



Forestry Department

Food and Agriculture Organization of the United Nations

**GLOBAL FOREST RESOURCES
ASSESSMENT**

COUNTRY REPORTS

BELIZE

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The Forest Resources Assessment Programme

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

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

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

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

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1 Table T1 – Extent of Forest and Other wooded land

1.1 FRA 2005 Categories and definitions

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

1.2 National data

1.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year	Additional comments
Forest Act, Chapter 213 of the Laws of Belize, Revised Edition 2003	H	Classifications and Definitions	1922	Did not include a definition of “forests”
National Lands Act, Chapter 191 of the Laws of Belize, Revised Edition 2003	H	Classifications and Definitions	1992	
National Parks System Act, Chapter 215 of the Laws of Belize, Revised Edition 2003	H	Classifications and Definitions	1981	
Registered Lands Act, Chapter 194 of the Laws of Belize, Revised Edition 2003	H	Definitions	1992	
Fisheries Act, Chapter 210 of the Laws of Belize, Revised Edition 2003	H	Definitions	1989	
Environmental Protection Act, Chapter 328 of the Laws of Belize, Revised Edition 2003	H	Definitions	1989	
Coastal Zone Management Act, Chapter 329 of the Laws of Belize, Revised Edition 2003	H	Definition and Classification	1998	
Ancient Monument and Antiquities Act, Chapter 330 of the Laws of Belize, Revised Edition 2003	H	Definitions	1972	
Land Information Centre, Ministry of Natural Resources	H	Land Cover Classification	1994	Utilized as National Classifications

1.2.2 Classification and definitions

a) Classifications and Definitions established by legislation

National Class	Definition
National Lands	All lands and seabed, other than reserved forest within the meaning of the Forest Act, including cayes and parts thereof not already located or granted, and includes any land which has been, or may hereafter become, escheated to or otherwise acquired by the Government of Belize. These can be classified as town, suburban, rural (including pastoral), mineral, and beach lands.
Forest Reserves	Naturally growing stands or ranges of trees declared under the Forests Act to provide the full range of goods and services, including biodiversity protection, inherent in such ecosystems, as well as similar areas being managed for the enhancement of these goods and services.
National Parks	Any area established as a national park in accordance with the provisions of section 3 of the Act for the protection and preservation of natural and scenic values of national significance for the benefit and enjoyment of the general public.
Natural Monuments	Any area reserved for the protection and preservation of nationally significant natural features of special interest or unique characteristics to provide opportunities for interpretation, education, research, and public appreciation.
Nature Reserves	Any area established as a scientific reserve in accordance with the provisions of section 3 of the Act for the protection of nature be it biological communities or species and to maintain natural processes in an undisturbed state in order to have ecological representative examples of the natural environment available for scientific study, monitoring, education and the maintenance of genetic resources.
Wildlife Sanctuaries	Any area established as a nature conservation reserve in accordance with the provisions of section 3 of the Act for the protection of nationally significant species, groups of species, biotic communities or physical features of the environment requiring specific human manipulation for their perpetuation.
Marine Reserves	Any area within the fishing limits of Belize and any adjacent surrounding land, to (a) afford special protection to the aquatic fauna and flora of such areas and to preserve and protect the natural breeding grounds and habitats of aquatic life; (b) allow for the natural regeneration of aquatic life in areas where such life has been depleted; (c) promote scientific study and research in respect of such area; and (d) preserve and enhance the natural beauty of such areas..
Ancients Monuments	Any structure or building erected by man or any natural feature transformed or worked on by man, or the remains or part thereof, whether upon any land or in any river, stream, or water course or under the territorial waters of the country, that has been in existence for one hundred years or more.
Coastal Zone	Includes the area bounded by the shoreline up to the mean high-water mark on its landward side, and by the water limit of the territorial sea in its seaward side, including all coastal waters.

b) Definitions for Land-cover Classifications in Belize

National Class	Definition
Broadleaf Forests	Extensive forest area with density greater than 40 %. Includes broadleaf forest plantations. Predominant species include <i>Achras zapote</i> , <i>Brosimum alicastrum</i> , <i>Swietenia macrophylla</i> , <i>Vochysia</i> , and <i>Terminalia</i> among others.
Open broadleaf forests	Broadleaf forests with densities between 10 % and 40 %
Pine Forests	Coniferous forests between 15 to 20 metres tall, primarily of <i>Pinus spp</i> , with densities greater than 40 %. <i>Byrsonimia crassifolia</i> , and <i>Miconia</i> species common in the under-story. Includes conifer plantations.
Open pine forests	Includes grass covered areas with scattered pine trees or stands between 10 % to 40 % densities. <i>Quercus</i> species are often found.
Thicket and other degenerate broadleaf forests	Broadleaf forest that has had heavy interventions.

Herbaceous and scrub	Secondary growth after clearing.
Bamboo and riparian vegetation	Evergreen and semi evergreen seasonal forests. Commonly developed along riverbanks. The flooded areas are usually colonized with bamboo and wild cane.
Coastal strand vegetation	Includes the palm areas with cohune palm common.
Rangeland	Open grassy savannah with herbaceous shrubs or thickets
Mangrove, medium and tall	Mangrove formations composed primarily of red, black, and white mangrove species and associated species growing taller than 10 metres.
Mangrove, dwarf	Mangrove forests growing less than 2 to 10 metres in height.
Saline swamp	Mangrove formations in estuaries, includes palmetto palms. High water tables evident between 3 to 7 months of the year.
Marsh	High water tables evident between 3 to 7 months of the year. <i>Bucida buceras</i> is one of a few tree species commonly found.
Urban areas	Includes all developed areas.
Agricultural land	Areas under permanent agricultural crops.
Water bodies	Areas with permanent standing or running water, present all year.

Source: Land Information Centre/MNR, 1994

1.2.3 Original Data

Land Cover Description (2000)	Area (ha)	% of total
Broadleaf Forests	1 328 447.55	61.01
Pine Forests	166 410.98	7.64
Herbaceous and scrub	1 912.70	0.09
Bamboo and riparian vegetation	7 990.86	0.37
Rangeland(Savannah)	106 392.00	4.89
Coastal strand vegetation	549.95	0.03
Mangrove	64 848.79	2.98
Marsh	61 828.40	2.84
Saline swamp	21 792.81	1.00
Urban areas	9 361.94	0.43
Agricultural land	367 472.81	16.88
Water bodies	40 461.42	1.86
TOTAL	2 177 470.60	100.0%

1.3 Analysis and processing of national data

1.3.1 Calibration

The reported values for 2000 developed in the Meerman and Sabido (2001) report require calibration beyond the scope of this exercise. This is due to the fact that the satellite images utilized for their ecosystem map were derived from three different periods, 1993, 1996, and 1998. There was an apparent greater than 10 percent overlap, probably resulting in some areas being estimated more than once. No calibration factors were provided to adjust to the correct reported total acreage of the country, hence the values reported here are the same as those of the source data. The original Meerman and Sabido scheme utilized 87 different ecosystem types. These were then grouped according to the UNESCO definitions.

Calibration factors used for adjusting total area with FAO Stat:

Year 2000
1.05

	2000
Forest	1653.035254
other wooded land	114.78
other land	512.18
inland water	16.00
TOTAL AREA	2,296.00

1.3.2 Estimation and projection

There is information regarding forest area for the year 1990 presented in the comments. Unfortunately the data were not compatible for the analysis of the forest area change. Therefore, it was considered more accurate to assume the forest area constant for the three reporting year. However, it is reasonable to assume that forest area in Belize is decreasing.

1.4 Reclassification into FRA 2005 classes

National classes	FRA classes
Broadleaf Forests	forest
Pine forests	forest
Herbaceous & scrubs	OWL
Bamboo & Riparian vegetation	forest
Rangeland (Savannah)	other land
Coastal strand vegetation	OWL
Mangrove	forest
Marsh	other land
Saline Swamps	other land
Urban Areas	other land
Agricultural areas	other land
Water bodies	water

1.5 Data for National reporting table T1

FRA 2005 categories	Area in 1000 hectares		
	1990	2000	2005
Forests	1653	1653	1653
Other wooded land	115	115	115
Other land	512	512	512
.....of which with tree cover			
Inland water	16	16	16
Total land area of country	2296	2296	2296

1.6 Comments to National reporting table T1

Agricultural expansion has been reported, but not detailed in perennial crops such as citrus, bananas, papayas, and mangoes. The same is true for annual crops like sorghum and potatoes. Land clearing for subsistence agriculture by individuals and families also continued. Housing expansion along with the accompanying infrastructure contributed to deforestation across the country. These developmental activities are not accurately or reliably reported in any national data system.

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)	Comments
King, et al., 1988. Tropical Forestry Action Plan Report – Final Version	H	Acreage and ownership of land with vegetation (forest) cover	1988	
Wilson, 1995. National Protected Areas Systems Plan – Synthesis Report	H	Forest cover	1995	

The 1988 Tropical Forestry Action Plan indicated the proportions of the ownership of the terrestrial area. The Assuming little change between the tenureship ratios, this value was used to derive the proportion of forested land ownership in 1990. The same cannot be done for the 2000 reporting year since rate of land use change increased considerably during the last decade.

2.2.2 Classification and definitions

Belize generally utilizes three categories of land ownership. National lands are those owned by the government and managed by the Lands and Surveys Department; Protected Areas (including Forest Reserves) are still government-owned but managed by the Forest Department, while private lands are owned by individuals, families or companies, etc.

2.2.3 Original data

Land Information Centre, Lands & Surveys Department, Ministry of Natural Resources – shape files. Summary of land tenure ship

Land tenure ship	Area (ha)	%
Public property	1 434 119	63.36
Private property	841 234	36.64

2.3 Analysis and processing of national data

2.3.1 Calibration

2.3.2 Estimation and projection

Percentages were applied to 1990. It is not possible to applied in the year 2000 as tenure was changed.

2.4 Reclassification into FRA 2005 classes

None.

2.5 Data for National reporting table T2

FRA 2005 Categories	Area (1000 hectares)			
	Forest ¹¹		Other wooded land	
	1990	2000	1990	2000
Public ownership	1047	ID	73	ID
Private ownership	606	ID	42	ID
Other ownership	ID	ID	ID	ID
TOTAL	1653	ID	115	ID

2.6 Comments to National reporting table T2

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)	Comments
UNEP-WCMC. Wold Data Base on Protected Areas.	M	Protected areas	2005	

3.2.2 Classification and definitions

Same as described in Table 1.2.1.

3.3 Analysis and processing of national data

3.3.1 Calibration

3.3.2 Estimation and projection

3.4 Reclassification into FRA 2005 classes

According to UNEP and the World Coservation Monitoring Centre 37% of the total forest area of Belize is under protection.

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						
Protection of soil and water						
Conservation of biodiversity	612	612	612			
Social services						
Multiple purpose			n. a.	not appl.	not appl.	not appl.
No or unknown function	1041	1041	1041	not appl.	not appl.	not appl.
Total – Forest	1653	1653	1653	not appl.	not appl.	not appl.
Other wooded land						
Production	i. d.	i. d.	i. d.			
Protection of soil and water						
Conservation of biodiversity						
Social services						
Multiple purpose				not appl.	not appl.	not appl.
No or unknown function	115	115	115	not appl.	not appl.	not appl.
Total – Other wooded land	115	115	115	not appl.	not appl.	not appl.

3.6 Comments to National reporting table T3

The national category described as “Protected Areas” include National Parks, Nature Reserves, Natural Monuments, and Wildlife Sanctuaries. Marine and Cultural Reserves are also national categories utilized by government agencies.

Available Data is insufficient to determine the distribution of the FRA classifications within the Forest and OWL category. For additional information, it is important to mention that Forest Reserves are considered to have the primary function of production, while all other categories are considered multiple use, since the available data is insufficient to provide greater detail all was grouped in the no or 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

The Forest Department recorded information about various forest tree plantations that were once established and maintained since 1951. Species such as *Pinus caribaea*, *Tectona grandis*, *Gmelina arborea*, *Sweetenia macrophylla*, and *Eucalyptus spp.* were all planted at some time during the thirty-year period ending in 1981. Except for *Gmelina*, none were planted on a scale to be considered as production forests, but instead as research plots. The greater proportion of the plantations have since been lost to other forms of land use, and no reliable and complete records are available to allow application to the FRA tables.

4.2.1 Classification and definitions

Same as described in Table 1.2.1.

4.3 Analysis and processing of national data

4.3.1 Calibration

4.3.2 Estimation and projection

4.4 Reclassification into FRA 2005 classes

Very little data remains to complete this section of the exercise.

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	612	612	612	0	0	0
Modified natural	1041	1041	1041	115	115	115
Semi-natural	ID	ID	ID	ID	ID	ID
Productive plantation	ID	ID	ID	ID	ID	ID
Protective plantation	NR	NR	NR	ID	ID	ID
TOTAL	1653	1653	1653	115	115	115

ID insufficient data. NR not relevant.

4.6 Comments to National reporting table T4

According to the FRA definitions, approximately most of forests in Belize would be considered as “Modified natural”. The forest area under protection is considered primary, even that it is known that these areas may be used by local people., No plantations have been planted in this country primarily for protective purposes. The available data is otherwise insufficient to allow determination the area under “productive plantation”.

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

While a number of forest inventories have been completed for three of the forest reserves in the country, these sets of data and information are all more than ten years old. Certain natural events such as hurricanes and major insect infestation have made all the data/information obsolete. No country-wide forest inventory has ever been conducted so this data is not available.

5.2.1 Data sources

Data derived for the Table 1 is used to determine the volumes of growing stock.

5.2.2 Classification and definitions

Not necessary.

5.2.3 Original data

Date coming from table number 1. More reliable or original data does not exist in the absence of a national forest inventory.

National classes.	(000 hectares)
Broadleaf forest area	1588
Pine forest	65

5.3 Analysis and processing of information

5.3.1 Calibration

Not necessary.

5.3.2 Estimation and projection

Year:	Forests	Other Wooded Land
2000	$(1588 \times 95) + (65 \times 130)$	(115×20)

Source: FRA Guidelines- Growth rates are estimated at 95 m³/ha for hardwood forests; 130 m³/ha for conifers; and 20 m³/ha for OWL.

5.4 Reclassification into FRA 2005 classes

Not necessary.

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	159	159	159	2.3	2.3	2.3
Commercial growing stock	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

The available data is insufficiently detailed to segregate the volumes into commercial growing stock.

Specification of country threshold values	Unit	Value	Complementary information
1. Minimum diameter at breast height of trees included in Growing stock (X)	cm	n.a.	
2. Minimum diameter at the top end of stem (Y) for calculation of Growing stock	cm	15.0	
3. Minimum diameter of branches included in Growing stock (W)	cm	n.a.	
4. Minimum diameter at breast height of trees in Commercial growing stock (Z)	cm	*	
5. Volume refers to “Above ground” (AG) or “Above stump” (AS)	cubic metre	.	Above stump or above buttress
6. Have any of the above thresholds (points 1 to 4) changed since 1990	Yes/No	n.a.	No
7. If yes, then attach a separate note giving details of the change	Attachment		

Minimum diameters for commercial harvest are established by the Forest Department through legislation and are detailed in the table below.

- minimum diameter for Mahogany = 150 cm above buttress;
- minimum diameter for pine 22.5 cm dbh;
- minimum diameter for hardwoods 30 cm dbh.

5.6 Comments to National reporting table T5

Throughout the recent history (four hundred years) of Belize, this country has applied the system of selective logging as part of its forest management strategy. The control for that system was based on minimum growth or diameter measurements to determine whether a tree met the criteria for felling. Three groups were standardized. Mahogany and cedar were group as primary hardwoods and the minimum diameter was established above the buttress. Pines (two species native to Belize) were in a group of their own, and the other commercially useful hardwoods were grouped together with the same minimum diameter applied to this group.

Attempts were made to introduce area control instead of selective logging, as a result of projects that evolved out of the Tropical Forestry Action Plan process. This method required the selection of a prescribed number of seed trees to repopulate a measured area after all commercially useful species were harvested. This system which did not use minimum diameter limits, was applied to those forest reserves for which management plans were developed and implemented. This trend continues.

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
First National Communication to the Conference of the Parties of the United Nations Framework Convention on Climate Change	M	Forest and Vegetation Cover	1990	The Forest resources (including biomass in protected areas were adequately recorded and estimated) but the data on trees and other vegetation cover outside of such areas were estimated for the purpose of the GHG inventory

6.2.2 Classification and definitions

The FAO classifications and definitions are applied here.

6.2.3 Original data

FRA 2005 Categories	Volume (million cubic meters over bark)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Growing stock	159	159	159	2.3	2.3	2.3
Commercial growing stock	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

6.3 Analysis and processing of national data

Biomass values are estimated using Table 5 with conversion factors from the 1996 Revised IPCC Good Practice Guidelines.

Estimation of Living Biomass (million tonnes)

Year	Species	Stock	Density	Stem Biomass	Biomass Exp Factor	Above Ground Biomass	Root Shoot ratio	Below Ground Biomass	Dead ratio
2000	Broadleaf	150.86	0.42	63.36	1.3	82.37	0.24	20	0.155
	Conifer	8.44	0.42	3.5	3.4	11.9	0.32	4	0.155
		159.3		66.86		94.27		24	

Year	Species	Stock	Density	Stem Biomass	Biomass Exp Factor	Above Ground Biomass	Root Shoot ratio	Below Ground Biomass	Dead ratio
2000	Other wooded land	2.3	0.20	0.46	1.3	0.59	0.24	0.14	0.155

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	94.27	94.27	94.27	0.59	0.59	0.59
Below-ground biomass	24	24	24	0.14	0.14	0.14
Total Living Biomass	118.27	118.27	118.27	0.73	0.73	0.73
Dead wood biomass	18.33	18.33	18.33	0.11	0.11	0.11
TOTAL	136.6	136.6	136.6	0.84	0.84	0.84

6.6 Comments to National reporting table T6

7 Table T7 – Carbon stock

7.1 FRA 2005 Categories and definitions

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

7.2 National data

7.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
First National Communication to the Conference of the Parties of the United Nations Framework Convention on Climate Change	M	Biomass values	1990	The Forest resources (including biomass in protected areas were adequately recorded and estimated) but the data on trees and other vegetation cover outside of such areas were estimated for the purpose of the GHG inventory
Herrera 1998. Forest and Climate Change Report	M	Sequestered carbon	1995	

7.2.2 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	94.27	94.27	94.27	0.59	0.59	0.59
Below-ground biomass	24	24	24	0.14	0.14	0.14
Total Living Biomass	118.27	118.27	118.27	0.73	0.73	0.73
Dead wood biomass	18.33	18.33	18.33	0.11	0.11	0.11
TOTAL	136.6	136.6	136.6	0.84	0.84	0.84

7.3 Analysis and processing of national data

National data is incomplete.

7.4 Reclassification into FRA 2005 classes

Not needed.

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	47	47	47	0.29	0.29	0.29
Carbon in below-ground biomass	12	12	12	0.7	0.7	0.7
Sub-total: Carbon in living biomass	59	59	59	0.995	0.995	0.995
Carbon in dead wood	9.17	9.17	9.17	0.49	0.49	0.49
Carbon in litter						
Sub-total: Carbon in dead wood and litter	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.
Soil carbon to a depth of _____ cm	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.
TOTAL CARBON	68	68	68	1.49	1.49	1.49

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 Department Annual reports	M	Numbers and areas affected by wildfires	1991	Incomplete information for forest reserves
FD annual reports.	H	Species, frequency, and areas affected by Insect	1991	
National Emergency Management Organization Annual.	H	Areas damaged by Hurricanes	2000	This agency was established in 2000.
Central Statistical Office.	H			

8.2.2 Original data

The forests in Belize are affected by all the disturbances selected for reporting. Unfortunately none of these phenomena are reported at the national level national data.

The Forest Department maintains some records of wildfires in forest reserves in certain parts of the country. Those in the reserves are generally caused by lightning. Wildfires, however, occurs in other parts of the country on both national and private land. Information about these are unrecorded therefore not allowing any analysis of cause or measurement of acreages damaged.

The situation is the same for insect and pest infestations. Some effort to control is usually applied in the reserves, but the other incidences usually pass unattended because of the scarcity of human and financial resources.

8.3 Analysis and processing of national data

8.3.1 Data available is incomplete.

8.3.2 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	n.a.	n.a.	n.a.	n.a.
Disturbance by insects	n.a.	n.a.	n.a.	n.a.
Disturbance by diseases	n.a.	n.a.	n.a.	n.a.
Other disturbance (Hurricane)	n.a.	n.a.	n.a.	n.a.

8.6 Comments to National reporting table T8

During the last decade (1990 – 2000), Belize has been spared the impact of hurricane damage. This last four year period has not been the same, with three major hurricanes damaging areas of forests and wooded lands. However, the recorded information does not allow separation for analysis or reporting according to the FAO categories. Chantal, Keith, and Iris are hurricanes that have all affected parts of the north and south of Belize. Chantal left its impact in the form of sustained flooding, while the other two caused both flooding and wind damage.

None will be attempted for the 2005 year because of two major natural events/disasters that have affected the country and its resources during the last few years. In 2001 parts of the two southern districts of the country experienced considerable damage after the passage of Hurricane Iris. Up until that event, the Columbia Forest Reserve represented a major proportion of the remaining mature broadleaf forest suitable for multiple use. The hurricane damaged the entire reserve.

The Mountain Pine Ridge Forest Reserve in the mid-western part of the country representing the largest block of pine forests in a managed forest was severely affected by infestation of bark beetles between 1999 and 2002. This resulted in damage to and death of approximately seventy percent (70 %) of the forest. An estimated, but unconfirmed ten to fifteen percent of the pine forests of the South Coastal Plains were similarly affected by the bark beetle infestation.

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

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
A. Castaneda and Noel Jacobs, 1998. The Belize Biodiversity Strategy and Action Plan. Belmopan, Belize.	H	Number of tree species	1990	
IUCN 2004. <i>2004 IUCN Red List of Threatened Species</i> . < www.redlist.org >..	H	Threatened tree species		

9.2.1 Classification and definitions

No national classes are defined by Belize.

9.2.2 Original data

List of plants presented by IUCN.

9.3 Analysis and processing of national data

Data available is incomplete.

9.3.1 Estimation and forecasting

9.4 Reclassification into FRA 2005 classes

9.5 Data for National reporting table T9

FRA 2005 Categories	Number of species (year 2000)
Native tree species	4000
Critically endangered tree species	0
Endangered tree species	11
Vulnerable tree species	18

9.6 Comments to National reporting table T9

This list corresponds to plants:

Endangered species:

Guaiacum sanctum

HOLYWOOD LIGNUM VITAE (E)
GUAYACÁN REAL (S) GUAYACÁN (S)

Pithecellobium johansenii

Pithecellobium stevensonii

Quiina schippii

Trichilia breviflora

Vitex gaumeri

FIDDLEWOOD (E) WALKING LADY (E) YAX-NIK (E)

Vitex kuylenii

Zanthoxylum belizense

Zanthoxylum ferrugineum

Zanthoxylum gentlei

Zanthoxylum procerum

Vulnerable species

Aegiphila monstrosa

Aegiphila panamensis

Cedrela odorata

CIGAR-BOX WOOD (E) RED CEDAR (E) SPANISH CEDAR (E)
ACAJOU ROUGE (F) ACAJOU-BOIS (F) CEDRAT (F) CEDRO ROJO

Ceratozamia robusta

Dalbergia retusa

COCOBOLO (S)

Fulfordianthus evansii

Gaussia maya

Magnolia yoroconte

Persea schiedeana

AGUACATILLO (S) CHUCPTE (S)

Pinus tecunumanii

Pouteria amygdalina

Pouteria belizensis

Quercus purulhana

Schippia concolor

MOUNTAIN PIMENTO (E) SILVER PIMETO (E)

Sideroxylon durifolium

Sideroxylon stevensonii

Swietenia humilis

MEXICAN MAHOGANY (E) PACIFIC COAST MAHOGANY (E)
CAOBA (S) COABILLA (S) CÓBANO (S) GATEADO (S)
VENADILLO (S) ZAPATÓN (S) ZOPILOTE (S)

Swietenia macrophylla

ACAJOU (E, F) BI (E) BRAZILIAN MAHOGANY (E) HONDURAS
MAHOGANY (E) LARGE-LEAVED MAHOGANY (E) MAHOGANI
GRANDS FEUILLES (F) CAOBA (S) MARA (S) MOGNO (S)

10 Table T10 – Growing stock composition

No Data is available for this table.

10.1 FRA 2005 Categories and definitions

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

Scientific name	Common (Local) name
<i>Swietenia macrophylla</i>	Honduran Mahogany
<i>Cedrela mexicana</i>	Mexican cedar
<i>Pinus caribaea</i>	Caribbean pine
<i>Virola koschnyi</i>	Banak
<i>Calophyllum brasiliense</i>	Santa Maria
<i>Terminalia amazonia</i>	Nargusta
<i>Lonchocarpus castolloi</i>	Black Cabbage Bark
<i>Vochysia hondurensis</i>	Yemeri
<i>Astronium graveolems</i>	Palo Mulato (Jobillo)
<i>Cordia dodecandra</i>	Ziricote
<i>Cordia alliodora</i>	Salmwood

10.2 National data

10.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
O. Rosado and Tomi Tuomasjukka 1997. Belize Forest Sector Review – Final version. IUCN.	H	Species list	1997	

10.2.2 Original data

O. Rosado and Tomi Tuomasjukka 1997. Belize Forest Sector Review – Final version. IUCN. The choice and popularity of species have remained the same over the period.

10.3 Analysis and processing of national data

10.4 Reclassification

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
Name of 1 st most common species	n.a.	n.a.
Name of 2 nd most common species	n.a.	n.a.
Name of 3 rd most common species	n.a.	n.a.
Name of 4 th most common species	n.a.	n.a.
Name of 5 th most common species	n.a.	n.a.
Name of 6 th most common species	n.a.	n.a.
Name of 7 th most common species	n.a.	n.a.
Name of 8 th most common species	n.a.	n.a.
Name of 9 th most common species	n.a.	n.a.
Name of 10th most common species	n.a.	n.a.
Remainder of species	n.a.	n.a.
TOTAL	n.a.	n.a.

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
FAO 1995. Forest Products 1991 – 1995, Annual Yearbook	M	Volumes Cubic metres	1990	
FAO 2001. Forest Products 1997 – 2001, Annual Yearbook	M	Volumes cubic metres	2000	
Forest Department Annual reports	M	Volumes in cubic metres	2000	The volumes reported are qualified because of the high rates of illegal activity.

11.2.2 Classification and definitions

11.2.3 Original data

Same data as reported in the FAO Forest Products Annual Yearbooks for all reporting years:

Industrial round wood 61,600 cubic meters under bark
Fuelwood 126,000 cubic meter under bark.

11.3 Analysis and processing of national data

Data was multiplied by 1.15 for the estimation over bark.

11.3.1 Estimation and forecasting

11.4 Reclassification into FRA 2005 classes

11.5 Data for National reporting table T11

FRA 2005 Categories	Volume in 1000 cubic meters of roundwood over bark					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial roundwood	70.84	70.84	70.84	0	0.	0
Woodfuel	144.9	144.9	144.9	n.a.	n.a.	n.a.
TOTAL for Country	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

11.6 Comments to National reporting table T10

While the Forest Products yearbooks publish some information about roundwood production, no details are available about the source of production of the timber. The records maintained by the Forest Department are insufficiently detailed to segregate the timber source into “Forests” and “other wooded land”. It is safe to assume that all round extraction would be harvested from Forests since no extraction would be allowed in the FAO classified OWL. Some wood fuel may be extracted from the OWL because of convenience to the users.

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
Abstract of Statistics, 1991. Central Statistical Office, Ministry of Economic Development.	H	National Statistics	1991	
Abstract of Statistics, 1991. Central Statistical Office, Ministry of Economic Development.	H	National Statistics	2001	

12.2.2 Original data

12.3 Analysis and processing of national data

12.3.1 Estimation and forecasting

12.4 Reclassification into FRA 2005 classes

12.5 Data for National reporting table T12

FRA 2005 Categories	Value of roundwood removal (1000 USD)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial roundwood	2.6	ID	ID	ID	ID	ID
Woodfuel	ID	ID	ID	ID	ID	ID
TOTAL for Country	ID	ID	ID	ID	ID	ID

12.6. Comments to National reporting table T12

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
<u>Plant products / raw material</u>
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
<u>Animal products / raw material</u>
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

No national records are maintained for any of these products.

13.3 Analysis and processing of national data

13.3.1 Estimation and forecasting

13.4 Reclassification into FRA 2005 classes

13.5 Data for National reporting table T12

Insufficient data.

13.6. Comments to National reporting table T13

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

The volume of these products extracted from the forests far exceed the amount that is permitted under Permits and Licences provided by the Forest Department. The department maintains re

14.1 FRA 2005 Categories and definitions

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

Category
<u>Plant products / raw material</u>
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
<u>Animal products / raw material</u>
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

Insufficient data available to attempt to complete this section.

14.2.2 Original data

Incomplete data available.

14.3 Estimation and forecasting

14.4 Reclassification

14.5 Data for National reporting table T14

Insufficient data.

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

Data is not available at a national level. Data about employment in forestry is available for the public (government) sector only. This sector relates mostly to the provision of services since 1995 after which the government sector was no longer involved in the manufacturing (value added) sector.

15.2.1 Data sources

The 1990 Data for this table have has been derived from O. Rosado and Tomi Tuomasjukka 1997 Forest Sector Review – Final Version.

Employment	1990	2000	2005
Public (forest department)/ services	202	120	105
Private (Manufacturing)	920	n.a.	n.a.
Total	1 128	n.a.	n.a.

15.3 Analysis and processing of national data

15.3.1 Estimation and forecasting

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	0.9	NA
Provision of services	0.2	0.120
Unspecified forestry activities (wood-workshop operation)	0	n.a
TOTAL	1.1	0.1

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).