigenous forest type classification project. Information on infestation and cost to control infestation was obtained through literature review.

3.2.2 Relevant Variables

National
1. Condition of natural/woodlands forest canopy
2. Population structure of target species
3. Extent and connectivity of natural ecosystems
4. Rehabilitation of degraded forest
5. Impacts of pests and diseases
6. Negative impacts of fire
7. Infestation by alien invader plants
8. Soil conservation
9. Pollution levels
Regional
1. Percentage of forest ecosystem with or without regeneration
2. Trends in yields of forests and agricultural produce
3. Percentage of forest area encroached by human activities
4. Percentage of forest ecosystem with or without regeneration
5. Percentage of the population employed in crop and livestock farming

3.2.3 Sources and Source data

Variable	Source	Reliability	Year
Plant invasive	Van Wilgen B.W., Richardson D.M., LE Maitre D.C., C. Marais., Magadlela D. 2001. The economic consequences of alien plant invasion: Examples of impacts and approaches to sustainable management in South Africa. Environment, Development and Sustainability 3. 145-168. Kluwer Academic Publishers. Netherlands.	Reliable	2001
Cost of clearing invasive	http://fred.csir.co.za/plants/global/continen/africa/safrica/bigpic/costclear		2002
Cost of fire			
Extent of forest type occurring in protection areas	Bailey, C.L., Shackleton, CM., Geldenhuys C, J., Moshe D., Fleming G., Vink E.R., Rathogwa N, R., Cawe, S.G. 1999. Guide to and summary of the meta-database pertaining to selected attributes of South African Indigenous Forest and woodlands	Reliable	1990
Extent of natural and woodlands forest by type	Von Maltitz G. et al. 2003. Classification System for South African Indigenous Forests. CSIR. Environmentek	Reliable	2002
Condition of natural/woodlands forest canopy	Department of Water Affairs and Forestry. 2003. Unpublished "state of the forest report"	Reliable	2001
Nutrient cycling			
Canopy cover of forest	Department of Water Affairs and Forestry. 2003. Unpublished "state of the forest report"		
State of environment of south Africa	www.ngo.grida.no/soesa/issues/land/state2.htm		

3.2.4 Additional Data

Table: Extent of natural and woodlands forest by type

Type Indigenous Forest ³¹	Area in ha	Type of woodland	Area protected by State organs
Southern Afrotropical ³²	80,542	High-altitude Acacia	1,205,132
Northern Afro temperate	14,635	Low-altitude Acacia	751,712
Northern Misbelt	65,240	Kuruman	9,410
Southern Misbelt	114,520	Ghaap Plateau	3,496
Scarp	177,237	Southern Renosterveld	4,582
Northern Coastal	51,330	Waterberg	267,798
Southern Coastal	15,000	Low-altitude Combretum	1,404,760
Azonal		Soutpansberg	82,996
Lowveld riverine	4,387	Spekboom	84,379
Swamp	4,843	Northern Succulent	11,652
Mangrove	673	Southern succulent	39,160
Licuati sand forest	6,000	Mopane	1,121,037
Total	534,407	Total	4,986,114

Table: Area converted out of timber production by species (in ha)

SPECIES	1990	2000
Softwood	776	4,767
<i>E. Grandis</i>	504	800
Other Eucalypts	2,418	n/a
Wattle	922	939
Other	133	7
TOTAL	4,753	6,513

Table: Area of woodlands degraded and converted to other land use

Woodland class	Degraded	Converted woodland	Actual woodland	Total
High-altitude Acacia	1,858,908	7,554,361	10,234,306	19,647,575
Low-altitude Acacia	470,337	2,022,868	2,351,012	4,844,217
Kuruman	2,831	548,484	752,674	1,303,989
Ghaap Plateau	81,241	94,779	2,163,103	2,339,123
Southern Renosterveld	1,701	114,119	18,056	133,876
Waterberg	11,396	0	1,224,270	1,235,666
Low-altitude Combretum	1,139,426	794,869	7,929,347	9,863,642
Soutpansberg	49,657	0	429,213	478,870
Spekboom	57,331	718	801,883	859,932
Northern Succulent	202,028	567,650	521,366	1,291,044
Southern succulent	82,827	324,012	552,637	959,476
Mopane	26,887		2,324,449	2,351,336
Total	3,984,570	12,021,860	29,302,316	45,308,746

Source: DWAF 2000

³¹ All indigenous forests are legally protected.

³² Same as above

Table: Summary table of the status of conditions of indigenous forest by forest group

Forest Type	Condition/Status
Western Cape Talus Forests	Most patches are protected within nature reserves
W. Cape Afrot temperate	1. Generally conserved in conjunction with fynbos.
Southern Cape Afrot temperate Forests	1. Largest portion well protected and managed within a system of 'strict' nature reserves and areas for sustainable exploitation.
Marekele Afrot temperate Forest	Well preserved
Northern Highveld Forests	Insufficient data to assess either the extent of use or conservation status. Most of the forest patches are within conservation areas
Drakensberg Montane Forests	Well preserved in nature reserves of Ezemvelo KZN Wildlife uKhahlamba-Drakensberg Park.
Northern KwaZulu-Natal Mistbelt Forests	Protected in a number of nature reserves found along the Low Drakensberg and in Ngome N.R.
Northern Mistbelt Forests	1. Well conserved in the Magoebaskloof under DWAF management and private ownership. 2. Threatened along the North Eastern Escarpment in previous Lebowa areas. 3. Well conserved in the Soutpansberg, excluding areas in communal land where subsistence agriculture and fire wood collection is not controlled.
Mpumalanga Mistbelt Forests	1. Occur on state land and are protected. 2. Those occurring on private land have been declared Natural Heritage Sites

Source: DWAF, 2002

Impacts of pests and diseases:**Table: Area of plantations affected by pests and diseases**

	1987	1999/00	2000/01	2001/02
Insects	202	41	165	470
Diseases	200	51	202	134

Negative impacts of fire:**Table: Number and area of sites negatively affected by fire**

	1986/87	1999/00	2000/01	2001/02
Number of occurrences	39	3,265	3,540	3,128
Hectares	32,037.6	2,0221	17,266	16,727

Table: Change in fire protection expenditure

Province	1987		2000		cost of protection	
	No of occurrences	Area in ha	No of occurrences	Area in ha	1987 R/ha	2000 R/ha
Western cape	5	0.16	65	1,851	0.03	94.25
Southern cape	17	178.61	147	314	3.58	
Eastern Cape	13	932.02	162	3,477	63.9	
KwaZulu Natal	54	7.03	1,900	3,327	0.51	133.99
Zululand	63	41	254	1,342	1.06	117.47
Central district	41	230	18	814	3.2	103.92
Mpumalanga	41	92.49	850	5,464	0.62	
Limpopo	15	9.59	125	101	1.34	96.27
	249	1,490.9	3,521	16,690		
Average for South Africa					4.02	108.91

Table: Fire Protection Cost: Catchments area

Province	1987/86		2000
	Area Protected (in ha)	Cost/ha	Cost/ha
Western Cape	717,859	0.3	No information
Southern Cape	548,452	2.08	
Natal	202,000	0.79	
Eastern Cape	38,977	2.94	
Limpopo	22,009	2.64	
Total	1,529,297	0.74	

Infestation by alien invader plants:**Table: Infestation area and stand densities of alien plant invader species**

Province	Total area in 000 ha	Area infested in 000 ha	
		1986/87	2000
Western Cape	12,931	373	3,727
Eastern Cape	16,986	7	671
KZN	9,212	24	922
Mpumalanga	7,957	23	1,277
Limpopo	12,214	8	1,178
Free State	12,993		166,308
Gauteng	1,651		22
Northern Cape	36,198		405
North West	11,601		1,702

Source: Plantation, catchments and drift sand

Table: Cost per hectares of controlling invading plants

PROVINCE	Cost of control		Cost per ha	
	1986	2000	1986	2000
	RM	R M	R/ha	R/ha
Western Cape	0.692	2,884	1.85	773.75
Eastern Cape	0.152	723.22	20.12	1076
KZN	0.541	765.67	22.10	830.44
Mpumalanga	0.28	477.75	12.06	373.88
Limpopo	0.059	525.58	6.75	446.03
Free State		127.03		763.85
Gauteng		57.63		2,610.75
Northern Cape		1,114.6		2,751.01
North West		297.39		446.03
Total		6,972.87		1,119.0822

Table: Cost per ha in real prices of controlling invading plants

Provinces	Cost per ha	
	1986	2000
Western Cape	7.16	773.75
Eastern Cape	77.92	1,076.00
KZN	85.59	830.44
Mpumalanga	46.71	373.88
Limpopo	26.14	446.03

3.2.5 Temporal Changes in Variables

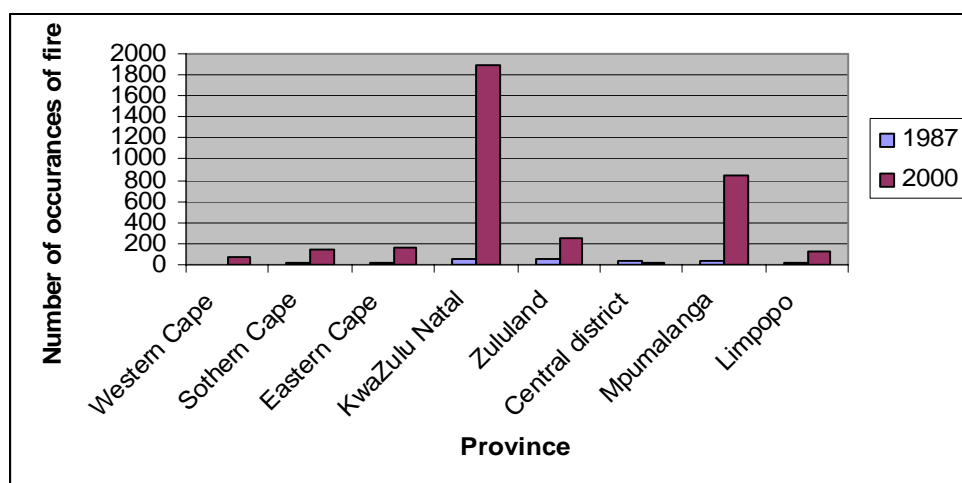


Fig.2: Comparison of number of occurrences of fire by province between 1990 and 2000

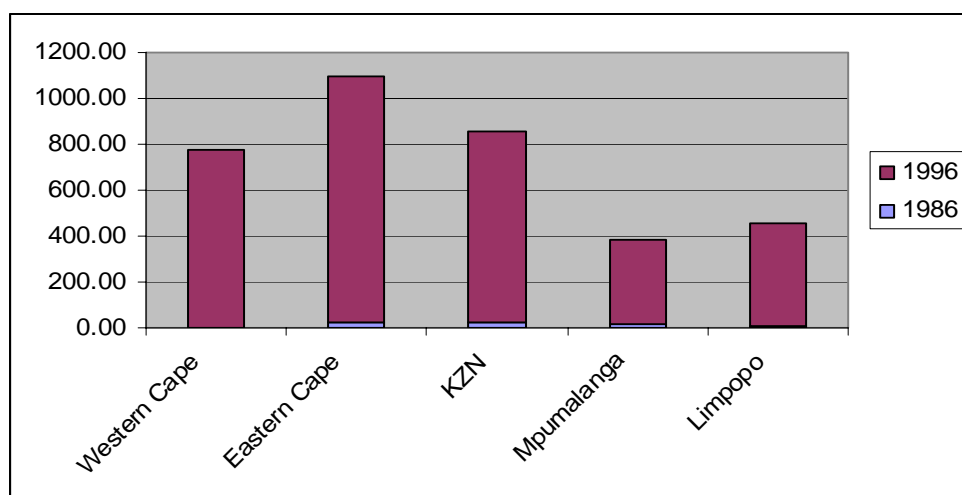


Fig.3: Comparison of cost per hectare of controlling invading plants between 1986 and 2000.

Regional:

No information available for areas of forests and other wooded lands managed for scenic and amenity purpose.

3.2.6 Assessment of forest ecosystem health and vitality

Most of the indigenous forests are well protected, except for a few forests which have been invaded by communities. Woodlands are however, still the most affected ecosystem in South Africa indicating that almost 35% of the total have been converted to other land use or degraded. The National Forest Act (NFA No.84 of 1998) recognises these negative trends and provides the Minister of Water Affairs and Forestry with powers to intervene urgently to prevent deforestation and to rehabilitate deforested areas.

Although the number of occurrences of fire in plantations has increased tremendously from 1986/87 to 2002, the actual total area affected has declined. This can be attributed to an increase in fire protection and conservation investments by the forest industry. The total land area infested by alien invasive though, has increased (by 97%) over the same period with Western Cape Province the most infested. Most plantations were severely affected by insects in 2001 whilst the rate of areas affected by diseases seems to have declined.

3.2.7 Conclusion

Frequency of fire occurrences in plantations were mostly found in the Kwa-Zulu Natal provinces followed by Mpumalanga. Although the number of occurrences was higher in Kwa-Zulu Natal, the actual area damaged was small as compared to Mpumalanga. This may be attributed to several factors, one of which is speedy reaction to fire alarm and the actual investment in forest protection and conservation. No reports on disease and insects effect on indigenous forest are available at national level, whilst there is fluctuation in the number and the area affected by insects and diseases in plantations. Invasive species seem to be a problem, affecting almost 10 million hectares of land in South Africa.

3.3 Biological diversity

3.3.1 Approach and methods

The IUCN red Data List system of categories and criteria were used for the purpose of publishing Southern African Red Data List. The system used consists of eight categories. The placement of taxon in each category was justified according to certain criteria that applied. Bailey et al, 1999, reports that the information on the protection status of the South African woodlands was compiled using the National Register of Protected Areas in South Africa (Wahl & Naudè 1996). Conservation officers in the nine provinces were consulted in the process. Where there were discrepancies, between these two sources, the data from the National Register was used. The National Register of Protected Areas forms part of the national data bank for national conservation planning in South Africa. This database is kept and maintained by the Department of Environmental Affairs and Tourism. When calculating the size of protected areas/reserves within woodlands, certain errors were encountered because the actual area of woodlands in the reserve could not always be determined. This can be attributed to the fact that it was not possible to digitise the exact boundary and locality/position of certain reserves. The ill defined boundary reserves were relatively small

compared to the total area for which calculation were done, and as such were excluded. There were a total of 12 such reserves nine of which was found in the Limpopo provinces. This may have resulted in a possible underestimation of the area.

3.3.2 Relevant Variables

National
1. Implementation of forest protection plans
2. State of forest protection
3. Extent of natural and woodlands forest by forest type
4. Extent of forest type occurring in protection areas
5. Presence of specific organism as bio monitoring indicators
6. Status of forest dwelling species at risk of not maintaining viable breeding population

Regional
1. Conservation area outside protected areas
2. Areas lost annually of forest ecosystem containing endemic species
3. Resource exploitation system
4. Average number of provenance
5. Population level of key species across their range
6. Degree of management of genetic resources

3.3.3 Sources and Source data

National variable	Source	Reliability	Year
IUCN categories of woodlands	Bailey, C.L., Shackleton, CM., Geldenhuys C, J., Moshe D., Fleming G., Vink E.R., Rathogwa N, R., Cawe, S.G. 1999. Guide to and summary of the meta-database pertaining to selected attributes of South African Indigenous Forest and woodlands		
Canopy cover of forest	Department of Water Affairs and Forestry. 2003. Unpublished "state of the forest report"		
State of environment of south Africa	www.ngo.grida.no/soesa/issues/land/state2.htm		
Implementation of forest protection plans	Annual report. 1986/87. Department of Environmental affairs. Government Printer, Pretoria	Reliable	
State of forest protection	ditto	Reliable	
Forestry protection cost	Rusk GD, Pennefather M, Cronje CA, Meyer WK. 1996. Forestry Costs in South Africa. The Green Gold Crop Pietermaritzburg	Reliable	

3.3.4 Additional Data

Table: Extent of protected indigenous forests and woodlands by type

Type Indigenous Forest ³³	Area in ha	Type of woodland	Area under Protection by organs of state
Southern Afrotperate ³⁴	80,542	High-altitude Acacia	1,205,132
Northern Afro temperate	14,635	Low-altitude Acacia	751,712
Northern Misbelt	65,240	Kuruman	9,410
Southern Misbelt	114,520	Ghaap Plateau	3,496
Scarp	177,237	Southern Renosterveld	4,582
Northern Coastal	51,330	Waterberg	267,798
Southern Coastal	15,000	Low-altitude Combretum	1,404,760
Azonal		Soutpansberg	82,996
Lowveld riverine	4,387	Spekboom	84,379
Swamp	4,843	Northern Succulent	11,652
Mangove	673	Southern succulent	39,160
Licuati sand forest	6,000	Mopane	1,121,037
Total	534,407	Total	4,986,114

Implementation of forest protection plans:

Table: Area of forest by type, number of hectares per forest protection person and protection expenditure

Forest type	Area of forests		Forest protection cost		% change in Cost of protection
	196/87	2000	86/87	1996	
	ha	ha	R/ha	R/ha	
Indigenous forest	507,496.7	533 669	0.74	?	
Woodlands	32,422,152 ³⁵	29,302,316	n/a	n/a	
Plantation	261,477.7	1,357,760	14.99	154.71	90%

There is no latest available data on the cost of protection and conservation for woodlands and indigenous forestry, however, the 1986/87' annual report by the Department of Environment Affairs indicates the average total cost per hectare for catchments areas as R0.74/ha. This figure also includes declared mountain catchments areas. The cost to protect and conserve plantations increased from R14.99 to R151.74 (90%), between 1987 and 1996, an increase of about 70% in the cost of protection.

³³ All indigenous forests are legally protected.

³⁴ Same as above

³⁵ Estimates from Le Roux (1979).

Table: Number and type of reported transgressions (by category) in terms of the Environmental Conservation Act, 1982 (Act 100 of 1982) and National Forest Act No.84 of 1998

Reported transgression	1986/87	2000/01
	EVA 1982	NFA 1998
Unlawful lighting of fire	100	No national figures
Theft	65	
Trespass	909	
Beer-brewing and illegal liquor sales	27	
Poaching	21	
Assault	30	
Unlawful grazing	1,265	
Malicious damage to property	17	
Littering	9	
Felling of protected trees	75	
Other	63	
Total number of trespasses	2,581	
Total number of prosecutions	1,638	
Total number of convictions	1,587	

Reported numbers of transgressions for recent years are collected at Forest Management Units by some regional foresters but have not yet been aggregated at national level to indicate national trends. However, an example of the type and extent of forest transgressions in South Africa was captured in the annual report of 1986/87 in compliance with the requirements of the Environmental Conservation Act (Act 100 of 1982). According to this information, a total of 1 587 transgressions were made in 1987, the highest of which was unlawful grazing. Indications are that this pattern still exists to date. The National Forest Act (NFA no84 of 1998) requires that the number and type of transgressions be reported at national level for the purpose of reporting and policy revision to address negative trends. Some measures that have been taken to address illegal transgression, uses and access are the issuing of licences and exemption for forests goods and services required for commercial and domestic purposes respectively to comply with the requirements of the Act.

Table: Conserved area and number of Red Data book taxa in South African hot-spots

Red data book taxa	Area conserved (%)	Number Extinct	Other
Wolkberg	13.3	0	32
Maputaland	10	?	?
Eastern Mountain	5.5	0	27
Pondoland	7	0	33
Albany	6.5	1	51
Succulent Karoo	2	18	978
Cape: Lowlands mountain	3	29	1,406

Table: Number of Endemic Tree Species in each Forest Group

Forest Group	Number
Southern Afrotperate Group	20
Northern Afro temperate Group	3
Northern Mistbelt Group	12
Southern Mistbelt Group	6
Scarp Group	44
Northern Coastal Group	0
Southern Coastal Group	3
Total	88

Table: Change in status of taxa in Each Red Data List in South Africa

	1980*	1995*	2002** (taxa)
Extinct	39	56	15
Endangered	104	241	77
Vulnerable	165	422	322
Rare	521	1,322	92
Indeterminate	259	378	334
Insufficiently known	805	849	108
Total	1,893	3,268	948

Source: * Figures from the National Environment Report.

** Figure from the Southern African Plant Red Data List (2002).

Table 15: The number of plant species for which national recovery plan is required

Category	1990	1995	2000 ³⁶	% Change
Number of threatened plants	2,215	3,268	3,973	44%
Number of threatened tree species	37	65	72	49%

3.3.5 Temporal changes in variables

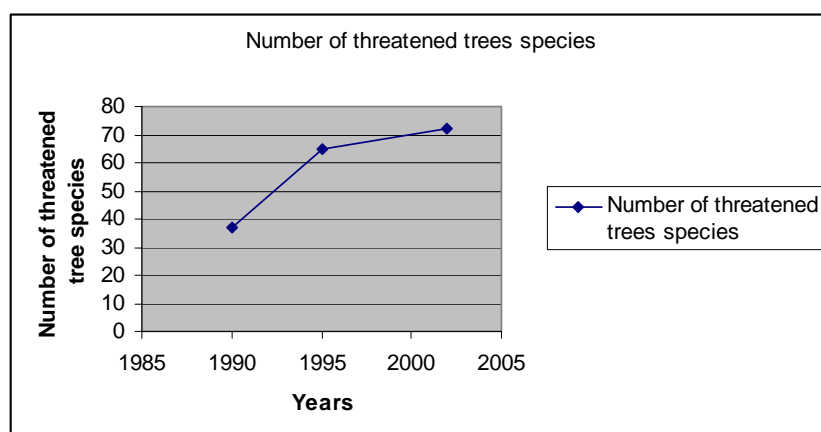


Fig.4: Temporal changes in the number of threatened tree species from 1990 -2002

³⁶ 2002 for 2000

3.3.6 Assessment of State of Biodiversity in South Africa

The number of threatened tree species has increased by 49% from 1990 to 2000 suggesting that either very little recovery plans are being implemented or the conservation status of these species is poor. The Criteria and Indicator System for Sustainable Forest Management that is currently being implemented require that forest management plans be drawn and recovery plans for species at risk of not maintaining viable breeding population be implemented. There has been no significant change in terms of protection and conservation of forests from 1986 to 2000. For example, the 1986/87 annual report by the Department of Environment Affairs indicates the area under protection by the state as 4 651 901 hectares (national parks, provincial reserves) as opposed to 4,986 114 ha in 2002, a minimal increase of 6.7% over 16 years. This seems to be the pattern even for the total area under any other formal protection where only 6.4% of the land was protected (e.g. conservation for multi-purpose 1 198 879 ha, Private conservation areas 2 067 574 and state owned conservation area 4,651,905 ha) in 1987 and a similar percentage is being quoted in 2000.

3.4 Productive functions

3.4.1 Approach and methods

Sixteen plots were established in nine forest area throughout the distribution range of mixed evergreen forest since 1987. In each area, one to four plots were established along local altitudinal or soil gradients. Each plot was subdivided into 10m x 10m sub-plots. The species and DBH of all stems greater than 5cm were recorded in all plots. Most plots were measured for the second time at 10 year interval. Data have been analysed for species richness, stand basal area, diameter and basal area growth, ingrowths from regeneration, mortality and growth of individual species.

3.4.2 Relevant Variables

National variables
1.Standing stock assessment
2.Level/rate of resources use
3.Levels of multiple resources use from forest ecosystems
4. Identification and developments of new alternative forests resources
Regional indicators
1. Degree of management of genetic resources
2. Periodic balance between growth and removals of wood products
3. Average annual consumption of wood for energy per capita
4. Managed and sustainable extraction of non-wood forest products

3.4.3 National data sources

Variable	Source	Reliability	year
Ratio of resource use	Forestry South Africa. 2002. <i>Forest and Forest Products Facts</i> . South Africa	Reliable	

3.4.4 Additional Data: Level/rate of resource use

Table: Ratio of annual removals to annual increment of plantations

Years	Removals	Annual Increment	Ratio
1992	15,907,785	21,566,872	0.74
2000	16,606,878	22,387,970	0.74

3.4.6 Conclusion

It was difficult to draw conclusion with respect to growing stock as the growth data from different plots has not been synthesised at national level. But indications are South Africa's indigenous forest grow continuously but at a very slow rate. Plantations are being managed sustainably and the ratio of annual removals to annual increment looks sustainable.

3.5 Protective functions

3.5.1 Approach and methods

The ACRU model was used in conjunction with a decision support system to assist the user in preparing input information to stimulate water production from afforested areas. Values of simulated streamflow were compared with observed stream flow at three locations, one each in Kwa-Zulu Natal, Mpumalanga and Limpopo province on forested catchments with a range of catchments sizes, forest species and ages of plantations.

3.5.2 Relevant variables

National
1. Water quality
2. Soil conservation
3. Riparian zone and wetland management activities
4. Pollution levels
Regional
1. Area and % of forests and other wooded areas managed mainly for the production of water, protection of watershed, riverine zones and for flood control

2. Change in water yield and quality
3. Areas of forests and other lands managed for scenic and amenity purpose

3.5.3 Sources and Source data

Stream flow reduction activities	Jewitt GPW., Schultze RE., 1999: Verification of the ACRU model for forest hydrology applications	1999
State of environment of south Africa	www.ngo.grida.no/soesa/issues/land/state2.htm	

3.5.4 Additional Data

Table: Comparison of simulated and observed stream flow for monthly totals of daily values revision

Catchments Name	% afforested	Name of Species	Total observed Flows (mm)	Total simulated (mm)	Observed flows variance	Age
Cedara (Midlands (KZN) 1977-1988)	92%	<i>P.Patula</i>	1,664.834	1,687	724.266	young to mature
		<i>P.radiata</i>				
Marite(Sabie, Mpumalanga) 1980-1989	85	<i>E. grandis</i>				
		<i>Eucaluptus (Upper)</i>	1,857.944	1,869	246.331	12
		<i>Pinus patula (Middle)</i>				20
	45	Mixed eucalyptus and pine (Lower)				15
Mokubalaan 1963-1979	100	<i>Eucalptus grandis</i>	1,992.271	1,724	201.879	0-12
(Drakensberg) 1969-1980	100	<i>Pinus patula</i>	1,913.084	1,942	421.405	0-10

Table: Area (ha) affected by erosion

Problem	Extent of soil degradation by cause
Crusting	Serious widespread problem of irrigated and dry land cultivated areas
Compaction	2 million
Salination/W after Logging	182,000 ha
Pollution	320 million ton/y
Acidification	5.04 million ha of high rainfall areas
Fertility loss	30,000 tonnes Nitrogen, 26 400 tonnes of Phosphorous and 363,000 tonnes of Potassium lost annually through erosion
Biological and microbiological degradation	3 million ha

3.6 Social and economic functions

3.6.1 Approach and methods

Questionnaires

3.6.2 Relevant variables

National	
1.	Forestry's contribution to local development
2.	Diversification within the forest industry
3.	Staff turnover in forest based businesses
4.	Opportunities for forest based activities
5.	Rights are understood and respected
6.	Control and enforcement of access and use
7.	Security of land tenure
8.	Level of satisfaction among users
9.	Identification and registration of significant sites
10.	Employment opportunities associated with forestry
11.	Employer compliance with labour legislation
12.	Remuneration of workers
13.	Negative impacts of forestry activities on people
14.	Conflict over distribution of costs
15.	Incidence of crime
16.	Absenteeism
17.	Implementation of outcomes of participation
18.	Capacity to participate
19.	Conflict Management
Regional	
1.	Share of forest sector in GDP
2.	Value from secondary industries
3.	Value from biomass energy
4.	Forest sector trade balance
5.	Investment in forests and forest industries including informal sector
6.	Contribution to food Security
7.	Degree to which social, cultural and spiritual needs are met
8.	Benefits accruing to local communities (with particular emphasis on women and youth)

3.6.3 Sources and Source data

Variable	Source	Reliability	Years
Contribution to the economy	Forestry South Africa. Forest and Forest Products Facts, 2002. Forestry South Africa		
Access to wilderness areas	Annual Report, 86/87. Department Of Environmental Affairs (DEAT) Government printers		86/87
Number of sites and visit	Expert Opinion. 2001. Department of Water affairs and Forestry		2002
Contribution to food security	The South Africa's Forestry and Forest Product Industry, 2002. Forest South Africa	Agricultural GDP	2002
Employment Statistics estimation	Appendix-the State of Forestry in South Africa Today. http://www.polity.org.za/html/govdocs/green_paoers/forest2.html		

3.6.4 Additional Data

Table: Value of sales from primary processing plants in Million Rand (Expressed in nominal terms)

PRODUCT	1990	1995	2000	2001	Change on previous year	Annual growth
Sawn Timber	724.4	903.9	2,078.7	1,867.7	-10%	13%
Pulp	3,366.7	6,946.3	6,838.4	8,641.7	26%	16%
Mining Timber	319.3	157	140.8	108.5	-23%	3%
Panel products	662.9	476.9	626.4	594.7	-5%	9%
Poles	89.2	87.5	246.8	164.4	-33%	11%
Charcoal	43.9	24.3	64.7	101	56%	15%
Chips/Mill residues	108.8	227	1,271.2	1,508.1	19%	25%
Other	117.3	175.4	599.5	820.7	37%	18%
Total	54,32.5	89,98.3	11,866.5	13,806.8	16%	15%

Regional variable: Resource use efficiency

No available information

3.6.5 Regional Indicators

Table 21: Contribution of forestry & forest products industry to GDP (in nominal terms)

Total R.S.A. G.D.P.	1990	1995	2000	2001	Change on previous year	Annual growth
	260,941	617,957	982,944	1,098,714		
Manufacturing G.D.P.	65,784	114,125	166,415	188,182	13.1%	13.7%
Forestry G.D.P.	1,071.5	1,797.9	2,712.4	3,266.2	20.4%	14.5%
Forest Products G.D.P.	5,658.6	8,998.3	11,866.5	13,806.8	16.4%	14.5%
Forest Products as % to Manufacturing	0.086018	0.078846	0.071307	0.073369	2.9%	0.7%
Forest Products as % to GDP	0.021685	0.014561	0.012072	0.012566	4.1%	-0.4%

Source: FSA

Value from biomass energy:

No data available

Table: Forest sector trade balance in Million Rand

Forest Products	1992		Trade	2002		Trade	Trade Compound annual increase 1992-2002		
	Imports	Exports	Balance	Imports	Exports	Balance	Imports	Exports	Balance
Pulp	41.7	1,001.6	959.9	291	2,894.4	2,603.4	21%	11%	10%
Paper	1,006.6	863.5	-143.1	3,682.3	4,254.2	571.9	14%	17%	n/a
Solid Wood	364.1	379	14.9	1,473.4	3,780.3	2,306.9	15%	26%	66%
Other (matches & tannin extract)	4	95.2	91.2	6.4	274.5	268.1	5%	11%	11%
Sub Total	1,416.4	2,339.3	922.9	5453.1	11203.4	5,750.3	14%	17%	20%
Total all Products	52,857.2	66,730	13,872.8	273,701.6	312,918.3	39,216.7	18%	17%	11%
Gold Exports		18,173			42,347.2			9%	
Exports Excl. Gold		48,557			270,571.1			19%	
Gold as % of total exports		0.27			0.14				
Imports & Exports of Forest Products as % of total imports and Exports	0.027	0.04		0.020	0.04				
Exports of Forest Products as % of total exports excluding gold		0.05			0.04				

Source: FSA

Contribution to food Security:**Table: Land use comparison between forest plantations and agricultural products**

Products	Million Hectares	
	2001	2002
Maize	3.223	3.567
Forests Plantations	1.352	1.351
Wheat	0.959	0.941
Sugar	0.432	0.435

Table: Contribution of forestry to food Security

	1990	1995	2000	2001	Change on previous year	Growth per annum
Agriculture, Forestry & Fisheries GDP	12,984	23,721	31,060	37,674	21.3%	11.1%
Forest Products G.D.P.	5,658.6	8,998.3	11,867	13,807	16.4%	14.5%
Forestry as % to Agricultural GDP	0.08252	0.0758	0.087	0.0867	-0.7%	3.1%

Table: The range of direct benefits to stakeholders arising from the use of resource at National level

Resource	Benefits
Fuelwood	cooking, lighting and heating
Timber	construction material and wood carving;
Fruit	dietary supplement, and sap for brewing of beer and wine
Bark	making ropes and weaving
Bark, bulbs, leaves and roots	bark, bulbs, leaves and roots
Honey	bark, bulbs, leaves and roots
Insects, mushrooms and other edible plants	Food
Grass	thatching and weaving, and for grazing cattle
Non-consumptive use	Recreation and tourism

Table: Type and number of initiatives to develop new alternative

Type of initiative	Number
Participatory Forest management	
Forest Enterprise Development Opportunities	
Medicinal Plants Projects	
Out grower's schemes	
Urban Greening	

Table: Type of forest user groups according to their resource needs/uses

Resource	Benefits
Domestic	cooking, lighting and heating
	construction material and wood carving;
	dietary supplement, and sap for brewing of beer and wine
	making ropes and weaving
Commercial/domestic	bark, bulbs, leaves and roots
	bark, bulbs, leaves and roots
	Food
	thatching and weaving, and for grazing cattle
Tourists	Recreation

Table: Number of people employed in forest and forest related activities

Forest Activity	Estimated number employed
Down stream activities	80,000
Sawmilling	36,000
Pulp and Paper Manufacturing	48,000
Secondary Processing	36,000
Working for Water	Extrapolated
Direct Employment	8,386
Secondary jobs created	714
Total employed	209,100

Remuneration of workers:

Table: Average wage rates within the sector or industry

Skills Category	Average wage/month
Unskilled Workers	570-600
Semi-skilled	880-920
Skilled	2,200-2,400

3.6.6 Temporal Changes in Variables

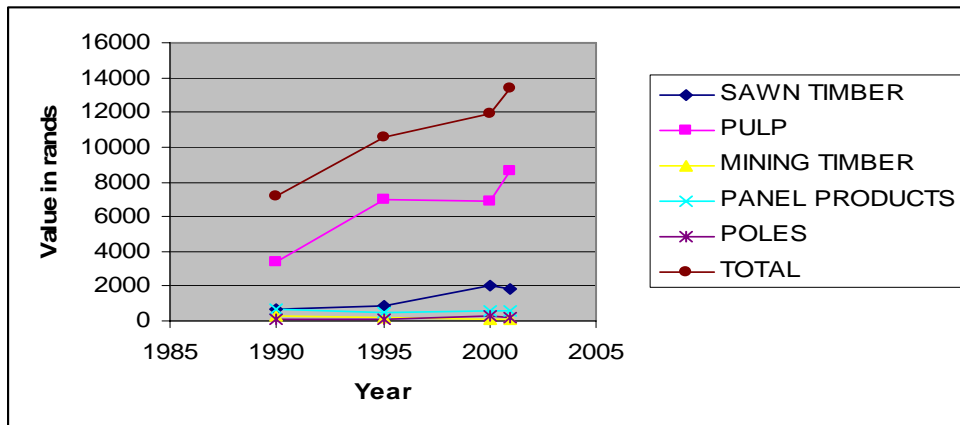


Fig. 5: Temporal changes in the value of forest products sold from primary processing plants

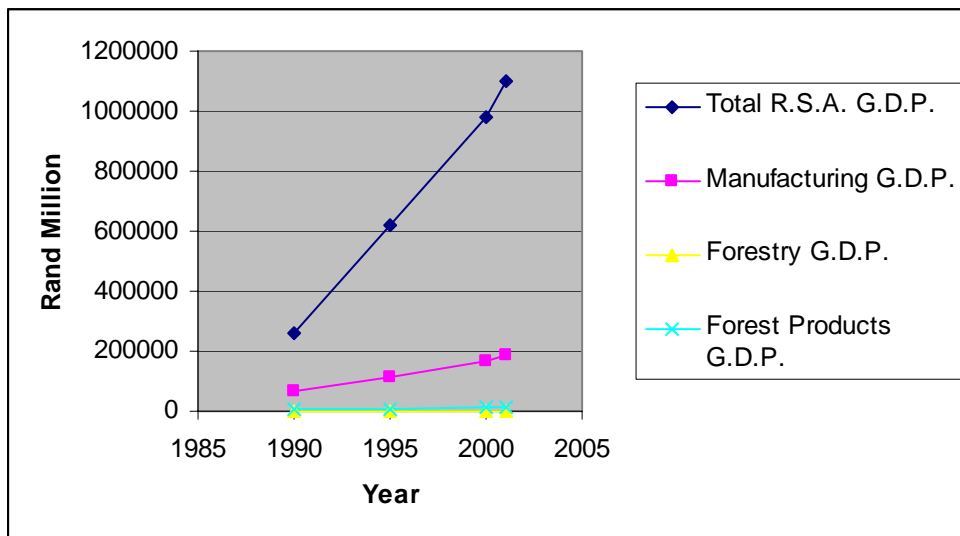


Fig. 6: Temporal changes in the GDP of South Africa, forestry, manufacturing, agriculture, forestry and fisheries

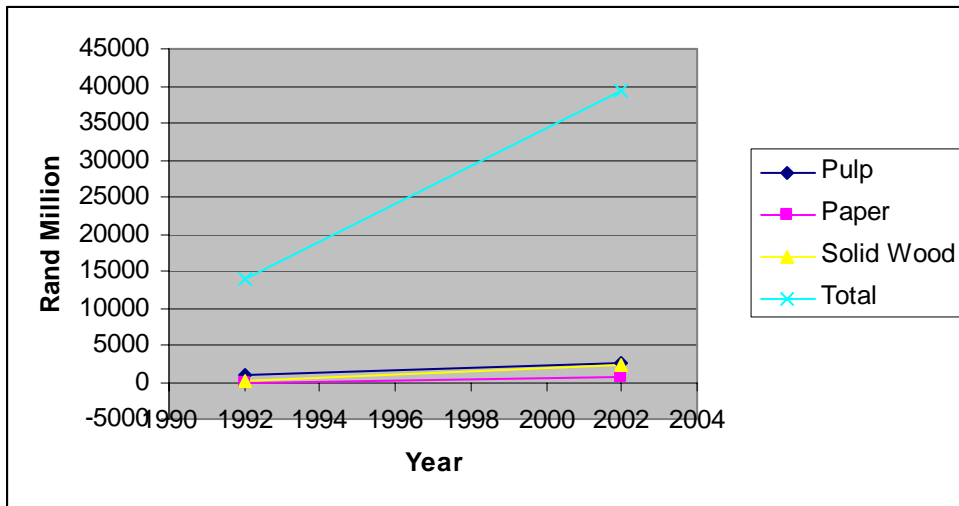


Fig. 7: Temporal changes in trade balance of Forest Products from 1992 to 2002

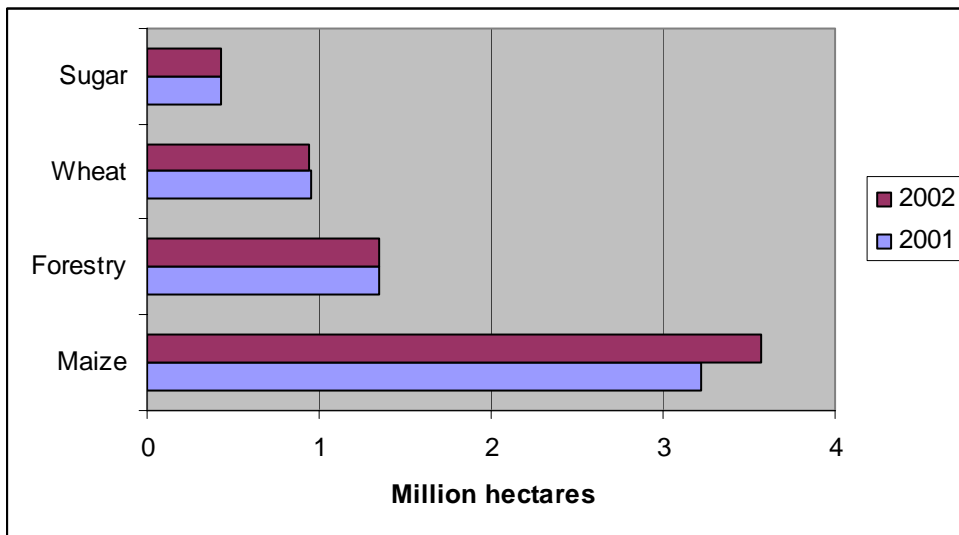


Fig. 8: Comparison between forestry plantations and different agricultural land use products

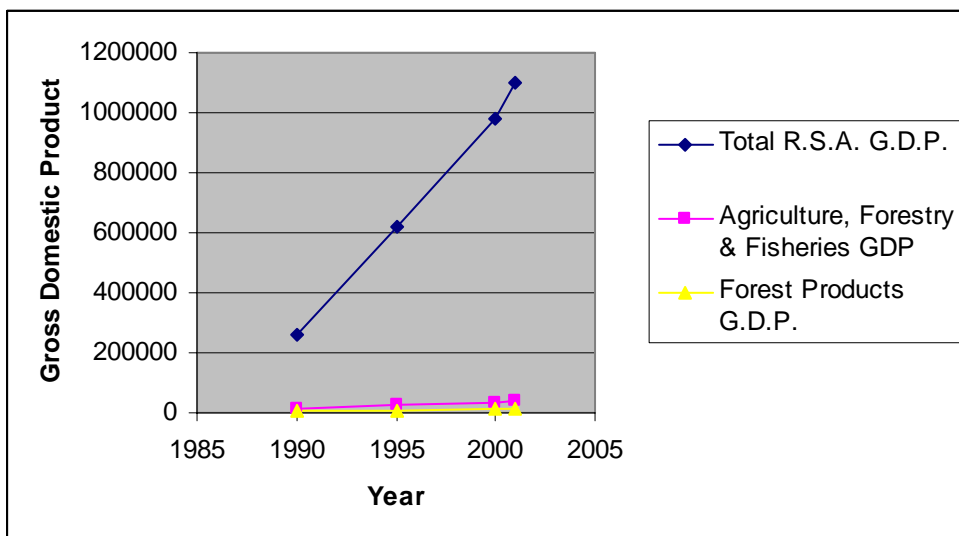


Fig. 9: Temporal changes in agriculture and forest and forest product GDP

3.6.7 Assessment of the contribution of Forestry to the economy

The value of forest good and service grew by R514 million per annum (15%) from 1990 to 2002 and trade balance by R2 534 annually (20%) from 1992 to 2002. This can be attributed to the depreciation of the currency since 1995. Forestry contribution to agricultural and manufacturing increased annually by 3.1% and 0.7% respectively from 1992 to 2002. However, the value of forest product as a percentage of the National GDP declined annually by 0.4% over the same period.

3.6.8 Conclusion

Although data in this report refers only to the formal sector, the informal sector makes an important contribution to the formal economy and the livelihoods of people, especially in rural areas. Processes are currently being undertaken or proposed to collect data from the informal sector: the South African Statistics Department and the proposed Regulatory Information Management System. There are still challenges of aligning methodologies to collect data on NWFP and other social benefits though. Generally, information on employment and other environmental benefits is scanty and mostly estimation

3.7 Summary Assessment

Overall assessment of forests in South Africa indicates that forest cover has not changed drastically over the past 13 years. This is evidenced by a slight change in percentage forest cover in terms of extent of indigenous forest and plantations. Woodland has however, declined over the same period due to degradation and conversion to other land use. The number of threatened tree species has increased by an estimated 49% over the past 12 years. Although no recovery plans have been reported on, programmes are in place to provide other incentives to encourage sustainable forest management in order to meet the obligation of the National Forest Act.

Forest growth studies from different plots in South Africa have not been synthesised at national level to provide an informed analysis of the overall growth patterns of South African forest however indications are that the growth pattern is slow but continuous. The majority of forests are protected although different kinds of threats remain a challenge to the government. The flow of environmental goods and services to communities especially with regard to NWFP seems evident although no national database exists to back-up these claims and programmes to allow community participation are in existence. The criteria and indicators of sustainable forest management provides the government with mechanisms to assess the state of the forests in South Africa, identify information gaps and promote and enforce sustainable forest management.

The purpose of this pilot report was to assess the status and trends of forests in South Africa, using thematic areas of the Global Forest Assessment 2005 in conjunction with national variables. It further highlighted information gaps and some regional variables that maybe unique to the country.

4. Final concluding remarks

There is an information gap regarding designation of indigenous forests however, the Department is in the process of developing a conservation plan in accordance with the IUCN categories. The proposed plan is due in 2004. Woodlands designation was done by Barley et al in 1999, but this database is yet to be updated.

The government recognises challenges that are currently threatening the ecosystem, health and vitality of forests. Challenges such as woodlands degradation, bush encroachment, overexploitation of medicinal plants, pests and diseases are being addressed by policies and programmes which are being implemented to curtail trends that are not in the national interest. These measures are enshrined within section (8) and 17(3) of the National Forest Act. These sections allows and gives the Minister powers to declare certain forests as protected forest areas and intervene urgently to prevent deforestation and to rehabilitate deforested areas.

Great strides have been achieved in term of development of criteria and indicators of sustainable forest management. Incorporating these Criteria and Indicators into management plans will enhance promotion of livelihoods of communities, improve economic contribution of the forest sector to the economy and peak the environmental management standards of South African forest to that of national and international environmental requirements.