Forestry Department
Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES
ASSESSMENT

COUNTRY REPORTS

MALAYSIA

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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Contents

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

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
Ministry of Primary Industries, Malaysia. *Statistics on Commodities 14th Edition*	H	Production and Areas under Primary Commodities	2000
Forestry Department Peninsular Malaysia. *Annual Report Year 1990*	H	Forest cover, timber and wood-based industries output.	1990
Forestry Department Peninsular Malaysia. *Annual Report Year 2000*	H	Forest cover, timber and wood-based industries output.	2000
Forestry Department Peninsular Malaysia. *Annual Report Year 2001*	H	Forest cover, timber and wood-based industries output.	2001
Forestry Department Peninsular Malaysia. *Annual Report Year 2002*	H	Forest cover, timber and wood-based industries output.	2002
Forestry Department Peninsular Malaysia. *Annual Report Year 2003*	H	Forest cover, timber and wood-based industries output.	2003
Forestry Department Peninsular Malaysia. *Annual Report Year 2004*	H	Forest cover, timber and wood-based industries output.	2004
Department of Agriculture Pen. Malaysia. *Crop Statistic 2000*	H	Wooded and non- wooded Tree Crop,	2000
Criteria and Indicators For Sustainable Management of Natural Tropical Forests. *Reporting Questionnaire for Indicators at the National Level*	H	Forest, Other land	2003
FRA2000	H	Forest, other wooded land, other land, Inland water.	2000

1.2.2   Classification and definitions

National class	Definition
Permanent Reserved Forest	Forested areas that are gazetted as Permanent Reserve Forest that are managed sustainably for the benefit of both present and future generations
Stateland Forest	Forested areas earmark for future development
National Parks and Wildlife & Bird Sanctuary	Forested areas designated for the protection of the environment and the conservation of biological diversity
Rubber Plantation	Areas planted with rubber tree crops
Other agriculture crops	Areas planted with agricultural crops such as oil palms, coconut, paddy, tobacco, sugar cane, cocoa, tea and coffee
Other lands	Urban areas, mining, etc

1.2.3   Original data

The two recent reference years in which information on forest cover was collected and the forest inventory was carried out in Malaysia are as following,

(a) Peninsular Malaysia – 1982 and 1992
(b) Sabah – 1992 and 1997,
(c) Sarawak – 1974 and 1994

The aim of these inventories were to determine the status of the forest. The "Forestry Department Peninsular Malaysia Annual Report" and "Statistics on Commodities, Ministry of Primary Industries, Malaysia" were sources of published information on forest cover and others relevant information. The following table provides the original information. For years 2001, 2002 and 2003 same information has been assumed as in 2000.

National 2005 Categories	Area (1000 hectares)				
	1990	**2000**	**2001**	**2002**	**2003**
(a) Permanent Reserved Forest (PRF):					
- Peninsular Malaysia	4750	4800	4800	4800	4800
- Sabah	3350	3600	3600	3600	3600
- Sarawak	4500	6000	6000	6000	6000
Total PRF	12600	14400	14400	14400	14400
(b) Stateland Forest	6820	4640	4680	4400	4370
(c) National Parks and Wildlife & Bird Sanctuary	1120	1120	1120	1120	1120
Total Forested Area (a+b+c)	**20540**	**20160**	**20200**	**19920**	**19890**
(d) Rubber Plantation	1836	1431	1389	1348	1315
Total Rubber Plantations (d)	**1836**	**1431**	**1389**	**1348**	**1315**
(e) Other Land:					
- Oil Palm	2029	3377	3499	3670	3802
- Agriculture Crops	1461	1007	968	966	959
- Urban & Other uses	6844	6735	6654	6806	6744
Total Other Land (e)	**10334**	**11119**	**11121**	**11442**	**11505**
Inland water bodies	120	120	120	120	120
Total area for country	**32830**	**32830**	**32830**	**32830**	**32830**

1.3 Analysis and processing of national data

1.3.1 Calibration

Changes made to Urban and Other Uses to calibrate to FAOSTAT country area figures

National Categories	Area (1000 hectares)				
	1990	2000	2001	2002	2003
(a) Permanent Reserved Forest (PRF):					
- Peninsular Malaysia	4750	4800	4800	4800	4800
- Sabah	3350	3600	3600	3600	3600
- Sarawak	4500	6000	6000	6000	6000
Total PRF	12600	14400	14400	14400	14400
(b) Stateland Forest	6820	4640	4680	4400	4370
(c) National Parks and Wildlife & Bird Sanctuary	1120	1120	1120	1120	1120
Total Forested Area (a+b+c)	**20540**	**20160**	**20200**	**19920**	**19890**
(d) Rubber Plantation	1836	1431	1389	1348	1315
Total Rubber Plantation (d)	**1836**	**1431**	**1389**	**1348**	**1315**
(e) Other Land:					
- Oil Palm	2029	3377	3499	3670	3802
- Agriculture Crops	1461	1007	968	966	959
- Urban & Other uses	6989	6880	6799	6951	6889
Total Other Land (e)	**10479**	**11264**	**11266**	**11587**	**11650**
Inland water bodies	120	120	120	120	120
Total area for country	**32975**	**32975**	**32975**	**32975**	**32975**

1.3.2 Estimation and forecasting

The figures for 1990 and 2000 are available. Figures for 2003 have been assumed as for 2005 for permanent reserved forest and national parks.

The figure for 2005 for State land Forest has been forecasted as 4141 (000 ha) using linear trend (Forest =222686-109*year).

The figure for 2005 for Rubber plantations has been forecasted as 1229 (000 ha) using linear trend (Rubber = 82204-40.3863*year).

1.4 Reclassification into FRA 2005 classes

National Classes	Percentage Allocation to a FRA 2005 Class			
	Forests	OWL	Other Land	Inland Water
Permanent Reserved Forest	100			
Stateland Forest	100			
National Parks and Wildlife & Bird Sanctuary	100			
Rubber Plantation	100			
Oil Palm Plantation			100	
Other Land:			100	
Inland water bodies				100

This leads to the following,

FRA 2005 Categories	Area (1000 hectares)		
	1990	2000	2005
Forests			
Permanent Reserved Forest (PRF):	12600	14400	14400
Stateland Forest	6820	4640	4141
National Parks and Wildlife & Bird Sanctuary	1120	1120	1120
Rubber Plantation	1836	1431	1229
(Sub Total)	(22376)	(21591)	(20890)
Other Land:	10479	11264	11965
Inland water bodies	120	120	120
Total area for country	**32975**	**32975**	**32975**

1.5 Data for National reporting table T1

FRA 2005 Categories	Area (1000 hectares)		
	1990	2000	2005
Forest	22376	21591	20890
Other wooded land			
Other land	10479	11264	11965
...of which with tree cover [1]			
Inland water bodies	120	120	120
TOTAL	**32975**	**32975**	**32975**

1)   Area of "Other land with tree cover" is included in the area reported under "Other land" and should therefore be excluded when calculating the total area for the country.

1.6 Comments to National reporting table T1

1. Area of Rubber Plantations has been added to forests only for reporting to FRA 2005. The country wishes to maintain it separate from forests.

2. In general, rubber plantation area has been decreasing over the years while oil palm plantation area has been increasing. The increase oil palm areas are from these sources, namely, rubber plantation, Stateland forest and some agriculture land.

2   Table T2 – Ownership of Forest and Other wooded land

2.1   FRA 2005 Categories and definitions

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

2.2   National data

2.2.1   Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ministry of Primary Industries, Malaysia. *Statistics on Commodities 14th Edition*	H	Production and Areas under Primary Commodities	2000	Statistical information covering primary and commodities-based sector in Malaysia
Forestry Department Peninsular Malaysia. *Annual Report Year 2000*	H	Forest cover, timber and wood-based industries output.	2000	
Department of Agriculture Pen. Malaysia. *Crop Statistic 2000*	H	Wooded and non-wooded Tree Crop,	2000	
Criteria and Indicators For Sustainable Management of Natural Tropical Forests. *Reporting Questionnaire for Indicators at the National Level*	H	Forest, Other land	2003	Report to ITTO
FRA2000	H	Forest, other wooded land, other land, Inland water.	2000	FAOSTAT

2.2.2   Classification and definitions

National class	Definition
Private ownership - Alienated land, Industrial land, Plantation land (Rubber, Oil Palm, Orchards)	Land administered under the National Land Code 1965
Public ownership - Permanent Forest Reserve - National Park - Wildlife and Bird Sanctuary - Stateland	Land administered under the National Forestry Act 1984 Land administered under the National Parks Act 1980 Land administered under the Protection of Wildlife Act 1972

Note: If different national data sources use different classes and definitions, a table such as above is needed for each relevant data source.

2.2.3 Original data

All rubber plantations have been assumed as private plantations

2.3 Analysis and processing of national data

2.3.1 Calibration

This step is not needed.

2.3.2 Estimation and forecasting

This step is not needed.

2.3 Reclassification into FRA 2005 classes

This step is not needed.

2.5 Data for National reporting table T2

FRA 2005 Categories	Area (1000 hectares)			
	Forest		Other wooded land	
	1990	2000	1990	2000
Private ownership	1836	1431	0	0
Public ownership	20540	20160	0	0
Other ownership	0	0	0	0
TOTAL	**22376**	**21591**	0	0

2.6 Comments to National reporting table T2

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

3.1   FRA 2005 Categories and definitions

Types of designation

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

Designation categories

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

3.2   National data

3.2.1   Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
GOM. 1978. National Forestry Policy 1978.	H			
GOM. 1984. National Forestry Act 1984	H			
GOM. 1980. National Parks Act 1980	H			
GOM. 1960. National Land Code 1960	H			
GOM. 1972. Protection of Wildlife Act 1972	H			

3.2.2   Classification and definitions

National class	Definition
Primary Function - Permanent Reserve Forest - National Park - Wildlife and Bird Sanctuary - Stateland Forest - Alienated Land - Plantation Land - Urban areas	}Land administered under the National Forestry Act 1984, National Parks }Act 1980, Protection of Wildlife Act 1972 } } Land administered under the National Land Code 1965 } } }

3.2.3 Original data

Forest	1990	2000	2005
Production Forest in 000 ha			
- Permanent Reserve Forest	9900	11490	10590
- Rubber Plantations	1836	1431	1229
Protection in 000 ha			
- Permanent Reserve Forest	2700	2910	3810
- National Park & Wildlife and Bird Sanctuary	1120	1120	1120
Multiple purpose in 000 ha			
- Stateland Forest	6820	4640	4141
Total – Forest in 000 ha	**22376**	**21591**	**20890**

3.3   Analysis and processing of national data

3.3.1   Calibration

This step is not necessary.

3.3.2   Estimation and forecasting

This step is not necessary.

3.4   Reclassification into FRA 2005 classes

A. Area with Primary Function

National Categories	Percentage allocation of a National class to FRA classes					
	Production	Protection	Conservation	Social	Multiple	Unknown
Permanent Reserve Forest in 1990	78.6	21.4				
Permanent Reserve Forest in 2000	79.8	20.2				
Permanent Reserve Forest in 2005	73.5	26.5				
Rubber Plantations	100.0					
National Park & Wildlife and Bird Sanctuary			100.0			
Stateland Forest					100.0	

B. Total Area with Function

National Categories	Percentage allocation of a National class to FRA classes			
	Production	Protection	Conservation	Social
Permanent Reserve Forest in 1990	78.6	100.0	21.4	
Permanent Reserve Forest in 2000	79.8	100.0	20.2	
Permanent Reserve Forest in 2005	73.5	100.0	26.5	
Rubber Plantations	100.0			
National Park & Wildlife and Bird Sanctuary		100.0	100.0	100.0
Stateland Forest	100.0	100.0		

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	11736	12921	11819	18556	17561	15960
Protection of soil and water	2700	2910	3810	20540	20160	19661
Conservation of biodiversity	1120	1120	1120	3820	4030	4930
Social services				1120	1120	1120
Multiple purpose	6820	4640	4141	not appl.	not appl.	not appl.
No or unknown function	n.a	n.a	n.a	not appl.	not appl.	not appl.
Total - Forest	**22376**	**21591**	**20890**	**not appl.**	**not appl.**	**not appl.**
Other wooded land						
Production						
Protection of soil and water						
Conservation of biodiversity						
Social services						
Multiple purpose				not appl.	not appl.	not appl.
No or unknown function				not appl.	not appl.	not appl.
Total – Other wooded land				**not appl.**	**not appl.**	**not appl.**

3.6   Comments to National reporting table T3

4 Table T4 – Characteristics of Forest and Other wooded land

4.1 FRA 2005 Categories and definitions

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

4.2 National data

4.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ministry of Primary Industries, Malaysia. *Statistics on Commodities 14th Edition*	H	Production and Areas under Primary Commodities	2000	Statistical information covering primary and commodities-based sector in Malaysia
Forestry Department Peninsular Malaysia. *Annual Report Year 2000*	H	Forest cover, timber and wood-based industries output.	2000	
Department of Agriculture Pen. Malaysia. *Crop Statistic 2000*	H	Wooded and non-wooded Tree Crop,	2000	
Criteria and Indicators For Sustainable Management of Natural Tropical Forests. *Reporting Questionnaire for Indicators at the National Level*	H	Forest, Other land	2003	Report to ITTO
FRA2000	H	Forest, other wooded land, other land, Inland water.	2000	FAOSTAT

4.2.2 Classification and definitions

National class	Definition
Primary	Virgin Jungle Reserves, National Parks and Wildlife Sanctuary
Semi-natural	Consist of three broad forest types, namely Dipterocarp Forest, Peat Swamp Forest and Mangrove Forest.
Productive plantation	Forest plantation planted with fast-growing hardwood species, such as *Tectona grandis, Pinus caribaea, Acacia mangium, Gmelina arborea,* and *Paraserianthes falcataria, P. merkusii* and *Araucaria* species. Includes Rubber Plantations.

Note: If different national data sources use different classes and definitions, a table such as above is needed for each relevant data source.

4.2.3   Original data

National Categories	Area (1000 hectares) Forest		
	1990	2000	2005
Part of Permanent Reserve Forest	2700	2720	2720
National Park & Wildlife & Bird Sanctuary	1120	1120	1120
Sub-Total	3820	3820	3820
Dipterocarp Forest,	15897	15386	14763
Peat Swamp Forest	133	146	154
Mangrove Forest	570	580	580
Sub-Total	16600	15902	14387
Productive plantation			
- Forest plantation	120	228	258
- Rubber plantation	1836	1431	1315
Sub-Total	1956	1659	1573
Protective plantation	n.a	n.a	n.a
TOTAL	**22376**	**21591**	**20890**

4.3   Analysis and processing of national data

This step is not necessary.

4.4   Reclassification into FRA 2005 classes

National Classes	Percentage allocation of a National Class to FRA classes				
	Primary	Modified	Semi-Natural	Prod. Plnt	Prot.Plnt
Part of Permanent Reserve Forest	100				
National Park & Wildlife & Bird Sanctuary	100				
Dipterocarp Forest,			100		
Peat Swamp Forest			100		
Mangrove Forest			100		
Forest plantation				100	
Rubber plantation				100	

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	3820	3820	3820			
Modified natural						
Semi-natural	16600	16112	15497			
Productive plantation	1956	1659	1573			
Protective plantation	n.a	n.a	n.a			
TOTAL	**22376**	**21591**	**20890**			

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 10 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 30 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)	Additional comments
GOM. 1997. Forestry Department Peninsular Malaysia 1997. Third National Forest Inventory.	H		1993	
GOM. 2004. Forestry Department Peninsular Malaysia 2004. Fourth National Forest Inventory.	H		2003	

5.2.2   Classification and definitions

National Classes for Fourth National Forestry Inventory (2001-2003)

National class	Stratum Code	Definition
Virgin forest, good	11	Virgin (not yet logged) forests growing in dry-lands whose main species are: Red Merantis, Keruing, Seraya, Kelat, Balau
Virgin forest, poor	12	Virgin (not yet logged) forests growing in dry-lands whose main species are: Red Merantis, Medang, Keruing, Kelat, Kedondong
Logged 1991-2003	20	Logged over forest.
Logged 1981-1990	21	Logged over forest.
Logged 1971-1980	22	Logged over forest.
Logged before 1971	23	Logged over forest.
Peat Swamp Forest	31	Virgin
Logged Peat Swamp Forest	32	Logged over forest.
Logged Dipterocarp Forest	40	In the Stateland Forest
Logged Peat Swamp Forest	41	In the Stateland Forest
Protection Forest	50	In Permanent Reserve Forest

Note: If different count national data sources use different classes and definitions, a table such as above is needed for each relevant data source.

5.2.3   Original data

A. Peninsular Malaysia

A. For 1992: (Third National Forest Inventory for Peninsular Malaysia ,1991-1993)

National class	Stratum Code	Area (ha)	>10 cm (m³/ha)	Gross Volume (m³)
Virgin forest, superior	11	430,986	332.5	143,302,845
Virgin forest, good	12	578,397	289.1	167,214,572
Virgin forest, moderate	13	735,688	271.8	199,959,998
Virgin forest, poor	14	184,275	192.6	35,491,365
Logged 1971-1980	23	864,959	228.6	197,573,265
Logged 1961-1970	24	374,717	223.7	83,824,192
Logged before 1960	25	373,943	227.3	84,997,243
Stateland forest		2,573,049	182.0	468,294,918
Total		**6,116,014**	**225.7**	**1,380,658,398**

B. For 2002: (Fourth National Forest Inventory for Peninsular Malaysia, 2001-2003)

National class	Stratum Code	Area (ha)	>10 cm (m³/ha)	Gross Volume (m³)
Virgin forest, good	11	603,044	317.7	191,587,078
Virgin forest, poor	12	512,896	286.4	146,893,414
Logged 1991-2003	20	528,590	173.7	91,816,083
Logged 1981-1990	21	941,821	207.0	194,956,947
Logged 1971-1980	22	686,250	257.8	176,915,250
Logged before 1971	23	598,390	266.0	159,171,740
Peat Swamp Forest	31	96,630	232.1	22,427,823
Logged Peat Swamp Forest	32	117,996	234.6	27,681,861
Stateland Logged Dip Forest	40	537,011	164.2	88,177,206
Stateland Logged P.S.Forest	41	155,470	69.8	10,851,806
Protection Forest	50	449,142	381.2	171,212,930
Total		**5,227,240**	**245.1**	**1,281,692,138**

B. Sarawak

Information on growing stock is available only from FAO/UNDP assisted project (Forest Industries Development) inventory in 1974, which indicated a growing stock density of 135 m³ /ha of net industrial stem wood under bark volume of trees 45 cm (dbh) and above.

C. Sabah

Information on growing stock of Sabah is quite old and limited to logged over commercial Class II forests. This information indicates variation of growth stock per ha from 25 m³ / ha in class 5 forest to 150 m³ /ha in class 1 forests.

In summary only information that cab be used for FRA 2005 is available for the peninsular region.

5.3   Analysis and processing of national data

5.3.1   Calibration

This step is not needed.

5.3.2   Estimation and forecasting

The growing stock has been estimated and forecasted by calculating the growing stock per hectare for the reference years (1990, 2000 and 2005) and multiplying it with related extent of forest in respective years.

A. Growing Stock per hectare

Peninsular Malaysia Region

The growing stock has been estimated and forecasted by calculating the growing stock per hectare for the reference years (1990, 2000 and 2005). For this purpose, the weighted average per hectare growing stock from national inventories with reference years of 1992 and 2002 has been interpolated or extrapolated.

Variable	Volume in m^3/ha				
	1992	2002	1990	2000	2005
Weighted average Growing Stock per hectare	225.7	245.1	221.8	241.2	250.9

Sabah Region

In absence of sufficient information, the above weighted average figures calculated for the peninsular Malaysia region have been adopted for the forests in Sabah region.

Sarawak Region

In absence of sufficient information, the above weighted average figures calculated for the peninsular Malaysia region have been adopted for the forests in Sarawak region.

B. Growing Stock

Since the growing stock per hectare figure for all the three regions have been assumed to be same hence these figures have been multiplies with the total extent of forests reported (including rubber plantations) in Table 1 to estimate the total growing stock in forests in Malaysia.

Variables	Growing Stock in million m^3		
	1990	2000	2005
Extent of Forest in Table 1 in 000 ha	22376	21591	20890
Growing stock per ha	221.8	241.2	250.9

Total Growing Stock in million m^3	4963	5208	5242

5.4   Reclassification into FRA 2005 classes

This step is not needed.

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	4963	5208	5242			
Commercial growing stock						

Specification of country threshold values	Unit	Value	Complementary information
1. Minimum diameter at breast height of trees included in Growing stock (X)	cm	10	
2. Minimum diameter at the top end of stem (Y) for calculation of Growing stock	cm	-	First branch
3. Minimum diameter of branches included in Growing stock (W)	cm	-	
4. Minimum diameter at breast height of trees in Commercial growing stock (Z)	cm	30	
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	No	
7. If yes, then attach a separate note giving details of the change	Attachment		

5.6   Comments to National reporting table T5

6 Table T6 – Biomass stock

6.1 FRA 2005 Categories and definitions

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

6.2 National data

6.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
GPG, 2003. Good Practise Guidance for Land-use, Land-use Change and Forestry. IPCC.	H	Basic Densities, Root: Shoot Ratio, Dead to Live Ration	All
Sandra Brown, 1997. Estimating Biomass Change in Topical Forests. A Primer. FAO Forestry Paper No. 134.	H	Biomass Expansion Factor	All

6.2.2 Classification and definitions

No national definitions and classes are available for this table.

6.2.3 Original data

The growing stock figures from Table 5 have been used for this table.

6.3 Analysis and processing of national data

6.3.1 Calibration

This step is not needed.

6.3.2. Estimation and Forecasting

A. Above Ground Biomass

Variables	1990	2000	2005
Growing Stock in forests in million m3	4963	5208	5242
Basic Density	0.5	0.5	0.5
Stem Biomass in million tonnes	2482	2604	2621
Stem Biomass/ha (tonnes/ha)	110.91	120.61	125.46
BEF	2.29	2.2	2.16
Above Ground Biomass in Forests	**5683**	**5729**	**5661**

The Biomass Expansion Factors have been calculated by using following Sandra Brown formula.

BEF = EXP (3.213-0.506*LN(Biomass in tonnes per hectare))

B. Below Ground Biomass

The default root to shoot ratio has been adopted from GPG, 2003 to calculate the below ground biomass in forests.

Variables	1990	2000	2005
Default Root Shoot Ratio	0.24	0.24	0.24
Above Ground Biomass in Forests in million tonnes	5683	5729	5661
Below Ground Biomass in Forest in million tonnes	1364	1375	1359
Total live biomass in Forests in million tonnes	7047	7104	7020

C. Dead Wood Biomass

The default dead to live ratio has been adopted from GPG, 2003 to calculate the dead wood biomass.

Variables	1990	2000	2005
Default Dead to Live Ratio	0.15	0.15	0.15
Total Live Biomass in Forests in million tonnes	7047	7104	7020
Dead Wood Biomass in Forests in million tonnes	1057	1066	1053

6.4   Reclassification into FRA 2005 classes

This step is not 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	5683	5729	5661			
Below-ground biomass	1364	1375	1359			
Dead wood biomass	1057	1066	1053			
TOTAL Biomass	8104	8170	8073			

6.6   Comments to National reporting table T6

7 Table T7 – Carbon stock

7.1 FRA 2005 Categories and definitions

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

7.2 National data

7.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
GPG, 2003. Good Practise Guidance for Land-use, Land-use Change and Forestry. IPCC.	H	Basic Densities, Root: Shoot Ratio, Dead to Live Ration	All

7.2.2 Classification and definitions

There are not national classes and definitions relating to this table.

7.2.3 Original data

This tables uses biomass data from Table 6.

7.3 Analysis and processing of national data

7.3.1 Calibration

This step is not needed.

7.3.2 Estimation and forecasting

The default conversion factor (biomass to carbon) factor of 0.5 has been adopted from GPG, 2003 to estimate carbon stock in forests.

Variables	1990	2000	2005
Above-ground biomass	5683	5729	5661
Default factor	0.5	0.5	0.5
Carbon in Above ground biomass	2842	2864	2831
Below-ground biomass	1364	1375	1359
Default factor	0.5	0.5	0.5
Carbon in Below ground biomass	682	687	679
Total	3524	3552	3510
Dead wood biomass	1057	1066	1053
Default factor	0.5	0.5	0.5
Carbon in Dead wood biomass	529	533	526

7.4   Reclassification into FRA 2005 classes

This step is not needed.

7.5   Data for National reporting table T7

FRA 2005 Categories	Carbon (Million metric tonnes)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Carbon in above-ground biomass	2842	2864	2831			
Carbon in below-ground biomass	682	687	679			
Sub-total: Carbon in living biomass	**3524**	**3551**	**3510**			
Carbon in dead wood	529	533	526			
Carbon in litter						
Sub-total: Carbon in dead wood and litter	**529**	**533**	**526**			
Soil carbon to a depth of _____ cm						
TOTAL CARBON	**4053**	**4084**	**4036**			

7.6   Comments to National reporting table T7

8   Table T8 – Disturbances affecting health and vitality

8.1   FRA 2005 Categories and definitions

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

8.2   National data

8.2.1   Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Forestry Department Peninsular Malaysia, Forest Plantation Unit, 2004	H		1990 - 2002	

8.2.2   Classification and definitions

National class	Definition
Forest Fire	Occurrences in the Permanent Forest Reserves

Note: If different national data sources use different classes and definitions, a table such as above is needed for each relevant data source.

8.2.3   Original data

Only following documented information is available.

Year wise Fire Damage in ha												
1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
690	116	418	56	156	25	18	26	1646	27	6	297	1350

8.3   Analysis and processing of national data

8.3.1   Calibration

This step is not necessary.

8.3.2   Estimation and forecasting

The average figure of 408 ha for 1990 has been calculated using only three years data (1990 to 1992). The average figure of 665 ha for 2000 is based on five year data (1998 to 2002).

8.4   Reclassification into FRA 2005 classes

This step is 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	0.408	0.665	n.a	n.a
Disturbance by insects	n.a	n.a	n.a	n.a
Disturbance by diseases	n.a	n.a	n.a	n.a
Other disturbance	n.a	n.a	n.a	n.a

8.6   Comments to National reporting table T8

The average figure of 408 ha for 1990 has been calculated using only three years data (1990 to 1992). The average figure of 665 ha for 2000 is based on five year data (1998 to 2002).

9   Table T9 – Diversity of tree species

9.1   FRA 2005 Categories and definitions

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

9.2   National data

9.2.1   Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
Ministry of Science, Technology and The Environment, Malaysia, *National Policy on Biological Diversity 1998.*	H	Species	1998
IUCN. 2004. IUCN Red List of Threatened species at its website.	H	Species	2004

9.2.2   Classification and definitions

The national information has been complied by the Ministry of Science in following 7 national classes. However, no definitions relating to these classes is available.

1. Flowering plants
2. Trees
3. Fern and fern allies
4. Non-Flowering Plants
5. Wild mammals
6. Birds
7. Invertebrates

9.2.3   Original data

Following is the national information complied by the Ministry of Science in the 7 national classes.

National class	Number of species
Flowering plants	12,500 species
Trees	2,650 species
Fern and fern allies	1,100 species
Non-Flowering Plants	814 species
Wild mammals	300 species
Birds	700-750 species
Invertebrates	100,000 species

The IUCN Red list 2004 provides following information. However it includes both tree and non-tree plant species.

A. Critically Endangered – 50 species.

1	*Actinodaphne cuspidata*	26	*Dipterocarpus grandiflorus*
2	*Aglaia densitricha*	27	*Dipterocarpus hasseltii*
3	*Alphonsea kingii*	28	*Dipterocarpus kerrii*
4	*Anisoptera curtisii*	29	*Dipterocarpus kunstleri*
5	*Anisoptera megistocarpa*	30	*Dipterocarpus lamellatus*
6	*Anisoptera reticulata*	31	*Dipterocarpus lowii*
7	*Anisoptera scaphula*	32	*Dipterocarpus perakensis*
8	*Beilschmiedia penangiana*	33	*Dipterocarpus rigidus*
9	*Castanopsis catappaefolia*	34	*Dipterocarpus rotundifolius*
10	*Cleistanthus major*	35	*Dipterocarpus semivestitus*
11	*Croton macrocarpus*	36	*Dipterocarpus validus*
12	*Dipterocarpus baudii*	37	*Dryobalanops aromatica*
13	*Dipterocarpus chartaceus*	38	*Eugenia camptophylla*
14	*Dipterocarpus concavus*	39	*Eugenia gageana*
15	*Dipterocarpus coriaceus*	40	*Eugenia klossii*
16	*Dipterocarpus cornutus*	41	*Eugenia scalarinervis*
17	*Dipterocarpus costulatus*	42	*Glycosmis crassifolia*
18	*Dipterocarpus cuspidatus*	43	*Hexapora curtisii*
19	*Dipterocarpus dyeri*	44	*Hopea aequalis*
20	*Dipterocarpus elongatus*	45	*Hopea apiculata*
21	*Dipterocarpus eurynchus*	46	*Hopea beccariana*
22	*Dipterocarpus fagineus*	47	*Hopea bilitonensis*
23	*Dipterocarpus glabrigemmatus*	48	*Hopea coriacea*
24	*Dipterocarpus globosus*	49	*Hopea depressinerva*
25	*Dipterocarpus gracilis*	50	*Hopea enicosanthoides*

B. Endangered species

The IUCN we site list 99 species. Since the list is long it is not being reproduced here. However it includes both tree and non-tree plant species.

C. Vulnerable species

The IUCN we site list 403 species. Since the list is long it is not being reproduced here. However it includes both tree and non-tree plant species.

9.3   Analysis and processing of national data

9.3.1   Calibration

This step is not necessary.

9.3.2   Estimation and forecasting

9.4   Reclassification into FRA 2005 classes

This step is not needed.

9.5   Data for National reporting table T9

FRA 2005 Categories	Number of species year 2000
Native tree species	2650
Critically endangered tree species	50
Endangered tree species	99
Vulnerable tree species	403

(The IUCN Red list of Threatened species contains both tree and non-tree plant species)

9.6   Comments to National reporting table T9

The IUCN "Red list 2004 of Threatened species" includes both tree and non-tree plant species.
Currently Forestry Department is working with the Forest Research Institute Malaysia (FRIM) to prepare the Red List for Malaysia based on extensive field studies.

10 Table T10 – Growing stock composition

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)
Forestry Department Peninsular Malaysia 1997. Third National Forest Inventory	H		1993
Forestry Department Peninsular Malaysia 2004. Fourth National Forest Inventory	H		2003

10.2.2 Classification and definitions

No national definitions and classes are available.

10.2.3 Original data

The species-wise data is available from third NFI for the peninsular region only.

Species (Scientific name and common name)	Growing Stock in Forests (million cubic meters)	
	1990	**2000**
Eugenia spp. (Kelat)	186.9	
Cinnamomum spp. (Medang)	136.4	
Canarium spp. (Kedondong)	115.4	
Shorea curtisii (Meranti seraya)	113.6	
Shorea leprosula (Meranti tembaga)	76.8	
Shorea platyclados (Meranti bukit)	75.9	
Koompassia (Kempas, Tualang)	64.2	
Palaquium (Nyatoh)	58.8	
Shorea ovalis (Meranti kepong)	55.2	
Shorea pauciflora (Meranti nemesu)	54.0	
Remainder of species	443.4	
TOTAL	**1,380.6**	

10.3 Analysis and processing of national data

10.3.1 Calibration

This step is not needed.

10.3.2 Estimation and forecasting

The species-wise data is available from third NFI for the peninsular region only. The average growing stock from this inventory has been applied to Sabah and Sarawak region as well as

rubber plantations areas to calculate the total growing stock. The following species-wise distribution of the growing stock in 1990 and 2000 has been developed by using proportionate distribution (excluding rubber plantations) of species in the growing stock in peninsular region only for 1992. It may therefore not reflect the ground reality.

Species (Scientific name and common name)	Growing Stock in Forests (million cubic meters)	
	1990	2000
Eugenia spp. (Kelat)	617	658
Cinnamomum spp. (Medang)	450	480
Canarium spp. (Kedondong)	381	406
Shorea curtisii (Meranti seraya)	375	400
Shorea leprosula (Meranti tembaga)	253	271
Shorea platyclados (Meranti bukit)	250	267
Koompassia (Kempas, Tualang)	212	226
Palaquium (Nyatoh)	194	207
Shorea ovalis (Meranti kepong)	182	194
Shorea pauciflora (Meranti nemesu)	178	190
Remainder of species and Rubber	1463	1562
TOTAL	4556	4863
Add growing stock of Rubber	407	345
Total growing stock in million m^3	4963	5208

10.4   Reclassification into FRA 2005 classes

This step is not needed.

10.5   Data for National reporting table T10

Species Common name	Species Scientific name	Growing Stock in Forests (million cubic meters)	
		1990	2000
Kelat	Eugenia spp.	617	658
Medang	Cinnamomum spp.	450	480
Kedondong	Canarium spp.	381	406
Meranti seraya	Shorea curtisii	375	400
Meranti tembaga	Shorea leprosula	253	271
Meranti bukit	Shorea platyclados	250	267
Kempas, Tualang	Koompassia	212	226
Nyatoh	Palaquium	194	207
ShMeranti kepong	Shorea ovalis	182	194
Meranti nemesu	Shorea pauciflora	178	190
Remainder of species plus Rubber	Remainder of species plus Rubber	1871	1909
	TOTAL	4963	5208

10.6   Comments to National reporting table T10

The species-wise distribution of the growing stock has been developed by using proportionate distribution (excluding rubber plantations) of species in 1992 in the growing stock in peninsular region only and it may therefore not reflect the ground reality.

11 Table T11 – Wood removal

11.1 FRA 2005 Categories and definitions

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

11.2 National data

11.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
Ministry of Primary Industries, Malaysia. *Statistics on Commodities 14th Edition*	H	Removal of wood	2000
Forestry Department Peninsular Malaysia. *Forestry Statistics*	H	Removal of wood	1990 - 2000

11.2.2 Classification and definitions

National class	Definition
Log production	Timber extracted from Permanent Reserved Forest, Stateland Forest, Alienated Land and Rubber Plantation

Note: If different national data sources use different classes and definitions, a table such as above is needed for each relevant data source.

11.2.3 Original data

Following is the time series data from FAOSTAT. The figures have been multiplied by 1.15 to convert from under bark figures into over bark figures.

Year	Removal Over bark (000 m^3)	
	Wood	Wood Fuel
1988	46447	4797
1989	48860	4706
1990	47449	4611
1991	47588	4520
1992	51794	4430
1993	43705	4330
1994	41898	4233
1995	41116	4135
1996	36276	4054
1997	37419	3977
1998	26464	3926
1999	26723	3889
2000	17359	3848
2001	18585	3778
2002	20600	3712

The 1990 and 2000 figures or removal from national records are following,

Type of Wood removal	1990	2000	2005
Industrial round wood (000 m^3)	40,099	23,075	20,052
Woodfuel (000 m^3)	n.a.	n.a.	n.a.

11.3 Analysis and processing of national data

11.3.1 Calibration

This step is not necessary.

11.3.1 Estimation and forecasting

The five year average from FAOSTAT (for 1990 and 2000) and linear extrapolation for 2005 provides following figures

FAOSTAT (over bark removal)	1990	2000	2005
Industrial roundwood	48428	21946	8705
Wood Fuel	4613	3831	3440

The regression estimates using the time-series for 1990, 2000 and 2005 are as following

FAOSTAT (over bark removal)	1990	2000	2005
Industrial roundwood	49151	24484	12151
Wood Fuel	4588	3805	3414

The country prefers regression (Wood Removal =-2466.69*year + 4957864 and Wood Fuel Removal = -78.2107*year + 160226.8) as it provides a smoother trend over the period 1988 to 2002 than five year averages around 1990 and 2000. However, it perceives that the forecasting of wood removal in 2005 by either method is much steeper than it expects. It considers the figure of 2002 for wood removal may be a good approximation for 2005.

11.4 Reclassification into FRA 2005 classes

11.5 Data for National reporting table T11

FRA 2005 Categories	Volume in 1000 cubic meters of roundwood over bark					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial roundwood	49151	24484	20600			
Woodfuel	4588	3805	3414			
TOTAL for Country	**53739**	**28289**	**24014**			

11.6 Comments to National reporting table T11

12 Table T12 – Value of wood removal

12.1 FRA 2005 Categories and definitions

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

12.2 National data

12.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ministry of Primary Industries, Malaysia. *Statistics on Commodities 14th Edition*	H		2000	Statistical information on primary and commodities-based sector in Malaysia
Forestry Department Peninsular Malaysia. *Forestry Statistics*	H		1990 - 2000	

12.2.2 Classification and definitions

National class	Definition
Log production	Timber extracted from Permanent Reserved Forest, Stateland Forest, Alienated Land and Rubber Plantation

Note: If different national data sources use different classes and definitions, a table such as above is needed for each relevant data source.

12.2.3   Original data

A. Tax free national prices of Round Wood

The price or value for 2005 has been assumed same as in 2000.

Year	F.O.B Unit Value (RM/m^3)
1990	198.5
2000	383.8
2005	383.8

B. Exchange rates

(Source: FRA Guidelines and IMF Website for 2005)

Year	Exchange rate (Value of US$1)
1990	2.7
2000	3.8
2005	3.8

12.3   Analysis and processing of national data

12.3.1 Calibration

This step is not needed.

12.3.2 Estimation and forecasting

The value of roundwood removal has been calculated using national prices and exchanges rates. The information on value of fuelwood is not available. It has been assumed that its price is about twenty percent of the roundwood price.

FRA 2005 Categories	Value in Million RM					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial roundwood	9756	9397	7906			
Woodfuel	182	292	262			
TOTAL for Country	**9939**	**9689**	**8168**			

The value of removal in US dollars using the historical rates in FRA 23005 country guidelines and IMF website for 2005.

FRA 2005 Categories	Value in Million US dollars					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial roundwood	3614	2473	2081			
Woodfuel	67	77	69			
TOTAL for Country	**3681**	**2550**	**2150**			

12.4   Reclassification into FRA 2005 classes

This step is not needed.

12.5   Data for National reporting table T12

FRA 2005 Categories	Value of roundwood removal (million USD)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial roundwood	3614	2473	2081			
Woodfuel	67	77	69			
TOTAL for Country	**3681**	**2550**	**2150**			

12.6   Comments to National reporting table T12

13 Table T13 – Non-wood forest product removal

No or Insufficient data is available for this table.

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

No or Insufficient data is available for this table.

15   Table T15 – Employment in forestry

15.1   FRA 2005 Categories and definitions

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

15.2   National data

15.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)
Ministry of Primary Industries, Malaysia. *Statistics on Commodities 14th Edition*	M		2000
Forestry Department Peninsular Malaysia. *Forestry Statistics*	H		1990 - 2000

15.2.2 Classification and definitions

National class	Definition
Primary production of goods	Employment in the logging sector.

15.2.3 Original data

FRA 2005 Categories	Employment (1000 person-years)	
	1990	**2000**
Logging	67.3	58.9
Staff of Forest Department	10.5	8.3
Unspecified forestry activities	n.a	n.a
TOTAL		

15.3   Analysis and processing of national data

15.3.1 Calibration

This step is not needed.

15.3.1 Estimation and forecasting

The forest department staff looks after both the provision of services and the production of goods from forests. Therefore the total strength ahs been apportioned to these two categories based on the ratio of the area under "protection" (17% in 1990 and 19% in 2000 of the total forest area) and "rest of the forests" (83% and 81%).

15.4   Reclassification into FRA 2005 classes

This step is not needed.

15.5   Data for National reporting table T15

FRA 2005 Categories	Employment (1000 person-years)	
	1990	**2000**
Primary production of goods	76	65.6
Provision of services	1.8	1.6
Unspecified forestry activities	n.a	n.a
TOTAL	**77.8**	**67.2**

15.6   Comments to National reporting table T15