Forestry Department
Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT

COUNTRY REPORTS

VIETNAM

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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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The following institutions have assisted in development of the country report

Forest Inventory and Planning Institute FIPI

Department of Forest Protection

Bee Company of Vietnam

Department of Forest

Information Centre of Ministry of Agriculture-Rural Development, and

The Medicinal Plants Centre.

General Information

Back ground

In the recent years, paralleling to the market economic development, there have been basic changes in forestry in Vietnam. In the past, Vietnam forestry was in favour of traditional forestry practices implemented and managed by the central government. The situation is different nowadays. The traditional forestry combines with social forestry. The forest management and forest development is now an integral part of the overall economic development. People have land and forests and therefore private households invest in forestry leading to increase in forest areas in recent years.

In the past, the exploitation of forest products was the key task of the Forestry Sector of VN, but now it has been being changed to forest development. Forest area and quantity of timber removed from the natural forest reduced annually, logging applied mainly to plantations to meet the needs of domestic raw material consumption in processing.

The Government of Vietnam has started a 5 million ha reforestation (5MHR) program in since 1998 to increase the forest coverage from 30 to 43%. The 5 MHR Program attracted attention of different international/ national organizations and they have committed to support the implementation of this program. Some of the industrial sectors such as pulp and wood processing industries need materials for their production are supporting forest growers and encouraging growing of forests for industrial use.

Vietnam conducts National Forest Inventory, Assessment and Monitoring of Forest Resources Change Program. This Program is reviewed each 5 years based on the basic of collecting and analyzing data from primary permanent sample plots. Data collected by this program are the important input for analysis, processing of data for the fulfilment of the FAO format.

Vietnam officially submitted its national report to the global Forest Resource Assessment 2000 for global aggregation and now it has developed this report to contribute to the global forest resource assessment 2005 for keeping pace with the international forestry development. However, due to insufficient information system and incompatibility with international demands of forest related information, this national report still has its limitation and constraints. Vietnam will make efforts to overcome these limitations in coming years.

Organizations involved in the data updating

Forest resources data have been collected, analysed and aggregated with close collaboration of organizations directly involved in forest management and the forestry related ones. The key organizations are FIPI, Department of Forest Protection, and Bee Company of VN, the Department of Forest, Information Centre of Ministry of Agriculture-Rural Development, and The Medicinal Plants Centre.

Contents

1 Table T1 – Extent of Forest and Other wooded land

The information on the extent of "Forest" and "Other wooded land" is necessary for assessing state and change in the forest resources and also for monitoring trends. It also establishes links between national and global classification systems.

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

Vietnam has launched the program of forest resources inventory and monitoring every 5 year. Earlier the data of forest was published by the government at interval of 5 years but from 2002 data the data is ratified and published every year. The forestry officer of each commune yearly sends the data to higher level, which is finally aggregated at the national level. The

Source	Variable	Quality	Information Year
Database of Forest Inventory and Planning Institute (FIPI) and Ministry of Agriculture and Rural Development (MARD)	Extent	H	1992
Database of Forest Inventory and Planning Institute (FIPI) and MARD	Extent	H	1995
Database of Forest Inventory and Planning Institute (FIPI) and MARD	Extent	H	2000
Database of Protection Forest department (PFD) and FIPI	Extent	M	2002
Database of Protection Forest Department (PFD) and FIPI	Extent	M	2003

The Forest inventory and planning institute (FIPI) directly collects and analyses the data through its Forest Resources Inventory Assessment and Monitoring Program (FRIAM). The data from Protection Forest Department (PFD) is the statistics collected from local level up to national level.

1.2.2 Classification and definitions

The current system of land classification of Vietnam (VN) is quite similar to that of FAO but there are some differences as indicated follow:

Categories	Definition
Forest	- A site of at least 0.5 ha, with trees higher than 3 m and the canopy cover 0.3 or the growing stock over than 30m^3/ha. It includes forest plantations. - Bamboo of such a mentioned canopy and at least 5000 stem/ha.
Unused land Land Type I C	The IC means "the land with bushes and scattered wooded trees with regenerated wooded tree density of at least 1000stem/ha and height 1 m upward". It is similar to "Other wood land" of FAO.
Rubber	Areas regulated by Agriculture

1.2.1.1.1.1.1.1

1.2.3 Original data

The general statistics office of Vietnam (http://www.gso.gov.vn/) provides following national statistics for the year 2002. The total country areas, land areas and area of inland water bodies do not match with FAOSTAT figures.

Land Use in 2002		Total area in 000 ha
Agricultural land		**9407**
	Annual crops land	5978
	Miscellaneous gardens	623
	Perennial crops land	2213
	Weed land for animal raising	40
	Water surface land for fishing	553
Forestry land covered by trees		**12051**
Specially used land		**1615,9**
Homestead land		**451,3**
Unused land and river, spring, mountain		**9405**
	Unused flat land	536
	Unused mountainous land	7137
	Unused water surface land	150
	River and spring	749
	Non tree rock mountain	618
	Other unused land	215
WHOLE COUNTRY		**32930**

FRA 2005 Category	Forest area in "000"ha				
	1990	1995	2000	2002	2003
Natural forest	8,396	8,252	9,675	9,879	10,004
Plantation forest	745	1,050	1,638	1,914	2,090
Total forest	**9,141**	**9,302**	**11,315**	**11,793**	**12,094**
Rubber Plantations	222	278	412	429	436
Other Wooded land	na	na	1,816	2,166	2,082

Other Land with trees	na	na	na	na	na

1.3 Analysis and processing of data

1.3.1 Calibration

The figures of total country area, total land area, and area of inland water bodies as maintained by the General Statistics Office of Vietnam are different than that in FAOSTAT (33,169, 32549 and 620 thousand hectares). For reporting to FRA 2005 purposes only, the report has adopted the FAOSTAT figures and has adjusted all the differences in area of "Other land" as presented below.

FRA 2005 Category	Forest area in "000"ha				
	1990	1995	2000	2002	2003
Natural forest	8396	8252	9675	9879	10004
Plantation forest	745	1050	1638	1914	2090
Rubber Plantations	222	278	412	429	436
Other Wooded land			1816	2166	2082
Other land	23186	22969	19008	18161	17937
Other Land with trees	na	na	na	na	na
Inland water body	620	620	620	620	620
Total Area of Country	33169	33169	33169	33169	33169

1.3.2 Estimation and Forecasting

Only forecasting has been done to develop figures for Forest (natural forest, forest plantation, rubber) for 2005 since the original figures for 1990 and 2000 are available.

To use the long time series data in case of natural forests, forest plantation and rubber plantations, the regression method has been used although pre and past 2000 data sets are not fully compatible. For forecasting figures for "Other wooded lands" the linear extra-polation method has been used since data is available for only three points in time.

FRA 2005 Category	Forest area in "000"ha		
	1990	2000	2005
Natural forest	8396	9675	10236
Plantation forest	745	1638	2215
Rubber Plantations	222	412	480
Other Wooded land	i.d.	1816	2259
Other land	23186	19008	17439
Other Land with trees	n.d.a.	n.d.a.	n.d.a.
Inland water body	620	620	620
Total Area of Country	33169	33169	33169

1.4 Reclassification into FRA2005 classes

National land use classes	Percentage of a national class belonging to FRA class			
	Forest	**Other wooded land**	**Other land with tree**	**Other land**
Natural Forest	100			
Plantation Forest	100			
Rubber Plantation	100			
Other wooded land		100		

1.5 Data for national reporting table T1

Table A. Excluding Rubber Area from forest

FRA 2005 Category	Area in "000" ha.		
	1990	**2000**	**2005**
Forests	9141	11313	12451
Other Wooded Land	i.d.	1816	2259
Other Land	23408	19420	17839
Other land with trees	n.d.a.	n.d.a.	n.d.a
Inland Water bodies	620	620	620
Total Country Area	33169	33169	33169

Table B. Including Rubber Areas with Forest Area

FRA 2005 Category	Area in "000" ha.		
	1990	**2000**	**2005**
Forests	9363	11725	12931
Other Wooded Land	0	1816	2259
Other Land	23186	19008	17359
Other Land with Trees	0	0	0
Inland Water bodies	620	620	620
Total Country Area	33169	33169	33169

1.6 Comments to National reporting table T1

1. For reporting to FRA 2005 purposes only, the country report has adopted the FAOSTAT figures and has adjusted all the differences in area of "Other land".
2. Similarly, the country report has added area of rubber in the area of forest for the purposes of reporting to FRA 2005 only.

2 Table T2 - Forest and wood land ownership

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

Before 1990, Vietnam followed the centrally-planned economy, there had been small area which has been allocated to households. But now it follows the market-oriented economy, so the land area allocated to households has become larger. From 2002 to 2003 the data on forest has been collected by Forest Protection Department because they have staff almost in every commune.

Source	Variable	Quality	Information Year
Database of Forest Inventory and Planning Institute and MARD	Ownership	H	1990
Database of Forest Inventory and Planning Institute and MARD	Ownership	H	1998
Database of Forest Protection Department	Ownership	H	2002
Database of Forest Protection Department	Ownership	H	2003

2.2.2 Classifications and definitions

Categories	Definition
Private ownership	Land owned by individuals, families, villages and communes, private co-operatives, 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 or land allocated to army, police …
Other ownership	Land where ownership has not been identified.

2.2.3 Original Data

Category FRA 2005	Forest area by the year in "000" ha			
	1990	2000	2002	2003
Privately Owned	14	2,080	2,839	2,617
Publicly owned without Rubber	5,476	6,167	6,377	8,805
Other	3,651	3,066	2,577	672
Total without Rubber	**9,141**	**11,313**	**11,793**	**12,094**
Rubber Areas (Public)	222	412	429	436
Total publicly owned (including Rubber)	5,698	6,579	6,806	9,241
Total with Rubber	**9,363**	**11,725**	**12,222**	**12,530**

The other wooded land is not included in the data of ownership . Rubber area is under control of the government, therefore its area has been included in the public ownership.

2.3 Analysis and processing of data

2.3.1 Calibration

This step is not needed.

2.3.2 Estimating and forecasting

The forecast for 2005 is based on ratio among areas under different ownership in 2003.

2.4 Reclassification

This step is not needed.

2.5 Data for National reporting table T2

Category FRA 2005	**Forest area by the year in "000" ha**		
	1990	**2000**	**2005**
Private ownership	14	2080	2700
Publicly ownership	5698	6579	694
Other ownership	3651	3066	9537
Total	**9363**	**11725**	**12931**

2.6 Comments to National reporting table T2

The country report has added area of rubber in the area of forest for the purposes of reporting to FRA 2005 only.

3 Table T3- Designation of functions for forest and other wood land

The information on the designated functions is essential for efficient planning, design and implementation of forest policy and for assessment of cross-sectoral impacts. The term "designated functions" refers to the functions assigned for the purpose for which that forest is suitable.

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

The forest areas are identified for the purposes of production, protection and bio-diversity purposes but the other wooded lands are not is identified and they serve multiple purposes.

3.2.1 Data Sources

Source	Variable	Quality	Information year

Database of Forest Inventory and Planning Institute and MARD	Designation	H	1992
Database of Forest Inventory and Planning Institute and MARD	Designation	H	1995
Database of Forest Inventory and Planning Institute and MARD	Designation	H	2000
Database of Protection Forest Department and FIPI	Designation	M	2002
Database of Protection Forest Department and FIPI	Designation	M	2003

3.2.2 Classification and definitions

Category	Definition
Production function	Forest / Other wooded land designated for production and extraction of forest goods, including both wood and non-wood forest products.
Protection	Forest / Other wooded land designated for protection of soil and water. Logging is not allowed. Its compose of watershed, control soil erosion, tidal along costal, fixation moving sand duns, reduce pollution nearby the plant or factories
Bio-diversity forests	Forest / Other wooded land designated for conservation of biological diversity. Forest is protected from logging and the main function is conservation fauna and flora. It is composed of national parks, natural sanctuaries, and historical cultural forest areas.
Social services function	Forest / Other wooded land designated for the provision of social services, which composes of conservation of bio-diversity
Multiple purpose function	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.

3.2.3 Original data

Categories	Area by the year in "000" ha				
	1990	**1995**	**2000**	**2002**	**2003**
Production forests	5,485	4,925	4,241	4,452	4,552
Protection forests	2,925	3,479	5,502	5,614	5,699
Bio-diversity	731	898	1,570	1,727	1,843
Total without Rubber	**9,141**	**9,302**	**11,313**	**11,793**	**12,094**
Rubber Area	222	278	412	429	436
Production with Rubber	5,707	5,203	4,653	4,881	4,988
Total Forest with Rubber	**9,363**	**9,580**	**11,725**	**12,222**	**12,530**

3.3 Analysis and processing of data

3.4.1 Calibration

This step is not needed.

3.4.2 Estimation and Forecasting

The figures are available for 1990 and 2000 and hence there is not need to conduct estimation for these years. The forecasting for 2005 has been done with the help of ratio among different categories of designation in 2003 since the regression estimate do not provide right trend for production areas because pre and past 2000 data indicate have apposite trend.

Category	**Area in 2005 ("000" ha)**
Production forest including rubber	5,148
Protection of water/soil	5,881
Bio-diversity conservation	1,902
Total	12,931

3.4 Reclassification

For Area under Primary Function

National Class	**Percentage of a National Class to a FRA Classes of Primary Function**					
	Production For./OWL	**Protection For./OWL**	**Conservation of Biodiversity**	**Social Service**	**Multiple Function**	**Unknown Function.**
	%	**%**	**%**	**%**	**%**	**%**
Production	100					
Protection		100				
Conservation			100			
Multiple Pur.					100	

For Area under Total Area with Function

National Class	**Percentage of a National Class to FRA Classes of Total Function**					
	Production For. / OWL	**Protection For./ OWL**	**Conservation of Biodiversity**	**Social Service**	**Multiple Function**	**Unknown Function.**
	%	**%**	**%**	**%**	**%**	**%**
Production	100	100				
Protection		100	100			
Conservation		100	100	100		
Multiple pur. OWL	100	100	100	100		

3.5 Data of 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	5707	4653	5148	5707	4653	5148
Protection of soil and water	2925	5502	5881	9363	11725	12931
Conservation of biodiversity	731	1570	1902	3656	7072	7783
Social services				731	1570	1902
Multiple purpose				not appl.	not appl.	not appl.
No or unknown function				not appl.	not appl.	not appl.

Total - Forest	**9363**	**11725**	**12931**	**not appl.**	**not appl.**	**not appl.**
Other wooded land						
Production					1816	2259
Protection of soil and water					1816	2259
Conservation of biodiversity					1816	2259
Social services					1816	2259
Multiple purpose	n.a.	1816	2259	not appl.	not appl.	not appl.
No or unknown function				not appl.	not appl.	not appl.
Total – Other wooded land	**n.a.**	**1816**	**2259**	**not appl.**	**not appl.**	**not appl.**

4 Table T4 - Characteristics of Forests and Other Wooded Lands

The information on "characteristics" is essential to understand the development of appropriate and efficient silvicultural and management practices to ensure and promote sustainability of the forest resource. These practices define the future structures and composition of forest resources and their ability to provide goods and services. It also provides information of the degree of human impacts on the forest ecosystems.

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

Following forms the basis of information for this national reporting table.

Source	Variable	Quality	Year
Data base of FIPI and MARD	Characteristics	H	1992
Data base of FIPI and MARD	Characteristics	H	1995
Data base of FIPI and MARD	Characteristics	H	2000
Database of PFD and FIPI	Characteristics	M	2002
Database of PFD and FIPI	Characteristics	M	2003

4.2.2 Classification and definitions

Category	Definition
Rich Forest	Forest of native species, where there are no clearly visible indications of human activities, the ecological processes are not significantly disturbed and they contain high standing volume (the forest type IV or IIIB).
Impact natural forest	Forest of naturally regenerated native species where there are clearly visible indications of human activities.
Semi-natural	Forest of native species, established through planting, seeding or assisted natural regeneration. But in Vietnam it is not separate semi-natural from impact Natural forest . So that semi-natural forest is included in impact Natural forest.
Productive plantation	Forest of introduced species and in some cases native species established through planting or seeding mainly for production of wood or non-wood goods.
Protective	Forest of native or introduced species, established through planting or seeding mainly

plantation	for provision of services. Forest of native species which is established on bio-diversity open land is included protective plantation in the national reporting table.

4.2.3 Original National Data

National Category	Sub-Category	Area in "000" ha.				
		1990	**1995**	**2000**	**2002**	**2003**
Natural forest						
	Rich forest	384	289	187		
	Other forest types	8,012	7,963	9,488		
	Total	**8,396**	**8,252**	**9,675**	**9,879**	**10,004**
Plantation excluding rubber						
	Production	442	623	972	1,137	1,238
	Protection	272	384	599	709	760
	Bio-diversity	31	43	67	68	92
		745	**1,050**	**1,638**	**1,914**	**2,090**
Rubber		**222**	**278**	**412**	**429**	**436**

4.3 Analysis and processing of data

4.3.1 Calibration

This step is not needed.

4.3.2 Estimation and forecasting

A. Rich Forests

The following rich forest area in 2005 has been forecasted with the help of linear extra-polation using data of two last points in time (1995 and 2000) since regression is not advisable with only three points in time.

The area of Rich forest in 2005 = 85 (000 ha)

B. Other forest types

The area of other forest types in 2005 is simply the area of natural forests in 2005 (Table 1) after excluding the above area of rich forests in 2005.

The area of "Other forest types" in natural forests = 10151 (000 ha)

C. Area of Plantations

To capture the latest trend in relative categories (Productive, Productive and biodiversity conservation) of plantations the ratio among different categories of plantations in 2003 have been applied to the total area of forest plantation (excluding rubber) forecasted for 2005 in Table 1.

Category of Plantation	Area in 2005 (000 ha)
Production Plantations	1312

Protection Plantations	805
Bio-diversity Plantations	98
Total	2215

4.4 Reclassification

National Category	FRA 2005 Category				
	Primary	**Modified**	**Semi-natural**	**Productive Plantation**	**Protective Plantation**
Rich forest	100				
Other forest types		100			
Production Plantations				100	
Protection Plantations					100
Bio-diversity Plantations					100
Rubber Plantations				100	

4.5 Data for National Reporting Table T4

FRA 2005 Category	Area (1000 hectares)					
	Forest			Other wooded land		
	1990	**2000**	**2005**	**1990**	**2000**	**2005**
Primary	384	187	85	n.a	n.a	n.a
Modified natural	8012	9488	10151	n.a	n.a	n.a
Semi-natural				n.a	n.a	n.a
Productive plantation	664	1384	1792	n.a	n.a	n.a
Protective plantation	303	666	903	n.a	n.a	n.a
Total	**9363**	**11725**	**12931**	n.a.	n.a.	n.a.

5 Table T5 – Growing stock

The information on "Growing stock" is essential to understand the dynamics and productive capacity of forest and other wooded land in order to develop national policies and strategies for a sustainable use of the forest resources.

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.

5.2 National data

5.2.1 Data Sources

The FIPI carried out a complete national forest inventory in 1989 but only for the natural forests and submitted to government for publication. From 1991 – 1995, FIPI implemented the program on assessment and monitoring the change of forest resources. The program assessed the state of forest on 5-year cycle. It provided data in 1995. The FIPI carried out another complete national forest inventory in 1999 and that covered both the natural forest and the plantations.

Source	Variable	Quality	Year
Forest Inventory and Planning Institute and MARD	Growing stock	H	**1989**
Forest Inventory and Planning Institute and MARD	Growing stock	H	**1995**
Forest Inventory and Planning Institute and MARD	Growing stock	H	**1999**

5.2.2 National Classification and Definitions

The following table provides the definition of growing stock used by FIPI.

Growing Stock	The sum-total of all trees, by number or volume or biomass, growing within a particular area of interest.

As required by FAO, forest growing stock should be calculated for 2 entities: (1) Volume with bark; (2) commercial stock is the Volume of species of commercial values. Vietnam definition on the mentioned entities is mainly similar to FAO proposal, however stock is not calculated for the land with trees with stock. According to Vietnam definition, the stock only accounts for forest with stock at least of $30m^3$ and upward. Some of the regulated stock thresholds for calculation can bee seen below:

Categories	Definition
Growing stock	It is the over bark standing volume of (standing) trees with diameter of 10

	cm and more at the breast height (dbh) or above the buttress (if higher than breast height). Explanation It includes the stump above the ground surface with minimum diameter of 10 cm. It includes volume of merchantable branches up to a diameter of 5 cm.
Commercial growing stock	It is that section (part) of the standing volume which is commercial as defined by the market, and of trees with dbh of more than 32 cm for natural forest. Explanation 1. The commercial growing stock of plantations is calculated as percentage of standing volume of mature plantation to that of total plantations. 2. The average percentage of the commercial growing stock to total standing volume is as under, Natural forest: About 9 % of the total standing volume Plantation: About 20% of the total standing volume

5.2.3 Original National Data

Following table contains national data on over bark growing stock reflecting stem volume including volume of merchantable branches up to a diameter of 5 cm.

Unit: area: ,000ha; Volume: ,000m^3

Categories	1989		1995		1999	
	Area	**Growing stock**	**Area**	**Growing stock**	**Area**	**Growing stock**
Natural Forest	8,396	638,096	8,252	627,152	9,676	754,728
Plantation Forest	745	n.a.	1,050	22,050	1,639	31,141
Total	**9,141**	**n.a.**	**9,302**	**649,202**	**11,315**	**785,869**

5.3 Analysis and processing of National Data

5.3.1 Calibration

Not considered as necessary

5.3.2 Estimation and Forecasting

A. Growing Stock in Forests

The inventory figures of 1989 and 1999 are being assumed for 1990 and 2000 respectively. The per hectare growing stock in forests in 2005 is assumed same as in 2000 (78 m^3/ ha). This per hectare figure has been multiplied by the area of forest in Table 1 to forecast growing stock in forest in 2005.

Categories	Growing Stock (000 m3) in Forests		
	1990	2000	2005
Growing stock (000 m3)	638,096	754,728	798,408
Area (000 ha)	8,396	9,675	10,236
Growing stock/ha (m3/ha)	76	78	78

B. Growing Stock in Forest Plantations (excluding Rubber)

The 1999 growing stock in forest plantations is being assumed for 2000. The per hectare growing stock in plantation in 1995 is being assumed for 1990 and that in 2000 for 2005 as well. The growing stock in forest plantations (excluding rubber) in 1990 and 2005 has been calculated by using the per hectare growing stock figures assumed above and the area reported in Table 1.

Categories	Growing Stock (000 m3) in Forest Plantations			
	1995	2000	1990	2005
Growing stock (000 m3)	22,050	31,141	15,645	42085
Area (000 ha)	1050	1,638	745	2215
average growing stock (m3/ha)	21	19	21	19

C. Growing Stock in Rubber Plantations

No figures are available to estimate growing stock in rubber plantations. Therefore per hectare growing stock figures of forest plantations have been assumed for Rubber plantations.

Categories	Reference Year		
	1990	2000	2005
Growing stock/ha (m3/ha)	21	19	19
Area (000 ha)	222	412	480
Growing stock (000 m3)	4662	7828	9120

D. Commercial Growing Stock

Category	Commercial Growing Stock in 000 m^3		
	1990	2000	2005
CGS in forests (9%) in (000 m3)	57429	67926	71857
CGS in forest plantations (20%)	149	328	443
Total	57578	68253	72300

5.4 Reclassification into FRA 2005 Classes

Table: Reclassification (Percentage allocation) into FRA 2005 classes

National Classification	Percentage of a National Class to a FRA Class	
	Growing Stock	Commercial Growing Stock
Growing stock	100	
Commercial Growing Stock[1]		100

5.5 Data for National Reporting Table T5

FRA 2005 category	Volume (million cubic meters over bark)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Growing Stock	658	794	850	n.a.	n.a.	n.a.
Commercial Growing Stock	58	68	72	n.a.	n.a.	n.a.

(Note: Commercial growing stock in forests is about 9% of the total growing stock and that in forest plantations it is about 20% of the total growing stock).

Appendix 1 to National Reporting Table 5

Item	Unit	Complementary information
1. Minimum diameter at breast height[1] 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	10
3. Minimum diameter of branches included in Growing stock (W)	cm	5
4. Minimum diameter at breast height of trees in Commercial growing stock (Z)	cm	32 for natural forest and 10 for plantation
5. Volume refers to "Above ground" (AG) or "Above stump" (AS)	AG / AS	AG
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	

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	Variable	Quality	Year
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 National Classification and Definitions

No information on national classification and definitions relevant to this table is available.

6.2.3 Original Data

Vietnam has data on growing stock only which has been collected and researched by FIPI. From experience an average ratio of biomass and growing stock or “average wood density” has been identified as 0.55 to calculate biomass from growing stock.

Categories	Unit	1990	2000	2005
Above Ground GS (rubber is included)	million m3	658	794	850
(Stem) BM/GS Ratio	t / m^3	0.55	0.55	0.55

6.3 Estimation and Forecasting

A. Stem biomass

Stem biomass has been calculated by multiplying the above growing stock in Table 5 with the “average wood density” of 0.55.

B. Biomass Expansion Factor

The BEFs has been calculated by using following formula of Sandra Brown (1997).

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

This provides BEF values of 3.91, 3.98 and 4.05 for 1990, 2000 and 2005 respectively based on respective values of stem biomass in those years.

C. Above Ground Biomass

The following estimates of "Above Ground Biomass" have been developed by using the figures of stem biomass and BEF.

Categories	Unit	1990	2000	2005
Total Growing Stock	million m3	658	794	850
Assumed Density		0.55	0.55	0.55
Stem biomass	million tonnes	362	437	468
Area Table 1	000 ha	9363	11725	12931
Per hectare Biomass	m3/ha	38.65	37.25	36.15
BEF		3.91	3.98	4.05
Total Above Ground Biomass	million tonnes	1415	1738	1893

D. Below Ground Biomass

The ratio of below ground bio-mass and above ground biomass depends on species and structure of the growing stock. Vietnam has not researched on this factor and considers that a ratio of 0.265 (same as in India report) is appropriate for its forests.

Categories	Biomass in million tonnes		
	1990	2000	2005
Above Ground Biomass in Forests	1415	1738	1893
BG/AG Ratio	0.265	0.265	0.265
Below Ground Biomass in Forests	340	417	455

E. Deadwood Biomass

The "Dead Wood Biomass" has been calculated for 1990, 2000 and 2005 using IPCC's default factor of 0.11 for tropical forests (IPCC, 2003). This default factor represents the default "ratio" between the "dead wood biomass" and the "total live biomass".

Item	Unit	1990	2000	2005
AG Biomass	million tonne	1415	1738	1893
BG Biomass	million tonne	340	417	455
Total Live Biomass	million tonne	1755	2155	2348
Default (Dead : Live) Ratio		0.11	0.11	0.11
Dead Wood Biomass	million tonne	193	237	258

6.4 Reclassification into FRA 2005 Classes

National Classification	Percentage of a National Class to a FRA Class		
	Above Ground	**Below Ground**	**Dead Wood Biomass**
Above Ground Biomass	100	0	0
Below Ground Biomass	0	100	0
Dead Wood Biomass	0	0	100

6.5 Data for National Reporting Table T6

Forest 2005 Category	Biomass in million metric tonnes					
	Forest			Other Wooded Land		
	1990	**2000**	**2005**	**1990**	**2000**	**2005**
Above Ground Tree Biomass	1415	1738	1893	n.a.	n.a.	n.a.
Below Ground Tree Biomass	340	417	455	n.a.	n.a.	n.a.
Dead Wood Tree Biomass	193	237	258	n.a.	n.a.	n.a.
TOTAL	1948	2392	2606	n.a.	n.a.	n.a.

(Note: Rubber plantation is included in the forest for calculation of total biomass.)

7 Table T 7 - Carbon Stock

7.1 FRA 2005 Categories and Definitions

Categories	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 no national definitions on this subject.

7.2.3 Original National Data

The carbon stock has been calculated using the default factor of 0.5 from GPG (2003) with data on biomass from Table 6 and area from Table 1.

7.3 Analysis and Processing of National Data

7.3.1 Calibration

This step is not necessary **.**

7.3.2 Estimation and Forecasting

A. Carbon in live biomass

The carbon in living (above and below ground) biomass in 1990, 2000 and 2005 was calculated by using the biomass figures from the National Reporting Table 6 using the GPG (2003) default factor of 0.5.

FRA Category	Unit	1990	2000	2005
Above Ground Biomass	million tonne	1415	1738	1893
Below Ground Biomass	million tonne	340	417	455
Carbon in Above Ground Biomass	million tonne	707	869	947
Carbon in Below Ground Biomass	million tonne	170	209	227
Sub Total: Carbon in Living Biomass	**million tonne**	877	1078	1174

B. Carbon in Deadwood biomass

The carbon in "deadwood" was calculated in the same manner i.e. using the dead wood biomass figures in the National Reporting Table 6 and the GPG default factor of 0.5.

FRA Category	Unit	1990	2000	2005
Deadwood Biomass	million tonne	193	237	258
Average Carbon Density		0.5	0.5	0.5
Carbon in Dead Wood Biomass	million tonne	97	119	129

C. Carbon in litter

The carbon in litter was calculated by using default value for litter carbon stock in Appendix 5-table 5.7. The value is selected 2.1 (for tropical forest).

FRA Category	Unit	1990	2000	2005
Forest Area	million ha	9.363	11.725	12.931
Per hectare Carbon in Litter	tonne/ ha	2.1	2.1	2.1
Carbon in Litter	million tonne	20	25	27

D. Carbon in top 1 meter of Soil

Carbon stock in soil of top 1m has been calculated by assuming a factor of 48.2 ton/ha for forested land.

FRA Category	Unit	1990	2000	2005
Forest Area	million ha	9.363	11.725	12.931
Per hectare Carbon in Soil up to top I m	tonne/ ha	48.2	48.2	48.2
Soil Carbon to a depth of top 1 m	million tonne	451	565	623

7.4 Reclassification into FRA 2005 Classes

It is not necessary as using IPCC categories which are same as FRA 2005 Categories.

7.5 Data for National Reporting Table T7

Table: Input to Global Reporting Tables

FRA 2005 Category	Carbon (Million metric tonnes)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Carbon in above -ground biomass	707	869	947	n.a.	n.a.	n.a.
Carbon in below-ground biomass	170	209	227	n.a.	n.a.	n.a.
Sub-total: Carbon in living biomass	**877**	**1078**	**1174**	n.a.	n.a.	n.a.
Carbon in dead wood	97	119	129	n.a.	n.a.	n.a.
Carbon in litter	20	25	27	n.a.	n.a.	n.a.
Sub-total: Carbon in dead wood and litter	**117**	**144**	**156**	n.a.	n.a.	n.a.
Soil carbon to a depth of top 100 cm	**451**	**505**	**623**	n.a.	n.a.	n.a.
TOTAL CARBON	**1445**	**1727**	**1953**	n.a.	n.a.	n.a.

8 Table T8 - Disturbances affecting Health and Vitality

8.1 FRA 2005 Categories and Definitions

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

8.2 National data

FIPI does not have data on these variables prior to 2000. The information after the year 2000 indicates that the affected areas are very small and scattered. Generally speaking, FIPI does not have data for table 8.

8.3 Analysis and Processing of National Data

Since no data is available this step is not applicable.

8.4 Reclassification into FRA 2005 Classes

Since no data is available this step is not applicable.

8.5 National reporting table T8

Category FRA 2005	**Forest**		**Other wood land**	
	1990	**2000**	**1990**	**2000**
Disturbed by fires	n.a.	n.a.	n.a.	n.a.
Disturbed by insects	n.a.	n.a.	n.a.	n.a.
Disturbed by diseases	n.a.	n.a.	n.a.	n.a.
Other disturbance (cutting)	n.a.	n.a.	n.a.	n.a.

9 Table 9 - 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 National Data Sources

The Red List (IUCN, 2002) of IUCN is main source for information on this table.

Source	Variable	Quality	Year
IUCN. 2004. Red List of Threatened Species. Gland, Switzerland: The World Conservation Union.	Threatened species	H	2004
Red List of Threatened Species of Vietnam	Number of species	H	

9.2.2 National Classification and Definitions

There are no standards for national definition or classification

9.2.3 Original National Data

IUCN RED List of Threatened Species 2004

Critically Endangered – 25

1 *Aglaia pleuropteris*
2 *Anisoptera scaphula*
3 *Aquilaria crassna*
4 *Cycas sp. nov. 'fugax'*
5 *Diospyros mun*
6 *Dipterocarpus baudii*
7 *Dipterocarpus dyeri*
8 *Dipterocarpus grandiflorus*
9 *Dipterocarpus hasseltii*
10 *Dipterocarpus kerrii*
11 *Dipterocarpus turbinatus*
12 *Hopea chinensis*
13 *Hopea cordata*
14 *Hopea hainanensis*
15 *Hopea hongayanensis*
16 *Hopea mollissima*
17 *Hopea reticulata*
18 *Hopea siamensis*

19 *Parashorea stellata*
20 *Shorea falcata*
21 *Shorea guiso*
22 *Shorea hypochra*
23 *Shorea thorelii*
24 *Vatica diospyroides*
25 *Xanthocyparis vietnamensis*

Endangered Species -36

1 *Afzelia xylocarpa*
2 *Alstonia annamensis*
3 *Amentotaxus hatuyenensis*
4 *Amentotaxus yunnanensis*
5 *Anisoptera costata*
6 *Annamocarya sinensis*
7 *Bretschneidera sinensis*
8 *Burretiodendron tonkinense*
9 *Cinnamomum balansae*
10 *Cleidiocarpon laurinum*
11 *Craigia yunnanensis*
12 *Cycas multipinnata*
13 *Cycas sp. nov. 'aculeata'*
14 *Cycas sp. nov. 'hoabinhensis'*
15 *Dalbergia oliveri*
16 *Dipterocarpus alatus*
17 *Dipterocarpus costatus*
18 *Erythrophleum fordii*
19 *Garcinia paucinervis*
20 *Hopea ferrea*
21 *Hopea pierrei*
22 *Hopea recopei*
23 *Laportea urentissima*
24 *Mangifera dongnaiensis*
25 *Michelia aenea*
26 *Parashorea chinensis*
27 *Pinus wangii*
28 *Schefflera kontumensis*
29 *Schefflera palmiformis*
30 *Shorea henryana*
31 *Shorea roxburghii*
32 *Vatica cinerea*
33 *Vatica mangachapoi*

Vulnerable species - 85

1 *Actinodaphne ellipticbacca*
2 *Aesculus wangii*
3 *Aglaia pervirdis*
4 *Alleizettella rubra*
5 *Alstodaphne hainanensis*
6 *Amentotaxus poilanei*
7 *Ammora dasyclada*
8 *Aquilaria banaensae*
9 *Bennettiodendron cordatum*
10 *Bursera tonkinensis*
11 *Caesalpinia nhatrangense*
12 *Calocedrus macrolepis*
13 *Camellia chrysantha*
14 *Camellia euphlebia*
15 *Camellia fleuryi*
16 *Camellia gilbertii*
17 *Camellia pleurocarpa*
18 *Cephalomappa sinensis*
19 *Cephalotaxus mannii*
20 *Cleidiocarpon cavaleriei*
21 *Cleistanthus petelotii*
22 *Craibiodendron scleranthum*
23 *Croton phuquocensis*
24 *Croton touranensis*
25 *Cunninghamia konishii*
26 *Cycas elongata*
27 *Cycas inermis*
28 *Cycas lindstromii*

29 *Cycas micholitzii*
30 *Cycas nongnoochiae*
31 *Cycas pachypoda*
32 *Cycas pectinata*
33 *Cycas siamensis*
34 *Cycas sp. nov. 'bifida'*
35 *Cycas sp. nov. 'collina'*
36 *Cycas sp. nov. 'condaoensis'*
37 *Cycas sp. nov. 'dolichophylla'*
38 *Dalbergia balansae*
39 *Dalbergia cochinchinensis*
40 *Dalbergia tonkinensis*
41 *Diplopanax stachyanthus*
42 *Dipterocarpus retusus*
43 *Elaeocarpus apiculatus*
44 *Endocomia canarioides*
45 *Fagus longipetiolata*
46 *Gmelina hainanensis*
47 *Goniothalamus macrocalyx*
48 *Helicia grandifolia*
49 *Hopea odorata*
50 *Horsfieldia longiflora*
51 *Huodendron parviflorum*
52 *Hydnocarpus hainanensis*
53 *Illicium ternstroemioides*
54 *Intsia bijuga*
55 *Ixonanthes chinensis*
56 *Knema mixta*
57 *Knema pachycarpa*
58 *Knema pierrei*
59 *Knema poilanei*
60 *Knema saxatilis*
61 *Knema sessiflora*
62 *Knema squamulosa*
63 *Knema tonkinensis*
64 *Madhuca pasquieri*
65 *Mangifera flava*
66 *Mangifera minutifolia*
67 *Manglietia aromatica*
68 *Mouretia tonkinensis*
69 *Phoebe poilanei*
70 *Pinus dalatensis*
71 *Pinus krempfii*
72 *Pinus merkusii*
73 *Pistacia cucphuongensis*
74 *Platanus kerrii*
75 *Potameia lotungensis*
76 *Pterocarpus indicus*
77 *Rhoiptelea chiliantha*
78 *Schefflera chapana*
79 *Sinoradlkofera minor*
80 *Styrax litseoides*
81 *Taiwania cryptomerioides*
82 *Taraktogenos annamensis*
83 *Trigonostemon fragilis*
84 *Vitex ajugaeflora*
85 *Xylopia pierrei*

9.3 Analysis and Processing of National Data

This step is not necessary as the table uses data from IUCN Red list.

9.3.1 Calibration

Considered not necessary.

9.3.2 Estimation and Forecasting

Necessary data and basis is not available for any estimation and forecasting.

9.4 Reclassification into FRA 2005 Classes

This step is not considered necessary.

9.5 Data for National Reporting Table T9

FRA 2005Category	Number of tree species in 2000
Indigenous	800
Critical threatened	25
Endangered	36
Near threatened	85

9.6 Comments to National reporting table T9

The number of threatened specie is from IUCN Red list 2004. It may contain some non-tree species.

10 Table T10 - Growing Stock Composition

10.1 FRA 2005 Categories and Definitions

Growing Stock Composition	The composition of "growing stock" in "Forest" by ten most common (by volume) tree species in forests.

10.2 National Data

10.2.1 National Data Sources

Source	Variable	Quality	Year
Forest Inventory and Planning Institute and MARD	Growing stock	H	**1989**
Forest Inventory and Planning Institute and MARD	Growing stock	H	**1995**
Forest Inventory and Planning Institute and MARD	Growing stock	H	**1999**

10.2.2 National Classification and Definitions

There is no national standard for definition of "Growing stock composition".

10.2.3 Original National Data

The species wise details of growing stock are not available prior to 1995.

10.3 Analysis and Processing of National Data

The data for 1999 of species-wise growing stock has been assumed for 2000 and it has been sorted to identify top 10 species in terms growing stock for the year 2000. The species wise details of growing stock are not available prior to 1995. Therefore, the growing stock for 1990 has been apportioned in same species-wise ration as in 2000 assuming that the percentage species composition of the growing stock in 2000 also holds good for 1990.

10.4 Reclassification into FRA 2005 Classes

This step is not considered necessary.

10.5 Data for National Reporting Table T10

FRA 2005 Categories / Species name (Common name)	FRA 2005 Categories / Species name (Scientific name)	Growing Stock in Forests (million cubic meters)	
		1990	2000
	Lagerstromia calyculata	18.9	21.1
	Lythocarpus ducampii	18.3	20.4
	Vatica odorata var. brevipetiolata	14.2	15.9
	Shorea obtusa	13.5	15.1
	Lithocarpus deabatus	12.8	14.3
	Schima khasiana	11.5	12.8
	Quercus spp	11.5	12.8
	Syzygium wightianum	11.5	12.8
	Nephelium melliferum	9.5	10.6
	Madhuca pasquieri	10	11.3
	Remainder of species	526.3	646.9
	TOTAL	**658**	**794**

(The1990 figures are based on intra-species composition of 2000)

11 Table T 11 - Wood Removal

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 National Data Sources

The data is collected the Forest Department every year, however, it does not reflect the real total removal as it does not contain any estimates of illegal harvesting.

Source	Variable	Quality	Year
National Forest Department	Removal	M	every year

11.2.2 National Classification and Definitions

No national standard definition exists for “Industrial wood” and “Fuel Wood ”. However, the “Forestry Statistics”, reports data separately on “fuel wood” and “wood” (Timber, Wood Poles, Matchwood and Pulpwood).

11.2.3 National Data

The “industrial wood” and the “wood fuel” or “fuelwood” mainly comes from the forest areas as removal of these products is generally not allowed from the “Other wooded lands”. The 1990 and 2000 figures are five year averages. The extent of felling areas in natural forests has been considerably reduced since 1990 but this is not fully reflected by quantity of the wood removal as yield from plantations area is much higher than the natural forests.

Product	Unit	1990	1995	2000	2001	2002	2003
Industrial Wood	Mill Cub M	3.446	2.793	2.376	2.397	2.504	2.500
Fuel wood	Mill Cub M	32.059	n.a.	24.843	n.a	n.a	n.a

(Source: Forestry Department)

11.3 Analysis and Processing of National Data

11.3.1 Calibration

This step was not considered necessary.

11.3.2 Estimation and Forecasting

National data on removal of “wood” for 1990 and 2003 is available. The removal of “wood” for 2005 has been assumed same as 2003. The removal of “Fuel wood” in 2005 has been forecasted by using linear extra-polation method.

11.4 Reclassification into FRA 2005 Classes

Table: Adaptation of VN classification (Percentage allocation) with FRA 2005 classes

National Classification	Percentage of a National Class to a FRA Class	
	Industrial Round Wood	Wood Fuel
Wood	100	
Fuel wood		100

11.5 Data for National Reporting Table T11

Table: Input to Global Reporting Tables

FRA 2005 Category	Volume in "000" cubic meters in round wood over bark					
	Forests			Other Wooded Land		
	1990	2000	2005	1990	2000	2005
Industrial Wood Removal	3446	2376	2500	n.a.	n.a.	n.a.
Wood Fuel Removal	32059	24843	21235	n.a.	n.a.	n.a.
Total	35505	27219	23735	n.a.	n.a.	n.a.

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 (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

12.2.1 National Data Sources

Source	Variable	Quality	Year
Database of Forestry Department, Vietnam	Removal	H	every year
Website of International Monetary Fund	Exchange Rate	H	1990 and 2000
Website (COIN) of FAO	Exchange Rate		2005

12.2.2 National Classification and Definitions

The national statistics uses the terms “revenue” and not the market value.

12.2.3 Original National Data

The documented data on prices is not available, therefore, based on local knowledge following prices for 1990 have been assumed with 10 percent increase from1990 price level to 2000 level and 5 percent increase from 2000 price level to 2005 level.

Type of wood	Price in “000”dongs / cubic meter		
	1990	2000	2005
Industrial Wood	500	550	578
Wood Fuel	50	55	58

These prices translate to following US dollars prices using exchange rates provided by IMF for 1990 (8,125 dong) and 2000 (14,514) and by COIN (FAO) on June 1, 2005 for 2005 (15,765 dongs).

Type of wood	Price in US dollars / cubic meter		
	1990	2000	2005
Industrial Wood	61.54	37.89	36.63
Wood Fuel	6.15	3.79	3.66

12.3 Analysis and Processing of National Data

12.3.1 Calibration

This step is not considered as necessary.

12.3.2 Estimation and Forecasting

The figures for 2005 were estimated based on regression from 1990 to 2003.

12.4 Reclassification into FRA 2005 Classes

Reclassification was not needed.

12.5 Data for National Reporting Table T12

Table: Input to Global Reporting Table (National Currency)

Round Wood Removal	Value of Round Wood Removal in billion Dong					
	Forests			Other wooded Land		
	1990	2000	2005	1990	2000	2005
Industrial wood	1723	1307	1444	n.a.	n.a.	n.a.
Fuel wood	1603	1366	1226	n.a.	n.a.	n.a.
Total	3326	2673	2670	n.a.	n.a.	n.a.

Table: Input to Global Reporting Table (US Dollars)

FRA 2005 Category	Value of Round Wood Removal (1000 US Dollars)					
	Forests			Other Wooded Land		
	1990	2000	2005	1990	2000	2005
Industrial Wood	212062	90037	91579	n.a.	n.a.	n.a.
fuel wood	197286	94141	77788	n.a.	n.a.	n.a.
Total	409348	184178	169367	n.a.	n.a.	n.a.

(Note: Exchange rates for 1990 (US$ 1 = 8,125 Vietnam dong) and 2000 (US$ 1 = 14,514 Vietnam dong) taken from guidelines. Exchange rate for 2005 has been estimated (US$ 1 = 15,765 Vietnam dong).

13 Table T13 - Non Wood Forest Products (NWFP) Removal

13.1 FRA 2005 Categories and Definitions

Non Wood Forest Products Removal	Annual removal of a Non Wood Forest Product (NWFP) from "Forest" and "Other Wooded Land".

Following sixteen categories have been identified for reporting removal of NWFP with eight categories each for plant products and animal products.

ID No	Name of Product	ID No	Name of Product
A. Plant Products / raw material			
1	Food	5	Raw material for utensils, handicrafts and construction
2	Fodder	6	Ornamental plants
3	Raw material for Medicine and Aromatic plants	7	Exudates
4	Raw material for Colorants and dyes	8	Other plant products
B. Animal Products/ raw material			
9	Living animals	13	Raw material for medicine
10	Hides, Skins and Trophies	14	Raw material for colorants
11	Wild honey and bee-wax	15	Other edible animal products
12	Bush meat	16	Other non-edible animal products

There are no global definitions for each of these categories.

13.2 National Data

13.2.1 National Data Sources

There no national level documentation on removal of NWFP. The FAO (2002) overview of NWFP in Vietnam provides some information on the subjecte. The FIPI has collected and compiled some information (specially on resin) form concerned departments.

Source	Variable	Quality	Year
FAO. 2002. Non Wood Forest Products in 15 Countries of Tropical Asia An Overview. EC-FAO Partnership Programme (2000-2002). FAO. Bangkok.	Removal of NWFP	M	1995 to 2000
Data provided by Protection Forest Department	Removal of resin	M	1990 to 2002
Data provided by concerned offices such as: Honey corporation, news paper, institute of herb medicine. etc..	Removal of Resin	L	1990 to 2002

13.2.2 National Classification and Definitions

There are no standard national definitions.

13.2.3 Original National Data

There no national level documentation on removal of NWFP. The FAO (2002) overview of NWFP in Vietnam provides some figures for 1995 and some for 2000 and some even for

2001. Many of these figures are related to exports. These figures have been assumed to hold good both for 1995 and 2000 grouped under proper FRA 2005 categories. The figures for removal of pine resin (exudates) represents the data complied by FIPI from various sources.

FRA 2005 Category	**Scale**	**Unit**	**NWFP Removal**	
			1995	**2000**
Plant products / raw material				
1. Food		Tonnes	1337	1337
2. Fodder		Tonnes		
3. Raw material for medicine and aromatic products		Tonnes	4343	4343
4. Raw material for colorants and dyes		Tonnes		
5. Raw material for utensil, Handicrafts & construction		Tonnes	23	23
6. Ornamental plants		Tonnes		
7. Exudates		Tonnes	57900*	290800
8. Other plant product		Tonnes		
Animal Product/ raw material				
9. Living animals				
10. Hides, skins and trophies		Tonnes		
11. Wild honey and bee-wax		Tonnes	56	56
12. Bush meat				
13. Raw material for medicine				
14. Raw material for colorants				
15. Other edibles animal products		Tonnes		
16. Other non-edibles animal products		Tonnes		
Total			**63659**	**296559**

(* Note: The figure for resin for 1995 is actually for 1990)

13.3 Analysis and Processing of National Data

13.3.1 Calibration

Not considered necessary

13.3.2 Estimation and Forecasting

The removal of rubber resin in 2005 has been estimated based on local knowledge by FIPI. The removal of other NWFP in 1990 has been assumed same as in 1995 and that in 2005 same as in 2000.

FRA 2005 Category	**Scale**	**Unit**	**NWFP Removal**		
			1990	**2000**	**2005**
Plant products / raw material					
1. Food		Tonnes	1337	1337	1337
3. Raw material for medicine and aromatic products		Tonnes	4343	4343	4343
5. Raw material for utensil, Handicrafts & construction		Tonnes	23	23	23

7. Exudates		Tonnes	57900	290800	318000
Animal Product/ raw material					
11. Wild honey and bee-wax		Tonnes	56	56	56
Total			**63659**	**296559**	**323759**

13.4 Reclassification into FRA 2005 Classes

This step is not needed.

13.5 Data for National reporting table T15

FRA 2005 Category	Scale	Unit	NWFP Removal		
			1990	2000	2005
Plant products / raw material					
1. Food		Tonnes	1337	1337	1337
2. Fodder		Tonnes			
3. Raw material for medicine and aromatic products		Tonnes	4343	4343	4343
4. Raw material for colorants and dyes		Tonnes			
5. Raw material for utensil, Handicrafts & construction		Tonnes	23	23	23
6. Ornamental plants		Tonnes			
7. Exudates		Tonnes	57900	290800	318000
8. Other plant product		Tonnes			
Animal Product/ raw material					
9. Living animals					
10. Hides, skins and trophies		Tonnes			
11. Wild honey and bee-wax		Tonnes	56	56	56
12. Bush meat					
13. Raw material for medicine					
14. Raw material for colorants					
15. Other edibles animal products		Tonnes			
16. Other non-edibles animal products		Tonnes			
Total			**63659**	**296559**	**323759**

14 Table T14 - Value of Non Wood Forest Product Removal

14.1 FRA 2005 Categories and Definitions

Value of NWFP Removal	The market value of total annual removal of all primary Non Wood Forest Products (NWFP).

This table needs value for the eight categories identified each for plant products and animal products falling under NWFP.

ID No	Name of Product	ID No	Name of Product
A. Plant Products / raw material			
1	Food	5	Raw material for utensils, handicrafts and construction
2	Fodder	6	Ornamental plants
3	Raw material for Medicine and Aromatic plants	7	Exudates
4	Raw material for Colorants and dyes	8	Other plant products
B. Animal Products/ raw material			
9	Living animals	13	Raw material for medicine
10	Hides, Skins and Trophies	14	Raw material for colorants
11	Wild honey and bee-wax	15	Other edible animal products
12	Bush meat	16	Other non-edible animal products

14.2 National Data

14.2.1 National Data Sources

There no national level documentation on removal of NWFP. The FIPI has compiled some information from other departments and in addition has used FAO (2002) for this table.

Source	Variable	Quality	Year
FAO. 2002. Non Wood Forest Products in 15 Countries of Tropical Asia An Overview. EC-FAO Partnership Programme (2000-2002). FAO. Bangkok.	Removal of NWFP	M	1995 to 2000
Data provided by Protection Forest Department	Removal of resin and others	M	1990 to 2002
Data provided by offices such as: Honey corporation, news paper, institute of herb medicine. etc..	Removal of resin and others	L	1990 to 2002

14.2.2 National Classification and Definitions

There are no national classes and definitions relating to this table.

14.2.3 Original National Data

There no national level documentation on value of the removal of NWFP. The FAO (2002) overview of NWFP in Vietnam provides some figures for 1995 and some for 2000 and some even for 2001. All the figures are in US dollars and most of them relate to exports. These figures have been assumed to hold good both for 1995 and 2000 and grouped under proper FRA 2005 categories. The data on value of resin (exudates) is a compilation by FIPI from

various sources. In following table, no adjustment has been made for changes in exchange rates as the value are broad approximations and based on broad assumptions.

FRA 2005 Categories	Value in 000 US dollars	
	1995	2000
Plant products / raw material		
1. Food	2323	2323
3. Raw material for medicine and aromatic products	9148	9148
5. Raw material for utensil, Handicrafts & construction	64	64
7. Exudates	50489	253578
Animal Product/ raw material		
11. Wild honey and bee-wax	676	676
Total	**62700**	**265789**

14.3 Analysis and Processing of National Data

14.3.1 Calibration

Not considered necessary

14.3.2 Estimation and Forecasting

The price of resin have stabilised hence same price has been assumed for 1990, 2000 and 2005 (US$872/tonne). In case of rest of the NWFP only values are known. The value of NWFPS in 2000 values have been assumed for 2005.

FRA 2005 Category	Value in 000 US$		
	1990	2000	2005
Plant products / raw material			
1. Food	2323	2323	2323
3. Raw material for medicine and aromatic products	9148	9148	9148
5. Raw material for utensil, Handicrafts & construction	64	64	64
7. Exudates	50489	253578	277296
Animal Product/ raw material			
11. Wild honey and bee-wax	676	676	676
Total	**62700**	**265789**	**289507**

14.4 Reclassification into FRA 2005 Classes

This step is not needed.

14.5 Data for National Reporting Table T14

FRA 2005 Category	Value of NWFP Removal (000 US dollars)		
	1990	**2000**	**2005**
Plant products / raw material			
1. Food	2323	2323	2323
2. Fodder			
3. Raw material for medicine and aromatic products	9148	9148	9148
4. Raw material for colorants and dyes			
5. Raw material for utensils, handicrafts & const.	64	64	64
6. Ornamental plants			
7. Exudates	50489	253578	277296
8. Other plant products			
Total			
Animal products / raw material			
9. Living animals			
10. Hides, skins and trophies			
11. Wild honey and bee-wax	676	676	676
12. Bush meat			
13. Raw material for medicine			
14. Raw material for colorants			
15. Other edible animal products			
16. Other non-edible animal products			
TOTAL	**62700**	**265789**	**289507**

15 Table T15 - Employment in Forestry

15.1 FRA 2005 Categories and Definitions

Primary Employment	The employment provided within the "Forest and "Other Wooded Land" by activities relating to primary (raw) production of goods, provision of services, and other primary activities.
Primary Activities	The forestry activities within the "Forest" and "Other Wooded Land". FRA 2005 classifies forestry activities into three broad classes; activities relating to "Wood Removal", "Non Wood Forest Product Removal" and "Other Primary Activities".
Other Primary Activities	The forestry activities, within the "Forest" and "Other Wooded Land", other than those related to "Wood Removal" (including "wood fuel" or "fuelwood" removal) and removal of "NWFP".

15.2 National Data

15.2.1 National Data Sources

The employment by production and other activities in forest is not reported at the national level.

15.2.2 National Classification and Definitions

No national definitions are available.

15.2.3 Original National Data

Category	Unit	1990	2000	2005
Rubber plantation	Employment per ha	0.25	0.25	0.25
Forest enterprises and forestry offices	Employment (000 Man year)	60	106	106

15.3 Analysis and Processing of National Data

15.3.1 Calibration

Calibration is not needed

15.3.2 Estimation and Forecasting

The employment by production and other activities in forest is not reported at the national level. Therefore, employment figures have been estimated using following methods. Further it has been assumed that figures for 2005 will be same as in 2000 because no change is expected between 2000 to 2005.

A. Employment through rubber plantations

An estimate of labour time to take care of plantations, to protect it from fire and collect resin etc. was developed and applied over the area of rubber plantations (National Reporting Table1) to provide data on annual employment (labour force).

B. Employment through Publicly owned forests

An estimate of labour employed by Forest Department to conserve and manage publicly owned forest land was developed by aggregating information coming from provincial Forest departments for 1990 and 2000

Category	Unit	Year		
		1990	2000	2005
Rubber plantation	Area in 000 ha	222	412	480
	Employment per ha	0.25	0.25	0.25
	Employment (000 Man year)	56	103	120
Forest enterprises and forestry offices	Employment (000 Man year)	60	106	106

15.4 Reclassification into FRA 2005 Classes

The employment through publicly owned forest has been apportioned to "goods" and services" based on the percentage of forests under conservation (8% in 1990 and 15 percent in 2000).

Table: Reclassification (Percentage allocation) into FRA 2005 classes

National Category	Percentage of a National Category to a FRA Category		
	Production of goods	**Provision of services**	**Unspecified**
Employment through Rubber Plantations	**100**		
Employment through Publicly owned forests in 1990	**92**	**8**	
Employment through Publicly owned forests in 1990	**85**	**15**	

15.5 Data for National Reporting Table T15

FRA 2005 Category	Employment (1000 person-years)	
	1990	**2000**
Primary production of goods	111	194
Provision of Services	5	16
Unspecified forestry activities		
Total	**116**	**210**