



Forestry Department

Food and Agriculture Organization of the United Nations

**GLOBAL FOREST RESOURCES
ASSESSMENT**

COUNTRY REPORTS

SIERRA LEONE

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The Forest Resources Assessment Programme

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

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

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

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

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

Report preparation and contact person

No official report has been received from Sierra Leone.

This report is the result of a desk study prepared by the FRA 2005 secretariat in Rome, which summarizes existing available information using the established format for FRA 2005 country reports.

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1 Table T1 – Extent of Forest and Other wooded land

1.1 FRA 2005 Categories and definitions

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

1.2 National data

1.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Laumans Paul A. 1996. Review of Existing Sources of information for Forest Resource Assesment in Sierra Leone. Working Document No. X (FO:DP/SIL/92/006). FAO, Rome			1976, 1986	

1.2.2 Classification and definitions

National class	Definition
Closed High Forest	Continuous tree formation of natural origin with canopy coverage more than 40%
Coastal tree savanna	Coastal tree savanna
Coastal woodland	Scrub, shrub and brushland
Ex-Mangrove swamp	Ex-Mangrove swamp
Forest Regrowth	Forest Regrowth
Fringing swamp forest	Fringing swamp forest
Lophira tree savanna	Lophira tree savanna
Mixed tree savanna	Mixed tree savanna
Montane grassland	Montane grassland
Oil Palm plantations	Artificial plantation

Raphia swamp forest	Raphia swamp forest
Rock outcrop	Rock outcrop
Rubber plantation	Artificial plantation
Savanna woodland	Scrub, shrub and brushland
Secondary Forest	Secondary Forest
Swamp and riverain grassland	Swamp and riverain grassland
Swamp cultivation	Swamp cultivation
Upland crops	Upland crops
Upland grassland	Upland grassland

1.2.3 Original data

National Class	Area (ha)	
	1976	1986
Closed High Forest	365 200	257 400
Coastal tree savanna	54 600	11 700
Coastal woodland	50 100	50 400
Ex-Mangrove swamp	0	28 900
Forest Regrowth	3 774 400	3 909 300
Fringing swamp forest	28 800	25 500
Lophira tree savanna	264 600	83 200
Mangrove	171 600	156 500
Mixed tree savanna	732 000	703 500
Montane grassland	4 000	2 900
Oil Palm plantations	6 300	7 200
Raphia swamp forest	35 500	35 000
Rock outcrop	50 000	60 300
Rubber plantation	2 100	1 700
Savanna woodland	622 600	540 500
Secondary Forest	261 000	205 600
Swamp and riverain grassland	181 900	138 600
Swamp cultivation	203 900	218 200
Upland crops	164 000	645 200
Upland grassland	255 200	148 800
Total	7 227 800	7 230 400

1.3 Analysis and processing of national data

1.3.1 Calibration

	Area
UN Total area (ha)	7174000
Land Area (ha)	7162000
Inland Water (ha)	12000
Calibration factor for 1976	0.99054
Calibration factor for 1986	0.99054

The resulting data now become:

	Calibrated area

National class	1976	1986
Closed High Forest	361 875	254 965
Coastal tree savanna	54 103	11 589
Coastal woodland	49 644	49 923
Ex-Mangrove swamp	0	28 627
Forest Regrowth	3 740 039	3 872 318
Fringing swamp forest	28 538	25 259
Lophira tree savanna	262 191	82 413
Mangrove	170 038	155 020
Mixed tree savanna	725 336	696 845
Montane grassland	3 964	2 873
Oil Palm plantations	6 243	7 132
Raphia swamp forest	35 177	34 669
Rock outcrop	49 545	59 730
Rubber plantation	2 081	1 684
Savanna woodland	616 932	535 387
Secondary Forest	258 624	203 655
Swamp and riverain grassland	180 244	137 289
Swamp cultivation	202 044	216 136
Upland crops	162 507	639 096
Upland grassland	252 877	147 392
Total	7 162 000	7 162 000

1.3.2 Estimation and forecasting

This was done by linear interpolation and extrapolation after reclassification.

1.4 Reclassification into FRA 2005 classes

National class	Forest	Other Wooded land	Other Land	Other Land with tree cover
Closed High Forest	100%			
Coastal tree savanna		100		
Coastal woodland	100%			
Ex-Mangrove swamp			100%	
Forest Regrowth	50%		50%	
Fringing swamp forest	100%			
Lophira tree savanna		100%		
Mangrove	100%			
Mixed tree savanna		100%		
Montane grassland			100%	
Oil Palm plantations				100%
Raphia swamp forest	100%			
Rock outcrop			100%	
Rubber plantation	100%			
Savanna woodland	100%			
Secondary Forest	100%			
Swamp and riverain grassland			100%	
Swamp cultivation			100%	
Upland crops			100%	
Upland grassland			100%	

Forest regrowth (areas of forest fallow) has been classified as 50% forest and 50% other land assuming that these are small patches within the forest of which half are reverting to forests and the other half are likely to still have agriculture as the main use.

The result of this reclassification gives the following:

FRA 2005 Categories	Area (hectares)	
	1976	1986
Forest	3 314 747	3 121 539
Other wooded land	1 119 812	866 029
Other land	2 727 442	3 174 434
...of which with tree cover ¹⁾	6 243	7 132
Inland water bodies	12 000	12 000
TOTAL	7 174 000	7 174 000

1.5 Data for National reporting table T1

FRA 2005 Categories	Area (1000 hectares)		
	1990	2000	2005
Forest	3 044	2 851	2 754
Other wooded land	765	511	384
Other land	3 353	3 800	4 024
...of which with tree cover ¹⁾	7	8	9
Inland water bodies	12	12	12
TOTAL	7 174	7 174	7 174

1.6 Comments to National reporting table T1

The rate of deforestation is estimated at about 30 000 ha per year based on forest area estimates from 1976 and 1986. This is likely to be an underestimate since it does not take into account deforestation caused by the civil war as well as post war reconstruction.

The source is a review of existing and available information on the size of various land categories based on remote sensing imagery and maps. It gives no data on non-rubber forest plantations. This may be due to the fact the plantation sizes are too small to provide an independent segregation from the above-mentioned maps, but also because most plantations were established after 1984, when an FAO forestry project promoted the establishment of plantations and woodlots.

The forest area is larger than reported in FRA 2000 and the area of other wooded land considerably smaller because 50 percent of the national class “forest regrowth” has been classified as “forest” in the 2005 classification. In the FRA 2000 classification it was all classified as “Forest fallow”, which was then classified as “Other wooded land”.

2 Table T2 – Ownership of Forest and Other wooded land

2.1 FRA 2005 Categories and definitions

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

2.2 National data

2.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
ATLANTA Industrie- und Unternehmensberatung GmbH 1979. Feasibility study on Forest Resources development in Sierra Leone. Volume 1. ATLANTA Industrie- und Unternehmensberatung GmbH, hamburg, Germany		Forest ownership	1978	

2.2.2 Classification and definitions

National class	Definition
Forest Reserve	Area allocated as forests under state law
Protected Forests	Mostly narrow strips of forests along roads and old railway lines.
Protection Forests	Area under wildlife reserves.

2.2.3 Original data

The government of Sierra Leone is responsible for the forests designated as Forest Reserves, Protected Forests and Protection forests.

National Class	Area 1978 (ha)
Forest Reserve	285 012
Protected Forests	3 1900
Protection Forests	76 665

2.3 Analysis and processing of national data

The above information indicates that 393 577 ha of forest was owned by the Government in 1978. However, there is no information on the rest of the forest and other wooded land.

2.3.1 Estimation and forecasting

2.4 Reclassification into FRA 2005 classes

2.5 Data for National reporting table T2

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

2.6 Comments to National reporting table T2

Available information indicates that 393 577 ha of forest was owned by the Government in 1978. However, there is no information on the rest of the forest and other wooded land, nor for any later date, so no estimation/forecasting has been done.

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

3.1 FRA 2005 Categories and definitions

Types of designation

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

Designation categories

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

3.2 National data

3.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
ATLANTA Industrie- und Unternehmensberatung GmbH 1979. Feasibility study on Forest Resources development in Sierra Leone. Volume 1. ATLANTA Industrie- und Unternehmensberatung GmbH, hamburg, Germany			1978	

3.2.2 Classification and definitions

National class	Definition
Forest Reserve	Area allocated as forests under state law
Protected Forests	Mostly narrow strips of forests along roads and old railway lines.
Protection Forests	Area under wildlife reserves.

3.2.3 Original data

National Class	Area (ha) (1978)
Forest Reserve	285012
Protected Forests	31900
Protection Forests	76665

3.3 Analysis and processing of national data

3.3.1 Estimation and forecasting

Original data for the 3 classes above were used for all 3 reporting years

3.4 Reclassification into FRA 2005 classes

Forest reserves have been reclassified as forests with production as the primary function.

Protected forests have been reclassified as having protection of soil and water as the primary function.

Protection forests (wildlife reserves) have been reclassified as having conservation of biological diversity as the primary function.

The rest of the forest area has been reclassified as no/unknown function.

All areas of other wooded land have been reclassified as no/unknown function.

3.5 Data for National reporting table T3

FRA 2005 Categories / Designated function	Area (1000 hectares)					
	Primary function			Total area with function		
	1990	2000	2005	1990	2000	2005
Forest						
Production	285	285	285	317	317	317
Protection of soil and water	32	32	32	32	32	32
Conservation of biodiversity	77	77	77	77	77	77
Social services						
Multiple purpose				not appl.	not appl.	not appl.
No or unknown function	2 651	2 457	2 361	not appl.	not appl.	not appl.
Total - Forest	3 044	2 851	2 754	not appl.	not appl.	not appl.
Other wooded land						
Production						
Protection of soil and water						
Conservation of biodiversity						
Social services						
Multiple purpose				not appl.	not appl.	not appl.
No or unknown function	435	277	198	not appl.	not appl.	not appl.
Total – Other wooded land	435	277	198	not appl.	not appl.	not appl.

3.6 Comments to National reporting table T3

The information provided above is based on a source with the reference year 1978 and the following assumptions:

Forest reserves have been reclassified as forests with production as the primary function.

Protected forests have been reclassified as having protection of soil and water as the primary function.

Protection forests (wildlife reserves) have been reclassified as having conservation of biological diversity as the primary function.

The area of these three classes has remained constant since 1978.

The rest of the forest area has been reclassified as no/unknown function.

All areas of other wooded land have been reclassified as no/unknown function.

4 Table T4 – Characteristics of Forest and Other wooded land

4.1 FRA 2005 Categories and definitions

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

4.2 National data

4.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Laumans Paul A. 1996. Review of Existing Sources of information for Forest Resource Assessment in Sierra Leone. Working Document No. X (FO:DP/SIL/92/006). FAO, Rome			1976, 1986	

4.2.2 Original data

	1976	1986
Rubber plantation Area ('000) ha	2.081	1.684

4.3 Analysis and processing of national data

4.3.1 Estimation and forecasting

4.4 Reclassification into FRA 2005 classes

Rubber plantations have been classified as productive plantations. Although some primary forests still exist, all other forests are classified as modified natural forests due to lack of sufficient information. All other wooded land have been classified as modified natural forest.

4.5 Data for National reporting table T4

FRA 2005 Categories	Area (1000 hectares)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Primary						
Modified natural	3 372	3 082	2 937	435	277	198
Semi-natural						
Productive plantation	2.0	2.6	3.0			
Protective plantation						
TOTAL	3 374	3 085	2 940	435	277	198

4.6 Comments to National reporting table T4

The plantation figures refer only to rubber plantations and are, therefore, likely to be severe underestimates.

In absence of any information on other types of forest classes, all other forests are classified as “modified natural”, although some pockets of primary forests still exist.

5 Table T5 – Growing stock

No data are available for this reporting table

6 Table T6 – Biomass stock

No data are available for this reporting table

7 Table T7 – Carbon stock

No data are available for this reporting table

8 Table T8 – Disturbances affecting health and vitality

8.1 FRA 2005 Categories and definitions

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

8.2 National data

8.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
FAO 2004. Sierra Leone Nfp update. FAO, Rome, (Draft)		Disturbance by fire		

8.2.2 Original data

The source quotes the National Environmental Action Plan of Sierra Leone which estimates an average of 200 000 ha being burned annually by bush fire.

8.3 Analysis and processing of national data

8.3.1 Estimation and forecasting

The above estimate was used for all 3 reporting years

8.4 Reclassification into FRA 2005 classes

None

8.5 Data for National reporting table T8

FRA-2005 Categories	Average annual area affected (1000 hectares)			
	Forests		Other wooded land	
	1990	2000	1990	2000
Disturbance by fire	200	200		
Disturbance by insects				
Disturbance by diseases				
Other disturbance				

8.6 Comments to National reporting table T8

It is not known how much of the burned area is other wooded land.

9 Table T9 – Diversity of tree species

9.1 FRA 2005 Categories and definitions

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

9.2 National data

9.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
IUCN Red List. http://www.fao.org/forestry/site/20747/en	H	Vulnerable and endangered species		
Savill, P.S and Fox, J.E.D. 1967. Trees of Sierra Leone	H	Tree species		

9.2.2 Classification and definitions

9.2.3 Original data

IUCN lists 4 endangered species and 42 vulnerable plant species on its Red List for Sierra Leone. All of these, except the following five vulnerable species are included in the book Trees of Sierra Leone:

Bafodeya benna

Eribroma oblonga

Hallea stipulosa

Pararistolochia goldieana

Pavetta lasioclada

However, it is assumed that they also exist in Sierra Leone.

9.3 Data for National reporting table T9

FRA 2005 Categories	Number of species (year 2000)
Native tree species	213
Critically endangered tree species	0
Endangered tree species	4
Vulnerable tree species	42

9.4 Comments to National reporting table T9

Endangered tree species listed by IUCN:

Neolemonniera clitandrifolia

Placodiscus pseudostipularis

Tieghemella africana

Tieghemella heckelii

Vulnerable tree species listed by IUCN:

Afzelia africana

Albizia ferruginea

Amanoa bracteosa

Anopyxis klaineana

Anthonotha vignei

Antrocaryon micraster

Bafodeya benna

Berlinia occidentalis

Copaifera salikounda

Cordia platythyrsa

Cryptosepalum tetraphyllum

Deinbollia maxima

Drypetes afzelii

Entandrophragma angolense

Entandrophragma cylindricum

Entandrophragma utile

Eribroma oblonga

Garcinia kola

Gilbertiodendron bilineatum

Gilbertiodendron splendidum

Guarea cedrata

Hallea stipulosa

Haplormosia monophylla

Heritiera utilis

Homalium smythei

Isolona deightonii

Khaya anthotheca

Khaya senegalensis

Lophira alata
Lovoa trichilioides
Millettia warneckeii
Monopetalanthus compactus
Nauclea diderrichii
Neostenanthera hamata
Nesogordonia papaverifera
Pararistolochia goldieana
Pavetta lasioclada
Pterygota macrocarpa
Rhodognaphalon breviscupe
Schumanniphyton problematicum
Terminalia ivorensis
Turraeanthus africanus

10 Table T10 – Growing stock composition

No data are available for this reporting table

11 Table T11 – Wood removal

11.1 FRA 2005 Categories and definitions

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

11.2 National data

11.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
FAOSTAT		Wood Fuel Production, Industrial Round Wood Production	1988-2002	

11.2.2 Original data

Wood Fuel Production

1988	1989	1990	1991	1992	1993	1994	1995
4795401	4767666	4688850	4591401	4559816	4482874	4402114	4610873

1996	1997	1998	1999	2000	2001	2002
4600674	4952592	5080258	5215230	5357763	5363942	5373620

Industrial Round Wood Production

1988	1989	1990	1991	1992	1993	1994	1995
140000	140000	138000	121600	120000	123600	123600	123600

1996	1997	1998	1999	2000	2001	2002
123600	123600	123600	123600	123600	123600	123600

11.3 Analysis and processing of national data

11.3.1 Estimation and forecasting

The original data is first multiplied by 1.15 to get the volume over bark. Values reported for 1990 are the averages from 1988-1992 while that of 2000 is the average from 1998-2002.

2005 data is then calculated by linear extrapolation.

11.4 Reclassification into FRA 2005 classes

Wood Fuel Production = 100% Woodfuel removal

Industrial Round Wood Production = 100% Industrial wood removal

11.5 Data for National reporting table T11

FRA 2005 Categories	Volume in 1000 cubic meters of roundwood over bark					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial roundwood	151.7	142.1	137.3			
Woodfuel	5382.7	6069.9	6413.5			
TOTAL for Country	5534.4	6212.0	6550.8			

11.6 Comments to National reporting table T11

12 Table T12 – Value of wood removal

No data are available for this reporting table

13 Table T13 – Non-wood forest product removal

No data are available for this reporting table

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

No data are available for this reporting table

15 Table T15 – Employment in forestry

15.1 FRA 2005 Categories and definitions

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

15.2 National data

15.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
FAO 2001. Forestry Outlook Studies for Africa: Sierra Leone. FAO,Rome		Forestry staff	2000	

15.2.2 Original data

Forestry staff = 177 people. Wildlife staff = 33 people

15.3 Analysis and processing of national data

15.3.1 Estimation and forecasting

The estimate for 2000 = reported data for 2000

15.4 Reclassification into FRA 2005 classes

Forestry staff = 100% Primary production of goods

Wildlife staff =100% Provision of services

15.5 Data for National reporting table T15

FRA 2005 Categories	Employment (1000 person-years)	
	1990	2000
Primary production of goods		0.177
Provision of services		0.033
Unspecified forestry activities		
TOTAL		0.210

15.6 Comments to National reporting table T15

The data above refers only to public service staff. People employed in other forest activities are not included.