Forestry Department
Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT 2010

COUNTRY REPORT

TRINIDAD AND TOBAGO

FRA2010/212
Rome, 2010

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 2010 (FRA 2010).

The reporting framework for FRA 2010 is based on the thematic elements of sustainable forest management acknowledged in intergovernmental forest-related fora and includes variables related to the extent, condition, uses and values of forest resources, as well as the policy, legal and institutional framework related to forests. More information on the FRA 2010 process and the results - including all the country reports - is available on the FRA Web site (www.fao.org/forestry/fra).

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 2010 is:

Mette Løyche Wilkie
Senior Forestry Officer
FAO Forestry Department
Viale delle Terme di Caracalla
Rome 00153, Italy

E-mail: Mette.LoycheWilkie@fao.org

Readers can also use the following e-mail address: fra@fao.org

Contents

Report preparation and contact persons

The present report was prepared by the following person(s):

Name (FAMILY NAME, First name)	Institution / address	E-mail	Fax	Tables
RAMNARINE SEEPERSAD	Forestry Division Long Circular Road, St James, Port of Spain Trinidad	forestry@tstt.net.tt	1-868-628-5503	1-17

1 Table T1 – Extent of Forest and Other wooded land

1.1 FRA 2010 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 *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
Forest Resource Inventory and Management Section Inventory of the indigenous Forests of Trinidad and Tobago 1980. Government of Trinidad and Tobago	H	Forest cover, forest type classification, land use/cover change	1970	Inventory of all public forests using Aerial photography from 1969 and ground truth in 1979
Internal Records Drawing Office Forestry Division	H	Forest cover,	1994	Aerial photography of forest reserves.
Caribbean island terrestrial habitats scitec.uwichill.edu.bb/bcs/courses/ Ecology	H	Definitions	2005	
National geographic society, and WWF. Terrestrial ecoregions in the world. http://www.worldwildlife.org/wildworld	H	Definitions	2005	Refers to dry forest description

1.2.2 Classification and definitions

National class	Definition
Evergreen Seasonal forest	This is also termed moist forest and is found at slightly higher (100-300 m) or more sheltered locations. It comprises mainly broad-leaved evergreen trees with some foliage reduction in the dry season. Imagine the semi-evergreen seasonal forest just described but with scattered, emergent trees like sandbox (Hura crepitans), silk cotton (Ceiba pentandra) and cabbage palm (Roystonea oleracea). Some species in this community are also found in rainforest.

Semi evergreen seasonal forests	This is also termed moist forest and is found at slightly higher (100-300 m) or more sheltered locations. This is a two storied forest with an upper closed canopy at 20 m high and a lower tree layer at about half that height. The upper trees are mainly evergreens like Spanish oak (*Inga laurina*) and beefwood (*Pisonia fragrans*) but a minority (< 1/3) may shed their leaves in the dry season, e.g. locust (*Hymenaea coubaril*). The lower layer is evergreen (e.g. balata - *Manilkara bidentata*) with the macaw palm (*Aiphanes minima)* in this layer. A shrub layer with members of the coffee and guava families is present but there are few herbs and epiphytes. The canopy has many woody vines or lianas.
Deciduous seasonal forests*	This is also termed dry forest and is found in low-lying areas. It has an upper open canopy at 20 m high and a lower closed shrub/tree layer. The upper trees are mainly deciduous, shedding their leaves in the dry season, e.g. Whitewood (*Tabebuia* spp.) and birchgum (*Bursera simaruba*). The lower shrubby layer can be quite dense and includes thorny species like bread 'n cheese (*Pithecellobium unguis-cati*) and ink berry *(Randia aculeata*). There are lianas but few if any epiphytes. What remains of this forest is often heavily impacted.
Dry evergreen forests	Is the littoral woodlands. It is situated near the sea exposed to the sea-blast. Structure varies greatly with exposure an amount of gale damage from low recumbent scrub to high forest or pure palm forest. Trees are evergreen and have thickly cutinized mesophyllous leaves and windswept crowns which present only a narrow edge to the wind. Flora is limited.
Seasonal montane forests	Sub-tropical temperatures. Evaporation ability of the air high on clear days due to exposure. Frequent mist. Abundant precipitation but available moisture seasonally low due to excessive soil drainage. A close tree canopy at 60 to 80 ft. somewhat open below. Deciduous tress present. Tremendously luxuriant lianas and epiphytes with abundant moss. Dense herbaceous ground layer, rare palms and tree ferns. Trees are often strongly buttressed.
Montane forests**	Includes lower montane rainforest, montante rain forest, Elfin woodlands.
Secondary Forests	Secondary forest is rainforest that has been disturbed in someway, naturally or unnaturally. Secondary forest can be created in a number of ways, from degraded forest recovering from selective logging, to areas cleared by slash and burn agriculture that have been reclaimed by forest. Generally, secondary forest is characterized (depending on its level of degradation) by a less developed canopy structure, smaller trees, and less diversity. Due to the lack of a full canopy, more light will reach the floor, supporting vigorous ground vegetation. "Jungle" is the term often applied to secondary forest with dense ground growth, but it is also applied to some tropical moist forests where seasonal variations permit thick ground growth
Swamp forests	Due to low relief the area is shallowly and more or less perpetually inundated with fresh water varying from few inches to 3 ft. deep. A close and even tree canopy about 60 ft with no lower stratification. Trees developed enormous sinous and spreading plank buttresses. 100 per cent evergreen leaves compound, mesophyllous and leathery. Very limited flora.
Bamboo	Clumps and stands of pure bamboo stand
Water	Dams for water production and open water bodies in the swamps
Abandoned forest plantation	Planted forest and abandoned
Mixed conversion forest	Degraded lands planted with a mixture of forest species
Teak and pine plantations	Pure stands of teak plantations and pure stands of pine plantations
Other plantations	Plantation of other local species

* Tropical dry forests in Trinidad and Tobago include both **deciduous** and **semi-evergreen** forests. A recent work by Howard Nelson suggests that areas which were formerly classified as **evergreen** forest also fit the criteria for dry forests.
In contrast to the moist forest ecoregion on Trinidad and Tobago,dry forest ecoregion is characterized by much more open forest, owing to the lack of a proper canopy. There is a greater proportion of deciduous trees and

fewer large trees. Mosses and epiphytes are not common owing to the greatly reduced rainfall. Prominent trees in this area include *Lonchocarpus punctatus, Bursera simaruba*, *Machaerium robinifolium* and *Pithecellobium unguiscati*. Along the coast several species of cactus and the century plant (*Agave evadens*) are common. In the foothills of the Northern Range, especially the area north and east of Port of Spain, *Cordia alliodora* becomes common in the semi-deciduous forest. A small portion of this ecoregion also is found on the northern tip of Tobago. Here the canopy is at about 15 m and dominant trees include *Bursera simaruba, Lonchocarpus domingensis, Coccothrinax australis*. Though many of the dominant species are deciduous, the understory is mostly evergreen with *Eugenia* spp. and *Mayepea caribaea* prominent.
** Lower montane forest: subtropical temperatures. No season drought. Available moisture more or less evenly distributed throughout the year and over 70 inches. Freedom from water logging and inundations. Exposure causes variations form true rainforest type. Canopy is lowered to between 70 and 100 ft. but is close at this level. No readily definable lower stratification. Dominants have long thin and clear boles. Lianas epiphytes poorly developed. Palms very rare. Ferns abundant but only small tree ferns. 100 percent evergreen. Leaves simple, mesophyllous, shiny and slightly leathery. Ground vegetation extremely sparse.
Montane rain forest: Canopy at 60 ft. much wind damage. Lowered stratum 20 40 ft and under storey of free ferns and small palms Lianas very abundant. Epiphytes tremendously luxuriant. Only small stemmed palms but abundant and several species of large tree-fern. 100 percent evergreen leaves simple, mesophyllous, leathery with epiphyllous. Dense herbaceous ground vegetation. Tree flora extremely poor.
Elfin woodland: Stunted gnarled thicket 15-25 ft. in height of stilt rooted, fleshy leaved trees with long straggling branches, festooned with moss and lichen. Canopy formed at 6-10 ft. under story of trees-ferns and small palms. Flora extremely limited.

1.2.3 Original data

National classes	1970 ha_a	1994 ha_b
Forests land use		
Evergreen Seasonal Forest	98180	88718
Semi-evergreen seasonal forest	13928	12586
Deciduous Seasonal Forests	3617	3268
Dry evergreen forests	495	447
Seasonal montane forests	926	837
Montane forests	21619	19535
Swamp forests	16789	15171
Secondary forests	22650	20467
Teak and pine plantations	16308	15000
Other plantations	5306	5306
Bamboo	528	528
Water	1613	1613
Other areas within forests	53729	72212
Total forest land owned by state	**255688**	**255688**
Total Private forests	**56000**	**56000**
Private lands	**201312**	**201312**
Total land area	**513000**	**513000**

1.3 Analysis and processing of national data

1.3.1 Calibration

Water area was calibrated to UN statistics and added to the of other land class.

1.3.2 Estimation and forecasting

The assumption of a rate of loss of forest cover for all forest types was made on the rate of loss of forest from forest reserves. This rate was applied to all forested lands in Reserves and

other lands owned by the state except for lands under teak, pine, other plantations , water, and bamboo which are assumed as constant. Attempts are being made to collect data on loss of forest cover from all other land agencies but due to the steep deadline this approach is being used. This is shown under estimation and forecasting. All lands lost from forests are placed under other areas within forests.

National classes	**1970** ha_a	**1994** ha_b	**1990**[1] ha_c	**2000**[1] ha_d	**2005**[1] ha_e	**2010**
Evergreen Seasonal Forest	98180	88718	90295	86352	84381	82410
Semi-evergreen seasonal forest	13928	12586	12810	12251	11971	11691
Deciduous Seasonal Forests	3617	3268	3326	3181	3108	3035
Dry evergreen forests	495	447	455	435	425	415
Seasonal montane forests	926	837	852	815	796	778
Montane forests	21619	19535	19882	19014	18580	18146
Swamp forests	16789	15171	15441	14767	14429	14092
Secondary forests	22650	20467	20831	19921	19466	19012
Teak and pine plantations	16308	15000	15000	15000	15000	15000
Other plantations	5306	5306	5306	5306	5306	5306
Bamboo	528	528	528	528	528	528
Water	1613	1613	1613	1613	1613	1613
Other areas within forests	53729	72212	69349	76505	80086	83662
Private lands	201312	201312	201312	201312	201312	201312
Total forest land owned by state	255688	255688	255688	255688	255688	255688
Private forests	56000	56000	56000	56000	56000	56000
Total land area	**513000**	**513000**	**513000**	**513000**	**513000**	**513000**

ha_a = original data for year 1970
ha_b = estimated data for year 1994
$ha_c = ha_b + (ha_a - ha_b)/24*4$
$ha_d = (ha_b - (ha_a - ha_b)/24 *6)$
$ha_e = (ha_b - (ha_a - ha_b)/24 * 11)$
$ha_f = (ha_b - (ha_a - ha_b)/24 * 16)$

1.3.3 Reclassification into FRA 2010 categories

	Forest	other wooded land	other land	other land with trees	inland water
Evergreen Seasonal Forest	100%				
Semi-evergreen seasonal forest	100%				
Deciduous Seasonal Forests	100%				
Dry evergreen forests	100%				
Seasonal montane forests	100%				
Montane forests	100%				
Swamp forests	100%				
Secondary forests	100%				
Teak and pine plantations	100%				
Other plantations	100 %				
Bamboo	100%				
Water			100%		
Other areas within forests		100%			
Private lands			81.7	18.3	
Private forests	100%				

1.4 Data for Table T1

FRA 2010 categories	Area (1000 hectares)			
	1990	2000	2005	2010
Forest	240.7	233.6	230.0	226.4
Other wooded land	69.3	76.5	80.1	83.7
Other land	202.9	202.9	202.9	202.9
...of which with tree cover	37	37	37	37
Inland water bodies	0	0	0	0
TOTAL	**513**	**513**	**513**	**513**

1.5 Comments to Table T1

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Forest	The figures are slightly different to FRA 2005 because other plantations area was added to forests. In 2005 it was under other wooded land.	
Other wooded land		
Other land		
Other land with tree cover	Refers to abandoned cocoa , coffee and coconut plantations	
Inland water bodies		

Other general comments to the table
An inventory was conducted in 1980 using 1969 photographs. This report is the basis for the forest data in 1970. An analysis of photographs was conducted for the forest reserves in 1994 but no ground surveys was conducted to verify. A rate of loss of forest reserve for the period 1980 to 1994 was applied to all forest areas even though the loss from other state-lands may have been greater. This loss of forest was transferred to other wooded lands.

Expected year for completion of ongoing/planned national forest inventory and/or RS survey / mapping	
Field inventory	2010/2011
Remote sensing survey / mapping	2009/2010

2 Table T2 – Forest ownership and management rights

2.1 FRA 2010 Categories and definitions

Category	Definition
Public ownership	Forest owned by the State; or administrative units of the public administration; or by institutions or corporations owned by the public administration.
Private ownership	Forest owned by individuals, families, communities, private co-operatives, corporations and other business entities, private religious and educational institutions, pension or investment funds, NGOs, nature conservation associations and other private institutions.
Individuals *(sub-category of Private ownership)*	Forest owned by individuals and families.
Private business entities and institutions *(sub-category of Private ownership)*	Forest owned by private corporations, co-operatives, companies and other business entities, as well as private non-profit organizations such as NGOs, nature conservation associations, and private religious and educational institutions, etc.
Local communities *(sub-category of Private ownership)*	Forest owned by a group of individuals belonging to the same community residing within or in the vicinity of a forest area. The community members are co-owners that share exclusive rights and duties, and benefits contribute to the community development.
Indigenous / tribal communities *(sub-category of Private ownership)*	Forest owned by communities of indigenous or tribal people.
Other types of ownership	Other kind of ownership arrangements not covered by the categories above. Also includes areas where ownership is unclear or disputed.
Categories related to the holder of management rights of public forest resources	
Public Administration	The Public Administration (or institutions or corporations owned by the Public Administration) retains management rights and responsibilities within the limits specified by the legislation.
Individuals/households	Forest management rights and responsibilities are transferred from the Public Administration to individuals or households through long-term leases or management agreements.
Private institutions	Forest management rights and responsibilities are transferred from the Public Administration to corporations, other business entities, private co-operatives, private non-profit institutions and associations, etc., through long-term leases or management agreements.
Communities	Forest management rights and responsibilities are transferred from the Public Administration to local communities (including indigenous and tribal communities) through long-term leases or management agreements.
Other form of management rights	Forests for which the transfer of management rights does not belong to any of the categories mentioned above.

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 Resource Inventory and Management Section Inventory of the indigenous Forests of Trinidad and Tobago 1980. Government of Trinidad and Tobago	H	Forest cover, forest type classification, land use/cover change	1970	Inventory of all public forests using Aerial photography from 1969 and ground truth in 1979
Internal Records Drawing Office Forestry Division	H	Forest cover,	1994	Aerial photography of forest reserves.
Caribbean island terrestrial habitats scitec.uwichill.edu.bb/bcs/courses/ Ecology	H	Definitions	2005	
National geographic society, and WWF. Terrestrial ecoregions in the world. http://www.worldwildlife.org/wildworld	H	Definitions	2005	Refers to dry forest description

2.2.2 Classification and definitions

As presented in 1.2.2.

2.2.3 Original data

See 1.2.3.

2.3 Analysis and processing of national data

2.3.1 Estimation and forecasting

The same rate of forest loss over the period 1970 to 1994 was used in forecasting for the relevant years. Please note that the total area under administration of the Forestry Division is still 255,688 ha of lands.

2.3.2 Reclassification into FRA 2010 categories

National classes	1970 ha_a	1994 ha_b	1990[1] ha_c	2000[1] ha_d	2005[1] ha_e	2010
Evergreen Seasonal Forest	98180	88718	90295	86352	84381	82410
Semi-evergreen seasonal forest	13928	12586	12810	12251	11971	11691
Deciduous Seasonal Forests	3617	3268	3326	3181	3108	3035
Dry evergreen forests	495	447	455	435	425	415
Seasonal montane forests	926	837	852	815	796	778
Montane forests	21619	19535	19882	19014	18580	18146
Swamp forests	16789	15171	15441	14767	14429	14092
Secondary forests	22650	20467	20831	19921	19466	19012
Teak and pine plantations	16308	15000	15000	15000	15000	15000
Other plantations	5306	5306	5306	5306	5306	5306
Bamboo	528	528	528	528	528	528
Public Forests (total above)	**200346**	**181863**	**184726**	**177570**	**173989**	**170413**
Private forests	56000	56000	56000	56000	56000	56000
Total forests	**256346**	**237863**	**240726**	**233570**	**229989**	**226413**

2.4 Data for Table T2

Table 2a - Forest ownership

FRA 2010 Categories	Forest area (1000 hectares)		
	1990	2000	2005
Public ownership	184.7	177.6	174.0
Private ownership	56	56	56
...of which owned by individuals	n.a.	n.a.	n.a.
...of which owned by private business entities and institutions	n.a.	n.a.	n.a.
...of which owned by local communities	n.a.	n.a.	n.a.
...of which owned by indigenous / tribal communities	n.a.	n.a.	n.a.
Other types of ownership	n.a.	n.a.	n.a.
TOTAL	**240.7**	**233.6**	**230.0**

Note: If other types of ownership is reported, please specify details in comment to the table.

Does ownership of trees coincide with ownership of the land on which they are situated?	x	Yes
		No
If **No** above, please describe below how the two differ:		

Table 2b - Holder of management rights of public forests

FRA 2010 Categories	Forest area (1000 hectares)		
	1990	2000	2005
Public Administration	184.7	177.6	174.0
Individuals	0	0	0
Private corporations and institutions	0	0	0
Communities	0	0	0
Other	0	0	0
TOTAL	**184.7**	**177.6**	**174.0**

2.5 Comments to Table T2

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Public ownership	All forests that are owned by the state which includes statelands and forest reserves	The total land area controlled by the State is fixed at 255,688 ha but due to squatting and illegal quarrying etc the area being reported is reduced.
Private ownership	Forest lands owned by private individuals and companies. Could not separate that owned by individuals and that owned by companies	
Other types of ownership		
Management rights		

Other general comments to the table

3 Table T3 – Forest designation and management

3.1 FRA 2010 Categories and definitions

Term	Definition
Primary designated function	The primary function or management objective assigned to a management unit either by legal prescription, documented decision of the landowner/manager, or evidence provided by documented studies of forest management practices and customary use.
Protected areas	Areas especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.
Categories of primary designated functions	
Production	Forest area designated primarily for production of wood, fibre, bio-energy and/or non-wood forest products.
Protection of soil and water	Forest area designated primarily for protection of soil and water.
Conservation of biodiversity	Forest area designated primarily for conservation of biological diversity. Includes but is not limited to areas designated for biodiversity conservation within the protected areas.
Social services	Forest area designated primarily for social services.
Multiple use	Forest area designated primarily for more than one purpose and where none of these alone is considered as the predominant designated function.
Other	Forest areas designated primarily for a function other than production, protection, conservation, social services or multiple use.
No / unknown	No or unknown designation.
Special designation and management categories	
Area of permanent forest estate (PFE)	Forest area that is designated to be retained as forest and may not be converted to other land use.
Forest area within protected areas	Forest area within formally established protected areas independently of the purpose for which the protected areas were established.
Forest area under sustainable forest management	To be defined and documented by the country.
Forest area with management plan	Forest area that has a long-term (ten years or more) documented management plan, aiming at defined management goals, which is periodically revised.

3.2 National data

3.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Internal Documents Drawing Office Forestry Division	H	Productive Forest and protective forests	1990	Area determined by planimeter based on a scale of 1:150000 map.

3.2.2 Classification and definitions

National class	Definition
Same as FRA	

3.2.3 Original data

National data	1990 Area(ha)	FRA classification
Watersheds	8334	Protection of soil and water
Nature reserves	458	Conservation of biological diversity
Wildlife Sanctuaries	19004	Conservation of biological diversity
National Parks	5002	Social Services
Production forests	75,875	Production
Protective forests	42,986	Protection of soil and water
Total reserve and unproclaimed reserve	143,324.7	

3.3 Analysis and processing of national data

3.3.1 Estimation and forecasting

Using the above table, percentages were calculated and applied to the different forest areas for the reporting year 1990, 2000 and the categories of production, protection and social service of the year 2005. In 2005 a further 3000 hectares was managed as national parks. The area managed for production, protection of soil and water, conservation of biological diversity are considered fixed for the period 1990 to 2010. The rest of the area is considered to be multiple purpose.

3.3.2 Reclassification into FRA 2010 categories

National clases	FRA Classes					
	Production	Multiple purpose	Protection	Conservation of biodiversity	Social service	Protection of Soil and Water
Watershed						100%
Nature reserve				100%		
Wildlife				100%		
National parks					100%	
Production of forests	100%					
Protective forests						100%
All other forested areas		100%				

3.4 Data for Table T3

Table 3a – Primary designated function

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Production	75.9	75.9	75.9	75.9
Protection of soil and water	51.3	51.3	51.3	51.3
Conservation of biodiversity	19.5	19.5	19.5	19.5
Social services	5.0	5.0	8.0	8.0
Multiple use	89.0	81.9	75.3	71.9
Other (please specify in comments below the table)	0	0	0	0
No / unknown	0	0	0	0
TOTAL	**240.7**	**233.6**	**230.0**	**226.4**

Table 3b – Special designation and management categories

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Area of permanent forest estate	143	143	143	143
Forest area within protected areas	n.a.	n.a.	n.a.	n.a.
Forest area under sustainable forest management	143	143	143	143
Forest area with management plan	143	143	143	143

3.5 Comments to Table T3

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Production		
Protection of soil and water		
Conservation of biodiversity		
Social services		
Multiple use		
Other		
No / unknown designation		
Area of permanent forest estate	The area of the permanent forest estate is fixed at 143,000 ha. Due to agricultural encroachment and squatting for housing and illegal quarrying the forest area has been reduced but the area is still legally under the control of the state.	
Forest area within protected areas		

Forest area under sustainable forest management		
Forest area with management plan		

Other general comments to the table
Although 100,000 hectares are proposed in the system of national parks and protected areas only 8000 hectares of forested lands are managed as national parks

4 Table T4 – Forest characteristics

4.1 FRA 2010 Categories and definitions

Term / category	Definition
Naturally regenerated forest	Forest predominantly composed of trees established through natural regeneration.
Introduced species	A species, subspecies or lower taxon, occurring outside its natural range (past or present) and dispersal potential (i.e. outside the range it occupies naturally or could occupy without direct or indirect introduction or care by humans).
Characteristics categories	
Primary forest	Naturally regenerated forest of native species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed.
Other naturally regenerated forest	Naturally regenerated forest where there are clearly visible indications of human activities.
Other naturally regenerated forest of introduced species *(sub-category)*	Other naturally regenerated forest where the trees are predominantly of introduced species.
Planted forest	Forest predominantly composed of trees established through planting and/or deliberate seeding.
Planted forest of introduced species *(sub-category)*	Planted forest, where the planted/seeded trees are predominantly of introduced species.
Special categories	
Rubber plantations	Forest area with rubber tree plantations.
Mangroves	Area of forest and other wooded land with mangrove vegetation.
Bamboo	Area of forest and other wooded land with predominant bamboo vegetation.

4.2 National data

4.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Internal Documents Drawing Office Forestry Division	H	Productive Forest and protective forests	1990	Area determined by planimeter based on a scale of 1:150000 map.

4.2.2 Original data

See table 1.3.2 and 3.2.3.

4.3 Analysis and processing of national data

4.3.1 Reclassification into FRA 2010 categories

Primary forests are considered to be all forests (42,986 ha) above the 152m contour along with the wildlife Sanctuaries (19004 ha) and nature reserves (458 ha) which equals 62,448 ha

4.4 Data for Table T4

Table 4a

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Primary forest	62.4	62.4	62.4	62.4
Other naturally regenerated forest	163.3	155.2	150.6	146.0
...of which of introduced species	0	0	0	0
Planted forest	15	16	17	18
...of which of introduced species	15	15	15	15
TOTAL	**240.7**	**233.6**	**230.0**	**226.4**

Table 4b

FRA 2010 Categories	Area (1000 hectares)			
	1990	2000	2005	2010
Rubber plantations (Forest)	0	0	0	0
Mangroves (Forest and OWL)	5.372	5.372	5.372	5.372
Bamboo (Forest and OWL)	.528	.528	.528	.528

4.5 Comments to Table T4

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Primary forest	Consists of the Wildlife Sanctuaries (19004 ha) and all protective forests within the forest reserves (42,982ha) and the nature reserves.	No reduction in area has been assumed over the periods since these are totally protected
Other naturally regenerating forest		
Planted forest		The amount of planted forest is increasing
Rubber plantations	There are no commercial rubber plantations in Trinidad	
Mangroves	Constant area is assumed for the mangrove since there is a no net loss policy for mangroves but some areas have been destroyed since 1980.	A total of 5,372 ha of mangroves was reported in the 1980 inventory. Since then there has been a reduction in mangroves but there are no up to date figures to substantiate my expert opinion. In the absence of new information I have assumed constant area.
Bamboo	Constant area assumed for Bamboo from 1980 inventory.	A total of 528 ha of bamboos were reported in 1980 inventory. In absence of any other data constant assumed.

Other general comments to the table

5 Table T5 – Forest establishment and reforestation

5.1 FRA 2010 Categories and definitions

Term	Definition
Afforestation	Establishment of forest through planting and/or deliberate seeding on land that, until then, was not classified as forest.
Reforestation	Re-establishment of forest through planting and/or deliberate seeding on land classified as forest.
Natural expansion of forest	Expansion of forests through natural succession on land that, until then, was under another land use (e.g. forest succession on land previously used for agriculture).

5.2 National data

5.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Internal records Forestry Division	H	Areas reforested	1988 to 2007	
Internal Records; National Reforestation and Watershed Rehabilitation Programme	H	Areas reforested	2005,2006,2007	

5.2.2 Original data

Table . Annual establishment of plantations on lands belonging to the state and on private lands from 1990 to 2007.

	state lands (ha)				private lands (ha)
year	teak plantations	pine plantations	other plantations	NRWRP[1]	other plantations
1990	54.5	200	50		
1991	52	220	95		
1992	54.5	65	68.8		
1993	5	21	65		
1994	16	32	58		
1995	9	30.4	44.5		
1996	20	77.4	70.2		
1997	12	55	71.4		
1998	28	115	110		692.5
1999	7	108	101.5		713
2000	4	125	138		138
2001	7	67.5	50.2		109
2002	7	39	124.5		209
2003	20	42.5	79.5		317
2004	6	48	111		301
2005	18	35	137	658	476
2006	18	60	124	617	626
2007	18	39.3	115	447	326

[1] NRWRP is the National Reforestation and Watershed Rehabilitation Programme

5.3 Analysis and processing of national data

5.3.1 Estimation and forecasting

Table Annual establishment of plantations on lands belonging to the state and on private lands from 1990 to 2007 along with 5 year averages.

	state lands				private lands
year	teak plantations	pine plantations	Other plantations	NRWRP	other plantations
1990	54.5	200	50		
1991	52	220	95		
1992	54.5	65	68.8		
Average (1990 to 1992	54	162	71		NIL
1993	5	21	65		
1994	16	32	58		
1995	9	30.4	44.5		
1996	20	77.4	70.2		
1997	12	55	71.4		
Average (1993 to 1997)					NIL
1998	28	115	110		692.5
1999	7	108	101.5		713
2000	4	125	138		138
2001	7	67.5	50.2		109
2002	7	39	124.5		209
Average (1998 to 2002)	11	91	105		372
2003	20	42.5	79.5		317
2004	6	48	111		301
2005	18	35	137	658	476
2006	18	60	124	617	626
2007	18	39.3	115	447	326
Average (2003 to 2007)	16	45	113.3	344	409

5.3.2 Reclassification into FRA 2010 categories

From the above table:
Reforestation for 1990=sum of (teak, pine and other plantations)
That Equals (54+72+162)= 287
Similarly for 2000 reforestation =(11+91+105+372) equals 579
Similarly for 2005 reforestation= (16+45+113+344+409) that is 909.
The average for lands established by NRWRP is 574 for 3 years so for 5 years the average would be 344.
Plantations of teak and pine are introduced species but the plantations of other species are considered indigenous. The teak plantations are established in existing degraded forests while the pine plantations and plantations of other species are established on areas which were recently harvested.

5.4 Data for Table T5

FRA 2010 Categories	Annual forest establishment (hectares/year)			...of which of introduced species [1)] (hectares/year)		
	1990	2000	2005	1990	2000	2005
Afforestation	0	0	0	0	0	0
Reforestation	287	579	909	216	102	60
...of which on areas previously planted	162	196	158			
Natural expansion of forest						

Note: The figures for the reporting years refer to the averages for the 5-year periods 1988-1992, 1998-2002 and 2003-2007 respectively.

5.5 Comments to Table T5

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Afforestation		
Reforestation		
Natural expansion of forest		

Other general comments to the table
In 1998 the Government of the Republic of Trinidad and Tobago approved a private reforestation programme with the provision of subsidies to assist of forest farmers. To date they have established 3907 ha of forest on private lands. Similarly, in 2004 the National Reforestation and Watershed Rehabilitation Programme (NRWRP)was established. They began operations in 2005 and within the last three years 1722 ha of forests have been planted in various areas across the nation.

6 Table T6 – Growing stock

6.1 FRA 2010 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.
Growing stock of commercial species	Growing stock (see def. above) of commercial species.

6.2 National data

6.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Forest Resource Inventory and Management Section Inventory of the indigenous Forests of Trinidad and Tobago 1980. Government of Trinidad and Tobago	H	Biomass Volume	1980	

6.2.2 Classification and definitions

Same as 1.2.2

6.2.3 Original data

National classes	Vol/ha
Evergreen Seasonal Forest	131.68
Semi-evergreen seasonal forest	98.73
Deciduous Seasonal Forests	73.44
Dry evergreen forests	98.73
Seasonal montane forests	142.41
Montane forests	142.41
Swamp forests	58.32
Secondary forests	82.45
Teak plantations	See below
Pine Plantations	See below
Other plantations	60
Bamboo	20
Water	NIL
Other areas within forests	18.82
Private forests	50

Table. Average volume per ha for teak plantations from local data

Age	Volume Per ha
5	28.21
10	72.28
15	122.44
20	163.8
25	192.75
30	235.3
35	262.38
40	285.93
45	303.23
50	320.5
>50	328.84

Table. Average volume per ha for pine plantations from local data.

Age	Volume per ha
5	54.3
10	108.64
15	197.14
20	296.39
25	388.65
30	480.9

6.3 Analysis and processing of national data

6.3.1 Estimation and forecasting

Table. Growing stock by year based on the original data in Table 1.3.2 and multiplying by average volume per ha.

	GROWING STOCK			
Forest Type	**1990**	**2000**	**2005**	**2010**
Evergreen Seasonal Forest	11890046	11370831	11111290	10851749
Semi-evergreen seasonal forest	1264731	1209541	1181897	1154252
Deciduous Seasonal Forests	244261.4	233612.6	228251.5	227223.4
Dry evergreen forests	44922.15	42947.55	41960.25	40972.95
Seasonal montane forests	121333.3	116064.2	113358.4	110795
Montane forests	2831396	2707784	2645978	2584172
Swamp forests	900519.1	861211.4	841499.3	821845.4
Secondary forests	1717516	1642486	1604972	1567539
teak plantations				
pine plantations	3297876	3407249	3438779	3165738
Other plantations	318360	318360	318360	318360
Bamboo	10560	10560	10560	10560
Water	NIL	NIL	NIL	NIL
Other areas within forests (OWL)	1305148	1439862	1488380	1574519
Private lands				
Total forest land owned by state				
Private forests	2800000	2800000	2800000	2800000
total growing stock	**26746669**	**26160509**	**25825285**	**25227726**

6.4 Data for Table T6

Table 6a – Growing stock

FRA 2010 category	Volume (million cubic meters over bark)							
	Forest				Other wooded land			
	1990	2000	2005	2010	1990	2000	2005	2010
Total growing stock	25.44	24.72	24.34	23.66	1.31	1.44	1.49	1.57
... of which coniferous	1.27	1.24	1.28	1.09	0	0	0	0
... of which broadleaved	24.17	23.48	23.06	22.57	1.31	1.44	1.49	1.57
Growing stock of commercial species	22.24	21.62	21.30	20.65	0.66	0.72	0.75	0.79

I have used an expert estimate of 50 % of the growing stock in other wooded land are of commercial species.

Table 6b – Growing stock of the 10 most common species

FRA 2010 category / Species name			Growing stock in forest (million cubic meters)		
Rank	Scientific name	Common name	1990	2000	2005
1st	Mora excelsor	Mora	3.469	3.317	3.241
2nd	Tectona grandis	Teak	2.028	2.167	2.160
3rd	Pinus caribaea	Caribbean Pine	1.270	1.240	1.279
4th	Spondias mombin	Hogplum	1.118	1.069	1.045
5th	Pentaclethra macroloba	Fineleaf	.958	.916	.895
6th	Sterculia caribaea	Mahoe	.923	.993	.863
7th	Carapa guianensis	Crappo	.853	.916	.798
8th	Eschweilera subglandulosa	Guatecare	.836	.799	.781
9th	Pachira insignis Wild	Chataigne	.789	.755	.737
10th	Bucida buceras	Bois gris	.508	.486	.475
Remaining			12.69	12.06	12.07
TOTAL			**25.44**	**24.72**	**24.34**

Note: Rank refers to the order of importance in terms of growing stock, i.e. 1st is the species with the highest growing stock. Year 2000 is the reference year for defining the species list and the order of the species.

Table 6c – Specification of threshold values

Item	Value	Complementary information
Minimum diameter (cm) at breast height[1] of trees included in growing stock (X)	20	
Minimum diameter (cm) at the top end of stem for calculation of growing stock (Y)	Crown point or 10 cm . for teak and pine 7.3 cm	
Minimum diameter (cm) of branches included in growing stock (W)	Natural forests no branches	Teak and pine plantation branches included
Volume refers to "above ground" (AG) or "above stump" (AS)	AG	

[1] Diameter at breast height (DBH) refers to diameter over bark measured at a height of 1.30 m above ground level or 30 cm above buttresses if these are higher than 1 m.

6.5 Comments to Table T6

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Total growing stock	Data on 2005 was based on individual species. For 2010 gross forest areas by mean volumes per ha were used. This may cause the increase in growing stock.	
Growing stock of broadleaved / coniferous		
Growing stock of commercial species	Most of the species in Trinidad and Tobago are utilized and therefore considered commercial. Those that are not utilized have been excluded.	
Growing stock composition	The category "remainder species" was calibrated in order to have the same results for total growing stock	

Other general comments to the table

7 Table T7 – Biomass stock

7.1 FRA 2010 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 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	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.

7.2 National data

7.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Forest Resource Inventory and Management Section Inventory of the indigenous Forests of Trinidad and Tobago 1980. Government of Trinidad and Tobago	H	Volume		

7.2.2 Original data

See 6.3.2

7.3 Analysis and processing of national data

Table . Above Ground Biomass

Natonal Class	BCEF[1]	ABOVE GROUND BIOMASS			
		1990	2000	2005	2010
Evergreen Seasonal Forest	1.3	15457059	14782081	14444677	14107273
Semi-evergreen seasonal forest	1.5	1897097	1814312	1772845	1731379
Deciduous Seasonal Forests	1.7	415244.4	397141.5	388027.6	386279.7
Dry evergreen forests	1.5	67383.23	64421.33	62940.38	61459.43
Seasonal montane forests	1.3	157733.3	150883.4	147365.9	144033.5
Montane forests	1.3	3680814	3520119	3439771	3359423
Swamp forests	2.05	1846064	1765483	1725074	1684783
Secondary forests	1.5	2576274	2463730	2407458	2351309
Teak and pine plantations		3132982	3236887	3266840	3007451
Other plantations	2.05	652638	652638	652638	652638
Bamboo	4	42240	42240	42240	42240
Water					
Other areas within forests (OWL)	4	5220593	5759447	5953519	6298075
Private lands					
Total forest land owned by state					
Private forests	2.05	5740000	5740000	5740000	5740000
total above ground biomass		40886123	40389382	40043395	39566345

[1]BCEF:FAO Guidelines for Country Reporting to FRA 2010, Appendix5, Table 5.4

Table . Below Ground Biomass in tonnes

All forests within Trinidad was assumed to be Tropical moist with the R either being 0.20 or 0.24 based on biomass values.

	Ratio (R)	BELOW GROUND BIOMASS			
		1990	**2000**	**2005**	**2010**
Evergreen Seasonal Forest	0.24	3709694	3547699	3466723	3385746
Semi-evergreen seasonal forest	0.2	379419.4	362862.4	354569	380903.3
Deciduous Seasonal Forests	0.2	83048.89	79428.3	77605.52	77255.94
Dry evergreen forests	0.2	13476.65	12884.27	12588.08	12291.89
Seasonal montane forests	0.24	37856	36212.01	35367.81	34568.03
Montane forests	0.24	883395.4	844828.5	825545.1	806261.6
Swamp forests	0.2	369212.8	353096.7	345014.7	336956.6
Secondary forests	0.2	515254.8	492745.9	481491.5	470261.8
teak plantations					
pine plantations	0.24	751915.7	776852.8	784041.6	721788.3
Other plantations	0.2	130527.6	130527.6	130527.6	130527.6
Bamboo	0.2	8448	8448	8448	8448
Water					
Other areas within forests OWL)	0.2	1044119	1151889	1190704	1259615
Private lands					
Total forest land owned by state					
Private forests	0.2	1148000	1148000	1148000	1148000
total below ground biomass		9074368	8945475	8860625	8772624

[1] Ratio of above ground to below ground biomass (R): FAO Guidelines for Country Reporting to FRA 2010, Appendix 5, Table 5.3.

Biomass of deadwood

	tonne/ha	DEAD WOOD			
		1990	**2000**	**2005**	**2010**
Evergreen Seasonal Forest	3.81	344024	329001.1	321491.6	313982.1
Semi-evergreen seasonal forest	3.81	48806.1	46676.31	45609.51	44542.71
Deciduous Seasonal Forests	3.81	12672.06	12119.61	11841.48	11788.14
Dry evergreen forests	3.81	1733.55	1657.35	1619.25	1581.15
Seasonal montane forests	3.81	3246.12	3105.15	3032.76	2964.18
Montane forests	3.81	75750.42	72443.34	70789.8	69136.26
Swamp forests	3.81	58830.21	56262.27	54974.49	53690.52
Secondary forests	3.81	79366.11	75899.01	74165.46	72435.72
teak plantations		36195	36195	36195	36195
pine plantations		20955	20955	20955	20955
Other plantations	3.81	20215.86	20215.86	20215.86	20215.86
Bamboo	3.81	2011.68	2011.68	2011.68	2011.68
Water					
Other areas within forests (OWL)	3.81	264219.7	291491.7	301313.9	318752.2
Private lands					
Total forest land owned by state					
Private forests	3.81	213360	213360	213360	213360
total deadwood		**1181386**	**1181393**	**1177576**	**1181611**

7.4 Data for Table T7

FRA 2010 category	Biomass (million metric tonnes oven-dry weight)							
	Forest				Other wooded land			
	1990	2000	2005	2010	1990	2000	2005	2010
Above-ground biomass	35.67	34.63	34.26	33.27	5.22	5.76	5.95	6.30
Below-ground biomass	8.03	7.79	7.67	7.51	1.04	1.15	1.19	1.26
Dead wood	.92	.89	.88	.86	.26	.29	.30	.32
TOTAL	**44.62**	**43.31**	**42.81**	**41.64**	**6.52**	**7.20**	**7.44**	**7.88**

7.5 Comments to Table T7

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Above-ground biomass	Growing stock data was converted by the various BCEF from Table 5.4 in the Guidelines..	
Below-ground biomass		
Dead wood	Mortality data from natural forests based on an analysis of over 100 sample plots showed an average of 5.22 cubic metres per ha. This value was divided by 1.37 (FAO Guidelines for Country Reporting to FRA 2010Appendix 4, Table of weight and volume) to convert into biomass mortality of 3.81 metric tonne per ha. This value was applied to all forest types.	

Other general comments to the table

8 Table T8 – Carbon stock

8.1 FRA 2010 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 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	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 the minimum diameter for dead wood (e.g. 10 cm), lying dead in various states of decomposition above the mineral or organic soil.
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.

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 Resource Inventory and Management Section Inventory of the indigenous Forests of Trinidad and Tobago 1980. Government of Trinidad and Tobago	H	Biomass Volume	1980	

8.2.2 Original data

See 6.3.2

8.3 Analysis and processing of national data

Carbon in above ground biomass

	Carbon fraction	1990	2000	2005	2010
Evergreen Seasonal Forest	0.47	7264818	6947578	6788998	6630419
Semi-evergreen seasonal forest	0.47	891635.6	852726.6	833237.3	813748
Deciduous Seasonal Forests	0.47	195164.9	186656.5	182373	181551.5
Dry evergreen forests	0.47	31670.12	30278.02	29581.98	28885.93
Seasonal montane forests	0.47	74134.66	70915.2	69261.96	67695.73
Montane forests	0.47	1729983	1654456	1616692	1578929
Swamp forests	0.47	867650.2	829777.2	810784.6	791848.1
Secondary forests	0.47	1210849	1157953	1131505	1105115
teak plantations	0.47				
pine plantations	0.47	1472502	1521337	1535415	1413502
Other plantations	0.47	306739.9	306739.9	306739.9	306739.9
Bamboo	0.47	19852.8	19852.8	19852.8	19852.8
Water					
Other areas within forests (OWL)	0.47	2453679	2706940	2798154	2960095
Private lands					
Total forest land owned by state					
Private forests	0.47	2697800	2697800	2697800	2697800
total carbon in above-ground biomass		19216478	18983010	18820396	18596182

Below ground biomass

	carbon fraction	1990	2000	2005	1010
Evergreen Seasonal Forest	0.47	1743556	1667419	1629360	1591300
Semi-evergreen seasonal forest	0.47	178327.1	170545.3	166647.5	179024.6
Deciduous Seasonal Forests	0.47	39032.98	37331.3	36474.59	36310.29
Dry evergreen forests	0.47	6334.023	6055.605	5916.395	5777.186
Seasonal montane forests	0.47	17792.32	17019.65	16622.87	16246.98
Montane forests	0.47	415195.9	397069.4	388006.2	378943
Swamp forests	0.47	173530	165955.4	162156.9	158369.6
Secondary forests	0.47	242169.7	231590.6	226301	221023.1
teak plantations					
pine plantations	0.47	353400.4	365120.8	368499.6	339240.5
Other plantations	0.47	61347.97	61347.97	61347.97	61347.97
Bamboo	0.47	3970.56	3970.56	3970.56	3970.56
Water	0.47				
Other areas within forests (OWL)	0.47	490735.7	541388	559630.8	592019.1
Private lands	0.47				
Total forest land owned by state	0.47				
Private forests	0.47	539560	539560	539560	539560
total carbon in below-ground biomass	0.47	4264953	4204373	4164494	4123133

Carbon in deadwood

	Carbon fraction	1990	2000	2005	2010
Evergreen Seasonal Forest	0.47	161691.3	154630.5	151101.1	147571.6
Semi-evergreen seasonal forest	0.47	22938.87	21937.87	21436.47	20935.07
Deciduous Seasonal Forests	0.47	5955.868	5696.217	5565.496	5540.426
Dry evergreen forests	0.47	814.7685	778.9545	761.0475	743.1405
Seasonal montane forests	0.47	1525.676	1459.421	1425.397	1393.165
Montane forests	0.47	35602.7	34048.37	33271.21	32494.04
Swamp forests	0.47	27650.2	26443.27	25838.01	25234.54
Secondary forests	0.47	37302.07	35672.53	34857.77	34044.79
teak plantations	0.47	17011.65	17011.65	17011.65	17011.65
pine plantations	0.47	9848.85	9848.85	9848.85	9848.85
Other plantations	0.47	9501.454	9501.454	9501.454	9501.454
Bamboo	0.47	945.4896	945.4896	945.4896	945.4896
Water					
Other areas within forests (OWL)	0.47	124183.3	137001.1	141617.5	149813.5
Private lands					
Total forest land owned by state					
Private forests	0.47	100279.2	100279.2	100279.2	100279.2
total carbon in deadwood	0.47	555251.3	555254.9	553460.6	555357

Carbon in litter

	Default values	1990	2000	2005	2010
Evergreen Seasonal Forest	2.1	189619.5	181339.2	177200.1	173061
Semi-evergreen seasonal forest	2.1	26901	25727.1	25139.1	24551.1
Deciduous Seasonal Forests	2.1	6984.6	6680.1	6526.8	6497.4
Dry evergreen forests	2.1	955.5	913.5	892.5	871.5
Seasonal montane forests	2.1	1789.2	1711.5	1671.6	1633.8
Montane forests	2.1	41752.2	39929.4	39018	38106.6
Swamp forests	2.1	32426.1	31010.7	30300.9	29593.2
Secondary forests	2.1	43745.1	41834.1	40878.6	39925.2
teak plantations	2.1	19950	19950	19950	19950
pine plantations	5.2	28600	28600	28600	28600
Other plantations	2.1	11142.6	11142.6	11142.6	11142.6
Bamboo	2.1	1108.8	1108.8	1108.8	1108.8
Water					
Other areas within forests (OWL)	2.1	145632.9	160664.7	166078.5	175690.2
Private lands					
Total forest land owned by state					
Private forests	2.1	117600	117600	117600	117600
total carbon in litter		668207.5	668211.7	666107.5	668331.4

Soil Carbon

	Default value	1990	2000	2005	2010
Evergreen Seasonal Forest	47	4243865	4058544	3965907	3873270
Semi-evergreen seasonal forest	47	602070	575797	562637	549477
Deciduous Seasonal Forests	47	156322	149507	146076	145418
Dry evergreen forests	47	21385	20445	19975	19505
Seasonal montane forests	63	53676	51345	50148	49014
Montane forests	63	1252566	1197882	1170540	1143198
Swamp forests	86	1327926	1269962	1240894	1211912
Secondary forests	47	979057	936287	914902	893564
teak plantations	47	446500	446500	446500	446500
pine plantations	47	258500	258500	258500	258500
Other plantations	47	249382	249382	249382	249382
Bamboo	47	24816	24816	24816	24816
Water		0	0	0	0
Other areas within forests (OWL)	47	3259403	3595829	3716995	3932114
Private lands		0	0	0	0
Total forest land owned by state		0	0	0	0
Private forests	47	2632000	2632000	2632000	2632000
total soil carbon		15507468	15466796	15399272	15428670

Source: FAO Guidelines for Country Reporting to FRA 2010, Appendix 5, Table 5.10.

8.4 Data for Table T8

FRA 2010 Category	**Carbon (Million metric tonnes)**							
	Forest				**Other wooded land**			
	1990	**2000**	**2005**	**2010**	**1990**	**2000**	**2005**	**2010**
Carbon in above-ground biomass	16.77	16.09	16.02	15.64	2.45	2.71	2.80	2.96
Carbon in below-ground biomass	3.77	3.66	3.60	3.53	.49	.54	.56	.59
Sub-total: Living biomass	***20.54***	***19.75***	***19.62***	***19.17***	***2.94***	***3.25***	***3.36***	***3.55***
Carbon in dead wood	.43	.41	.41	.41	.12	.14	.14	.15
Carbon in litter	.53	.51	.50	.49	.14	.16	.17	.18
Sub-total: Dead wood and litter	***.96***	***.92***	***.90***	***.90***	***.26***	***.30***	***.31***	***.33***
Soil carbon	12.25	11.87	11.68	11.50	3.26	3.60	3.72	3.93
TOTAL	**33.75**	**32.54**	**32.20**	**31.57**	**6.46**	**7.15**	**7.39**	**7.81**

Soil depth (cm) used for soil carbon estimates	30

8.5 Comments to Table T8

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Carbon in above-ground biomass		
Carbon in below-ground biomass		
Carbon in dead wood		
Carbon in litter		
Soil carbon	For soil carbon values most of the forests were assumed to be on LAC soils with 47 tonnes of carbon per ha. For the montane and seasonal montane forests 63 tonnes of carbon per ha was used; and for the swamp forests the global figure for wetland soils of 86 tonnes per ha was used.	

Other general comments to the table

9 Table T9 – Forest fires

9.1 FRA 2010 Categories and definitions

Category	Definition
Number of fires	Average number of vegetation fires per year in the country.
Area affected by fire	Average area affected by vegetation fires per year in the country.
Vegetation fire *(supplementary term)*	Any vegetation fire regardless of ignition source, damage or benefit.
Wildfire	Any unplanned and/or uncontrolled vegetation fire.
Planned fire	A vegetation fire regardless of ignition source that burns according to management objectives and requires limited or no suppression action.

9.2 National data

9.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Annual reports of Forestry Division	H	Fires	1987-2008	
Records from the Sugar Manufacturing company of Trinidad and Tobago	H	Estimate of fires	1984 to 2007	

9.2.2 Original data

Number of fires and areas burnt within forested areas from 1987 to 2008.

YEAR	AREA BURNT	NUMBER OF FIRES
1987	21420	502
1988	5495	583
1989	970	146
1990	1100	234
1991	680	229
1992	2710	431
1993	1570	228
1994	2600	256
1995	7245	516
1996	2664	178
1997	446	156
1998	10289	764
1999	988	167
2000	927	91
2001	5309	464
2002	373	62
2003	4723	347
2004	1493.2	136
2005	1696	270
2006	1245.8	210
2007	3566.5	452
2008	1534.1	226

Sugar Cane production from Farmers holdings and Caroni Land from 1984 to 2007.

SUGAR CANE PRODUCTION						
YEAR	FARMERS Cane (tons)	CARONI Cane (tons)	farmers land (ha)	Caroni lands(ha)	total lands burnt (ha)	average
1984	290852	558219	5885.309591	12550.45191	18435.76	
1985	413749	661749	8372.096317	14878.11952	23250.22	
1985	350954	645534	7101.4569	14513.55726	21615.01	
1986	415987	713195	8417.381627	16034.78124	24452.16	
1988	491894	719839	9953.338729	16184.15846	26137.5	
1989	523212	668868	10587.04978	15038.17618	25625.23	
1990	691394	787019	13990.16592	17694.5681	31684.73	
1991	613459	687409	12413.1728	15455.03395	27868.21	
1992	611200	655009	12367.46257	14726.58393	27094.05	27681.94
1993	607487	581629	12292.33104	13076.77953	25369.11	
1994	697037	679314	14104.35047	15273.03386	29377.38	
1995	663504	645315	13425.81951	14508.63348	27934.45	
1996	747326	656754	15121.93444	14765.81681	29887.75	
1997	762211	657354	15423.12829	14779.30662	30202.43	
1998	614828	442027	12440.87414	9938.104231	22378.98	
1999	773891	599454	15659.46985	13477.53946	29137.01	
2000	780330		15789.76123		15789.76	
2001	550170		11132.53743		11132.54	
2002	749760		15171.18575		15171.19	18721.89
2003	557490		11280.65561		11280.66	
2004	536740		10860.78511		10860.79	
2005	455260		9212.059895		9212.06	
2006	434180		8785.511938		8785.512	
2007	363000		7345.204371		7345.204	9496.843

All cane supplied to the factories are burnt. In order to calculate the area burnt a yield of 20 tons of cane per acre was used as a conversion factor for farmers cane and 18 tons per ha was used for cane supplied by Caroni limited. The average from 1988 to 1995 was used as the area burnt per annum. Since the closure of Caroni even though there is no cane on the lands the area is burnt annually. I used the area of 27,682 ha as the total area burnt every year.

9.3 Analysis and processing of national data

9.3.1 Estimation and forecasting

The average of 1988-1992 was used as an estimate of fires in 1990, the average from 1998 to 2002 was used as an estimate of fires in 2000; the average from 2003 to 2007 was used as an estimate of fires in 2005.

9.4 Data for Table T9

Table 9a

FRA 2010 category	Annual average for 5-year period					
	1990		2000		2005	
	1000 hectares	number of fires	1000 hectares	number of fires	1000 hectares	number of fires
Total land area affected by fire	29.873	n.a	31.259	n.a	30.227	n.a
... of which on forest	2.191	325	3.577	310	2.545	283
... of which on other wooded land	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
... of which on other land	27.682	n.a	27.682	n.a	27.682	n.a

Table 9b

FRA 2010 category	Proportion of forest area affected by fire (%)		
	1990	2000	2005
Wildfire	100	100	100
Planned fire	0	0	0

Note: The figures for the reporting years refer to the averages of annually affected areas for the 5-year periods 1988-1992, 1998-2002 and 2003-2007 respectively

9.5 Comments to Table T9

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Area affected by fire	Data on fires could not be separated in fires in forests and fires in other wooded lands	
Number of fires		
Wildfire / planned fire		

Other general comments to the table

10 Table T10 – Other disturbances affecting forest health and vitality

10.1 FRA 2010 Categories and definitions

Term	Definition
Disturbance	Damage caused by any factor (biotic or abiotic) that adversely affects the vigour and productivity of the forest and which is not a direct result of human activities.
Invasive species	Species that are non-native to a particular ecosystem and whose introduction and spread cause, or are likely to cause, socio-cultural, economic or environmental harm or harm to human health.
Category	**Definition**
Disturbance by insects	Disturbance caused by insect pests.
Disturbance by diseases	Disturbance caused by diseases attributable to pathogens, such as bacteria, fungi, phytoplasma or virus.
Disturbance by other biotic agents	Disturbance caused by biotic agents other than insects or diseases, such as wildlife browsing, grazing, physical damage by animals, etc.
Disturbance caused by abiotic factors	Disturbances caused by abiotic factors, such as air pollution, snow, storm, drought, etc.

10.2 National data

10.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Annual reports of Forestry Division	H	Disturbance and invasive species	1990, 2000,2005	No disturbance by insects, diseases, biotic and abiotic agents reported.

10.3 Data for Table T10

Table 10a – Disturbances

FRA 2010 category	Affected forest area (1000 hectares)		
	1990	2000	2005
Disturbance by insects	0	0	0
Disturbance by diseases	0	0	0
Disturbance by other biotic agents	0	0	0
Disturbance caused by abiotic factors	0	0	0
Total area affected by disturbances	0	0	0

Notes: The figures for the reporting years refer to the averages of annually affected areas for the 5-year periods 1988-1992, 1998-2002 and 2003-2007 respectively.

The total area affected by disturbances is not necessarily the sum of the individual disturbances as these may be overlapping.

Table 10b – Major outbreaks of insects and diseases affecting forest health and vitality

Description / name	Tree species or genera affected (scientific name)	Year(s) of latest outbreak	Area affected (1000 hectares)	If cyclic, approx. cycle (years)

Note: Area affected refers to the total area affected during the outbreak.

Table 10c – Area of forest affected by woody invasive species

Scientific name of woody invasive species	Forest area affected 2005 (1000 hectares)
Total forest area affected by woody invasive species	

Note: The total forest area affected by woody invasive species is not necessary the sum of the values above, as these may be overlapping.

10.4 Comments to Table T10

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Disturbance by insects		
Disturbance by diseases		
Disturbance by other biotic agents		
Disturbance caused by abiotic factors		
Major outbreaks		
Invasive species	Acacia mangium (tree species) was introduced in Trinidad in 1984. Possesses invasive tendencies especially in areas where fires are frequent in the dry season. It has been found in the natural forests but there is no widespread occurrence. May be affecting only a few hectares possibly less that 5 ha.	

Other general comments to the table
No data available for reporting this table.

11 Table T11 – Wood removals and value of removals

11.1 FRA 2010 Categories and definitions

Category	Definition
Industrial roundwood removals	The wood removed (volume of roundwood over bark) for production of goods and services other than energy production (woodfuel).
Woodfuel removals	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
Forestry Division Internal Reports	H	Volumes, log prices at roadside	1988-2007	

11.2.2 Original data

Please note that the volumes are measured overbark in Trinidad and all the data reported in this table are overbark volumes.

Yield from the forests

Year	Total yield from forests over bark(cubic metres)	Average for given years in 1000 cubic metres
1988	45167	
1989	62054	
1990	52256	52.223
1991	43225	
1992	58415	
1993	42959	
1994	49247	
1995	66443	
1996	58809	
1997	71302	
1998	50289	
1999	47531	
2000	71956	58.654
2001	63151	
2002	60344	
2003	70028	
2004	50208	
2005	64513	57.399
2006	52244	
2007	Estimated 50,000	

Table Round log prices at roadside per hoppus foot in TT$ by classes.

Year	Class I	Class II	Class III	Class IV
1990	15	9	6	4
2000	37.5	14.5	10	8
2005	39	14	8	6

11.3 Analysis and processing of national data

Table Total value by classes in TT$ for 1990 and 2000

	Volume in 1990 (m3)	Price in 1990 per m3	Total value (TT$)	Volume in 2000 (m3)	Price in 2000 (TT$)	Total value (TT$)
Class I	26696	416.10	11108206	29081	1040.25	30251510
Class II	18099	249.66	4528596	9574	402.23	3850950
Class III	3463	166.44	576382	9240	277.40	2563176
Class IV	3965	110.96	439956	10758	166.44	1790562
Total	52223		16,653,140	58654		38,456,198

Table Total value by classes in TT$ for 2005.

	Volume in 2005 (m3)	Price in 2005 per m3	Total value (TT$)
Class I	28700	1040.25	29855175
Class II	9184	402.23	3694080
Class III	9184	277.40	2547642
Class IV	10332	166.44	1719658
Total	57400		37,816,555

11.4 Data for Table T11

FRA 2010 Category	Industrial roundwood removals			Woodfuel removals		
	1990	2000	2005	1990	2000	2005
Total volume (1000 m^3 o.b.)	52.223	58.654	53.917	45.655	41.975	39.905
... of which from forest	52.223	58.654	53.917	45.655	41.975	39.905
Unit value (local currency / m^3 o.b.)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total value (1000 local currency)	16,653	38,456	37,816	n.a.	n.a.	n.a.

Note: The figures for the reporting years refer to the averages of annually affected areas for the 5-year periods 1988-1992, 1998-2002 and 2003-2007 respectively.

	1990	2000	2005
Name of local currency	Trinidad and Tobago Dollar (TT$)	Trinidad and Tobago Dollar (TT$)	Trinidad and Tobago Dollar (TT$)

11.5 Comments to Table T11

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Total volume of industrial roundwood removals		
Total volume of woodfuel removals	Used data from Guidelines Appendix 3, Table 3.2. Please note that although I used the figures my opinion is that wood fuels are much less than this.	
Unit value	Due to the varying prices by classes it is difficult to use a unit value See table above	
Total value	Total value reported in TT$. Please note that the exchange rate was not constant over the various years. 1990 1 US=4.25TT 2000 1US =6.30TT 2005 1US=6.30TT	

Other general comments to the table

12 Table T12 – Non-wood forest products removals and value of removals

12.1 FRA 2010 Categories and definitions

Term	Definition
Non-wood forest product (NWFP)	Goods derived from forests that are tangible and physical objects of biological origin other than wood.
Value of NWFP removals	For the purpose of this table, value is defined as the market value at the site of collection or forest border.

NWFP categories

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. Wild meat
13. Raw material for medicine
14. Raw material for colorants
15. Other edible animal products
16. Other non-edible animal products

12.2 National data

12.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Internal reports – Forestry division	H	Bush meat and other plant products	2005	

12.3 Data for Table T12

Rank	Name of product	Key species	Unit	NWFP removals 2005		NWFP category
				Quantity	Value (1000 local currency)	
1st	Bush Meat		1000 kg	12	1 200	12
2nd	Other plant Products		cord	60	108	8
3rd						
4th						
5th						
6th						
7th						
8th						
9th						
10th						
All other plant products						
All other animal products						
TOTAL					**1 308**	

Name of local currency	Trinidad and Tobago Dollar (TT$)

12.4 Comments to Table T12

Variable / category	Comments related to data, definitions, etc.
10 most important products	
Other plant products	
Other animal products	
Value by product	
Total value	

Other general comments to the table
Traditionally there is demand from the natural forest for handicraft materials, fruits, flowering plants, vines for basket manufacture, bamboo, Roseau stems, collection of wild honey etc. The royalty rates are nominal and there is very little data capture of this important resource. As a result except for bushmeat and some insecticide data there is no data available.

13 Table T13 – Employment

13.1 FRA 2010 Categories and definitions

Category	Definition
Full-time equivalents (FTE)	A measurement equal to one person working full-time during a specified reference period.
Employment	Includes all persons in paid employment or self-employment.
Paid employment	Persons who during a specified reference period performed some work for wage or salary in cash or in kind.
Self-employment	Persons who during a specified reference period performed some work for profit or family gain in cash or in kind (e.g. employers, own-account workers, members of producers' cooperatives, contributing family workers).

13.2 National data

13.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Internal Records of the Forestry Division	H		1990 to 2007	List of wood workers
Annual Reports of the Forestry Division	H		1990 to 2007	**List of employees in Forestry Division**

13.2.2 Original data

The number of persons in this table reflects the amount of Forestry Employees within the Forestry Division, the number of workers employed in the planting of forests and the number of persons directly involved in logging and harvesting of round logs.

13.3 Data for Table T13

FRA 2010 Category	Employment (1000 years FTE)		
	1990	2000	2005
Employment in primary production of goods	1.300	1.400	1.400
...of which paid employment	1.000	1.100	1.124
...of which self-employment	0.300	0.300	0.276
Employment in management of protected areas	n.a.	n.a.	n.a.

13.4 Comments to Table T13

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Employment in primary production of goods		
Paid employment / self-employment		
Employment in management of protected areas		

Other general comments to the table

14 Table T14 – Policy and legal framework

14.1 FRA 2010 Categories and definitions

Term	Definition
Forest policy	A set of orientations and principles of actions adopted by public authorities in harmony with national socio-economic and environmental policies in a given country to guide future decisions in relation to the management, use and conservation of forest and tree resources for the benefit of society.
Forest policy statement	A document that describes the objectives, priorities and means for implementation of the forest policy.
National forest programme (nfp)	A generic expression that refers to a wide range of approaches towards forest policy formulation, planning and implementation at national and sub-national levels. The national forest programme provides a framework and guidance for country-driven forest sector development with participation of all stakeholders and in consistence with policies of other sectors and international policies.
Law (Act or Code) on forest	A set of rules enacted by the legislative authority of a country regulating the access, management, conservation and use of forest resources.

14.2 Data for Table T14

Indicate the existence of the following (2008)			
Forest policy statement with national scope		x	Yes
			No
If Yes above, provide:	Year of endorsement	1942, Revised 1981, Revised 1998; Reformulated 2008.	
	Reference to document		
National forest programme (nfp)			Yes
		x	No
If Yes above, provide:	Name of nfp in country		
	Starting year		
	Current status		In formulation
			In implementation
			Under revision
			Process temporarily suspended
	Reference to document or web site		
Law (Act or Code) on forest with national scope		x	Yes, specific forest law exists
			Yes, but rules on forests are incorporated in other (broader) legislation
			No, forest issues are not regulated by national legislation
If Yes above, provide:	Year of enactment	1918	
	Year of latest amendment	1999	
	Reference to document	Laws of Trinidad and Tobago(Act 23 of 1999 and Act 66 of 1980)	

In case the responsibility for forest policy- and/or forest law-making is decentralized, please indicate the existence of the following and explain in the comments below the table how the responsibility for forest policy- and law-making is organized in your country.		
Sub-national forest policy statements		Yes
	x	No
If Yes above, indicate the number of regions/states/provinces with forest policy statements		
Sub-national Laws (Acts or Codes) on forest		Yes
	x	No
If Yes above, indicate the number of regions/states/provinces with Laws on forests		

14.3 Comments to Table T14

Variable / category	**Comments related to data, definitions, etc.**
Forest policy statement with national scope	
National forest programme (nfp)	
Law (Act or Code) on forest with national scope	
Sub-national forest policy statements	
Sub-national Laws (Acts or Codes) on forest	

Other general comments to the table

15 Table T15 – Institutional framework

15.1 FRA 2010 Categories and definitions

Term	Definition
Minister responsible for forest policy-making	Minister holding the main responsibility for forest issues and the formulation of the forest policy.
Head of Forestry	The Head of Forestry is the Government Officer responsible for implementing the mandate of the public administration related to forests.
Level of subordination	Number of administrative levels between the Head of Forestry and the Minister.
University degree	Qualification provided by University after a minimum of 3 years of post secondary education.

15.2 Data for Table T15

Table 15a – Institutions

FRA 2010 Category	2008	
Minister responsible for forest policy formulation : please provide full title	Minister of Agriculture, Land and Marine Resources	
Level of subordination of Head of Forestry within the Ministry		1st level subordination to Minister
	x	2nd level subordination to Minister
		3rd level subordination to Minister
		4th or lower level subordination to Minister
Other public forest agencies at national level	National Reforestation and Watershed Rehabilitation Project (NRWRP) formed in 2005	
Institution(s) responsible for forest law enforcement	Forestry Division, Ministry of Agriculture, Land and Marine Resources, 30 Long Circular Road, St James, Port of Spain, Trinidad.	

Table 15b – Human resources

FRA 2010 Category	Human resources within public forest institutions					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Total staff	**783**	**15**	**824**	**17**	**946**	**19**
...of which with university degree or equivalent	15	13	13	23	16	25

Notes:
1. Includes human resources within public forest institutions at sub-national level
2. Excludes people employed in State-owned enterprises, education and research, as well as temporary / seasonal workers.

15.3 Comments to Table T15

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Minister responsible for forest policy formulation		
Level of subordination of Head of Forestry within the Ministry		
Other public forest agencies at national level		
Institution(s) responsible for forest law enforcement		
Human resources within public forest institutions		

Other general comments to the table

16 Table T16 – Education and research

16.1 FRA 2010 Categories and definitions

Term	Definition
Forest-related education	Post-secondary education programme with focus on forests and related subjects.
Doctor's degree (PhD)	University (or equivalent) education with a total duration of about 8 years.
Master's degree (MSc) or equivalent	University (or equivalent) education with a total duration of about five years.
Bachelor's degree (BSc) or equivalent	University (or equivalent) education with a duration of about three years.
Technician certificate or diploma	Qualification issued from a technical education institution consisting of 1 to 3 years post secondary education.
Publicly funded forest research centers	Research centers primarily implementing research programmes on forest matters. Funding is mainly public or channelled through public institutions.

16.2 National data

16.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Internal Records Forestry Division	H	Technician Diploma	2000,2005,2008	Records obtained from the Eastern Caribbean Institute of Agriculture and Forestry located in Trinidad

16.2.2 Original data

Table . Graduates at the technician level from the Eastern Caribbean Institute of Agriculture and Forestry for the period 1998 to 2008.

year	male	female	total	%female
1998	6	2	8	0.25
1999	12	7	19	0.368421
2000	8	6	14	0.428571
2001	9	4	13	0.307692
2002	7	5	12	0.416667
2004	6	4	10	0.4
2005	5	1	6	0.166667
2006	11	8	19	0.421053
2007	14	8	20	0.4
2008	11	9	20	0.45

16.3 Data for Table T16

FRA 2010 Category	Graduation [1] of students in forest-related education					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Master's degree (MSc) or equivalent	0	n.a.	0	n.a.	0	n.a.
Bachelor's degree (BSc) or equivalent	0	n.a.	0	n.a.	0	n.a.
Forest technician certificate / diploma	14	43	6	17	20	45
FRA 2010 Category	**Professionals working in publicly funded forest research centres [2]**					
	2000		2005		2008	
	Number	%Female	Number	%Female	Number	%Female
Doctor's degree (PhD)	0	n.a.	0	n.a.	0	n.a.
Master's degree (MSc) or equivalent	2	0	2	0	2	0
Bachelor's degree (BSc) or equivalent	1	100	1	100	1	100

Notes:

1. Graduation refers to the number of students that have successfully completed a Bachelor's or higher degree or achieved a certificate or diploma as forest technician.
2. Covers degrees in all sciences, not only forestry.

16.4 Comments to Table T16

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Graduation of students in forest-related education	All graduates in Forestry at the Bachelors and above are educated overseas. All graduates at the technician level are educated locally	Within the last three years up to 2008 the intake has increased to 20 students per year.
Professionals working in public forest research centres	The Research Section of the Forestry Division conducts research into flora (timber and forest species) and a wildlife Section which conducts research into the fauna.	Over the period 2000 to 2008 only two persons have been actively engaged in research activities.

Other general comments to the table

17 Table T17 – Public revenue collection and expenditure

17.1 FRA 2010 Categories and definitions

Category	Definition
Forest revenue	All government revenue collected from the domestic production and trade of forest products and services. For this purpose, forest products include: roundwood; sawnwood; wood-based panels; pulp and paper; and non-wood forest products. As far as possible, this should include revenue collected by all levels of government (i.e. central, regional/provincial and municipal level), but it should exclude the income of publicly owned business entities.
Public expenditure	All government expenditure on forest related activities (further defined below).
Operational expenditure *(sub-category to Public expenditure)*	All government expenditure on public institutions solely engaged in the forest sector. Where the forest administration is part of a larger public agency (e.g. department or ministry), this should only include the forest sector component of the agency's total expenditure. As far as possible, this should also include other institutions (e.g. in research, training and marketing) solely engaged in the forest sector, but it should exclude the expenditure of publicly owned business entities.
Transfer payments *(sub-category to Public expenditure)*	All government expenditure on direct financial incentives paid to non-government and private-sector institutions, enterprises communities or individuals operating in the forest sector to implement forest related activities.
Domestic funding	Public expenditure funded from domestic public financial resources, including: retained forest revenue; forest-related funds; and allocations from the national budget (i.e. from non-forest sector public revenue sources).
External funding	Public expenditure funded from grants and loans from donors, non-governmental organisations, international lending agencies and international organisations, where such funds are channelled through national public institutions.

17.2 National data

17.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Internal Records Forestry Divison	H	Revenue, Expenditure, subsidy	1998 to 2007	Data from National Reforestation and Watershed Rehabilitation Programme are for 3 years only since project commenced in 2005.

17.2.2 Original data

REVENUE FROM 1998 TO 2008

Year	Revenue	Average
1998		
1999	4792546	
2000	7411742	7809159
2001	1769971	
2002	17262376	
2003	6932089	
2004	4246610	
2005	7419344	7461860
2006	7708423	
2007	11002832	

Development and Recurrent expenditure for the Forestry Division and the NRWRP for stated years.

FORESTRY DIVISION			NRWRP		
YEAR	RECURRENT	DEVELOPMENT		TOTAL	AVERAGE
	EXPENDITURE	EXPENDITURE			
1999	33815322			33815322	
2000	34893728	2638495		37532223	40186136
2001	40499126	1930048		42429174	
2002	43872631	3095193		46967824	
2003	47317668	5034697		52352365	
2004	58220585	6624175		64844760	
2005	67975460	7012819	12388750	87377029	96246276
2006	70050376	11278239	45468854	126797469	
2007	84228707	12518051	53113000	149859758	
2008	62613630	11990316		74603946	

Transfer Payments for the period 1990 to 2008 in turtle patrols and reforestation. Turtle patrols are conducted under areas designated under the Forest Act as prohibited areas and Forest and Wildlife Officers are the authorized officers to conduct these activities.

Year	funds paid for turtle patrols	funds paid as subsidies	Total	Average
1990	1329		1329	
1991	4159		4159	
1992	62209		62209	
1993	55065		55065	
1994	42950		42950	
1995	68884		68884	
1996	63679		63679	
1997	64318		64318	
1998	93445		93445	
1999	119780		119780	
2000	153075		153075	250970.2
2001	137760	262013	399773	
2002	132772	356006	488778	
2003	175800	320678	496478	
2004	228480	360423	588903	
2005	342375	370634	713009	691402.8
2006	392300	300784	693084	
2007	587820	377720	965540	
2008	632100	346994	979094	

17.3 Data for Table T17

Table 17a - Forest revenues

FRA 2010 Categories	Revenues (1000 local currency)	
	2000	2005
Forest revenue	7411	7419

Table 17b - Public expenditure in forest sector by funding source

FRA 2010 Categories	Domestic funding (1000 local currency)		External funding (1000 local currency)		Total (1000 local currency)	
	2000	2005	2000	2005	2000	2005
Operational expenditure	37532	87377	NIL	NIL	37532	87377
Transfer payments	153	713	NIL	NIL	153	713
Total public expenditure	37685	88090	NIL	NIL	37685	88090

If transfer payments are made for forest management and conservation, indicate for what specific objective(s) - Please tick all that apply.	x	Reforestation
		Afforestation
		Forest inventory and/or planning
	x	Conservation of forest biodiversity
	x	Protection of soil and water
	x	Forest stand improvement
	x	Establishment or maintenance of protected areas
	x	Other, specify below
	PATROLS TO PROTECT TURTLES DURING THE NESTING SEASON.	

17.4 Comments to Table T17

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Forest revenue	Revenue collected from sale of forest produce,	It may appear that the revenue is constant. However the data over the periods shows that the revenue is increasing.
Operational expenditure	Total sum expended in the recurrent and development programmes of the Forestry Division and the National Reforestation and watershed Rehabilitation Programme (NRWRP)	Even without the funds made available to the NRWRP the total expenditure of the Forestry Division for the 2005 is 74.988 millions, an increase of 100% over the year 2000
Transfer payments	Subsidies payable to private persons to establish forests on their private property; Funds payable to various groups to protect turtles during the nesting season	

Other general comments to the table