Forestry Department
Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT

COUNTRY REPORTS

SURINAME

FRA2005/213
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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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1 Table T1 – Extent of Forest and Other wooded land

1.1 FRA 2005 Categories and definitions

1.1.1 A. Global Classification and Definitions (FRA 2005)

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

1.2 National data

1.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Lindeman J.C and S.P Molenaar	H	Forest types	1957	Classification of forest types
Preliminary Classification of Forested land of Suriname	M	Forest Classification/NARENA SBB	1998	LANDSAT TM images of 1998, Arial photo's, Field checks, topographic maps has been used to asses the extend of the forest types with GIS
Indicative Forest Classification map	M	NARENA/SBB	1998	As mentioned above

1.2.2 Classification and definitions

National class	Definition
High Dry land Forest (Rain Forest)	Is a three or four storeys forest with emergent up to 45 m. The lower storey reaches 25 to 30 m. Its undergrowth consists of small trees and poles.
High Savannah Forest or dry evergreen forest	Is a two storey forest with a closed canopy reaching 25-30 meters on height. Big trees are scares. Palms are few and small. Dominant species are the same as in the rain forest. It occurs on deep white sand
Low Savannah forest	This forest does not show any storey. High varies from 10 – 20 meters. This type of forest is very dens and closed and more homogenous than the previous ones
High Swamp forest.	These forests are marked by very wet conditions all year around. The shorter the time inundation the more it resembles the rain forest. Is at least 20 meter high with two storeys and is fairly closed.

Low Swamp Forest	This forest is marked by very wet conditions all year around. The shorter the time inundation the more it resembles rainforest. Varies in physiognomy from open scrub to a low closed forest. Palm and epiphytes are rare. The forest has not big trees and is not rich in species. Low swamp forest which varies form open woodland to single storied 10 to 15 meter high forest in permanently inundated terrain.
Mangrove forest.	One storey and closed forest. The undergrowth is restricted to ferns. Two types are distinguished along the coast *Avicennia nitida*. Along major rivers *Rizophora mangle* and patches of *Laguncularia*
Marsh Forest	This forest are characterized by insufficient drainage , causing seasonal fluctuation in moisture conditions from very dry to very wet
Ridge Forest	This forest is a two storey forest up to 30 m and is strongly influenced by Palms form the undergrowth strongly influenced by rain forest and has

1.2.3 Original data

National class	**Area 1000 ha 1998**
High Dry land Forest (Rain Forest)	13,333
High Savannah Forest or dry evergreen forest	132
Low Savannah forest	18
High Swamp forest.	485
Low Swamp Forest	240
Mangrove forest.	115
Marsh Forest	470
Ridge Forest	35
Total Forest	**14,828**
Total country area	**16,384**

1.3 Analysis and processing of national data

1.3.1 Calibration

Calculating the calibration factor

Total area according to FAOSTAT (1000 ha)	16327
Calibration factor (=16327/16384)	0,9965

Calibrated national data

National class	**Area 1000 ha 1998**
High Dry land Forest (Rain Forest)	13,286.614
High Savannah Forest or dry evergreen forest	13,541
Low Savannah forest	17,937
High Swamp forest.	483,313
Low Swamp Forest	239,165
Mangrove forest.	114,600
Marsh Forest	468,365
Ridge Forest	34,878
Total forest area	**14,776.413**

1.3.2 Estimation and forecasting

It is not likely that activities will take place in a short time that will affect the area of the forest cover significantly, therefore the forest area is considered constant for the three reported years.

1.4 Reclassification into FRA 2005 classes

National class	FRA 2005 categories			
	Forest	**Other wooded land**	**Other land with tree cover**	**Other land**
High Dry land Forest (Rain Forest)	100%			
High Savannah Forest or dry evergreen forest	100%			
Low Savannah forest	100%			
High Swamp forest.	100%			
Low Swamp forest	100%			
Mangrove forest.	100%			
Marsh Forest	100%			
Ridge Forest	100%			

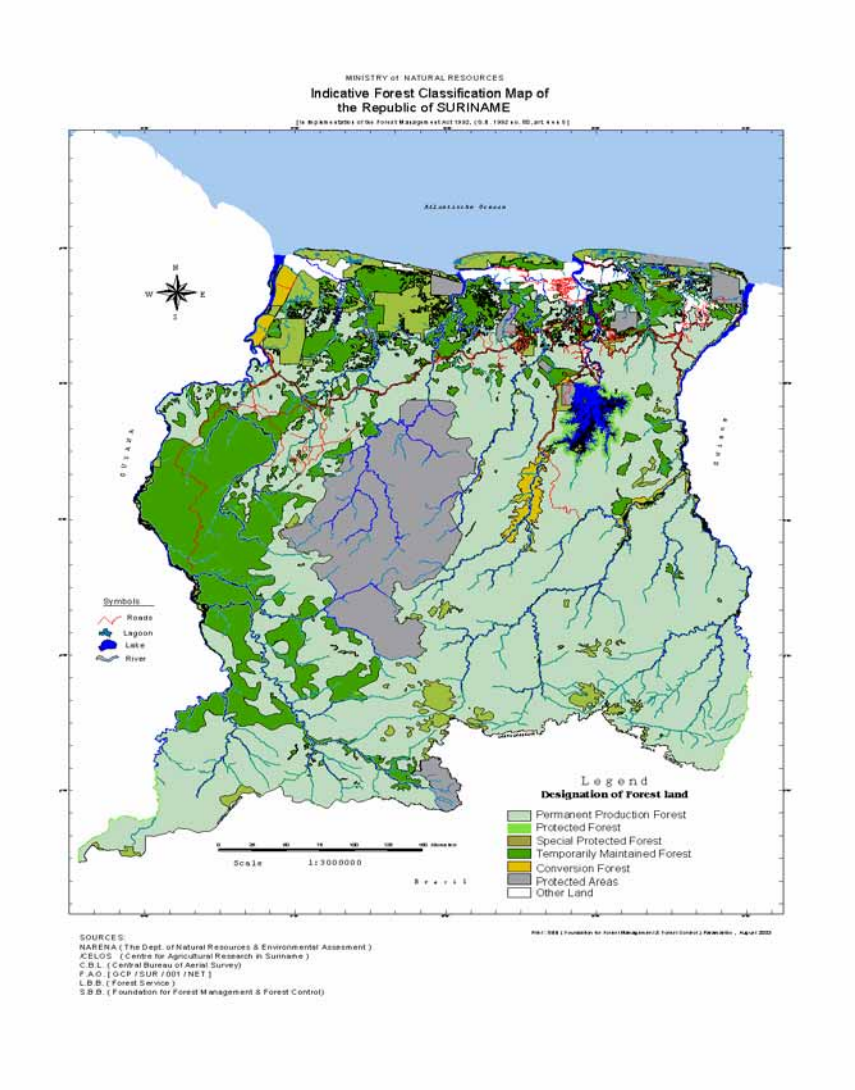
1.5 Data for National reporting table T1

FRA 2005 Categories	Area (1000 hectares)		
	1990	**2000**	**2005**
Forest	14,776	14,776	14,776
Other wooded land			
Other land	824	824	824
...of which with tree cover			
Inland water bodies	727	727	727
TOTAL	16,327	16,327	16,327

1.6 Comments to National reporting table T1

The difference in forest area presented in this report and the FRA 2000 report is mainly because of the reclassification process, as the marsh forest and low savannah was not considered forest. These results are more accurate as the re-classification is done by national experts.

The country map of Suriname with the preliminary classification of forest types "indicative forest classification map" is shown below



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
Forest management Act	H	State forest	1992	
Diagnosis of Land management issues in Suriname	H	Land titles	2002	Buursink International Consultants in Environmental Management
Agricultural census	M	Land area, type of land tenure	1981 1985	Minister of Agriculture, Fishery and Husbandry

2.2.2 Classification and definitions

National class	Definition
State land	All land not burdened by any real right of use
Allodial property	This is the oldest title issued by the Dutch. All descendants of the first own the land. Allodial title was issued subject to various conditions, the most important of which was that the land must be cultivated. Most of the these titles included a provision in which the government reserves the right to reclaim the land with a simple procedure
Private land	This is the most complete title to land available in Suriname. However, private property was not issue the Agrarian Ordinance was promulgated in 1973. There are no limitations imposed by the state. The owner has full and limited enjoyment of land within the context of the law. Due to fears that the land would abandoned, and therefore be unproductive, private land was always issued sparingly
Lease hold	A real right. These titles are valid for a renewable period of 75 years, are mortgage able and freely transferable, and are issued subject to payment of an annual fee. Under a new decree "L-Decree 1982" renewable of these title is not possible. According to this decree , lease hold right has to be converted into a long lease rights
Land lease	Land lease is the only title issued by the Sate/ Land lease is issued for land use purposes for a limited duration (15-40 years) and is subjected to various conditions. These include annual fee and the usage of the land according to the purposes for which it was issued. These are mortgage able, transferable and renewable. The state reserves the right to reclaim the land the land by a simple procedures if the land is not being used as designated on the title
Other land (simple rent and simple use)	

2.2.3 Original data

In accordance with the constitution of the Republic of Suriname (1987) all forests, except for those on privately owned land, belong to the state. Forests on private land do not cover more than a total area of 50,000 ha.

2.3 Analysis and processing of national data

2.3.1 Calibration

2.3.2 Estimation and forecasting

For the total forest area of the year 2000, is was deducted the 50,000 hectares of private forest.

2.4 Reclassification into FRA 2005 classes

National classification	FRA Clases
State land	Public
Public ownership	Public
Allodial property	Public
Lease hold	Public
Land lease	Public
Other ownership, including private owned	50,000 ha private all the rest public

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*	50	ID	ID
Public ownership	ID	14,726	ID	ID
Other ownership	ID	ID	ID	ID
TOTAL		**14,776**		

* Insufficient data

2.6 Comments to National reporting table T2

Data on land allocation are outdated (1985), but serve to indicate the magnitudes of land allocation by tenure type at that time for indigenous and maroon people, the constitution does not provide tribal rights of land use. The Constitution does not provide for tribal rights of land use. However, the indigenous and maroon people claim these rights. The Government recognizes the urgency of this matter and has announced in the National Forest Policy that it will enter into a structural and constructive consultation with the interior people on this matter.

Estimated land area of Suriname by type of tenure as of 1985 is as follows

National classification	**Area in ha (x 1000)**
	1985
State land	162,300
Public ownership	n.a
Allodial property	370
Lease hold	465
Land lease	262
Other ownership, including private owned	603

A project GLIS (Geographic Land Information System) is now being implemented by the government. With the execution of this project reliable information can be produced regarding Ownership and Land tenure in Suriname

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
Forest Management Act	H	Designation of forest land	1992	Forest classification
Indicative Forest Classification Map	H	Forest classification	2001	The Classification of the forest must be done through a bylaw. The law is in preparation.
SBB Data base"LogPro, Concession Map	H	Data, including Issued concessions and other wood cutting rights	2005	The concession map is frequently updated
National Forest Policy	H	Designation of forest land	2003	The forest policy have been formulated in a participatory process with all relevant stakeholders

3.2.2 Classification and definitions

National class	Definition
Permanent Forest	Forest to be preserved permanently in the interest of the sustainable harvesting of wood and/or sustainable gathering of forest by-products and/or for any lasting ecological, protective or recreational function. Permanent forest includes production forest, protected forest, and special protected forest;
Production forest	permanent forest which is primarily intended for the sustainable, commercial harvesting of wood and/or the sustainable gathering of forest by-products
Protection forest	permanent forest which, because of its location, has an important stabilizing influence on the natural environment, in particular the soil and the soil hydrology
Special protected forest	permanent forest which, on account of its location, the composition of its fauna and/or flora, or its aesthetic value, has a particular scientific, educational, cultural or recreational function;
Conversion forest	Forest in regions where the land will be used for purposes other than forestry
Forest to be temporarily maintained	Forest to be maintained pending its definitive designation as permanent forest or conversion forest
Community forest	Forest areas which are situated around communal land and which are designated as communal forest for the benefit of the forest dwelling tribal communities living in villages and settlements, and which serve the purpose of providing for their own need for food and wood production, as well as possible commercial timber use, gathering of forest by-products and development for agricultural purposes

3.2.3 Original data

The Forest Management Act distinguishes three main categories, Permanent forest Conversion forest and Preliminary Permanent forest. These categories are subdivided and in fact two categories can be added notably Nature conservation forest areas and Community forest. So in practice the following categories are distinguished:

According to the Forest Management Act
Permanent Forest (to be preserved permanently)
- Production forest
- Protection forest
- Special protected forest

Community forest (forest designated to tribal communities in the interior)
Conversion Forest (forest land designated for non- forest use)
Preliminary maintained forest (designation to one of the other four categories not yet decided)

National class	Area (1000 ha)
Permanent Forest	
- Production forest	4,500*
- Protection forest	
- Special protected forest	
Conversion forest	
Preliminary maintained forest	
National conservation areas (land portion only)	1,886.98

* This includes also 490.000 community forest

3.3 Analysis and processing of national data

3.3.1 Calibration

3.3.2 Estimation and forecasting

3.4 Reclassification into FRA 2005 classes

National class	FRA categories	Total area
Permanent forest	Production forest	
- production forest	Production forest	4010
- protected forest	Protection for soil and water	
-special protected forest	Conservation of biodiversity	
Conversion forest	No or unknown function	
Preliminary maintained forest	No or unknown function	
Community forest	Multiple use	490
Conservation area	Conservation of biodiversity	1,886.99

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		4,010	4,010			
Protection of soil and water						
Conservation of biodiversity		1,887	1,887			
Social services						
Multiple purpose		490	490	not appl.	not appl.	not appl.
No or unknown function	14,776	8389	8389	not appl.	not appl.	not appl.
Total - Forest	**14,776**	**14,776**	**14,776**	**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				not appl.	not appl.	not appl.
Total – Other wooded land				**not appl.**	**not appl.**	**not appl.**

3.6 Comments to National reporting table T3

According to the Nature Conservation Act 1954:

The permanent forest estate comprises the Permanent forests, the Nature conservation forest areas and the Community forests. According to the Forest Management Act, areas may be designated as Permanent forest by State Decree, signed by the President. Nature conservation areas are designated by State Decree by virtue of the Nature Conservation Act 1954. The Minister of Natural Resources may designate Community forests to tribal communities living in the interior, after consultation with the Minister for Regional Development.

The permanent forest estate is secured as far as formal designation has taken place. This is the case for 2.1 million ha Nature conservation reserves, including the 1.6 million ha Central Suriname Nature Reserve. In a way the 490,000 ha Community forests could be considered as being formally designated, including the communal wood cutting licenses – Houtkap Vergunningen (HKV) - which were issued prior to the Forest Management Act. In the coastal zone, so called Multiple Use Management Areas have been designated by virtue of the Decree Issuance State land (decreet uitgifte domeingrond) In these multiple use areas the forests, mainly Mangrove and swamp forests are being protected.

The forests which have been tentatively classified under Permanent Forests have not been formally designated. Proposals for the designation of 90.000 ha protection forests are being prepared. De facto, part of the production forests have been designated through the issuing of concessions. However some of the timber concessions may be in conversion forests or preliminary permanent forest. There seems to be consensus that the present feasible gross production forest area is the, south of the coastal area, East West running Forest Belt of some 4, 5 million ha, with an estimated net productive area of 2,5 million ha. The rationale for this limited area is mainly based on economic factors such as, accessibility and transport costs.

In 2001 SBB has produced an Indicative Forest Classification Map. The basis of the map is topographic data, some FAO inventory data from the sixties and rough estimations of economic feasibility of some specific land uses. The intention was to use the map as a reference in a participatory discussion process to arrive at some conclusions on the division of forest land over the five categories. On the map large areas of Preliminary Permanent Forest appear, mainly mixed marsh and mesophytic high dryland forest situated in the west, and south of the coastal area. Some conversion areas have been identified but they do not include an envisaged mining area near the Bakhuys Mountains, a possible hydro power lake in the same region and an envisaged oil palm plantation of 52.000 ha in the west.

As of August 2003, the government has formerly set aside more than 12%, or about 1,886,987 ha its territory as natural reserves, and parks. According to the National forest policy only 4, 5 million ha is designated as production forest. The remaining part, 10, 3 million ha will be preserved.

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
National Forest Policy	H		2003	
Preliminary Classification of the forested lands of Suriname	M		1998	

4.2.2 Classification and definitions

4.2.3 Original data

Besides the natural forests there are approximately 7,000 ha. of pine plantations and some smaller plantations approximately, 5000 ha of broadleaf species, which were planted in the sixties, mostly by way of experiment. During the last 30 years there has not been any afforestation. There is a largely untapped timber stock of variable quality on the present plantations.

Rough estimations indicate that presumably 330,000 ha has been logged but still have potential to be re-logged within the coming 10 to 15 years, while presumably 220,000 ha has been over harvested.

4.3 Analysis and processing of national data

4.3.1 Calibration

4.3.2 Estimation and forecasting

4.4 Reclassification into FRA 2005 classes

	Natural forest	**Broadleave plantation**	**Pine plantation**	**Logged areas**
Primary	100%			
Modified natural				100%
Semi-natural		100%		
Productive plantation			100%	
Protective plantation				

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	14,214	14,214	14,214			
Modified natural	550	550	550			
Semi-natural	5	5	5			
Productive plantation	7	7	7			
Protective plantation	0	0	0			
TOTAL	**14,776**	**14,776**	**14,776**			

4.6 Comments to National reporting table T4

5 Table T5 – Growing stock

5.1 FRA 2005 Categories and definitions

Category	Definition
Growing stock	Volume over bark of all living trees more than X cm in diameter at breast height (or above buttress if these are higher). Includes the stem from ground level or stump height up to a top diameter of Y cm, and may also include branches to a minimum diameter of W cm.
Commercial growing stock	The part of the growing stock of species that are considered as commercial or potentially commercial under current market conditions, and with a diameter at breast height of Z cm or more.

5.2 National data

5.2.1 Data sources

Expert estimation.

5.2.2 Classification and definitions

5.2.3 Original data

National experts estimate the volume of tress >15 cm is 150 m3/ha

5.3 Analysis and processing of national data

5.3.1 Calibration

5.3.2 Estimation and forecasting

The estimated volume is multiplied by total forest area presented in table number 1.

5.4 Reclassification into FRA 2005 classes

5.5 Data for National reporting table T5

FRA 2005 Categories	Volume (million cubic meters over bark)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Growing stock	2,216	2,216	2,216			
Commercial growing stock	ID	ID	ID			

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

5.6 Comments to National reporting table T5

6 Table T6 – Biomass stock

6.1 FRA 2005 Categories and definitions

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

6.2 National data

6.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Poels, R.L.H. (1987). Soils, water and nutrients in a forest ecosystem in Surinam. PhD thesis, Agricultural University Wageningen, pp 253.	M	Biomass production	1998	

6.2.2 Original data

According to Poels, 1987 the Surinamese rainforest contain a biomass of 542.5 ton/ha

6.3 Analysis and processing of national data

6.3.1 Calibration

6.3.2 Estimation and forecasting

The reported biomass is considered to be above ground biomass. This was multiplied by the total forest area presented in table number 1. A root-shoot ratio of 0.42 and a relation dead/live ratio of 0.11 was applied.

6.4 Reclassification into FRA 2005 classes

6.5 Data for National reporting table T6

FRA 2005 Categories	Biomass (million metric tonnes oven-dry weight)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Above-ground biomass	8016	8016	8016			
Below-ground biomass	3367	3367	3367			
Dead wood biomass	1252	1252	1252			
TOTAL	**12635**	**12635**	**12635**			

6.6 Comments to National reporting table T6

Based on measurements done by NARENA in 1998. K. Tjon (1998) Monitoring Tropical Rainforest in Suriname; Internal Memorandum NARENA/CELOS the following figures were estimated

Mean biomass (kg/ha)

Forest type	High Forest	High Dry Forest	Creek Forest	Walaba Forest	Marsh Forest	Savanna Forest	Liana Forest	Swamp Forest	Palm and liana
Bio-mass	505488	378722	138517	314787	375317	441866	249051	140430	265107

Based on measurements done by NARENA in 1998. K. Tjon (1998) Monitoring Tropical Rainforest in Suriname; Internal Memorandum NARENA/CELOS the following figures were estimated

Measured trees are all greater than 10 cm d.b.h. (diameter at breast height).
*Plot size = 50 * 20 m²; No. of plots 31*
*Gross Volume in m³ = basal area * (bole length - reference height) *0.7*
*Biomass = exp (-3.1141 + 0.9719 ln (d² * h)*

(Source Biomass calculation formula: J.M. Anderson and J.S.I. Ingram, 1993, Tropical Soil Biology and Fertility, A handbook of methods)

7 Table T7 – Carbon stock

7.1 FRA 2005 Categories and definitions

Category	Definition
Carbon in above-ground biomass	Carbon in all living biomass above the soil, including stem, stump, branches, bark, seeds, and foliage.
Carbon in below-ground biomass	Carbon in all living biomass of live roots. Fine roots of less than 2 mm diameter are excluded, because these often cannot be distinguished empirically from soil organic matter or litter.
Carbon in dead wood biomass	Carbon in all non-living woody biomass not contained in the litter, either standing, lying on the ground, or in the soil. Dead wood includes wood lying on the surface, dead roots, and stumps larger than or equal to 10 cm in diameter or any other diameter used by the country.
Carbon in litter	Carbon in all non-living biomass with a diameter less than a minimum diameter chose by the country for lying dead (for example 10 cm), in various states of decomposition above the mineral or organic soil. This includes the litter, fumic, and humic layers.
Soil carbon	Organic carbon in mineral and organic soils (including peat) to a specified depth chosen by the country and applied consistently through the time series.

7.2 National data

7.2.1 Data sources

Table number 6.

7.2.2 Classification and definitions

7.2.3 Original data

FRA 2005 Categories	Biomass (million metric tonnes oven-dry weight)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Above-ground biomass	8016	8016	8016			
Below-ground biomass	3367	3367	3367			
Dead wood biomass	1252	1252	1252			
TOTAL	**12635**	**12635**	**12635**			

7.3 Analysis and processing of national data

7.3.1 Calibration

7.3.2 Estimation and forecasting

Estimation was done by multiplying the data from table 6 by 0.5.

7.4 Reclassification into FRA 2005 classes

7.5 Data for National reporting table T7

FRA 2005 Categories	Carbon (Million metric tonnes)					
	Forest			Other wooded land		
	1990	**2000**	**2005**	**1990**	**2000**	**2005**
Carbon in above-ground biomass	4008	4008	4008			
Carbon in below-ground biomass	1684	1684	1684			
Sub-total: Carbon in living biomass	**5692**	**5692**	**5692**			
Carbon in dead wood	626	626	626			
Carbon in litter						
Sub-total: Carbon in dead wood and litter						
Soil carbon to a depth of 30cm						
TOTAL CARBON	**6318**	**6318**	**6318**			

7.6 Comments to National reporting table T7

8 Table T8 – Disturbances affecting health and vitality

8.1 FRA 2005 Categories and definitions

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

8.2 National data

8.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Forest sector environmental assessment plan	M	Forest resource use and environmental assessment	2003	

8.2.2 Classification and definitions

8.2.3 Original data

Forest fires had not affected significantly the forest area in Surinam.

8.3 Analysis and processing of national data

8.3.1 Estimation and forecasting

8.4 Reclassification into FRA 2005 classes

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	Not significant (ns)	ns		
Disturbance by insects	ns	ns		
Disturbance by diseases	ns	ns		
Other disturbance	ns	ns		

8.6 Comments to National reporting table T8

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.iucnredlist.org				

9.2.2 Classification and definitions

9.2.3 Original data

The flora and fauna of Suriname is estimated at 670,000 species. Up to now, roughly 5,800 species of mosses and vascular plants (ferns and seed plants) have been identified. Among these are about 600 tree species. Of the 5,800 identified species of plants, about 200 or 3% are endemic to Suriname.

In Suriname there are no tree species categorized yet as endangered, critically or vulnerable species, although some of these species are listed within the IUCN red-list. There are 6 tree species that are protected but not because they are endangered but for other reasons. The species are:

Bolletrie-Manilkara bidentata	For the latex production
Rozenhout-Aniba mas (A. rosaeodora)	Rare species
Tonka- Dipteryx oderata (D. punctata)	For the production of oil (extracts)
Sawari –Caryocar nuciferum	For the collection of the nuts
Hoepelhout-Copaifera guianensis	For the production of cosmetic and oil (extracts)
Inginoto-Bertholletia excelsa	For the collection of the nuts

9.3 Analysis and processing

9.4 Reclassification

9.5 Data for National reporting table T9

FRA 2005 Categories	**Number of species (year 2000)**
Native tree species	> 600
Critically endangered tree species	1
Endangered tree species	2
Vulnerable tree species	24

9.6 Comments to National reporting table T9

The country is also rich in wildlife, including at least 185 species of mammals, 668 bird species, 152 reptile species, 95 species of amphibians, and 790 marine and freshwater species. Of these 1,890 identified species of vertebrates, approximately 36 species or 2% (mainly freshwater fishes) are endemic to Suriname.

The knowledge of the invertebrate fauna is still very incomplete, and inventories routinely reveal many new species. Most inventories have taken place in the accessible areas of the Coastal Plain and along rivers and near airstrips in the Interior. Large areas of the Interior, including the mountain ranges, remain completely unknown for their flora and fauna.

10 Table 10 Growing stock composition

10.1 FRA Categories and definitions

10.2 National data

10.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
LBB yearly statistics	High	Timber, Production, Export, Import	1999-2003	It is estimated that about 20% of the production is not registered

10.3 Original data

List of species names (scientific and common names) of the ten most common species is presented below. There is no information on volume.

10.4 Analysis and processing of national data

10.4.1 Calibration

10.4.2 Estimation and forecasting

10.5 Data for National reporting table T10

FRA 2005 Categories / Species name (Scientific name and common name)		Growing Stock in Forests (million cubic meters)	
		1990	2000
Gronfolo	*Ruizterania albiflora* (was:Qualea albiflora)	ID	ID
Basra locus	*Dicorynia guinansis*	ID	ID
Wana	*Goupia glabra*	ID	ID
Walaba	*Eperua* spp	ID	ID
Babun	*Virola surinamensis*	ID	ID
Sumaruba	*Simarouba amara*	ID	ID
Groenhart	*Tabebuia serratifolia*	ID	ID
Bruinhart	*Voucapoua americana*	ID	ID
Wis Wis Kwari	*Vochysia guinanensis*	ID	ID
Rode kabbes	*Andira surinamensis*	ID	ID
TOTAL			

10.6 Comments to National reporting table T10

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
LBB yearly statistics	High	Timber, Production, Export,	1991	It is estimated that about 20% of the production is not registered
SBB yearly statistics	High	Timber, Production, Export, Import	2001	It is estimated that about 20% of the production is not registered

11.2.2 Classification and definitions

National class	Definition
Industrial roundwood	Sawlogs & Veneer logs and other industrial round wood
Woodfuel	Wood fuel including wood for charcoal
Sawlogs & Veneer logs	Roundwood that will be sawn lengthways for the manufacture of sawnwood or railway sleepers or used for the production of veneer mainly by peeling or slicing
Other industrial roundwood	Industrial roundwood other than saw logs and veneer logs. It includes roundwood that will be used for hewn square poles, fence posts, poles and pilling
Wood fuel	Round wood that will be used as fuel for the purposes such as cooking, heating, cremation. It includes wood harvested from main stems, branches and other parts of trees and wood that will be used for charcoal
Wood charcoal	Wood carbonised by partial combustion or the application of heat from external sources

11.2.3 Original data

Data are collected by the SBB in the field from the cutting registers, waybills, export bills and in the processing units. The original numbers are not included in the report.

11.3 Analysis and processing of national data

Five years data should be reported. This numbers should be multiplied by 1.15 to converted from under bark to over bark.

11.3.1 Estimation and forecasting

11.4 Reclassification into FRA 2005 classes

National class	**FRA Class**
Industrial roundwood	Industrial wood removal
Woodfuel	Industrial wood removal
Sawlogs & Veneer logs	Industrial wood removal
Other industrial roundwood	Industrial wood removal
Woodfuel	Woodfuel
Wood charcoal	Woodfuel

11.5 Data for National reporting table T11

FRA 2005 Categories	Volume in 1000 cubic meters of round wood over bark					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial roundwood	116	176	200			
Woodfuel	0.4	0.05	5			
TOTAL for Country	**116,4**	**176,05**	**205**			

11.6 Comments to National reporting table T11

For the year 2005 the industrial round wood production is estimated on 200,000 m3. There are some initiatives as well as from the private as the public sector to increase the wood production significantly.

The government has produced a report that gives some proposals and ideas to increase the national timber production on the level of 500,000 m3 per year. The private sector has also produced a strategic action plan to increase the wood production on the level of 1,000,000 m3 per year. Furthermore in the east of the country the government has issued a Chinese investment group an area of 40,000 ha as conversion forest for the establishment of a palm oil plantation. If this project start in 2005 the wood production will increase up to about 350,000 in that year.

12 Table T12 – Value of wood removal

12.1 FRA 2005 Categories and definitions

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

12.2 National data

12.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
LBB yearly statistics	High	Timber, Production, Export, Price information	1991	It is estimated that about 20% of the production is not registered The average price of wood and wood products in Paramaribo.
SBB yearly statistics	High	Timber, Production, Export, Import Price information	2004	It is estimated that about 20% of the production is not registered The average price of wood and wood products in Paramaribo

12.2.2 Classification and definitions

National class	Definition
Industrial roundwood	Sawlogs & Veneer logs and other industrial roundwood
Woodfuel	Wood fuel including wood for charcoal
Sawlogs & Veneer logs	Roundwood that will be sawn lengthways for the manufacture of sawnwood or railway sleepers or used for the production of veneer mainly by peeling or slicing
Other industrial roundwood	Industrial roundwood other than sawlogs and veneerlogs. It includes roundwood that will be used for hewn square poles, fence posts, poles and pilling
Woodfuel	Roundwood that will be used as fuel for the purposes such as cooking, heating, cremation. It includes wood harvested from main stems, branches and other parts of trees and wood that will be used for charcoal
Wood charcoal	Wood carbonised by partial combustion or the application of heat from external sources

12.2.3 Original data

SBB yearly statistics. The year average price of industrial round wood per m3 in 1990, 2000 were respectively. US $ 40 and US $ 60.00 For 2005 it is estimated on US$ 75,00 per m3. The year average price of wood fuel per m3 in 1990, 2000 were respectively. US $ 10 and US$ 12, For 2005 it is estimated on US 12, per m3. The value of round wood removal is production volume multiplied by the average unit price

12.3 Analysis and processing of national data

12.3.1 Estimation and forecasting

For 2005 it is estimated on 15,060,000.00

12.4 Reclassification into FRA 2005 classes

National class	FRA Class
Industrial roundwood	Industrial wood removal
Woodfuel	Industrial wood removal
Sawlogs & Veneer logs	Industrial wood removal
Other industrial roundwood	Industrial wood removal
Woodfuel	Woodfuel
Wood charcoal	Woodfuel

12.5 Data for National reporting table T12

FRA 2005 Categories	Value of round wood removal (1000 USD)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial round wood	4,640	10,560	15,000			
Wood fuel	4	0.6	60			
TOTAL for Country	**4,644**	**10,560.6**	**15,060**			

12.6 Comments to National reporting table T12

The year average price of industrial round wood per m3 in 1990, 2000 were respectively. US $ 40 and US $ 60.00 For 2005 it is estimated on US$ 75,00 per m3. The year average price of wood fuel per m3 in 1990, 2000 were respectively. US $ 10 and US$ 12, For 2005 it is estimated on US 12, per m3. The value of round wood removal is production volume multiplied by the average unit price

13 Table T13 – Non-wood forest product removal

13.1 FRA 2005 Categories and definitions

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

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

13.2 National data

13.2.1 Data sources

References to sources of information	**Quality (H/M/L)**	**Variable(s)**	**Year(s)**	**Additional comments**
An inventory of commercial the Non Timber Forest Products in the Guyana shield	H	Commercial NTFP extraction	2002	
Personal comments of Mr. Teunissen	H		2002	
Data collection and Analysis related to NTFP Caroline Rahan Chin for the FAO	H		2002	

13.2.2 Classification and definitions

National class	Definition
Forest By Products	Any and all produce of vegetable origin, which may be harvested without permanent damage to tree, plant or forest.

13.2.3 Original data

Discussions are going on to change the definition of NTFP in Suriname.There is very little published information available about current NTFP commercialisation in Suriname (Peneux, 1999), with the exception of animal exports. Except for wildlife, Suriname does not appear in export statistics of NTFPs (Broekhoven, 1996). Quite a number of publications, however, have stressed the importance of NTFPs for local (subsistence) use in the country (Stahel, 1944; Ostendorf, 1962; May, 1982, Heyde, 1990, Raghoenandan, 1994, van 't Klooster, 2000). Moreover, scientists currently working in Suriname state that there exists a lively national market in forest products. From the scattered published information and personal comments of experts working in Surinam, it can be deduced that the following products are Surinam's main commercial NTFPs: wildlife (bushmeat & live animals for trade, parrots and macaus), podosiri (*Euterpe oleracea*) , and other palm fruits maripa (*Maximiliana maripa*) and awara (*Astrocaryum vulgare*) kumbu (*Oenocarpus bacaba*),., medicinal plants, crafts and brazil nuts.

It should be noted here that the definition of NTFPs used by the Suriname Forest Management Law of 1992, only includes plant products and not animal products (De Dijn, pers.comm.). Wildlife collection and trade are covered by various laws.

Most of the value of Suriname's trade is made up of CITES listed birds (Psittacines and some Toucans), while reptiles and amphibians are exported in the highest numbers. For the majority of CITES listed species, realized exports are much lower than the allowed quota. This is mainly due to decreasing demand and new international restrictions (Ouboter, 2001). The main commercial animal groups in Suriname are: psittacines, reptiles, primates, amphibians, songbirds and bushmeat species.

CITES export data on Wildlife Exports for Suriname (Numbers)

	1997	1998	1999	2000
Birds	884,129	727,377	676,843	591,440
Mammals	290,778	151,387	133,300	86,575
Reptiles/Amphibians	134,439	122,044	77,513	126,848
Total	1,309,346	1,000,808	887,656	804,863

Source: Van Andel et al, 2002

13.3 Analysis and processing of national data

13.3.1 Estimation and forecasting

The average of the figures from 1997 to 2000 has been used to report year 2000.

13.4 Reclassification into FRA 2005 classes

13.5 Data for National reporting table T13

FRA 2005 Categories	Scale factor	Unit	NWFP removal		
			1990	2000	2005
Plant products / raw material					
1. Food			ID	ID	ID
2. Fodder			ID	ID	ID
3. Raw material for medicine and aromatic products			ID	ID	ID
4. Raw material for colorants and dyes			ID	ID	ID
5. Raw material for utensils, handicrafts & construction			ID	ID	ID
6. Ornamental plants			ID	ID	ID
7. Exudates			ID	ID	ID
8. Other plant products			ID	ID	ID
			ID		ID
Animal products / raw material			ID		ID
9. Living animals		number	ID	1,000,668	ID
10. Hides, skins and trophies			ID	ID	ID
11. Wild honey and bee-wax			ID	ID	ID
12. Bush meat			ID	ID	ID
13. Raw material for medicine			ID	ID	ID
14. Raw material for colorants			ID	ID	ID
15. Other edible animal products			ID	ID	ID
16. Other non-edible animal products			ID	ID	ID
					ID

13.6 Comments to National reporting table T13

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

14.1 FRA 2005 Categories and definitions

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

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

14.2 National data

14.2.1 Data sources

References to sources of information	**Quality (H/M/L)**	**Variable(s)**	**Year(s)**	**Additional comments**
An inventory of commercial the Non Timber Forest Products in the Guyana shield	H	Commercial NTFP extraction	2002	An inventory of commercial the Non Timber Forest Products in the Guyana shield
Personal comments of Mr. Teunissen	H		2002	Personal comments of Mr. Teunissen
Data collection and Analysis related to NTFP Caroline Rahan Chin for the FAO	H		2002	Data collection and Analysis related to NTFP Caroline Rahan Chin for the FAO
An inventory of commercial the Non Timber Forest Products in the Guyana shield	H	Commercial NTFP extraction	2002	An inventory of commercial the Non Timber Forest Products in the Guyana shield

14.3 Classification and definitions

14.3.1 Original data

Non-CITES export data on Wildlife Exports for Suriname (Value in US$)

	1997	1998	1999	2000
Birds	68,406.50	49,678.00	36,874.00	98,953.50
Reptiles/Amphibians	24,077.00	11,636	17,772.00	133,591.00
Mammals	900.00	822.00	0	2,160.00
Total	93,383.50	62,136.00	54,646.00	234,704.50

14.3.2 Analysis and processing of national data

14.3.3 Estimation and forecasting

Average was applied to report year 2000.

14.4 Reclassification into FRA 2005 classes

Living animals.

14.5 Data for National reporting table T14

FRA 2005 Categories	Value of the of NWFP removed (1000 USD)		
	1990	2000	2005
Plant products / raw material			
1. Food	ID	ID	ID
2. Fodder	ID	ID	ID
3. Raw material for medicine and aromatic products	ID	ID	ID
4. Raw material for colorants and dyes	ID	ID	ID
5. Raw material for utensils, handicrafts & construction	ID	ID	ID
6. Ornamental plants	ID	ID	ID
7. Exudates	ID	ID	ID
8. Other plant products	ID	ID	ID
	ID	ID	ID
Animal products / raw material	ID		ID
9. Living animals	ID	111	ID
10. Hides, skins and trophies	ID	ID	ID
11. Wild honey and bee-wax	ID	ID	ID
12. Bush meat	ID	ID	ID
13. Raw material for medicine	ID	ID	ID
14. Raw material for colorants	ID	ID	ID
15. Other edible animal products	ID	ID	ID
16. Other non-edible animal products	ID	ID	ID
TOTAL	ID	ID	ID

14.6 Comments to National reporting table T14

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
LBB	High	Forest industry information	1989	The source of the information of 1990 is the forest industry survey done in 1989 by the Forest service LBB
LBB/FAO	High	Forest industry information	1999	The source of the information of 2000 is the forest industry survey done in 1999 by the Forest service LBB and FAO

15.2.2 Classification and definitions

National class	Definition
Primary production of goods	Employment in activities related to primary production of goods, like industrial round wood and wood fuel and non-wood forest products

15.2.3 Original data

Employment figures for Primary production of goods are constructed as follow: For 1990 we see that 2,600 people is working in the primary production of good, of which 2,400 in the industrial round wood and fuel wood production which is recorded in 1989. While it is estimated that the production of non-wood forest products gives employment to another 200 people.

For 2000 we see that 3,000 people is working in the primary production of good, of which 2,800 in the industrial round wood and fuel wood production which is recorded in 1999. While it is estimated that the production of non-wood forest products gives employment to another 200 people. The figures of provision of services and unspecified forestry activities are estimations.

15.3 Analysis and processing of national data

15.3.1 Estimation and forecasting

Industrial employment is not to be considered in this table, so it was deducted from the original data.

15.4 Reclassification into FRA 2005 classes

15.5 Data for National reporting table T15

FRA 2005 Categories	Employment (1000 person-years)	
	1990	2000
Primary production of goods	0.4	0.2
Provision of services	0.2	0.2
Unspecified forestry activities	0	0
TOTAL	**0.6**	**0.4**

15.6 Comments to National reporting table T15

16 Thematic reporting tables

If countries would like to submit additional reporting tables, these should be included here. (See the chapter on thematic reporting in the Guidelines for Country Reporting).