Forestry Department
Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT

COUNTRY REPORTS

BRUNEI DARUSSALAM

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The Forest Resources Assessment Programme

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

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

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

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

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General information

The provision of data for this report is based on previous study by the appointed consultants and interpolation of available data from the said study. Therefore, the Department relies duly on this study for the preparation of the report.

Due to lack of study on specific fields and some of data under the jurisdiction of other government agencies in Brunei Darussalam, the Department is not able to give some detail information as requested. Some steps for reporting tables as stated in the guidelines are not relevant due limited source of data.

Furthermore, estimation on certain figures provided in this report truly reflect the present conditions such as the monitoring of forest cover of Brunei Darussalam and the error of calculation is kept as minimal as possible.

There is insufficient data for T5, T6, T7, T8, T13 and T14 as these tables refer to data from the most recent NFI, where as first study on the forest resources was conducted in 1984. Further some steps are not necessary due to lack of data or some data is directly taken from the report or record.

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 *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

The Forestry Department of Brunei Darussalam had conducted 2 studies on the national forest resources as mentioned in the Table below. Maps produced as a result of the studies were: Forest Type map1 and map2 (1:50,000 and 1:200,000); soil map and vegetation map (1:20,000). Since then, no further follow-up study is conducted and therefore, the data provided in FRA 2005 is mainly based on these studies.

Source	**Quality**	**Variable**	**Reference Year**	**Remarks**
Anderson & Marsden, 1984. Forest Resources & Strategic Planning Study	Medium	Vegetation type Forest cover	1979	Both aerial and ground surveys were conducted.
JICA, 1994. The Development Survey on the Forest Resources in Brunei Darussalam	Medium	Stock volume; Soils and forest conditions;	1992 - 1994	Study was conducted within designated national park and intended for saw timber plantation areas
DOF, 1996. An Introduction to Forestry in Brunei Darussalam. Department of Forestry, Ministry of Industry and Primary Resources, Brunei Darussalam.	Medium	Overview of forestry Sector	1996	Provides good descriptions of National classes based on Anderson & Marsden, 1984.

1.2.2 Classification and definitions

Forest Types	Definitions
Mangrove Forest	Occurs exclusively on saline soils subject to tidal influence and can usually be clearly differentiated from peat swamp forest which it usually borders.
Freshwater Swamp Forest	Levee alluvium (empran). Located on the fresh water riverside and generally with higher canopy trees.
Peat Swamp Forest	Generally dominated by Alan (Shorea albida), Terentang (Campnosperma coriacea), Keruntum (combretocarpus rotundatus), and Kapur paya (Dryobalanop rappa) growing on very thick peat soils.
Kerangas	Heath forest or dryland site with soil conditions very poor and sandy. Trees usually have medium crown.
Mixed Dipterocarps	Multi-storied high forest with uneven canopy. Forest mainly made up of a mixture of dipterocarps species such as highly commercial important Shorea and dipterocarpus species.
Montane Forest	Found only on higher altitude in Temburong District with contour 762m and higher.
Mixtures	Forests compose of a mixture of forest types which their boundaries cannot be determined
Plantations	Systematically planted trees for a specific end product such as for sawn timber.
Secondary	Very young forest not more than 50 yrs of age, regenerated naturally or assisted after partial or complete deforestation.
Primary Forests	Undisturbed forests or forests with slightly undisturbed by unnoticeable disturbances that do not cause change in forest ecosystem.
Disturbed Forests	Exploited forests area or logged-over forests with noticeable changes in terms of composition, structure, ecosystem etc..

1.2.3 Original data

National Categories	Extent in 000 ha					
	1979			1996		
	Primary	Disturbed	Total	Primary	Disturbed	Total
Mangrove	18.418		18.418	10.798	7.620	18.418
Freshwater Swamp forest	12.668		12.668	12.668		12.668
Peat Swamp forest	90.884	12.821	103.705	87.267	16.438	103.705
Kerangas	3.455	4.153	7.608	1.517	5.041	6.558
Mixed Dipeterocarpus	192.575	31.179	223.754	164.775	58.979	223.754
Montane	7.196		7.196	7.196		7.196
Mixtures	15.988	36.683	52.671	13.988	38.683	52.671
Plantations		0.076	0.076		2.360	2.360
Secondary/ others		42.950	42.950		20.788	20.788
Total Forests	**341.184**	**127.862**	**469.046**	**298.209**	**149.909**	**448.118**

Abstract

National Categories	Extent of Forests in 000 ha	
	1979	**1996**
Primary Forests	341.184	298.209
Disturbed forest	127.862	149.909
Other land	57.486	78.414
Inland water	50.000	50.000
Total Area of Country	**576.532**	**576.532**

1.3 Analysis and processing of national data

1.3.1 Calibration

Source	Total Area (1000 hectares)
National	577
FAOSTAT	577

The figures from the two sources are the same hence the calibration step is not needed.

1.3.2 Estimation and forecasting

The figures for 1990, 2000 and 2005 for primary and disturbed forests have been estimated and forecasted using linear intra-polation and extrapolation trend method. The Other land is simply difference between total land area and primary and disturbed forests.

National categories	Extent in 000 ha		
	1990	**2000**	**2005**
Primary Forests	313	288	278
Disturbed forest	142	155	160
Other land	72	84	89
Inland water	50	50	50
Total Area of Country	577	577	577

1.4 Reclassification into FRA 2005 classes

FRA 2005 Categories	National Classes		
	Primary	**Disturbed**	**Other land**
Forest	100%		
Other wooded land		100%	
Other land			100%
...of which with tree cover [1)]			
TOTAL	100%	100%	100%

1.5 Data for National reporting table T1

FRA 2005 Categories	Area (1000 hectares)		
	1990	**2000**	**2005**
Forest	313	288	278
Other wooded land	142	155	160
Other land	72	84	89
...of which with tree cover [1)]			
Inland water bodies	50	50	50
TOTAL	**577**	**577**	**577**

1.6 Comments to National reporting table T1

The area of inland water bodies is referring to the natural permanent lakes or water bodies in Brunei Darussalam. Hence, assumption is made for year 2005 that there will be no different in area. The weakness of this data is that conversion of other forest area on the state land for the purpose of development project is not included since the data is not available from other government agencies.

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 source

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Anderson & Marsden Report	M	Area of notified in the gazette	1984	The report stated the forest reserves gazetted under the national forest Law and the proposed additional areas for gazettment.

2.2.2 Classification and definitions

National class	Definition
Forest Reserve	Legislatively protected and administered by the Forestry Department.
State Land	Land under Land Code and administered by the Land Department. However, the extraction of forest products on this type of land is controlled by the Forestry Department in accordance with Forest Rules.
Private Land	Land issued to the individuals on perpetuity basis.
T.O.L & imperpetuity land	State land which is temporarily owned by individuals.

2.2.3 Original data

All forests (Table 1) are government owned. Only a small portion (assumed to be 5%) of disturbed forests (Other wooded lands- Table 1) are under private ownership.

2.3 Analysis and processing of national data

2.3.1 Calibration

The step is not needed as data from Table 1 will be used.

2.3.2 Estimation and Forecasting

This step is not needed as data for Table 1 will be used.

2.4 Reclassification into FRA 2005 classes

Reclassification is based on the national category of ownership i.e. public ownership means government ownership and private ownership means individuals or private property in perpetuity status.

	Percentage allocation of a National Class into FRA classes		
	Public	**Private**	**Total**
Primary Forests	100%		100%
Disturbed Forests	95%	5%	100%

2.5 Data for National reporting table T2

FRA 2005 Categories	**Area (1000 hectares)**			
	Forest		**Other wooded land**	
	1990	**2000**	**1990**	**2000**
Private ownership	0	0	7	8
Public ownership	313	288	135	147
Other ownership				
TOTAL	313	288	142	155

2.6 Comments to National reporting table T2

Due to lack of real data for OWL under private ownership and assumption (5%) has been made on the percentage of private ownership in the year 1990 and 2000. However, the total area of land with individuals is constant except for the year 2005 in which it is expected to increase because temporarily owned land, T.O.L, by the individuals have been gazetted permanently and awarded to the owner as part of a housing scheme project.

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)**
Anderson & Marsden. 1984. Brunei Forest Resources and Strategic Planning Study.	H	Area by Functions	1984
DOFB. 1989. National Forest Policy. Forestry Department. Ministry of Industry and Primary Resources.	H	Functional Forest types	1990
DOFB. 1996. An Introduction to Forestry in Brunei Darussalam. Editor: Virgilio J. A. Ramos. Department of Forestry. Ministry of Industry and Primary Resources. Brunei Darussalam.	H	Area by functions	1996

3.2.2 Classification and definitions

National class	Definition
Production forest	Natural and man-made forests, including related non-timber plantations, for the principal purpose of supplying on sustained and economically competitive basis, the forest produce requirements of the country.
Conservation forest	Undisturbed forests for the purposes of preserving in perpetuity the wilderness, flora and fauna, and other elements of the ecosystem for scientific, educational, and other special related purposes.
Protection forest	Unexploitable Preserved forests intended primarily to keep intact the forest conditions protecting critical soils and water resources; keep the country green and beautiful and the climate invigorating; prevent or minimize the occurrence of floods, droughts, erosion, desertification and atmospheric pollution; and contributing to the general ecological stability of the country in particular and the world as a whole.
Recreational forest	Forested areas reserved and developed for outdoor recreation in order to contribute significantly to social, psychological, physical, and economic well-being of the people.
National Park	Areas that may include geologic and topographic formation of special interest and which are reserved to maintain biologically diverse plant and animal communities for the benefit of the present and future generations.

(Source: DOFB, 1989)

3.2.3 Original data

The allocation of national's functional forest types is based on the National Forest Policy and the report by Anderson and Marsden in 1984.

National Category	Area in "000" ha			
	Primary Undisturbed	Disturbed	Non-Forest	Total
Conservation Forests	31.684			31.684
Protection Forests	18.070	0.477	0.015	18.562
National Parks	48.854			48.854
Parks and Recreation Forests	4.445			4.445
Production Forests	218.650			218.650
Total	**321.703**	**0.477**	**0.015**	**322.195**

(Source: Anderson and Marsden, 1984)

The following is basically an update of the above information (DOFB, 1996).

National Category	Area in 000 ha		
	Gazetted Before 1996	Proposed	Total
Conservation Forests	28.511	3.173	31.684
Protection Forests	18.562		18.562
National Parks	46.210	2.644	48.854
Parks and Recreation Forests	4.211	0.234	4.445
Production Forests	138.026	80.624	218.650
Total	**235.520**	**86.675**	**322.195**

(Source: DOFB. 1996)

3.3 Analysis and processing of national data

3.3.1 Calibration

This step is not necessary.

3.3.2 Estimation and forecasting

It is assumed that figures for before 1996 (DOFB, 1996) stand for 1990. It is also assumed that all the proposed areas came into force by 2000. Further that the primary areas under production (production forest), keep on changing to disturbed areas based on the annual production coupe of around 1,500 hectares with the annual sustainable production of about 100,000 cubic meters.

A. Conservation Forests

1990 28,511 ha
2000 and 2005 31,684 ha

B. Protection Forests

1990, 2000 and 2005 18,562 ha

C. National Parks

1990 46,210 ha
2000 and 2005 48,854 ha

D. Parks and Recreation Forests

1990 4,211 ha
2000 and 2005 4,445 ha

E. Production Forests

The area of designated primarily to production forests is derived using the logic that it is the area remaining after taking out the area under conservation, protection, national park, and parks and recreation.

	Area in "000" ha		
National Category	**1990**	**2000**	**2005**
Production Remaining	215	184	174

3.4 Reclassification into FRA 2005 classes

A. Reclassification table for Primary function

National Category	Percentage reclassification in FRA 2005 Categories			
	Production	**Protection**	**Conservation**	**Social Service**
Conservation Forests			100	
Protection Forests		100		
National Parks			100	
Parks and Recreation Forests				100
Production Forests	100			
Total				

B. Reclassification table for Total Area with function

National Category	Percentage reclassification in FRA 2005 Categories			
	Production	**Protection**	**Conservation**	**Social Service**
Conservation Forests		100	100	100
Protection Forests		100	100	100
National Parks				100
Parks and Recreation Forests				100
Production Forests	100			100
Total				

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	215	184	174	215	184	174
Protection of soil and water	19	19	19	94	100	100
Conservation of biodiversity	75	81	81	94	100	100
Social services	4	4	4	316	294	282
Multiple purpose				not appl.	not appl.	not appl.
No or unknown function				not appl.	not appl.	not appl.
Total - Forest	313	288	278	**not appl.**	**not appl.**	**not appl.**
Other wooded land						
Production						
Protection of soil and water						
Conservation of biodiversity						
Social services						
Multiple purpose				not appl.	not appl.	not appl.
No or unknown function	142	155	160	not appl.	not appl.	not appl.
Total – Other wooded land	142	155	160	**not appl.**	**not appl.**	**not appl.**

4 Table T4 – Characteristics of Forest and Other wooded land

4.1 FRA 2005 Categories and definitions

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

4.2 National data

4.2.1 Data sources

References to sources of information	**Quality (H/M/L)**	**Variable(s)**	**Year(s)**
Anderson & Marsden. 1984. Brunei Forest Resources and Strategic Planning Study.	H	Area by Functions	1984
DOFB. 1989. National Forest Policy. Forestry Department. Ministry of Industry and Primary Resources.	H	Functional Forest types	1990
DOFB. 1996. An Introduction to Forestry in Brunei Darussalam. Editor: Virgilio J. A. Ramos. Department of Forestry. Ministry of Industry and Primary Resources. Brunei Darussalam.	H	Area by functions	1996
National Development Plan Report	M	Area	1990-2005

4.2.2 Classification and definitions

National class	Definition
Productive plantation	Plantation designated for the production of sawn timber or any other related end uses or value-added products.
Protective plantation	Plantation designated for the rehabilitation of degraded area, as to prevent further deterioration of ecological conditions of the area that complement the functional protection forest.
Primary	Undisturbed forest with pristine conditions or slightly disturbed without significantly changing the nature and ecological processes in the forest.
Modified forest	Referring to logged-over forest including enriched logged-over forest
Semi-natural	Referring to enriched or restored logged-over forest area only.

4.2.3 Original data

All interventions (like plantations) are limited to disturbed forests (other wooded lands). The project accomplishments for relevant (5^{th} to 8^{th}) National Development Plan (NDP) period have been used to estimate data for 1990 and 2000 forecast for 2005.

4.3 Analysis and processing of national data

4.3.1 Calibration

The step of calibration is not necessary.

4.3.2 Estimation and forecasting

The work programme accomplishments under the National Development Plan (NDP) have been used to estimate data for 1990 and 2000 forecast for 2005. i.e. from 5^{th} to 8^{th} NDP.

Productive plantations on disturbed forests

2000 - about 2000 ha
2005 - about 3000 ha

Protective plantations on disturbed forests

1990 – About 500 ha
2000 and 2005 – About 520 ha

4.4 Reclassification into FRA 2005 classes

The national categories of primary forest and disturbed forests have been respectively treated as primary and semi-natural forests categories of FRA 2005.

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	313	288	278			
Modified natural						
Semi-natural				141	152	156
Productive plantation				0	2	3
Protective plantation				1	1	1
TOTAL	313	288	278	142	155	160

5 Table T5 – Growing stock

5.1 FRA 2005 Categories and definitions

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

5.2 National data

5.2.1 Data sources

References to sources of information	**Quality (H/M/L)**	**Variable(s)**	**Year(s)**
Anderson & Marsden. 1984. Brunei Forest Resources and Strategic Planning Study.	H	Area by Functions	1984

5.2.2 Classification and definitions

National class	Definition
Productive plantation	Plantation designated for the production of sawn timber or any other related end uses or value-added products.
Protective plantation	Plantation designated for the rehabilitation of degraded area, as to prevent further deterioration of ecological conditions of the area that complement the functional protection forest.
Net Industrial Stemwood Volume (NIS)	Section of the stem which is regarded as commercially utilizable in solid form.. The sections of the stem, considered unsuitable for peeler or sawlong, are excluded. The NIS volume refers to sound, form-defect free timber above specified dimension limits, which has an average sound shell exceeding 13 cms.
Grade 1 trees	Trees yielding predominantly peeler logs
Grade 2 trees	Trees yielding predominantly low grade or better saw logs

5.2.3 Original data

There has been no complete National Forest Inventory although forest inventory was done as early as in 1934. The latest inventory is by Anderson (Anderson, 1984), which uses 1981/82 information for area their filed enumeration results for volume estimations. They survey most of the primary forest in “Mixed Dipterocarp Forest” and “Peat Swamp Forest”, which are the main constituent Brunei forest resources. They estimated only net industrial stem wood (NIS) volume of grade 1 and grade 2 trees. Following is the summary information.

Total area surveyed (in 000 ha)	202
Total NIS volume in million cubic meters	17.7

This leads to an average commercial growing stock about 87.62 cubic meters per hectare.

It may be mentioned that a study was conducted in 1994 by JICA Inventory on group of species only within intended forest plantation site (state land). The study does not mention volume by individual species. Based on this study, the undisturbed Alan Forest (stratum 3.3, 3.5) is the highest volume, ranging from 528 to 585 cu. m per hectare and followed by undisturbed Peat Swamp (stratum 3.1, 3.2) and Mixed Dipterocarp Forest (stratum 5) from 331 to 448 cu. m per hectare.

5.3 Analysis and processing of national data

5.3.1 Calibration

Not needed since are figures from Table 1 are being used for this table.

5.3.2 Estimation and forecasting

Since the average commercial growing stock figure of about 87.62 cubic meters per hectare is latest and no other information on growing stock is available, therefore it is being assumed for 1990, 2000 and 2005 for "forest" in Brunei.

Further, since rate of internal decay is quite high and the above figures are for NIS, therefore it assumed that NIS is (not more than) 40 percent of the growing stock. Therefore, the growing stock is 2.5 times of the NIS volume i.e. 219.05 cubic meters per hectare.

Year	Forest Area (000 ha)	NIS /ha	NIS Million CubM	GS /ha	GS Million CubM
1990	313.00	87.62	27.43	219.05	68.56
2000	288.00	87.62	25.23	219.05	63.09
2005	278.00	87.62	24.36	219.05	60.90

5.4 Reclassification into FRA 2005 classes

The NIS volume is considered as assumed as commercial volume under FRA 2005.

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	68.56	63.09	60.90	n.a.	n.a.	n.a.
Commercial growing stock	27.42	25.24	24.36	n.a.	n.a.	n.a.

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.	n.a.
2. Minimum diameter at the top end of stem (Y) for calculation of Growing stock	cm	20 30	Shorea albida All others
3. Minimum diameter of branches included in Growing stock (W)	cm	n.a.	n.a.
4. Minimum diameter at breast height of trees in Commercial growing stock (Z)	cm	50 40 30	Mixed Dipterocarps Peat Swamp spp. Shorea albida
5. Volume refers to "Above ground" (AG) or "Above stump" (AS)	AG / AS	AS	
6. Have any of the above thresholds (points 1 to 4) changed since 1990	Yes/No	n.a.	n.a.
7. If yes, then attach a separate note giving details of the change	Attachment	n.a.	n.a.

n.a. = data not available

6 Table T6 – Biomass stock

The information on biomass stock is essential to assess the amount of carbon that exists in the woody vegetation on "Forest" and "Other wooded land". This information is directly linked tot he international processes reporting on greenhouse gases and climate change. The information on biomass stock is also of interest from a wood energy point of view.

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

There is no information on biomass stock.

6.2.2 Original data

6.3 Analysis and processing of national data

6.3.1 Calibration

Calibration of data is not considered necessary as the data are directly taken from Table T5.

6.3.2 Estimation and forecasting

Information on basic densities and biomass expansion factor is not available nationally for Brunei therefore its factors assumed by Malaysia in its country report (0.5 and 2.08 r4espectively) are applicable to Brunei also.

A. Above Ground Biomass

Category	Unit	1990	2000	2005
Growing stock	million m^3	68.56	63.09	60.90
Basic density	tonnes/m3	0.5	0.5	0.5
BEF		2.08	2.08	2.08
Above Ground Biomass	Million tones	**71.30**	**65.61**	**63.34**

B. Below Ground Biomass

A root shoot ratio of 0.24 has been used following GPG (2003).

Category	Unit	1990	2000	2005
Above Ground Biomass	Million tonne	71.30	65.61	63.34
Root Shoot Ratio		0.24	0.24	0.24
Below Ground Biomass	million tones	**17.11**	**15.75**	**15.20**

D. Dead Wood Biomass

A dead to live ratio of 0.11 have been used following GPG (2003).

Category	Unit	1990	2000	2005
Total Live biomass	million tonne	88.41	81.36	78.54
Dead to live ratio		0.11	0.11	0.11
Dead Wood Biomass	million tones	**9.73**	**8.95**	**8.64**

6.4 Reclassification into FRA 2005 classes

Reclassification is not considered necessary.

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	71.30	65.61	63.34	n.a.	n.a.	n.a.
Below-ground biomass	17.11	15.75	15.20	n.a.	n.a.	n.a.
Total living biomass	**88.41**	**81.36**	**78.54**	n.a.	n.a.	n.a.
Dead wood biomass	9.73	8.95	8.64	n.a.	n.a.	n.a.
TOTAL	**98.14**	**90.31**	**87.18**	n.a.	n.a.	n.a.

6.6 Comments to National reporting table T6

7 Table T7 – Carbon stock

The information on Carbon stock indicates the contribution of "Forest" and "Other wooded land" to the carbon cycle. The information is used by international processes that monitor greenhouse gases and climate change.

7.1 FRA 2005 Categories and definitions

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

7.1 National data

7.1.1 Data sources

No national data sources are available

7.2.2 Classification and definitions

No national definitions on forest carbon stocks are available

7.2.3 Original data

Data from Table 6 are being directly used for this table.

7.3 Analysis and processing of national data

7.3.1 Calibration

The basic data are derived from Table T6, therefore calibration is not considered necessary.

7.3.2 Estimation and forecasting

A. Conversion factor Biomass to Carbon

The default conversion factor (0.5) from GPG (2003) has been assumed.

FRA 2005 Categories	Carbon (Million metric tonnes)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Carbon in above-ground biomass	35.65	32.81	31.67	n.a.	n.a.	n.a.
Carbon in below-ground biomass	8.56	7.87	7.60	n.a.	n.a.	n.a.
Sub-total: Carbon in living biomass	**44.21**	**40.68**	**39.27**	n.a.	n.a.	n.a.
Carbon in dead wood	4.86	4.47	4.32	n.a.	n.a.	n.a.

B. Carbon in forest litter

The default factor of 22 tonnes C/ha has from GPG (2003) have been assumed.

Category	Unit	1990	2000	2005
Forest Area	000 ha	313	288	278
Carbon Content	tonnes/ha	22	22	22
Carbon in forest litter	million tonnes	**6.89**	**6.34**	**6.12**

7.4 Reclassification into FRA 2005 classes

Reclassification is not considered necessary.

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	35.65	32.81	31.67	n.a.	n.a.	n.a.
Carbon in below-ground biomass	8.56	7.87	7.60	n.a.	n.a.	n.a.
Sub-total: Carbon in living biomass	**44.21**	**40.68**	**39.27**	n.a.	n.a.	n.a.
Carbon in dead wood	4.86	4.47	4.32	n.a.	n.a.	n.a.
Carbon in litter	6.89	6.34	6.12	n.a.	n.a.	n.a.
Sub-total: Carbon in dead wood and litter	**11.75**	**10.81**	**10.44**	n.a.	n.a.	n.a.
Soil carbon to a depth of 30 cm	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
TOTAL CARBON	**55.96**	**51.49**	**49.70**	n.a.	n.a.	n.a.

7.6 Comments to National reporting table T7

8 Table T8 – Disturbances affecting health and vitality

Some steps are not necessary as the data is directly extracted from Fire Brigade's operational report.

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
Fire Brigade Report	L	Area burnt	2000	Estimation of area burnt during the operation. The area is visual estimation only.

8.2.2 Classification and definitions

No national definitions on forest disturbance are available.

8.2.3 Original data

The data is drawn from the report from the Fire Brigade. It is insufficient data to report for disturbance by fire except for 2000. The data for other type of disturbances are also not available at the moment. So far, no study has been conducted to assess these disturbances.

8.3 Analysis and processing of national data

8.3.1 Calibration

It is not needed

8.3.2 Estimation and forecasting

Since the data is extracted directly from the report, estimation and forecasting is not needed.

8.4 Reclassification into FRA 2005 classes

Not necessary.

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	i.d.	n.a.	i.d.	1.0
Disturbance by insects	n.a.	n.a.	n.a.	n.a.
Disturbance by diseases	n.a.	n.a.	n.a.	n.a.
Other disturbance	n.a.	n.a.	n.a.	n.a.

(i.d. = insufficient data, n.a. = data not available)

8.6 Comments to National reporting table T8

The data is drawn from the report from the Fire Brigade. It is insufficient data to report for disturbance by fire except for 2000. The data for other type of disturbances are also not available at the moment. So far, no study has been conducted to assess these disturbances.

9 Table T9 – Diversity of tree species

The information on diversity of tree species provides the information on tree species distribution. It will also give information for addressing some and /or many critical issues relating to conservation of biodiversity in the forests. Further the information also helps in meeting the requirement of reporting to the national government as to some international organizations on the biodiversity of the country.

9.1 FRA 2005 Categories and definitions

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

9.2 National data

9.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
In Brunei Forests: Introduction to the Plant Life in Brunei Darussalam	M	Species number	1997	Stated number of trees found in Brunei.
IUCN 2003. 2003 IUCN Red List of threatened species.	H	Threatened,, endangered and vulnerable species	2003	

9.2.2 Classification and definitions

No national classes and definitions are available

9.2.3 Original data

The data for native tree species of the country is sourced from a book published by the Forestry Department entitled "In Brunei Forests: Introduction to the Plant Life of Brunei Darussalam", 1997.

The following data on threatened species is form website of IUCN Red List of 2004.

1. Critically Endangered Species – 38 Species

1	*Anisoptera reticulata*
2	*Dipterocarpus eurynchus*
3	*Dipterocarpus globosus*
4	*Dipterocarpus lowii*
5	*Hopea ferruginea*
6	*Hopea latifolia*
7	*Hopea micrantha*
8	*Hopea nutans*
9	*Hopea pentanervia*
10	*Hopea tenuivervula*
11	*Parashorea macrophylla*
12	*Parashorea malaanonan*
13	*Shorea acuta*
14	*Shorea asahii*
15	*Shorea bullata*
16	*Shorea flaviflora*
17	*Shorea flemmichii*
18	*Shorea foraminifera*
19	*Shorea geniculata*
20	*Shorea hypoleuca*
21	*Shorea inaequilateralis*
22	*Shorea isoptera*
23	*Shorea ladiana*
24	*Shorea laxa*
25	*Shorea longiflora*
26	*Shorea longisperma*
27	*Shorea materialis*
28	*Shorea myrionerva*
29	*Shorea pachyphylla*
30	*Shorea revoluta*
31	*Shorea rubella*
32	*Shorea slootenii*
33	*Shorea superba*
34	*Shorea xanthophylla*
35	*Vatica coriacea*
36	*Vatica havilandii*
37	*Vatica parvifolia*
38	*Vatica rynchocarpa*

The *Dipterocarpus globosus* *species* is of commercial value and still abundant in Brunei Darussalam hence this will not be sued for reporting in this table,

2. Endangered species -25 Species

1	*Anisoptera costata*
2	*Anisoptera grossivenia*
3	*Anisoptera laevis*
4	*Cotylelobium burckii*
5	*Dryobalanops beccarii*

6	*Hopea centipeda*
7	*Hopea dasyrrhachia*
8	*Hopea fluvialis*
9	*Hopea mesuoides*
10	*Hopea vaccinifolia*
11	*Prunus turfosa*
12	*Shorea albida*
13	*Shorea andulensis*
14	*Shorea argentifolia*
15	*Shorea balanocarpoides*
16	*Shorea biawak*
17	*Shorea domatiosa*
18	*Shorea obscura*
19	*Shorea teysmanniana*
20	*Upuna borneensis*
21	*Vatica badiifolia*
22	*Vatica brunigii*
23	*Vatica mangachapoi*
24	*Vatica maritima*
25	*Vatica nitens*

The *Dryobalanops beccarii* *species* is of commercial value and still abundant in Brunei Darussalam hence this will not be sued for reporting in this table.

3. Vulnerable Species -32

1	*Agathis dammara*
2	*Aglaia angustifolia*
3	*Aglaia cumingiana*
4	*Aglaia laxiflora*
5	*Aglaia ramotricha*
6	*Aglaia scortechinii*
7	*Aglaia tenuicaulis*
8	*Alangium havilandii*
9	*Anisophyllea ferruginea*
10	*Combretocarpus rotundatus*
11	*Dacryodes elmeri*
12	*Dacryodes expansa*
13	*Durio grandiflorus*
14	*Durio kutejensis*
15	*Durio testudinarum*
16	*Dyera polyphylla*
17	*Elaeocarpus miriensis*
18	*Eusideroxylon zwageri*
19	*Gonystylus bancanus*
20	*Gonystylus lucidulus*
21	*Hopea pachycarpa*
22	*Horsfieldia disticha*
23	*Horsfieldia fragillima*
24	*Horsfieldia gracilis*
25	*Horsfieldia sabulosa*
26	*Knema minima*
27	*Knema rufa*

28	*Knema sericea*
29	*Mangifera pajang*
30	*Myristica corticata*
31	*Myristica extensa*
32	*Tabernaemontana antheonycta*

No national information is available on the last species *Tabernaemontana antheonycta* and it is not known whether is a tree or not. Hence it will not be used in the report.

9.3 Analysis and processing of national data

9.3.1 Calibration

This step is not necessary

9.3.2 Estimation and Forecasting

This step is not necessary.

9.4 Reclassification into FRA 2005 classes

This step is not necessary.

9.5 Data for National reporting table T9

FRA 2005 Categories	Number of species (year 2000)
Native tree species	2000
Critically endangered tree species	37
Endangered tree species	24
Vulnerable tree species	31

9.6 Comments to National reporting table T9

The data for native tree species of the country is sourced from a book published by the Forestry Department entitled "In Brunei Forests: Introduction to the Plant Life of Brunei Darussalam", 1997. The data on threatened species is from website of IUCN Red list 2004 of threatened species. However it may be mentioned that two species (Dipterocarpus globosus - vernacular name: Keruing Buah Bulat and Dryobalanops becarrii -vernacular name: Kapur Bukit) in IUCN Redlist are of commercial value and still abundant in Brunei Darussalam. Therefore, these tow species are not included in above numbers. Further, no national information is available on *Tabernaemontana antheonycta* species hence it has not been included in the above numbers. Similar information is not available about other species in the list.

10 Table T10 – Growing stock composition

The information on "Growing stock composition" is important for understanding the dynamics of forests composition and addresses some critical issues relating to conservation of biodiversity. It also helps in developing efficient management plans and to satisfy needs for national and international reporting related to biodiversity.

10.1 FRA 2005 Categories and definitions

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

10.2 National data

10.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Comments
Anderson & Marsden, 1984. Forest Resources & Strategic Planning Study	Medium	Vegetation type Forest cover	1979	
JICA. 1994.	M	Forest Strata, stock volume	1994	Inventory on group of species only within intended forest plantation site (state land)

10.2.2 Original data

The following list of species names of the ten most common commercial species is based on Anderson & Marsden, 1984 which is still referable as a valid data for this report.

Scientific name	Common name
Shorea parvifolia	Meranti sarang punai
Dryobalanops beccarii	Kapur bukit
Kumus	Shorea leavis
Dryobalanops lanceolata	Kapur paji
Dipterocarpus acutangulus	Keruing beludu
Shorea argentifolia	Meranti binatoh
Koompassia malaccensis	Kempas
Dipterocarpus globosus	Keruing buah bulat
Shorea macroptera	Meranti melantai
Shorea mecistopteryx	Meranti kawang burong

It may be mentioned that a study was conducted in 1994 by JICA Inventory on group of species only within intended forest plantation site (state land). The study does not mention volume by individual species. Based on this study, the undisturbed Alan Forest (stratum 3.3, 3.5) is the highest volume, ranging from 528 to 585 cubic meters per hectare and followed by undisturbed Peat Swamp (stratum 3.1, 3.2) and Mixed Dipterocarp Forest (stratum 5) from 331 to 448 cu. m per hectare.

10.3 Analysis and processing of national data

10.3.1 Calibration

Not considered necessary.

10.3.2 Estimation and forecasting

Necessary information is not available hence this step is not necessary.

10.4 Reclassification into FRA 2005 classes

This step is not necessary.

10.5 Data for National reporting table T10

FRA 2005 Categories / Species name (Scientific name)	Common name	Growing Stock in Forests (million cubic meters)	
		1990	2000
Shorea parvifolia	Meranti sarang punai	n.a	n.a
Dryobalanops beccarii	Kapur bukit	n.a	n.a
Kumus	Shorea leavis	n.a	n.a
Dryobalanops lanceolata	Kapur paji	n.a	n.a
Dipterocarpus acutangulus	Keruing beludu	n.a	n.a
Shorea argentifolia	Meranti binatoh	n.a	n.a
Koompassia malaccensis	Kempas	n.a	n.a
Dipterocarpus globosus	Keruing buah bulat	n.a	n.a
Shorea macroptera	Meranti melantai	n.a	n.a
Shorea mecistopteryx	Meranti kawang burong	n.a	n.a

10.6 Comments to National reporting table T10

11 Table T11 – Wood removal

The information provided in the under-mentioned tables gives the actual wood removal from the forest. It indicates the economic and social utility of the forest resources in national economy and dependent local communities. This information will also help to monitor sustained use of forest resources by comparing actual removal with sustained potential.

11.1 FRA 2005 Categories and definitions

Category	Definition
Industrial wood removal	The wood removed (volume of round wood over bark) for production of goods and services other than energy production (wood fuel).
Wood fuel 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)	Comment
DOF. 2004 Forest Production Section.	M	Volume	2004	Statistical yearly report of forest production.

11.2.2 Classification and definitions

National class	Definition
Industrial wood removal	Refers to the round timber removed from forest measured at the processing mill excluding bark thickness.
Wood fuel removal	Refers to the rhizophora species removed from the mangrove for firewood and charcoal production.

11.2.3 Original data

The existing data is based on the measurement of felled trees at the processing mill. Therefore, measurement of volume excludes bark thickness. Hence, the table provides information on actual removal of timber from the designated production Forests which reflect the actual production of round timber. Wood fuel refers to the Rhizophora species only which are extracted from the mangrove forests, entirely for the production of charcoal and firewood. Brunei Darussalam has introduced reduced-cut policy in 1990 in which the allowable volume to be extracted from the designated production is now limited to a sustainable volume of 100,000 cu.m. per year. The additional volume as reported in the year 1990 and 2000 respectively, is from ad hoc extraction from intended

land to be developed in the state land (OWL). Hence, source of industrial timber is mainly from designated production natural forest.

Categories	Volume in 1000 cubic meters of round wood over bark			
	Forest		Other wooded land (state land)	
	1990	2000	1990	2000
Industrial round wood (round timber at processing mill)	100	100	33	3
Firewood & charcoal (rhizophora species only)	0.3	0.2	0	0
TOTAL	100.3	100.2	33	3

11.3 Analysis and processing of national data

Figures for 2000 have been assumed for 2005 as well.

FRA 2005 Categories	Volume in 1000 cubic meters of round wood over bark					
	Forest			Other wooded land (state land)		
	1990	2000	2005	1990	2000	2005
Industrial round wood (round timber at processing mill)	100	100	100	3	3	3
Firewood & charcoal (rhizophora species only)	0.3	0.2	0.2	0	0	0
TOTAL	100.3	100.2	100.2	3	3	3

11.4 Reclassification into FRA 2005 classes

11.5 Data for National reporting table T11

FRA 2005 Categories	Volume in 1000 cubic meters of round wood over bark					
	Forest			Other wooded land[1]		
	1990	2000	2005	1990	2000	2005
Industrial round wood	100	100	100	3	3	3
Wood fuel	0.3	0.2	0.2	n.a.	n.a.	n.a.
TOTAL for Country	100.3	100.2	100.2	3	3	3

11.6 Comments to National reporting table T11

12 Table T12 – Value of wood removal

The information on the value of the wood removed from the forest indicates the economic contribution from the forests and woodlands. This information would be very important for development and monitoring of national policies and for evaluating the economic sustainability of the forests.

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 (wood fuel).
Value of wood fuel removal	Value of the wood removed for energy production purposes, regardless whether for industrial, commercial or domestic use.

12.2 National data

The data for 1990

12.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year (s)	Year(s)
DOF. 2004 Forest Production Section.	M	Volume	2004	Statistical yearly report of forest production.

12.2.2 Classification and definitions

National class	Definition
Value of industrial wood removal	Value of round timber removed from the designated production forests and development area (state land) at the processing mill (felled tree).
Value of wood fuel removal	Value of charcoal and firewood (rhizophora species) extracted from mangrove areas at the processing site.

12.2.3 Original data

Product	Price in US dollars		
	1990	2000	2005
Timber	29.9	30.6	31.6
Wood Fuel	7	7.2	7.5

The value of industrial wood is based on the average market stumpage price of NBD$53 per cubic meter at log landing or border of the felling areas. The value of Charcoal and firewood is based on market price of NBD$12.5 per cubic meter or NBD$0.025/kg. The table uses the exchange rates of US$1 = NBD$1.772 for 1990, US$1 = NBD B$1.729 for 2000 and US$1= NBD$1.676 for 2005. (The country uses NBD$1 = Singapor$1)

12.3 Analysis and processing of national data

12.3.1 Calibration

This step is not necessary.

12.3.2 Estimation and forecasting

The following values have been calculated using prices mentioned in section 12.2 and the quantity of removal in Table 11.

	Value of round wood removal (1000 USD)					
National Categories	**Forest**			**Other Wooded Land**		
	1990	**2000**	**2005**	**1990**	**2000**	**2005**
Industrial round timber	2990.0	3060.0	3160.0	0	0	0
Charcoal and firewood	2.1	1.4	1.5	0	0	0
TOTAL for Country	2992.1	3061.4	3161.5	0	0	0

12.4 Reclassification into FRA 2005 classes

It is not needed

12.5 Data for National reporting table T12

FRA 2005 Categories	**Value of round wood removal (1000 USD)**					
	Forest			**Other wooded land**		
	1990	**2000**	**2005**	**1990**	**2000**	**2005**
Industrial round wood	2990.0	3060.0	3160.0	0	0	0
Wood fuel	2.1	1.4	1.5	0	0	0
TOTAL for Country	2992.1	3061.4	3161.5	0	0	0

12.6 Comments to National reporting table T12

The value of industrial wood is based on the average market stumpage price of NBD$53 per cubic meter at log landing or border of the felling areas. The value of Charcoal and firewood is based on market price of NBD$12.5 per cubic meter or NBD$0.025/kg. The table uses the exchange rates of US$1 = NBD$1.772 for 1990, US$1 = NBD B$1.729 for 2000 and US$1= NBD$1.676 for 2005. (The country uses NBD$1 = Singapor$1).

13 Table T13 – Non-wood forest product removal

No national data is available.

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

No national data is available.

15 Table T15 – Employment in forestry

The information on employment if forestry is useful in identifying trends, especially in the context of public expectation, policies, industry development and socio-economic dependence.

15.1 FRA 2005 Categories and definitions

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

15.2 National data

15.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year (s)	Comments
Contractors – Local Companies	L	Number of persons	2004	Survey forms were distributed to local companies. The data reported in this table is based on their feedback.

15.2.2 Classification and definitions

No national definitions exists

15.2.3 Original data

The data has been collected from contracted involved in forestry activities and the forest from the forest department. The Employment for the category under primary production of goods includes forestry staffs directly involved in the primary production and private sectors involve in the supply of seedling for the primary production activities. The total number of employment under the category for provision of services is estimated based on the information obtained from the companies' feedback providing services in forestry-related activities such as plantation development, silvicultural treatment, construction of park facilities, tour operators and furniture makers. Most of the contractors are involved in forestry related activities such as construction as well as forestry development program (plantation and silvicultural treatment). Their nature of business is multitasking, that is, the same company provides many goods and services.

Categories	Employment (1000 person-years)	
	1990	**2000**
Primary production of goods	0.8	1
Provision of services	0.4	0.4
Unspecified forestry activities	ID	ID
TOTAL	1.2	1.4

15.3 Analysis and processing of national data

15.3.1 Calibration

It is not needed

15.3.2 Estimation and forecasting

It is not needed as data collected directly from the firms.

15.4 Reclassification into FRA 2005 classes

It is not needed

15.5 Data for National reporting table T15

FRA 2005 Categories	Employment (1000 person-years)	
	1990	**2000**
Primary production of goods	0.8	1
Provision of services[1]	0.4	0.4
Unspecified forestry activities	i.d.	i.d.
TOTAL	1.2	1.4

(i.d. = insufficient data)

15.6 Comments to National reporting table T15

The data is weak because the Forest Department does not monitor the number of staff in each company that is involved with the department. Actually there was no data available to fill the above table. Therefore a special a survey was done among contractors. It may be noted that not all companies/contractors had provided input for this table.