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Food and Agriculture Organization of the United Nations

**GLOBAL FOREST RESOURCES
ASSESSMENT 2005**

ITALY

COUNTRY REPORT

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The Forest Resources Assessment Programme

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

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

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

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

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1 Table T1 - Extent of Forest and Other wooded land

1.1 FRA 2005 Categories and definitions

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

1.2 National data

1.2.1 Data sources

References to sources of information	Quality (H/M/L)	VARIABLE(S)	Year(s)	Additional comments
Ministero dell’Agricoltura e delle Foreste - ISAFA. 1988. <i>Inventario Forestale Nazionale. Sintesi metodologica e risultati.</i>	H	Forests; Other Wooded Land; Other land	1985	
Ministero delle Politiche Agricole e Forestali – ISAFA. 2004 (In progress) <i>Inventario Nazionale delle Foreste e del Carbonio.</i> Preliminary results.	M	Forest+OWL; Many other variables not yet available	2002	The Inventory is still in progress. Reported data refers to its first phase (Interpretation of Orthophotos 2002) and partially to 6000 points controlled on the ground (out of a total of 30000 ones)
FAOSTAT http://apps.fao.org/faostat/form?collection=LandUse&Domain=Land&servlet=1&hasbulk=0&version=ext&language=EN	H	Total area	1990 2000	

1.2.2 Classification and definitions

The Forest Inventory (here in after IFN) carried out in 1985, applied the following thresholds to define “Forest land”:

- Minimum area - 2 000 square meters
- Minimum width - 20 m
- Minimum density - 20%

National class - IFN 1985	National definition
High forest	Forest normally composed of trees of seedling origin.
Coppice	Forest originating mainly from sprouts or root suckers rather than seed.
Plantations and specialised stands	- <u>Forest formations for wood production</u> : poplar plantations and others rapid-growth coniferous plantations. - <u>Forest formations for non-wood production</u> : planted or natural forest formations for NWFP production (including chestnut and cork oak formations).
Particular woody formation	Natural wooded lands having a cover density of at least 20%, composed by trees and shrubs species, not managed for economic purposes. - <u>Riparian formations</u> : can be composed by trees species or shrubs species growing in particularly difficult areas. - <u>Shrub formations</u> : mainly composed by shrub species.
Included areas (in forest areas)	Included areas with no forest cover falling within a forest and having a small extent (minor than 0.2 ha) not interrupting the continuity of the forest. Can be distinguished in: - <u>Permanently not productive</u> : rocks, rivers, lakes, pasture and fields, agricultural lands, forestry nurseries, etc. - <u>Temporally not productive</u> : bare lands or abandoned agricultural that may be colonized by woody formations.

Source: FI 1985

National classes - ongoing IFN	National definitions
Plantations	Artificial forest stands aimed at wood production meeting FRA 2005 definition of “Forest” (this class belongs to “Forest” as defined by FRA).
Forests and OWL	Same as FRA 2005 nomenclature (Not broke down at present).

Source: Ongoing Forest Inventory (Ortho-photos year 2002).

1.2.3 Original data

National classes	Area ha (1985)
High stands	2 242 679
Coppices	3 791 707
Plantations and specialised stands	288 900
Particular woody formation	2 160 900
Included areas	190 800

Source: FI 1985

Accounting of data originally collected for different species and silvicultural-systems. (Full list available in this report at table 5.7.3)

National classes	AREA HA (2002)
Plantations for wood production	145 509
Forests and OWL	10 528 080

Source: Ongoing FI
Preliminary data (Interpretation of Ortho-photos).

1.3 Analysis and processing of national data

1.3.1 Calibration

No calibration was carried out because the forest inventories do not take into account total land area.

1.3.2 Estimation and forecasting

Due to the incompatibility of the national classifications, the reclassification was done according to the FRA categories. Estimation and forecast were then carried out on the reclassified data.

1.4 Reclassification into FRA 2005 classes

Reclassification (Percentage allocation) into FRA 2005 classes

National Land use Classes 1985	Percentage of a National class belonging to a FRA Class				Inland Water
	Forests	Other Wooded Land*	Other Land Total	Other Land with Tree Cover	
Percentage	%	%	%	%	%
High forest	100				
Coppice	100				
Productive forest formation	100				
Particular woody formation	61.86	38.14			
Included areas	100				

*To retrieve the 1985's area of OWL it was assumed that the ratio OWL/Forest had not changed during 17 years (1985-2002). On the basis of the ongoing IFN (based on orthophotos taken in 2002) this ratio is equal to 9.5%. Thus the same percentage was applied to all 1985's classes and OWL, which finally resulted equal to the 38,14% of the whole national class "Particular woody formation".

National Land use Classes 2000	Percentage of a National class belonging to a FRA Class				Inland Water
	Forests	Other Wooded Land	OTHER LAND WITH TREE COVER	Other Land	
Percentage	%	%	%	%	%
Plantations	100				
Forest and OWL	90.5	9.5			

Preliminary data from the ongoing National Forest Inventory.
(Ortho-photos 2002)

The percentage of OWL was estimated taking into account the results of a sub-sample (about 20% of total number) of inventory points already visited on the field during the second operational phase of the IFN (here in after Phase II).

The estimation for 1990 was done through a linear interpolation between the 1985 and 2002 data. By assuming that the defined trend could be valid for the near future, it was possible to extrapolate and forecast data for 2005.

Data source	Forest (ha)	OWL (ha)
IFNI 1985	7 850 862	824 124
Ongoing IFN	9 659 598	1 013 991

Table: Estimation for 1990 and 2000 and forecasting for 2005

Years	Forest (ha)	OWL (HA)
1990	8 382 843	879 967
2000	9 446 806	991 654
2005	9 978 787	1 047 497

1.5 Data for National reporting table T1

FRA 2005 Categories	AREA (1000 HECTARES)		
	1990	2000	2005
Forest	8 383	9 447	9 979
Other wooded land	880	992	1 047
Other land	20 148	18 972	18 385
of which with tree cover	n.a.	n.a.	n.a.
Inland water bodies*	723	723	723
TOTAL	30 134	30 134	30 134

* calculated by subtracting total land area from total country surface as reported in FAOSTAT

1.6 Comments to National reporting table T1

The Italian Ministry of Agriculture and Forests (MAF) and the Experimental Institute for Forest Management (ISAFMA) carried out the first National Forest Inventory in 1985. As a result of the IFN, based on a regular sampling grid of 3 km by 3 km, the global Italian extent of forest resources (F+OWL) was about 8.7 million hectares.

A second National Forest Inventory, using a grid of 1km by 1 km, had been launched in 2001. Some preliminary results of the first inventory phase (interpretation of orthophotos) were used for the compilation of the present report. Thus this source of information refers to the 2002.

Additional source of information is the National Institute of Statistics (ISTAT), which provides annual data on forest area extent. Unfortunately the forest definition adopted by ISTAT implies a minimum cover density of 50% and a minimum forest extent of 0.5 hectares. This leads to an underestimation of the actual forest resources as less dense formations are not considered. This is the reason why such an important set of historical data was not used to estimate and forecast the forest area extent for the requested years.

To retrieve the percentage of OWL from the classes of the only completed Forest National Inventory (1985) it was assumed that the ratio OWL/Forest had not changed during the last 17 years being equal to of 9.5%. This percentage was estimated taking into account the results obtained by controlling on the ground about 6 000 sampling points out of the total of 30 000 ones provided by the second phase of the ongoing inventory.

More precise figures than the ones estimated and forecasted in this report will be available in 2006, as a final result of the new forest inventory. Anyway, although the quality of Forest resources assessment reported here can be further improved, this report can be considered an advancement compared with the TBFRA 2000. This because, for the first time in Italy, the new Forest Inventory (whose partial data were used here) is collecting first hand information on land cover and land use fully adopting FRA thresholds and definitions. On the other hand in previous assessments reclassification of previous non-consistent data had always been made. As different methodologies lead to different results, discrepancies comparing the extent of Forest and Other wooded land reported in TBFRA 2000 and FRA 2005 can be found. For the same reason the annual forest area increase retrievable from TBFRA 2000 and the present report varies substantially.

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
ISTAT http://www.istat.it/Imprese/Agricoltura/index.htm	M	Public forest; Private forest; Other property	2000	
ISTAT 1993 <i>Statistiche Forestali</i> . Annuario n 43, edizione 1993	M	Public forest; Private forest; Other property	1990	

2.2.2 Classification and definitions

The source documents provided the forest distribution according to the following ownership categories: state forest; private forest; forest belonging to municipalities and other institutions such as rural or religious communities.

No information on Other Wooded Land (OWL) is available.

2.2.3 Original data

National classes	State (ha)	Municipalities (ha)	Others institutions (ha)	Private (ha)	Total (ha)
High forest	271 611	1 094 902	164 708	1 399 995	2 931 216
Coppice	197 141	755 249	189 609	2 585 867	3 727 866
Total forest Area	468 752	1 850 151	354 317	3 985 862	6 659 082

Source: Istat 1990

National classes	State (ha)	Municipalities (ha)	Others institutions (HA)	Private (ha)	Total (ha)
High forest	287 850	1 105 703	162 804	1 413 309	2 969 666
Coppice	193 650	732 603	186 396	2 505 293	3 617 942
Total forest	481 500	1 838 306	349 200	3 918 602	6587608

Source: Istat 2000

2.3 Analysis and processing of national data

2.3.1 Calibration

Original ISTAT data was calibrated to match with forest area as reported in table T1.

2.3.2 Estimation and forecasting

No estimation needed.

2.4 Reclassification into FRA 2005 classes

Reclassification (Percentage allocation) into FRA 2005 classes

NATIONAL CLASSES OF OWNERSHIP	Percentage of a National class belonging to a FRA Class		
	Public Ownership	Private Ownership	Other or unspecified Ownership
Percentage	%	%	%
State	100		
Municipalities	100		
Other institutions		100	
Private		100	

Share of private and public forest (reclassified data)

Year	Total Forest As in Tabe T1	Total Forest (ISTAT)	Forest owned by State and Municipalities		Forest owned by Private and Others	
	(ha)	(ha)	(ha)	%	(ha)	%
1990	8 382 843	6 659 082	2 318 903	35	4 340 179	65
2000	9 446 806	6 853 796	2 386 928	35	4 466 868	65

Percentages in the table above, applied to forest area in T1 give the following share of area

Year	Public Forest (ha)	Private Forest (ha)
1990	2 933 995	5 448 848
2000	3 306 382	6 140 424

2.5 Data for National reporting table T2

FRA 2005 Categories	AREA (1000 HECTARES)			
	Forest		Other wooded land	
	1990	2000	1990	2000
Public ownership	2 934	3 306	n.a.	n.a.
Private ownership	5 449	6 140	n.a.	n.a.
Other ownership	0	0	n.a.	n.a.
TOTAL	8 383	9 446¹	n.a.	n.a.

2.6 Comments to National reporting table T2

¹ The difference between this total and the Forest extent reported in chapter T1 (9 447 ha) is only due to rounding off of the data concerning the ownership categories in the present table.

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.

3.1.1 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
Ministero dell'Agricoltura e delle Foreste-ISAFA . 1988 <i>Inventario Forestale Nazionale Sintesi metodologica e risultati</i>	H	Production Forest; Protective Forest; Conservation Forest; Social service Forest	1985	
Ministero dell'Ambiente e della Tutela del Territorio – Centro Interregionale. 1995	M	Corine Land Cover – Level 3	1990	
APAT (National Agency for the Protection of the Environment). 2004	M	Corine Land Cover – Level 3	2000	
Ministero dell'Ambiente e della Tutela del Territorio – Direzione protezione Natura (MATT-DPN). 2004	H	Protected areas:-Official National list;-RAMSAR sites;-Natura 2000 network's Special; Protection areas (SPAs) and Sites of Community Importance (SCI) (2000 and 2003 data only)	1993 2000 2003	Ministry of Environment's <i>ad hoc</i> elaboration

3.2.2 Classification and definitions

The IFNI 1985 provides figures on forest designated to primary, secondary and accessory function. The following are the definitions applied by Corine Land Cover (CLC).

Classes	Definitions
Broadleaved forests	Vegetation formation composed principally of trees, including shrubs and bush, where broadleaved species predominate
Coniferous forests	Vegetation formation composed principally of trees, including shrub and bush, where coniferous species predominate
Mixed forests	Vegetation formation composed principally of trees, including shrub and bush, where broadleaved and coniferous species co-dominate
Moors and heathland	Vegetation with low and closed cover, dominated by bushes, shrubs and herbaceous plants (heath, briars, broom, gorse, laburnum, etc)
Sclerophyllous vegetation	Bushy sclerophyllous vegetation
Transitional woodland/shrub ²	Bushy or herbaceous vegetation with scattered trees Can represent either woodland degradation or forest regeneration/colonization

² In the Italian context, the definition has to be mainly interpreted as “forest colonization”.

3.2.3 Original data

Type of functions of Italian forest resources (Forest and OWL aggregated)	Primary	Secondary	Accessory	Total area with function
	ha	ha	ha	ha
Wood production	4 886 100	406 800	12 600	5 305 500
Non wood production	158 400	38 700	3 600	200 700
Protective direct	429 300	544 500	27 000	1 000 800
Protective indirect	2 461 500			2 461 500
Environmental*	576 900			576 900
Touristic-recreational	17 100	47 700	29 700	94 500
Total**	8 529 300	990 000	43 200	9 639 900
Unknown***	145 686			
Total Forest 1985	8 674 986			

* Total forest resources in protected areas

** Total of upper rows

*** Value retrieved subtracting the total (mentioned above) from the sum of the national classes reported in Table T1.2.3

Source: IFNI 1985

Share of primary functions in Particular Woody Formation	%
Wood production	4 .7
Non wood production	0 .1
Protective direct	9 .1
Protective indirect	80 .2
Environmental	5 .7
Touristic-recreational	0 .2

Source: IFNI 1985

Main legal bindings on Italian Forest resources (Forest and OWL)	Legal act	Year of enforcement	Bound area %
Hydro-geological protection	R .D. L. 3267	1923	89.4*
Landscape protection	L. 431	1985	100
Prevention and control of Forest Fires	L. 353	2000	100 (of burnt area)

*Source: IFNI 1985

3.3 Analysis and processing of national data

3.3.1 Calibration

It was assumed that the 1985's share of designated primary functions for forest resources (F+OWL) was applicable to the 1990's Forest area. For this purpose data calibration was necessary to match with area reported in Table T1.

Type of function - Forest and OWL aggregated (1985)	Primary	Secondary + Accessory	TOTAL AREA WITH FUNCTION
	ha	ha	ha
Wood production	4 886 100	419 400	5 305 500
Non wood production	158 400	42 300	200 700
Protective direct	429 300	571 500	1 000 800
Protective indirect	2 461 500		2 461 500
Environmental	576 900		576 900
Touristic-recreational	17 100	77 400	94 500
Hydro-geological protection*		4 293 137	4 293 137
Landscape protection (by law)		8 674 986	8 674 986
Unknown	145 686		

* To avoid double counting, this category was calculated subtracting, from the 89,4% of the whole forest resources (bound by law for hydro-geological protection - RDL 3267/1923), all areas already assigned to any protective function by the IFN 1985 (upper rows)

Type of function	Primary (F+OWL 1985)	Primary calibrated (Forest 1990)	Total area with functions (F+OWL 1985)	Total calibrated (Forest 1990)
	ha	ha	ha	ha
Wood production	4 886 100	4 721 553	5 305 500	5 126 829
Non wood production	158 400	153 066	200 700	193 941
Protective direct	429 300	414 843	1 000 800	967 097
Protective indirect	2 461 500	2 378 605	2 461 500	2 378 605
Environmental	576 900	557 472	576 900	557 472
Touristic-recreational	17 100	16 524	94 500	91 318
Hydro-geological protection			4 293 137	4 148 559
Landscape protection			8 674 986	8 382 843
Unknown	145 686	140 780		
Total	8 674 986*	8 382 843	22 608 023	21 846 664

*Total Forest 1990

3.3.2 Estimation and forecasting

1985 data was considered valid for 1990, thus estimation was not necessary. The only exception being "area with environmental function", which in 1990 augmented up to 695 000 ha (estimation for Forest and OWL aggregated) due to the establishment of new protected areas. Thus, difference of Forest protected area between 1990 and 1985, was subtracted from the area with unknown function, after calibration.

As regards OWL, percentages shown in the table: “Share of primary functions in Particular woody formation”³ were applied to 1990’s OWL area reported in Table T1.

To retrieve information on the function “Conservation of Biodiversity”, the Ministry of Environment calculated the extent of protected Forest and OWL for the years 1993 (year of the first National Official List of Protected Areas), 2000 and 2003 (latest update of Official National List), while final data for 1990 and 2005 were assessed (by the same experts) taking into account also dates of institution of several protected areas. See following table and related methodological notes.

CORINE Land Cover Classes	Forest resources under protection		
	1993*	2000**	2003**
	ha	ha	ha
Broadleaved forests	633 100	1 650 500	1 683 600
Coniferous forests	134 000	385 700	409 900
Mixed forests	104 500	255 000	273 500
Moors and heathland ***	54 500	110 400	111 300
Sclerophyllous vegetation	49 200	264 100	267 700
Transitional woodland/shrub	154 200	319 100	325 100
Burned areas	100 000		3 600
Total	1 129 600	2 984 800	3 074 700

Source: Ministero dell’Ambiente e della Tutela del Territorio – Direzione Protezione Natura

* Data obtained overlapping in GIS Corine LC 1990 (level 3) and all Italian protected areas (1993’s National Official List + Ramsar sites).

** Data obtained overlapping in GIS Corine LC 2000 (level 3) and all Italian protected areas (2000’s and 2003’s National Official List + Ramsar sites + Natura 2000 network’s Special Protection areas and Sites of Community Importance).

*** Considered as OWL in the reclassification.

In the compilation of the national reporting table a rough estimation for 2000 and forecast 2005 was possible only for the following categories: Total area with functions, Conservation, Protection and Social services. The latter two, just taking into account the main legal bindings on forest resources.

³ As explained in chapter T1, OWL are equivalent to the 38,14% of the whole national class “Particular woody formation”.

3.4 Reclassification into FRA 2005 classes

3.4.1 Reclassification (Percentage allocation) into FRA 2005 classes

Type of function	Production	Protection	Conservation	Social services	Unknown
Percentage	%	%	%	%	%
Wood production	100				
Non wood production	100				
Protective direct		100			
Protective indirect		100			
Hydro-geological protection		100			
Environmental (Protected Areas)			100		
Touristic-recreational				100	
Landscape protection				100	
Unknown					100

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	4 875	n.a.	n.a.	5 351	n.a.	n.a.
Protection of soil and water	2 793	n.a.	n.a.	7 537	8 445	8 921
Conservation of biodiversity	645	2 874	2 980	645	2 874	2 980
Social services	17	n.a.	n.a.	8 522	9 447	9 979
Multiple purpose	0	n.a.	n.a.	not. app.	not. app.	not. app.
No or unknown function	53	6 573	6 999	not. app.	not. app.	not. app.
Total - Forest	8 383	9 447	9 979	not. app.	not. app.	not. app.
Other wooded land						
Production	42	n.a.	n.a.	n.a.	n.a.	n.a.
Protection of soil and water	786	n.a.	n.a.	787	887	936
Conservation of biodiversity	50	110	120	50	110	120
Social services	2	n.a.	n.a.	882	992	1 047
Multiple purpose	0	n.a.	n.a.	not. app.	not. app.	not. app.
No or unknown function	0	882	927	not. app.	not. app.	not. app.
Total - Other wooded land	880	992	1 047	not. app.	not. app.	not. app.

3.6 Comments to National reporting table T3

As already mentioned above, Italian Forest Resources are 100% legally bound. The two main bindings provided by the laws n. 3267 of 1923 and n. 431 of 1985 compel private and public owners to strictly respect limitations concerning the use of their forest resources. As a matter of fact, each exploitation of forest resources must not compromise their perpetuation and therefore, any change of land use; this for the sake of hydro-geological, landscape and environmental protection in general (the same limitations apply also to burnt forest and OWL, due to the law on forest fires approved in 2000). As a consequence not only unplanned cuttings are always forbidden, but local (at level of Province) prescriptions fix precise silvicultural rules to be observed. Only exception made for productive forestry plantations, such as poplar stands, usually located on plains and managed according to intensive silvicultural techniques.

In conclusion, the 100% of Italian Forest and OWL are to be recognised “managed” according with the current UN/FAO definition, even if previous reports as the *TBFRA* and *FRA 2000* or the *State of World's Forests 2001* only mention the limited extent of forest included in formal management plans.

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
WWF. 1994 Petretti F. & Lombardi P. "Lo stato delle Foreste primarie naturali e seminaturali in Europa Occidentale"	L	Primary Forest	1994	
Ministero dell'Agricoltura e delle Foreste-ISAFA. 1988. <i>Inventario Forestale Nazionale. Sintesi metodologica e risultati.</i>	H	Plantations and specialised stands	1985	
Ministero delle Politiche Agricole e Forestali – ISAFA. 2004 (In progress) <i>Inventario Nazionale delle Foreste e del Carbonio.</i> Preliminary results.	H	Productive plantations	2002	

4.2.2 Classification and definitions

Insufficient data.

4.2.3 Original data

The extent of Italian primary forest according with FRA 2005 definition is not well known. Anyway such extent was estimated by WWF in 1994 equal to 160 000 ha. To compile this report, this data was considered unvaried for the years 1990 and 2000. Italian primary forest is mainly located within protected areas managed by the State or local Administrations.

No information concerning Modified natural, Semi-natural, protective plantations is available.

As concerns Productive plantations, the total obtained by the Forest Inventory carried out in 1985 was equal to 288 900 ha of which 134 100 devoted to wood production and 154 800 to non wood products (e.g. cork and nuts). Unfortunately the preliminary results of the ongoing Inventory refer just to specialised plantation for wood production.

National class	1995 Area (ha)
Primary Forest	160 000

Source: WWF 1994

National classes	1985*	2002**
	ha	ha
Productive plantations for wood production	134 100	145 509
Productive plantations for wood production	154 800	n. a.

* IFN 1985

** Preliminary data from the ongoing National Forest Inventory (Ortho-photos 2002)

4.3 Analysis and processing of national data

4.3.1 Calibration

No calibration was made.

4.3.2 Estimation and forecasting

Area of plantations for wood production was estimated equal to 144 167 ha by means of linear interpolation between 1985 and 2002 inventory values.

Forest, which is neither Primary nor Plantation, is shared out into the categories Modified natural or Semi-natural, but even if it is commonly known that most Italian forest belongs to the Modified natural class, any break down is impossible due to the lack of specific information. Thus no data on the matter is reported in the final table 4.5.

4.4 Reclassification into FRA 2005 classes

Reclassification (Percentage allocation) into FRA 2005 classes

National Classes	Percentage of a National Class into a FRA class								
	Primary F	Mod F	Semi F	Prod Pl F	Prot Pl F	Pri OWL	Mod OWL	Semi OWL	Prot Pl OWL
Percentage	%	%	%	%	%	%	%	%	%
Primary Forest	100								
Plantations				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	160	160	n.a.	n.a.	n.a.	n.a.
Modified natural	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Semi-natural	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Productive plantation*	289	144	146	n.a.	n.a.	n.a.
Protective plantation	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
TOTAL	8 383	9 447	9 979	880	992	1 047

* 1990 value refers to all productive plantations, 2000 and 2005 values refer to plantations for wood production only.

4.6 Comments to National reporting table T4

5 Table T5 – Growing stock

5.1 FRA 2005 Categories and definitions

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

5.2 National data

5.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ministero dell'Agricoltura e delle Foreste-ISAFA 1988 <i>Inventario Forestale Nazionale Sintesi metodologica e risultati</i>	H	Growing stock; Commercial growing stock	1985	
http://gaia.agraria.unitus.it/download/alsom.html	H	Growing stock	2001	Collection of Forest Yield Tables
M. Vitullo, S. Federici & R. Koeble; 2003 "EU FOREST INVENTORY DATA Elaboration. and implementation of forest inventory data in the frame of the CARBODATA information system, comparison of tree species distribution from different data sources and analysis of the representativity of the CarboEuroflux sites for the European forests" Technical report of European Commission – Directorate-General Joint Research Centre, Institute for Environment and Sustainability, October 2003)	H	Algorithm	2003	Richards function

5.2.2 Classification and definitions

The volume was calculated starting from a minimum diameter of 2.5 cm at breast height. The volume for conifers other than pines was calculated for the entire stem excluding branches and top, while the formulas used to estimate the volume for broadleaves and pines with expanded crown included the stem and branches (excluding twigs with diameter less than 3 cm).

5.2.3 Original data

Forest types	Area (ha)	Volume/ha (m ³ /ha)	Total volume (m ³)
HIGH FOREST			
Norway spruce	443 497.21	257.80	114 334 352.15
Silver fir	74 138.25	297.54	22 058 738.45
Larches	281 374.72	167.81	47 218 645.53
Mountain pines	312 181.15	153.49	47 915 672.64
Mediterranean pines	126 614.08	99.84	12 641 658.93
Other conifers	27 310.84	105.96	2 893 821.10
European beech	335 679.36	196.71	66 030 935.16
Turkey oak	112 423.07	137.44	15 451 778.24
Other oaks	205 685.08	93.92	19 317 584.15
Other broadleaves	323 775.23	116.13	37 598 479.80
COPPICE			
Beech	452 881.99	115.31	52 221 793.46
Chestnut	534 453.39	107.44	57 419 481.67
Hornbeams	429 867.37	52.30	22 482 931.81
Other oaks	778 751.64	39.60	30 836 359.02
Turkey oak	382 477.83	84.01	32 132 790.49
Evergreen oaks	209 873.85	71.05	14 911 400.16
Other broadleaves	887 106.75	52.94	46 966 133.90
Conifers (spread in coppice stands)	116 294.17	107.07	12 451 969.93
PLANTATIONS AND SPECIALISED STANDS			
Eucalyptus coppices	900.00	100.31	90 275.75
Other broadleaved coppices	2 700.00	99.56	268 804.24
Poplars	110 700.00	95.11	10 528 842.74
Other broadleaved stands	11 700.00	84.81	992 225.00
Conifers	8 100.00	121.38	983 160.00
Other specialised stands	154 800.00	228.75	35 409 984.76
PARTICULAR WOODY FORMATIONS			
Rupicolous forest	575 100.00	60.65	34 878 352.26
Riparian forest	110 700.00	179.36	19 855 417.03
Shrublands	1 475 100.00	51.74	76 319 319.56
INCLUDED AREAS	190 800.00	0	0
TOTAL	8 674 986.00	96.16	834 210 907.92

Source: Forest Inventory (1985 data)

5.3 Analysis and processing of national data

5.3.1 Calibration

No calibration needed.

5.3.2 Estimation and forecasting

The estimation and forecast of aboveground biomass for 1990, 2000 and 2005 were made applying the following methodology:

1. the initial growing stock volume is the 1985 growing stock data (NFI);
2. starting from 1985, for each year, the current increment per hectare [$\text{m}^3 \text{ha}^{-1}$] was computed with the derivative Richards function⁴, for each forest typology by the Italian yield tables collection;
3. starting from 1986, for each year the growing stock per hectare [$\text{m}^3 \text{ha}^{-1}$] was computed, from the previous year growing stock volume, with the addition of the calculated increment (“y” value of the derivative Richards) for the current year and subtraction of the losses due to harvest⁵, mortality and fire⁶ for the current year.

The equation being:

$$v_i = \frac{V_{i-1} + I_i - H_i - F_i - Mi}{A_i} \quad \text{where } I_i = f(v_{i-1}) \cdot A_{i-1} \text{ is estimated year by year applying the derived}$$

Richards function and:

- v_i is the volume per hectare of growing stock for the current year
- V_{i-1} is the total previous year growing stock volume
- I_i is the total current increment of growing stock for the current year
- H_i is the total amount of harvested growing stock for the current year
- F_i is the total amount of burned growing stock for the current year
- Mi is the annual rate of mortality
- A_i is the total area referred to a specific forest typology for the current year
- v_{i-1} is the previous year growing stock volume per hectare
- A_{i-1} is the total area referred to a specific forest typology for the previous year
- f is the Richards function reported above

The resultant value of volume per hectare for the year 1990, 2000 and 2005 was multiplied by the correspondent forest area of 1990, 2000 and 2005 indicated in T1 (see 5.5 for further details).

To assess the growing stock of the OWL, in the mentioned equation, the average per-hectare growing stock of the national class “shrubland” was used.

⁴ In the followed approach the Richards function is fitted through the data of growing stock [m^3] and increment [$\text{m}^3 \text{y}^{-1}$] obtained by the data of the national forestry inventory and yield tables collection. The independent variable, x, represents the growing stock of the stand, while the dependent variable y is the correspondent increment computed with the Richards function - first derivative.

$$\frac{dy}{dt} = \frac{k}{v} \cdot y \cdot \left[1 - \left(\frac{y}{a} \right)^v \right] + y_0 \quad (\text{first derivative})$$

where the general constrain for the parameters are the following:

$$a, k > 0 \quad -1 \leq v \leq \infty \quad e \quad v \neq 0$$

The constant y_0 is derived from the data of age and volume reported in the yield tables: more precisely y_0 has the value of the volume for the age 1. After choosing the function, it is fitted to the measurements by non-linear regression. The minimization of the deviation is performed by the least squares method. The model performances were evaluated against the data by validation statistics according to Jabssen. and Heuberger (1995).

⁵ Reported in T11

⁶ Reported in T8

The annual rate of mortality for the calculation was estimated as equal to 1/20th of the global amount of volume of standing dead trees reported in IFN 1985, according to the GPG LULUCF 2003 (IPPC).

No documented information is available on the share of commercial Growing stock, which was roughly estimated by subtracting, from the total volume, the part falling in protected areas where fellings are normally limited. The average-per-ha Growing Stock was multiplied by the extent of forest resources in protected areas as reported in table 3.5 under the category “Conservation of Biodiversity”. As a result in the 1990/2005 period non-commercial Growing Stock varies with the increase of protected forest areas. Nevertheless it must be said that such limitations do not usually apply to the protected areas as a whole (e.g. National Parks), but to their main cores while in buffer surrounding zones, authorised removals can be allowed.

It is deemed that this over-estimation of the non-commercial Growing Stock largely compensates the part of forest resources which is inaccessible, strictly aimed at protection of soil and water or not covered by commercial species.

As regards smallest assortments (minimum diameter always > 2.5 cm), they are usually marketed as wood fuel or wood chips and have to be considered part of the commercial Growing Stock.

5.4 Reclassification into FRA 2005 classes

Reclassification (Percentage allocation) into FRA 2005 classes

National Classification	% of a National Class belonging to a FRA Class	
	Growing Stock	Commercial Growing Stock
Volume minimum diameter > 2.5 cm ⁷	100	Variable with reference years

FRA 2005 Categories	Volume over bark					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Total Growing Stock - GS (000 m ³)	1 051 400	1 289 400	1 447 200	56 700	83 600	96 800
Area (000 ha)	8 383	9 447	9 979	880	992	1 047
GS/Area (m ³ /ha)	125,42	136,49	145,02	64,43	84,27	92,45
Conservation of Biodiversity (000 ha)	645	2.800	2.980	50	100	120
GS in Forest for Conservation of Biodiv.(000 m ³)	80 896	382 166	432 173	3 222	8 427	11 095
Commercial GS (m³)	970 504	907 234	1 015 027	53 478	75 173	85 705

⁷ This is also equal to Commercial growing stock.

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	1 051.4	1 289.4	1 447.2	56.7	83.6	96.8
Commercial growing stock	970.5	907.2	1 015.0	53.5	75.2	85.7

Specification of country threshold values	Unit	Value	Complementary information
1 Minimum diameter at breast height of trees included in Growing stock (X)	cm	2.5	
2 Minimum diameter at the top end of stem (Y) for calculation of Growing stock	cm	3 ⁸	
3 Minimum diameter of branches included in Commercial Growing stock (W)	cm	3 ⁹	
4 Minimum diameter at breast height of trees in Commercial growing stock (Z)	cm	2.5	
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	no	

5.6 Comments to National reporting table T5

Growing stock and related carbon pools were assessed estimating the evolution in time of the three component of the Total Woody biomass: the aboveground biomass, the belowground biomass and the dead mass (see paragraph 6.2.2 for further details).

⁸ For broadleaves and conifers with expanded crowns. Volume for other conifers was calculated up to the top of the trees.

⁹ For broadleaves and conifers with expanded crowns. Volume for other conifers was calculated without branches.

6 Table T6 - Biomass stock

6.1 FRA 2005 Categories and definitions

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

6.2 National data

6.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ministero dell'Agricoltura e delle Foreste-ISAFA. 1988 <i>Inventario Forestale Nazionale Sintesi metodologica e risultati</i>	H	Used to estimate: Aboveground tree biomass	1985	
Preliminary results of "Progetto Riselvitalia" – ISAFA. 2004 Personal communication	M	Above and belowground biomass expansion factors (BEF)	-	Project still in progress
Giordano, G. 1971 <i>Tecnologia del legno</i> . UTET, Torino	H	Wood basic density (WBD)	-	Manual of wood processing

6.2.2 Classification and definitions

Applying the methodology outlined in table T5, the evolution in time of the three component of the Total Woody biomass was estimated as follows:

Aboveground biomass (d.m. = dry matter)

- starting from the 1985 growing stock data (NFI), the amount of aboveground tree biomass [t] was calculated, for each forest typology, as showed in table 6.2.3 using the formula:

$$\text{Aboveground tree biomass(d.m.)} = GS \cdot BEF \cdot WBD \cdot A$$

where:

GS = volume of growing stock (NFI 1985) [m³]

BEF¹⁰ = Biomass Expansion Factors for the conversions of volume to aboveground tree biomass

WBD = Wood Basic Density [t d. m. m⁻³]

A = total area referred to a specific forest typology (NFI 1985)

BEFs were derived for each forest typology and different wood basic density values were used depending on tree species;

¹⁰ ISAFA, 2004

2. starting from 1985, for each year, the current increment per hectare [$\text{m}^3 \text{ha}^{-1}$] was computed with the derivative Richards function¹¹, for each forest typology using the Italian yield tables collection;
3. starting from 1986, for each year the growing stock per hectare [$\text{m}^3 \text{ha}^{-1}$] was computed, from the previous year growing stock volume, with the addition of the calculated increment (“y” value of the derivative Richards) for the current year and subtraction of the losses due to harvest¹², mortality and fire¹³ for the current year, as described in section 5.3.2..

Re-applying the formula :

$$\text{Aboveground tree biomass} = GS \cdot BEF \cdot WBD \cdot A$$

it was possible to obtain the aboveground tree biomass [t d.m.] for each forest typology, for each year, starting from the 1986.

The value of aboveground tree biomass per hectare for the year 1990, 2000 and 2005 was computed following the shown iterative procedure.

Belowground biomass

Using the preliminary results of the *RiselyItalia Project* carried out by ISAF, Belowground biomass was estimated applying a BEF to the Growing stock. As showed in table 6.2.3, the belowground biomass was computed, as follows:

$$\text{Below - ground biomass(d.m.)} = GS \cdot BEF \cdot WBD \cdot A$$

where:

GS = volume of growing stock [m^3]

BEF = Biomass Expansion Factors for the conversions of belowground biomass/aboveground biomass

WBD = Wood Basic Density [t d.m. m^{-3}]

A = total area referred to a specific forest typology

Also in this case, the BEFs were derived for each forest typology.

Dead mass

The Deadwood biomass was estimated in accordance with the FRA 2005 Guidelines applying a dead mass expansion factor (DEF) of 20%, as the only available national information refers to dead standing trees in high forest stands. As showed in table 6.2.3, the dead mass [t] is:

$$\text{Dead mass(d.m.)} = GS \cdot BEF \cdot WBD \cdot DEF \cdot A$$

where:

GS = volume of growing stock [m^3]

BEF = Biomass Expansion Factors for the conversions of volume to aboveground tree biomass

WBD = Wood Basic Density [t d.m. m^{-3}]

DEF = Dead mass expansion factor

A = total area referred to a specific forest typology

¹¹ see note 4

¹² Reported in T11

¹³ Reported in T8

6.2.3 Original data

Aboveground biomass

	AREA (HA)	VOLU ME(M3 /HA)	BEF	WBD	DRY BIOMASS (T/HA)	TOTAL DRY BIOMASS (T)
HIGH FOREST	2 242 679.00	171.88	1.34	0.50	115.72	259 532 881.69
Norway spruce	443 497.21	257.80	1.29	0.38	126.26	55 994 273.48
Silver fir	74 138.25	297.54	1.34	0.38	151.48	11 230 709.87
Larches	281 374.72	167.81	1.22	0.56	114.39	32 185 108.25
Mountain pines	312 181.15	153.49	1.33	0.47	95.94	29 952 185.26
Mediterranean pines	126 614.08	99.84	1.53	0.53	80.88	10 240 402.28
Other conifers	27 310.84	105.96	1.37	0.43	62.48	1 706 478.50
European beech	335 679.36	196.71	1.36	0.61	163.61	54 919 422.01
Turkey oak	112 423.07	137.44	1.45	0.69	137.94	15 508 106.09
Other oaks	205 685.08	93.92	1.42	0.67	89.58	18 425 152.23
Other broadleaves	323 775.23	116.13	1.47	0.53	90.71	29 371 043.72
COPPICE	3 791 707.00	71.06	1.37	0.58	56.99	216 080 352.79
Beech	452 881.99	115.31	1.36	0.61	95.91	43 434 046.57
Chestnut	534 453.39	107.44	1.33	0.49	69.98	37 402 133.45
Hornbeams	429 867.37	52.30	1.28	0.66	44.25	19 020 845.00
Other oaks	778 751.64	39.60	1.39	0.65	35.84	27 913 002.09
Turkey oak	382 477.83	84.01	1.23	0.69	71.20	27 230 511.90
Evergreen oaks	209 873.85	71.05	1.45	0.72	74.41	15 616 443.26
Other broadleaves	887 106.75	52.94	1.53	0.53	42.93	38 085 455.31
Conifers (spread in coppice stands)	116 294.17	107.07	1.38	0.43	63.44	7 377 915.22
PLANTATIONS AND SPECIALISED STANDS	288 900.00	167.09	1.41	0.44	104.72	30 254 022.42
Eucalyptus coppices	900.00	100.31	1.33	0.54	72.01	64 804.61
Other broadleaved coppices	2 700.00	99.56	1.45	0.53	76.75	207 222.70
Poplars	110 700.00	95.11	1.24	0.29	34.22	3 788 483.50
Other broadleaved stands	11 700.00	84.81	1.53	0.53	68.77	804 608.29
Conifers	8 100.00	121.38	1.41	0.43	73.35	594 130.88
Other specialised stands	154 800.00	228.75	1.46	0.48	160.17	24 794 772.43
PARTICULAR WOODY FORMATIONS	2 160 900.00	60.65	1.46	0.57	50.18	108 430 193.49
Rupicolous forest	575 100.00	60.65	1.44	0.52	60.65	25 970 434.23
Riparian forest	110 700.00	179.36	1.39	0.41	179.36	11 278 081.11
Shrubland	1 475 100.00	51.74	1.49	0.63	51.74	71 181 678.15
INCLUDED AREAS	190 800.00	0	0	0	0	0
TOTAL	8 674 986.00	96.16	1.37	0.54	70.81	614 297 450.39

Source: Elaboration from 1985 Forest Inventory data

Belowground biomass

	AREA (HA)	VOLU ME (M3/H A)	BEF	WBD	DRY BIOMAS S (T/HA)	TOTAL DRY BIOMASS (T)
HIGH FOREST	2 242 679.00	171.88	0.27	0.50	22.90	51 363 710.86
Norway spruce	443 497.21	257.80	0.29	0.38	28.37	12 583 041.54
Silver fir	74 138.25	297.54	0.28	0.38	32.02	2 373 666.48
Larches	281 374.72	167.81	0.29	0.56	27.02	7 604 017.60
Mountain pines	312 181.15	153.49	0.36	0.47	26.01	8 120 293.97
Mediterranean pines	126 614.08	99.84	0.33	0.53	17.57	2 224 542.52
Other conifers	27 310.84	105.96	0.29	0.43	13.22	361 053.67
European beech	335 679.36	196.71	0.20	0.61	24.18	8 116 023.53
Turkey oak	112 423.07	137.44	0.24	0.69	23.11	2 598 644.26
Other oaks	205 685.08	93.92	0.20	0.67	12.71	2 614 740.69
Other broadleaves	323 775.23	116.13	0.24	0.53	14.73	4 767 686.59
COPPICE	3 791 707.00	71.06	0.28	0.58	12.08	45 793 762.85
Beech	452 881.99	115.31	0.20	0.61	14.17	20 799.53
Chestnut	534 453.39	107.44	0.28	0.49	14.58	34 085.80
Hornbeams	429 867.37	52.30	0.26	0.66	8.98	644 520.25
Other oaks	778 751.64	39.60	0.20	0.65	5.20	125 819.39
Turkey oak	382 477.83	84.01	0.24	0.69	14.13	122 666.02
Evergreen oaks	209 873.85	71.05	1.00	0.72	51.28	4 780 920.94
Other broadleaves	887 106.75	52.94	0.24	0.53	6.71	20 799.53
Conifers (spread in coppice stands)	116 294.17	107.07	0.29	0.43	13.36	34 085.80
PLANTATIONS AND SPECIALISED STANDS	288 900.00	167.09	0.27	0.44	19.83	5 728 811.94
Eucalyptus coppices	900.00	100.31	0.43	0.54	23.11	64 804.61
Poplars	110 700.00	95.11	0.21	0.29	5.82	3 788 483.50
Other broadleaved stands	11 700.00	84.81	0.24	0.53	10.75	804 608.29
Conifers	8 100.00	121.38	0.29	0.43	15.14	594 130.88
Other specialised stands	154 800.00	228.75	0.28	0.48	30.88	24 794 772.43
PARTICULAR WOODY FORMATIONS	2 160 900.00	60.65	0.51	0.57	18.09	39 080 805.84
Rupicolous forest	575 100.00	60.65	0.42	0.52	13.28	7 634 876.61
Riparian forest	110 700.00	179.36	0.23	0.41	16.56	1 833 048.42
Shrubland	1 475 100.00	51.74	0.62	0.63	20.08	29 612 880.81
INCLUDED AREAS	190 800.00	0	0	0	0	0
TOTAL	8 674 986.00	96.16	0.31	0.54	16.37	141 967 091.49

Source: Elaboration from 1985 Forest Inventory data

Dead mass

	AREA (ha)	VOLUME (m ³ /ha)	BEF	WBD	DEF	Dry dead mass (t/ha)	Total dry dead mass (t)
HIGH FOREST	2 242 679.00	171.88	1.34	0.50	0.2	19.98	44 813 152.90
Norway spruce	443 497.21	257.80	1.29	0.38	0.2	25.25	11 198 854.70
Silver fir	74 138.25	297.54	1.34	0.38	0.2	30.30	2 246 141.97
Larches	281 374.72	167.81	1.22	0.56	0.2	22.88	6 437 021.65
Mountain pines	312 181.15	153.49	1.33	0.47	0.2	19.19	5 990 437.05
Mediterranean pines	126 614.08	99.84	1.53	0.53	0.2	16.18	2 048 080.46
Other conifers	27 310.84	105.96	1.37	0.43	0.2	12.50	341 295.70
European beech	335 679.36	196.71	1.36	0.61	0.2	22.90	7 688 719.08
Turkey oak	112 423.07	137.44	1.45	0.69	0.2	19.31	2 171 134.85
Other oaks	205 685.08	93.92	1.42	0.67	0.2	12.54	2 579 521.31
Other broadleaves	323 775.23	116.13	1.47	0.53	0.2	12.70	4 111 946.12
COPPICE	3 791 707.00	71.06	1.37	0.58	0.2	8.34	31 630 910.90
Beech	452 881.99	115.31	1.36	0.61	0.2	13.43	6 080 766.52
Chestnut	534 453.39	107.44	1.33	0.49	0.2	9.80	5 236 298.68
Hornbeams	429 867.37	52.30	1.28	0.66	0.2	6.19	2 662 918.30
Other oaks	778 751.64	39.60	1.39	0.65	0.2	5.02	3 907 820.29
Turkey oak	382 477.83	84.01	1.23	0.69	0.2	9.97	3 812 271.67
Evergreen oaks	209 873.85	71.05	1.45	0.72	0.2	14.88	3 123 288.65
Other broadleaves	887 106.75	52.94	1.53	0.53	0.2	6.01	5 331 963.74
Conifers (spread in coppice stands)	116 294.17	107.07	1.38	0.43	0.2	12.69	1 475 583.04
PLANTATIONS AND SPECIALISED STANDS	288 900.00	167.09	1.41	0.44	0.2	0	0
Eucalyptus coppices	900.00	100.31	1.33	0.54	0.2	0	0
Other broadleaved coppices	2 700.00	99.56	1.45	0.53	0.2	0	0
Poplars	110 700.00	95.11	1.24	0.29	0.2	0	0
Other broadleaved stands	11 700.00	84.81	1.53	0.53	0.2	0	0
Conifers	8 100.00	121.38	1.41	0.43	0.2	0	0
Other specialised stands	154 800.00	228.75	1.46	0.48	0.2	0	0
PARTICULAR WOODY FORMATIONS	2 160 900.00	60.65	1.46	0.57	0.2	7.70	16 636 024.98
Rupicolous forest	575 100.00	60.65	1.44	0.52	0.2	7.68	4 414 973.82
Riparian forest	110 700.00	179.36	1.39	0.41	0.2	20.38	2 255 616.22
Shrubland	1 475 100.00	51.74	1.49	0.63	0.2	6.76	9 965 434.94
INCLUDED AREAS	190 800.00	0	0	0	0	0	0
TOTAL	8 674 986.00	96.16	1.37	0.54	0.31	10.73	93 080 088.78

Source: Elaboration from 1985 Forest Inventory data

Aboveground biomass

	1990			2000			2005		
	AREA (thousands of ha)	Dry biomass per ha (t/ha)	Total dry biomass (millions of t)	AREA (thousands of ha)	Dry biomass (t/ha)	Total dry biomass (millions t)	AREA (thousan ds of ha)	Dry biomass (t/ha)	Total dry biomass (millions t)
High forest	2 488.8	117	292.1	3 007	119	359	3 240.5	121	393.5
Coppices	3 975.7	71	283.5	4 309.7	93	401.7	4 409.1	104	459.5
Plantation, specialised stands	246.7	127	31.3	162.4	199	32.3	128.6	261	33.5
Particular woody formation	2 346.5	62	145.5	2 725.6	77	210.7	2 885.1	85	244.1
Included areas	205.1	0	0	233.8	0	0	245.3	0	0
TOTAL	9 262.8	81	752.4	10 438.5	96	1 003.6	10 908.7	104	1 130.7

Belowground biomass

	1990			2000			2005		
	AREA (thousands of ha)	Dry biomass per ha (t/ha)	Total dry biomass (millions of t)	AREA (thousan ds of ha)	Dry biomass (t/ha)	Total dry biomass (millions t)	AREA (thousands of ha)	Dry biomass (t/ha)	Total dry biomass (millions t)
High forest	2 488.8	23	57.8	3 007	24	71.1	3 240.5	24	77.9
Coppices	3 975.7	15	58.1	4 309.7	19	81.9	4 409.1	21	93.1
Plantation, specialised stands	246.7	24	5.9	162.4	38	6.1	128.6	49	6.3
Particular woody formation	2 346.5	22	52	2 725.6	28	76.6	2 885.1	31	88.8
Included areas	205.1	0	0	233.8	0	0	245.3	0	0
TOTAL	9 262.8	19	173.8	10 438.5	23	235.7	10 908.7	24	266.3

Deadwood biomass

	1990			2000			2005		
	AREA (thousands of ha)	Dry biomass per ha (t/ha)	Total dry biomass (millions of t)	AREA (thousan ds of ha)	Dry biomass (t/ha)	Total dry biomass (millions t)	AREA (thousands of ha)	Dry biomass (t/ha)	Total dry biomass (millions t)
High forest	2 488.8	20	50.4	3 007	21	61.8	3 240.5	21	67.6
Coppices	3 975.7	10	40.8	4 309.7	14	58.3	4 409.1	15	66.6
Plantation, specialised stands	246.7	0	0	162.4	0	0	128.6	0	0
Particular woody formation	2 346.5	9	22	2 725.6	12	32.2	2 885.1	13	37.3
Included areas	205.1	0	0	233.8	0	0	245.3	0	0
TOTAL	9 262.8	12	113.1	10 438.5	15	152.2	10 908.7	16	171.5

6.3 Analysis and processing of national data

6.3.1 Calibration

No calibration was necessary since the per-hectare Biomass was multiplied by the Forest area resulting from T1.

6.3.2 Estimation and forecasting

The above-ground and below-ground biomass estimates for 1990-2000 and the forecasting for 2005 were calculated applying Biomass Expansion Factors to growing stock values.

The estimates and forecast for Deadwood biomass were calculated following the FRA 2005 guidelines.

6.4 Reclassification into FRA 2005 classes

National Classification	Percentage of a National Class to a FRA Class		
	Above Ground Biomass	Below Ground Biomass	Dead Wood Biomass
Percentage	%	%	%
Coppice biomass	100		
High forest biomass	100		
Plantation biomass	100		
Particular woody formation biomass	100		
Belowground <i>estimated</i> biomass		100	
Deadwood <i>estimated</i> biomass			100

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	700.5	927.4	1042.6	51.9	76.2	88.1
Below-ground biomass	152.3	204.0	229.6	21.6	31.7	36.6
Dead wood biomass	105.8	141.5	159.2	7.3	10.7	12.3
TOTAL	958.6	1273.0	1431.3	80.8	118.5	137.1

6.6 Comments to National reporting table T6

7 Table T7 - Carbon stock

7.1 FRA 2005 Categories and definitions

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

7.2 National data

7.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ministero dell'Agricoltura e delle Foreste-ISAFA 1988 <i>Inventario Forestale Nazionale Sintesi metodologica e risultati</i>	H	Used to estimate: Forest carbon	1985	
IPCC 2003 Good Practice Guidance on Land Use, Land use Change and Forestry	M	Conversion factors	2004	
Estimation from European Project CANIF	L	Litter carbon & soil carbon	2000	

7.2.2 Classification and definitions

All definitions in line with FRA 2005 ones As regards soil carbon data refers to a depth of 30 cm

7.2.3 Original data

Typology	Area (ha)	Total carbon (t)					Carbon per ha (t/ha)				
		Above Ground biomass	Below Ground biomass	dead mass	litter	soil	Above Ground biomass	Below Ground biomass	dead mass	litter	soil
High forest	2 242 679.00	129 766 440.85	25 681 855.43	22 406 576.45	13 818 072.55	195 545 404.81	57.86	11.45	9.99	6.80	88.95
norway spruce	443 497.21	27 997 136.74	6 291 520.77	5 599 427.35	2 022 718.92	43 747 783.04	63.13	14.19	12.63	4.56	98.64
silver fir	74 138.25	5 615 354.94	1 186 833.24	1 123 070.99	342 060.15	7 566 741.19	75.74	16.01	15.15	4.61	102.06
larches	281 374.72	16 092 554.12	3 802 008.80	3 218 510.82	1 276 290.13	27 315 009.34	57.19	13.51	11.44	4.54	97.08
mountain pines	312 181.15	14 976 092.63	4 060 146.98	2 995 218.53	1 403 936.17	29 586 260.69	47.97	13.01	9.59	4.50	94.77
mediterranean pines	126 614.08	5 120 201.14	1 112 271.26	1 024 040.23	565 400.95	11 647 001.89	40.44	8.78	8.09	4.47	91.99
other conifers	27 310.84	853 239.25	180 526.83	170 647.85	120 902.78	2 438 696.94	31.24	6.61	6.25	4.43	89.29
european beech	335 679.36	27 459 711.00	4 058 011.77	3 844 359.54	3 216 589.87	28 747 069.29	81.80	12.09	11.45	9.58	85.64
turkey oak	112 423.07	7 754 053.05	1 299 322.13	1 085 567.43	988 703.10	8 961 775.22	68.97	11.56	9.66	8.79	79.71
other oaks	205 685.08	9 212 576.12	1 307 370.34	1 289 760.66	1 503 493.88	13 716 926.90	44.79	6.36	6.27	7.31	66.69
other broadleaves	323 775.23	14 685 521.86	2 383 843.30	2 055 973.06	2 377 976.60	21 818 140.31	45.36	7.36	6.35	7.34	67.39
Coppices	3 791 707.00	108 040 176.39	22 896 881.42	15 815 455.45	23 680 635.66	228 241 198.78	28.49	6.04	4.17	6.32	61.23
european beech	452 881.99	21 717 023.29	3 209 354.10	3 040 383.26	3 398 385.96	30 983 916.84	47.95	7.09	6.71	7.50	68.41
sweet chestnut	534 453.39	18 701 066.72	3 895 690.99	2 618 149.34	3 585 139.16	33 541 642.98	34.99	7.29	4.90	6.71	62.76
hornbeams	429 867.37	9 510 422.50	1 929 700.96	1 331 459.15	2 543 963.21	23 992 448.94	22.12	4.49	3.10	5.92	55.81
other oaks	778 751.64	13 956 501.05	2 024 638.37	1 953 910.15	4 407 725.14	41 361 971.27	17.92	2.60	2.51	5.66	53.11
turkey oak	382 477.83	13 615 255.95	2 702 009.12	1 906 135.83	2 579 922.64	24 068 587.88	35.60	7.06	4.98	6.75	62.93
evergreen oaks	209 873.85	7 808 221.63	5 380 912.39	1 561 644.33	1 436 365.63	15 084 550.68	37.20	25.64	7.44	6.84	71.87
other broadleaves	887 106.75	19 042 727.65	2 977 777.40	2 665 981.87	5 214 075.42	48 808 580.63	21.47	3.36	3.01	5.88	55.02
spread conifers	116 294.17	3 688 957.61	776 798.10	737 791.52	515 058.50	10 399 499.56	31.72	6.68	6.34	4.43	89.42
Plantation	288 900.00	15 127 011.21	2 864 405.97	0.00	1 851 946.09	22 196 328.92	52.36	9.91	0.00	6.50	82.12
eucaliptuses coppices	900.00	32 402.31	10 399.77	0.00	6 093.14	58 588.56	36.00	11.56	0	5.17	65.10
other broadleaves coppices	2 700.00	103 611.35	17 042.90	0.00	18 672.66	172 329.23	38.37	6.31	0	7.69	63.83
poplars stands	110 700.00	1 894 241.75	322 260.13	0.00	621 054.16	5 855 146.48	17.11	2.91	0	6.04	52.89
other broadleaves stands	11 700.00	402 304.15	62 909.70	0.00	78 048.79	721 216.50	34.38	5.38	0	5.17	61.64
conifers stands	8 100.00	297 065.44	61 333.01	0.00	36 042.84	735 553.29	36.67	7.57	0	7.69	90.81
others	154 800.00	12 397 386.22	2 390 460.47	0.00	1 092 034.49	14 653 494.86	80.09	15.44	0	6.04	94.66
Particular woody formation	2 160 900.00	54 215 096.74	19 540 402.92	8 318 012.49	12 734 384.93	224 497 358.97	25.09	9.04	3.85	5.95	115.05
rupicolous forest	575 100.00	12 985 217.11	3 817 438.31	2 207 486.91	2 972 256.64	41 469 412.76	22.58	6.64	3.84	5.17	72.11
riparian forest	110 700.00	5 639 040.56	916 524.21	1 127 808.11	850 984.81	13 306 541.00	50.94	8.28	10.19	7.69	120.20
shrublands	1 475 100.00	35 590 839.07	14 806 440.41	4 982 717.47	8 911 143.48	169 721 405.21	24.13	10.04	3.38	6.04	115.06
Included areas	190 800.00	0	0	0	0	11 862 322.20	0	0	0	0	62.17
TOTAL	8 674 986.00	307 148 725.19	70 983 545.75	46 540 044.39	52 085 039.23	682 342 613.68	35.41	8.18	5.36	6.36	87.58

Forest carbon was estimated multiplying biomass by the IPCC default conversion factor of 0.5. To retrieve information on carbon in litter and soil, data on carbon in biomass, soil and litter were used in linear regressions. Basic input data in equations was carbon in biomass.

7.3 Analysis and processing of national data

7.3.1 Calibration

No calibration required.

7.3.2 Estimation and forecasting

Estimates for 1990, 2000 and forecasting for 2005 were calculated applying the appropriate regressions and multiplying per-hectare value by the 1990, 2000 and 2005 forest area resulting from T1.

7.4 Reclassification into FRA 2005 classes

Reclassification was not necessary since the amount of carbon was calculated following FRA 2005 definitions.

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	347.3	463.8	521.2	26.0	38.1	44.1
Carbon in below-ground biomass	76.1	102.0	114.8	10.8	15.8	18.3
Sub-total: Carbon in living biomass	423.5	565.7	636.0	36.7	54.0	62.4
Carbon in dead wood	52.9	70.8	79.6	3.6	5.3	6.2
Carbon in litter	52.5	62.8	67.4	5.6	6.9	7.5
Sub-total: Carbon in dead wood and litter	105.4	133.5	147.0	9.2	12.3	13.7
Soil carbon to a depth of 30 cm	649.9	770.7	824.7	102.2	120.0	127.6
TOTAL CARBON	1,178.7	1,470.1	1,607.7	148.2	186.1	203.7

7.6 Comments to National reporting table T7

8 Table T8 – Disturbances affecting health and vitality

8.1 FRA 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
UNECE-FAO 2000 Forest Resources of Europe, CIS, North America, Australia, Japan and New Zealand	M	Disturbances by insects; Disturbances by diseases	1995	Secondary data source
Corpo forestale dello Stato www.corpoforestale.it	H	Disturbances by fires	1988/1992 1998/2002	2000/2002's data not yet published

8.2.2 Classification and definitions

According to the Italian Forest Service (Corpo Forestale dello Stato), forest fires are those fires that occur in Forest and OWL, completely or partially, excluding those fires occurring on agricultural or bare land.

8.2.3 Original data

Year	ha	Year	ha
1988	60 109	1998	73 017
1989	45 933	1999	39 362
1990	98 410	2000	58 234
1991	30 172	2002	38 006
1992	44 522	2002	20 218
Average	55 829	Average	45 767

Source: Corpo forestale dello Stato

FOREST AREA (000 HA)	Forest Area damaged by			
	Insect and disease	Wildlife and grazing	Storm, wind, snow and other identifiable abiotic factors	Tot damaged
	66	6	17.5	89.5

Source: UNECE-FAO 2000

8.3 Analysis and processing of national data

8.3.1 Estimation and forecasting

Apart from very reliable data on forest fires, for which average figures of the two five-year periods (1988/92 and 1998/02) were considered, other data on disturbances is fragmented and not harmonised. Thus only information already published in TBFRA 2000 was included.

8.4 Reclassification into FRA 2005 classes

National Classes	Percentage of a National Class belonging to a FRA Class			
	Disturbance by fire	Disturbance by insects	Disturbance by diseases	Other disturbance
Percentage	%	%	%	%
Insect and disease ¹⁴		50	50	
Wildlife and grazing				100
Storm, wind, snow and other identifiable abiotic factors				100

Source: UNECE-FAO 2000

National Classes	Percentage of a National Class belonging to a FRA Class			
	Disturbance by fire	DISTURBANCE BY INSECTS	Disturbance by diseases	Other disturbances
Forest fires	100			

Source: Corpo forestale dello Stato

8.5 Data for National reporting table T8

Input for Global Reporting Table

FRA-2005 category	Average annual area affected (1000 hectares)			
	Forest		Other wooded land	
	1990	2000	1990	2000
Disturbance by fire	55.8	45.8	n.a.	n.a.
Disturbance by insects	n.a.	66.0	n.a.	n.a.
Disturbance by diseases	n.a.	n.a.	n.a.	n.a.
Other disturbance	n.a.	23.5	n.a.	n.a.

8.6 Comments to National reporting table T8

¹⁴ The original source does not distinguish between insects and other diseases

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)	Additional comments
Accademia Italiana di Scienze Forestali & Società Botanica Italiana. 2004	H	Native tree species	2003	<i>Ad-hoc</i> assessment
www.IUCN.org	H	Threatened species	2003	

9.2.2 Classification and definitions

Consistent with FRA 2005.

9.2.3 Original data

Number of native tree species assessed on purpose by the Italian Academy of Forest Sciences (AISF) and Italian Botanic Society (SBI).

9.3 Data for National reporting table T9

FRA 2005 Categories	Number of species
	(year 2000)
Native tree species	117*
Critically endangered tree species	2**
Endangered tree species	0
Vulnerable tree species	0

*This number includes only species able to reach the height of 5 m at maturity if not affected by anthropic or natural disturbances.

** *Abies nebrodensis* and *Zelkova sicula*

9.4 Comments to National reporting table T9

10 Table T10 - Growing stock composition

10.1 FRA 2005 Categories and definitions

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

10.2 National data

10.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ministero dell'Agricoltura e delle Foreste-ISAFA 1988 <i>Inventario Forestale Nazionale Sintesi metodologica e risultati</i>	H	Growing stock by tree species	1985	

10.2.2 Original data

Species or group of species	High forest		Coppice		Total GS (m ³)
	Area (ha)	GS/ha m ³ /ha	Area (ha)	GS/ha m ³ /ha	
Norway spruce (<i>Picea excelsa</i>)	443 497.21	257.80			114 334 352.15
Silver fir (<i>Abies alba</i>)	74 138.25	297.54			22 058 738.45
Larches (<i>Larix decidua</i>)	281 374.72	167.81			47 218 645.53
Pines (<i>Pinus</i> spp)	438 795.23	138.01			60 557 331.57
Beech (<i>Fagus sylvatica</i>)	335 679.36	196.71	452 881.99	115.31	118 252 728.62
Turkey oak (<i>Quercus cerris</i>)	112 423.07	137.44	382 477.83	84.01	47 584 568.73
Other oaks (<i>Quercus</i> spp)	205 685.08	93.92	988 625.49	46.27	65 065 343.33
Chestnut (<i>Castanea sativa</i>)			534 453.39	107.44	57 419 481.67
Hornbeams (<i>Carpinus</i> spp, <i>Ostrya carpinifolia</i>)			429 867.37	52.30	22 482 931.81
Poplars (<i>Populus</i> spp)	110 700.00	95.11			10 528 842.74
Total					565 502 964.60

10.3 Analysis and processing of national data

10.3.1 Calibration

No calibration was necessary

10.3.2 Estimation and forecasting

Due to lack of updated information, it was assumed that species composition had remained constant throughout the years and the same tree distribution was applied to 1990 and 2000 forest area.

Species or group of species	Area 1990 (thousands ha)	GS 1990 (millions m3)	Area 2000 (thousands ha)	GS 2000 (millions m3)
Norway spruce (<i>Picea excelsa</i>)	484 576	120.6	569 336	135.1
Silver fir (<i>Abies alba</i>)	87 469	23.6	116 734	27
Larches (<i>Larix decidua</i>)	310 274	50	370 676	56.3
Pines (<i>Pinus spp</i>)	487 282	75.7	589 462	105.3
Beech (<i>Fagus sylvatica</i>)	843 511	135.2	951 973	169.7
Turkey oak (<i>Quercus cerris</i>)	529 663	56.1	598 378	73
Other oaks (<i>Quercus spp</i>)	1 265 486	82.2	1 401 617	115.2
Chestnut (<i>Castanea sativa</i>)	560 382	85.7	607 469	138.4
Hornbeams (<i>Carpinus spp</i> , <i>Ostrya carpinifolia</i>)	450 722	24.5	488 595	29
Poplars (<i>Populus spp</i>)	94 540	10.8	62 220	9.1
Total	5 113 906	664.3	5 756 461	858
Forest Area 1990	9 262 810	1 005.2		
Forest Area 2000			10 438 459	1 337.1

10.4 Data for National reporting table T10

Species or groups of species*	Growing Stock in Forests (million cubic meters)	
	1990	2000
(1) Beech (<i>Fagus sylvatica</i>)	135.2	169.7
(2) Norway spruce (<i>Picea excelsa</i>)	120.6	135.1
(3) Chestnut (<i>Castanea sativa</i>)	85.7	138.4
(4) Other oaks (<i>Quercus spp</i>)	82.2	115.2
(5) Pines (<i>Pinus spp</i>)	75.7	105.3
(6) Turkey oak (<i>Quercus cerris</i>)	56.1	73.0
(7) Larch (<i>Larix decidua</i>)	50.0	56.3
(8) Hornbeams (<i>Carpinus spp.</i> , <i>Ostrya carpinifolia</i>)	24.5	29.0
(9) Silver fir (<i>Abies alba</i>)	23.6	27.0
(10) Poplars (<i>Populus spp</i>)	10.8	9.1
Remainder of species	387.0	431.3
Total Growing stock in Forests	1 051.4	1 289.4

10.5 Comments to National reporting table T10

11 Table T11 - Wood removal

11.1 FRA 2005 Categories and definitions

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

11.2 National data

11.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
ISTAT <i>Coltivazioni agricole e foreste</i> (2001/2004) ISTAT Dati in corso di pubblicazione	H	Industrial roundwood removal; Woodfuel removal	1998/2002	No information on removals in OWL
ISTAT <i>Statistiche Forestali</i> Annuari 1991/1995)	H	Industrial roundwood removal; Woodfuel removal	1988/1992	No information on removals in OWL

11.2.2 Classification and definitions

National definitions are consistent with the international ones adopted by EUROSTAT, UN/ECE, FAO and ITTO.

11.2.3 Original data

Annual removals under bark (1988-1992)

	1988 (m3)	1989 (m3)	1990 (m3)	1991 (m3)	1992 (m3)
Industrial Roundwood	4 679 939	4 599 481	4 324 297	4 043 215	4 012 446
Woodfuel	4 357 159	4 041 557	3 633 098	4 196 766	5 053 764
Total	9 037 098	8 641 038	7 957 395	8 239 981	9 066 210

Annual removals under bark (1998-2000)

	1998 (m3)	1999 (m3)	2000 (m3)	2001 (m3)	2002 (m3)
Industrial Roundwood	4 387 143	3 105 581	3 783 853	3 073 796	3 174 714
Woodfuel	5 182 712	5 413 925	5 458 277	5 150 762	4 883 273
Total	9 569 855	8 519 506	9 242 130	8 224 558	8 057 987

Removals under bark (averages of five-year periods for 1990 and 2000 and forecast for 2005)

	1990 (m3)	2000 (m3)	2005 (m3)
Industrial Roundwood	4 331 876	3 505 017	3 281 654
Woodfuel	4 256 469	5 217 790	5 002 280
Total	8 588 344	8 722 807	7 754 858

11.3 Analysis and processing of national data**11.3.1 Estimation and forecasting**

National data was used in order to allow full consistency between the present Table T11 and Table T12 “Value of wood removal”. This way data provided on the latter subject refers to the same amount of wood removals considered here.

As recommended in the guidelines, reported figures for 1990 and 2000 are averages of the five-year periods 1988/1992 and 1998/2002.

The value for reference year 2005 is a national expert forecast.

11.4 Reclassification into FRA 2005 classes

The IPCC conversion factor (equal to 1.15) was used to convert under-bark into over-bark removals. No other reclassification was applied.

Reclassification (Percentage allocation) into FRA 2005 classes

National classes of Round Wood	Percentage of a National Class belonging to a FRA Class	
	Industrial Round Wood	Wood Fuel (Woodfuel)
Percentage	%	%
Industrial Roundwood	100	
Wood fuel		100

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	4 982	4 031	3 800	n.a.	n.a.	n.a.
Woodfuel	4 895	6 000	5 800	n.a.	n.a.	n.a.
TOTAL for Country	9 877	10 031	9 600	n.a.	n.a.	n.a.

11.6 Comments to National reporting table T11

No information available on wood removals in Other Wooded Land. Anyway this removal is considered negligible in the Italian context.

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
ISTAT National Accounts Unit 2004 Data not yet published Personal Communication	H	Values at production of Industrial Roundwood and Woodfuel at current prices	1988/1992 1998/2002	

12.2.2 Classification and definitions

Consistent with Table T11.

12.2.3 Original data

Values in million Italian Lira (1988/2000) or in thousands Euro (2001/2002). Average value for the five-year period 1998/2002 is reported in €. For this calculation 1998/2000 values were converted applying the ratio: 1936.27 Italian Lira = 1€

Classes	1988	1989	1990	1991	1992
	millions £	millions £	millions £	millions £	millions £
Roundwood of conifers	145 570	171 690	138 190	117 480	108 180
Roundwood of non conifers	260 040	260 890	270 370	263 150	282 810
Woodfuel	248 860	240 910	227 630	340 540	397 220

Classes	1998	1999	2000	2001	2002
	millions £	millions £	millions £	Thousand €	Thousand €
Roundwood of conifers	145 630	134 500	129 430	64 857	66 102
Roundwood of non conifers	416 000	279 120	275 890	112 921	120 624
Woodfuel	440 970	506 740	456 020	211 283	205 430

Classes	1990	2000
	millions £	Thousand €
Roundwood from forest	403 674	215 502
Woodfuel from forest	291 032	228 336

In the table below, all figures converted in Euro show the real trend of removals value.

Classes	1990	2000
	Thousand €	Thousand €
Roundwood from forest	208 480	215 502
Woodfuel from forest	150 305	228 336
TOTAL	358 785	443 838

12.3 Analysis and processing of national data

12.3.1 Estimation and forecasting

Conversion of values concerning the five-year period 1988/1992 were made applying an average exchange rate of 1250,69 Italian Lire per 1US Dollar. For the second five-year period, values were first converted in € (1 € = 1927,36 £) and then in US\$ as the Italian Lira was no more current in 2002 (1€ = 0,9615 US\$).

The value of wood removal was not forecasted for 2005, due to the unpredictable fluctuations of both national prices and exchange rates (€ vs. \$).

12.4 Reclassification into FRA 2005 classes

National Class	Percentage of a National Class belonging to a FRA 2005 Class (Value of Wood Removal)	Percentage of class not belonging to FRA 2005 class
Percentage	%	%
Price of roundwood	100	
Price of wood fuel	100	

12.5 Data for National reporting table T12

FRA 2005 Categories	Value of roundwood removal (1000 USD)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial roundwood	322 761	207 205	n.a.	n.a.	n.a.	n.a.
Woodfuel	232 697	219 545	n.a.	n.a.	n.a.	n.a.
TOTAL for Country	555 458	426 750	n.a.	n.a.	n.a.	n.a.

12.6 Comments to National reporting table T12

The exchange rates fluctuation affects the trend of wood removals value that is, for the period 1990-2000, positive if the value is expressed in national currency and negative if the value is expressed in US Dollars (see Tables 12.3 and 12.5).

13 Table T13 - Non-wood forest product removal

13.1 FRA 2005 Categories and definitions

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

Category
<u>Plant products / raw material</u>
1. Food
2. Fodder
3. Raw material for medicine and aromatic products
4. Raw material for colorants and dyes
5. Raw material for utensils, handicrafts & construction
6. Ornamental plants
7. Exudates
8. Other plant products
<u>Animal products / raw material</u>
9. Living animals
10. Hides, skins and trophies
11. Wild honey and bee-wax
12. Bush meat
13. Raw material for medicine
14. Raw material for colorants
15. Other edible animal products
16. Other non-edible animal products

13.2 National data

13.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
ISTAT. 2002. <i>Coltivazioni agricole, foreste e caccia</i> . Settore Agricoltura Anno 1999.	M	Non-wood forest products removal	1998/2002	Products partially harvested in "Other land"
ISTAT. 1993. <i>Statistiche Forestali</i> . Annuario n. 43, edizione 1993.	M	Non-wood forest products removal	1988/1992	Products partially harvested in "Other land"

13.2.2 Classification and definitions

Non-wood forest products are forest products for human or animal consumption or for industrial purposes. The available data refer to the quantity of harvested product, even when not yet removed from forests but expected to be. Values refer to the average price received by the producer or the collector.

13.2.3 Original data

ISTAT NWFP	1988	1989	1990	1991	1992	1998	1999	2000	2001	2002
	(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)
Chestnuts	52 296	50 273	49 559	66 579	69 101	78 425	52 158	63 213	56 861	55 073
Pine seeds	1 394	1 429	1 854	1 489	1 426	1 081	4 861	3 341	3 046	1 978
Acorns	6 482	6 375	3 971	8 045	10 960	4 307	2 859	2 734	2 288	3 092
Reproduction cork	3 233	2 427	6 472	6 347	6 421	7 882	9 697	9 787	5 905	7 791
Virgin cork	1 080	1 045	1 329	783	1 183	2 816	3 831	4 669	3 132	1 682
Hazelnuts	10 830	10 973	7 982	20 188	25 816	11 466	20 087	14 164	9 773	45 685
Mushrooms	1 413	1 973	1 792	2 507	2 173	1 279	1 903	1 121	874	1 990
Truffles	75	159	107	77	86	63	86	98	69	118
Blueberries	516	142	73	213	254	197	324	126	151	174
Strawberries	56	72	82	90	74	111	338	212	71	39
Raspberries	70	78	59	73	61	69	121	64	50	41

13.3 Analysis and processing of national data

13.3.1 Estimation and forecasting

Average five-year data were calculated to retrieve information for the central years 1990 and 2000. The forecast for 2005 was based on expert assessment.

NWFP	1990	2000	2005
	(t)	(t)	(t)
Chestnuts	57 561	61 146	50 646
Pine seeds	1 519	2 861	2 856
Acorns	7 167	3 056	2 306
Reproduction cork	4 980	8 212	7 219
Virgin cork	1 084	3 226	2 484
Hazelnuts	15 158	20 235	23 787
Mushrooms	1 972	1 433	1 532
Truffles	101	87	110
Blueberries	240	194	140
Strawberries	75	154	40
Raspberries	68	69	45

13.4 Reclassification into FRA 2005 classes

National Class or single NWFP	Quant (t)	Percentage a National class that falls i n.a. FRA class of NWFP																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Chestnuts	100																	
Pine seeds	100																	
Acorns	100		100															
Reproduction cork																		
Virgin cork					100													
Hazelnuts	100				100													
Mushrooms	100																	
Truffles	100																	
Blueberries	100																	
Strawberries	100																	
Raspberries	100																	

Table: Reclassification (Percentage allocation) into FRA 2005 classes

13.5 Data for National reporting table T13

FRA 2005 Categories	Scale factor	Unit	NWFP removal		
			1990	2000	2005
<u>Plant products / raw material</u>		ton			
1 Food			76 693	83 043	79 155
2 Fodder			7 167	3 056	2 306
3 Raw material for medicine and aromatic products			n.a.	n.a.	n.a.
4 Raw material for colorants and dyes			n.a.	n.a.	n.a.
5 Raw material for utensils, handicrafts & construction			6 064	11 438	9 703
6 Ornamental plants			n.a.	n.a.	n.a.
7 Exudates			n.a.	n.a.	n.a.
8 Other plant products			n.a.	n.a.	n.a.
			n.a.	n.a.	n.a.
<u>Animal products / raw material</u>			n.a.	n.a.	n.a.
9 Living animals			n.a.	n.a.	n.a.
10 Hides, skins and trophies			n.a.	n.a.	n.a.
11 Wild honey and bee-wax			n.a.	n.a.	n.a.
12 Bush meat			n.a.	n.a.	n.a.
13 Raw material for medicine			n.a.	n.a.	n.a.
14 Raw material for colorants			n.a.	n.a.	n.a.
15 Other edible animal products			n.a.	n.a.	n.a.
16 Other non-edible animal products			n.a.	n.a.	n.a.

13.6 Comments to National reporting table T13

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

14.1 FRA 2005 Categories and definitions

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

Category
<u>Plant products / raw material</u>
1. Food
2. Fodder
3. Raw material for medicine and aromatic products
4. Raw material for colorants and dyes
5. Raw material for utensils, handicrafts & construction
6. Ornamental plants
7. Exudates
8. Other plant products
<u>Animal products / raw material</u>
9. Living animals
10. Hides, skins and trophies
11. Wild honey and bee-wax
12. Bush meat
13. Raw material for medicine
14. Raw material for colorants
15. Other edible animal products
16. Other non-edible animal products

14.2 National data

14.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
ISTAT 2002 <i>Coltivazioni agricole, foreste e caccia</i> Settore Agricoltura Anno 1999	M	Non wood forest products value	1998/2002	Products partially harvested in “Other land”
ISTAT 1993 <i>Statistiche Forestali</i> Annuario n 43, edizione 1993	M	Non wood forest products value	1988/1992	Products partially harvested in “Other land”

14.2.2 Classification and definitions

Consistent with Table T13.

14.2.3 Original data

Values in thousand Italian lira (1988/2001) or in thousand Euro (2002).

ISTAT	1988	1989	1990	1991	1992	1998	1999	2000	2001	2002
NWFP	1000 £	1000 £	1000 £	1000 £	1000 £	1000 £	1000 £	1000 £	1000 £	1000 €
Chestnuts	56 451 675	55 942 644	66 397 58	96 935 619	96 625 648	149 989 564	80 979 844	110 660 665	100 491 573	50 861
Pine seeds	2 217 525	2 226 312	3 423 213	3 118 406	3 156 746	3 448 318	15 696 428	6 022 218	10 306 208	3 127
Acorns	2 607 583	3 771 073	2 285 971	6 433 492	9 153 680	4 818 172	2 174 066	1 915 875	1 580 261	1 549
Reproduction cork	2 025 218	1 588 827	3 741 176	6 250 167	7 016 250	19 798 053	25 836 300	29 753 377	18 398 839	15 808
Virgin cork	225 905	263 822	362 621	243 887	514 595	1 019 441	1 646 096	1 982 886	1 368 451	557
Hazelnuts	17 147 960	15 429 528	14 164 683	30 204 730	35 789 494	25 960 927	60 472 814	43 384 956	27 096 792	51 654
Mushrooms	19 405 177	30 560 509	31 271 125	45 888 593	37 704 540	31 422 370	37 424 705	22 030 564	19 624 244	22 301
Truffles	17 665 637	20 365 864	17 333 043	20 820 855	21 229 817	23 258 799	36 583 759	28 681 068	24 484 286	19 523
Blueberries	2 674 129	1 045 912	633 552	1 590 506	1 756 323	2 822 323	2 544 718	1 029 977	1 966 787	707
Strawberries	528 330	620 851	781 273	757 400	766 132	2 406 447	1 826 975	1 146 935	791 521	317
Raspberries	479 481	579 798	415 841	722 180	489 171	2 332 936	768 980	701 455	562 558	294

ISTAT VALUE THOUSAND US DOLLAR	Value 1990	Value 2000*
Chestnuts	74 470 569	108 120 455
Pine seeds	2 828 440	8 305 578
Acorns	4 850 360	2 697 531
Reproduction cork	4 124 328	24 879 025
Virgin cork	322 166	1 419 075
Hazelnuts	22 547 279	51 386 316
Mushrooms	32 965 989	30 736 528
Truffles	19 483 043	30 161 942
Blueberries	1 540 084	1 946 550
Strawberries	690 797	1 357 135
Raspberries	537 294	987 038

*To obtain the five year average, 2002's values in Euro (€) were converted in Italian Lire (£) It was used the fixed conversion factor: 1 €= 1927,36 £

14.3 Analysis and processing of national data

14.3.1 Estimation and forecasting

Conversion of values concerning the five-year period 1988/1992 were made applying an average exchange rate of 1250,69 Italian Lire per 1US Dollar. For the second five-year period, values were first converted in €(1 €= 1927,36 £) and then in US\$ as the Italian Lira was no more current in 2002 (1€= 0,9615 US\$).

The value of NWFP was not forecasted for 2005, due to the unpredictable fluctuations of both national prices and exchange rates (€vs. \$).

14.4 Reclassification into FRA 2005 classes

Reclassification (Percentage allocation) into FRA 2005 classes

National Class	Percentage of a National Class belonging to a FRA 2005 Class (Value of NWFP Removal)	Percentage of class not belonging to FRA 2005 class
Percentage	%	%
Value of NWFP	100	0

14.5 Data for National reporting table T14

FRA 2005 Categories	Value of the of NWFP removed (1000 USD)		
	1990	2000	2005
<u>Plant products / raw material</u>			
1 Food	125 233	115 707	n.a.
2 Fodder	3 878	1 340	n.a.
3 Raw material for medicine and aromatic products	n.a.	n.a.	n.a.
4 Raw material for colorants and dyes	n.a.	n.a.	n.a.
5 Raw material for utensils, handicrafts & construction	3 555	13 059	n.a.
6 Ornamental plants	n.a.	n.a.	n.a.
7 Exudates	n.a.	n.a.	n.a.
8 Other plant products	n.a.	n.a.	n.a.
	n.a.	n.a.	n.a.
<u>Animal products / raw material</u>	n.a.	n.a.	n.a.
9 Living animals	n.a.	n.a.	n.a.
10 Hides, skins and trophies	n.a.	n.a.	n.a.
11 Wild honey and bee-wax	n.a.	n.a.	n.a.
12 Bush meat	n.a.	n.a.	n.a.
13 Raw material for medicine	n.a.	n.a.	n.a.
14 Raw material for colorants	n.a.	n.a.	n.a.
15 Other edible animal products	n.a.	n.a.	n.a.
16 Other non-edible animal products	n.a.	n.a.	n.a.
TOTAL	132 666	130 106	n.a.

14.6 Comments to National reporting table T14

15 Table T15 - Employment in forestry

15.1 FRA 2005 Categories and definitions

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

15.2 National data

15.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
MCPFE-UNECEFAO 2003 Report of Europe's forest	M	Employment by wood removals; Employment by NWFP	1990-2000	

15.2.2 Classification and definitions

Available national data refers only to seasonal contracts with forestry companies. Thus, the MCPFE Report, referring to the EUROSTAT "New Cronos" database, was the unique source of information. The definitions of the forestry activities are consistent with the ISIC, section A, division 02: Forestry logging and related service activities.

The ISIC definition covers the production of standing timber as well as the extraction and gathering of wild growing forest materials except for mushrooms, truffles, berries and nuts. Besides the production of timber, it also takes into account those products that undergo some sort of processing, such as wood for fuel or industrial use.

15.2.3 Original data

Forestry logging	
Full Time Equivalent in 1990	Full Time Equivalent in 2000
56 440	36 050

15.3 Analysis and processing of national data

15.3.1 Estimation and forecasting

No estimation needed.

15.4 Reclassification into FRA 2005 classes

As activity wise information was not available, the data could not be reclassified.

Reclassification (Percentage allocation) into FRA 2005 classes

National Class	Percentage of a National Class belonging to a FRA Class				
	Wood Removal	NWFP Removal	Other Activity	Combination	Total
of employment					
Percentage	%	%	%	%	%
Wood removals employees					100

15.5 Data for National reporting table T15

FRA 2005 Categories	Employment (1000 person-years)	
	1990	2000
Primary production of goods	56.44	36.05
Provision of services	n.a.	n.a.
Unspecified forestry activities	n.a.	n.a.
TOTAL	56.44	36.05

15.6 Comments to National reporting table T15