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Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT

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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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Contents

1 Table T1 – Extent of Forest and Other wooded land

1.1 FRA 2005 Categories and definitions

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

1.2 National data

1.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Public enterprise "Hrvatske šume": Forest Management Plan of the Republic of Croatia, Zagreb, 1993.	L[1]	Forest, and other wooded land	1986	Plans from 1986 to 1995. data valid for 01.01.1986.
Public enterprise "Hrvatske šume": Forest Management Plan of the Republic of Croatia, Zagreb, 1996.	M[2]	Forest, and other wooded land	1996	Plans from 1996 to 2005. Data valid for 01.01.1996.

[1] Low reliability was estimated for the year 1986 due to ther poorly managed forests, which resulted from the absence of forest management plans and programs for about one third of the forests in the Republic of Croatia (Dalmatia and one part of Lika). The data for this Forest Management Plan (in further text (FMP) were obtained by summing up the data of eleven forest management regions.

[2] Medium reliability was assessed for 1996, because at this time one part of the forests was managed, and a central forest service was established at the level of Forest Enterprise headquarters. However, within this reliability, the data on the state forests that were managed by the Forest Enterprise are the most accurate.

1.2.2 Classification and definitions

National classes	Definition
FOREST	Forest is defined as the land covered by forest trees formed as forest stand over an area larger than 10 *ars* (1 ar = 100 square meters). Separate forest tree groups over an area up to 10 ars, forest nurseries, wind barrier belts, tree avenues, and parks in settlements are not considered forests.
Other wooded land	Wooded land is defined as the land upon which forest is grown, or, owing to its natural characteristics and management conditions, is assigned as the most appropriate for forest cultivation. It consists of the following: a) Productive wooded land without vegetation cover, b) Non-productive wooded land without vegetation, c) Barren wooded land
a) Productive wooded land without tree cover	Clearings, stony ground, etc.
b) Non-productive wooded land without tree cover	Fire lanes, light tracts along roads wider than three meters, landings, mountain meadows, etc.
c) Barren wooded land	Forest roads wider than three meters, streams, canals, swamps, straight karst, areas under developments, gravel pits, quarries, etc.
Other land	All land which is not classified as forest or other wooded land.
Other land with tree cover	Separate forest tree groups over an area up to 10 ars, forest nurseries, wind barrier belts, tree avenues, and parks in settlements are not considered forests.
Inland water bodies	The water bodies including the main rivers, lakes and water reservoirs.

The sources of the data for the definitions:

1. The Republican Committee of Agriculture and forestry, 1983, Forest Law (*Narodne novine* 54/1983)
2. The Republican Committee of Agriculture and forestry, 1985 Statute on the making of forest management plans the forest units management plans, and the forest management programmes (*Narodne novine* 42/1985).
3. The Ministry of Agriculture and Forestry, 1990, Forest Law (*Narodne novine* 52/1990)
4. Ministry of Agriculture and Forestry, 1994, Statute on Forest Management (*Narodne novine* 52/1994)
5. Ministry of Agriculture and Forestry, 1994, Statute on Forest Management *Narodne novine* 11/1997).

In the above-mentioned sources there were no significant changes of definitions.

1.2.3 Original data

National classes	**Area (hectares)**	
	1986	**1996**
FOREST	2,061,509	2,078,289
Other wooded land		
Productive wooded land without tree cover	315,166	331,334
Non-productive wooded land without tree cover	16,961	14,617
Barren wooded land	64,012	61,370
Other land	3,134,352	3,106,390
Other land with tree cover	-	-
Inland water bodies	62,000	62,000
Total for country:	5,654,000	5,654,000

Since the original documents (FMP) report only on forests and other wooded land, without including other land categories, the data fore the latter have been obtained by deducting the areas of forests and other wooded land (FAOSTAT) from the total land area (FAOSTAT).

1.3 Analysis and processing of national data

1.3.1 Calibration

Calibration is not necessary, because the original documents report on forests and other wooded land, and do not encompass the category of other land, other land with tree cover, and continental water bodies. If the category other land were taken from other sources, these data would not be compatible.

1.3.2. Estimation and forecasting

National classes	**Area (hectares)**		
	1990	**2000**	**2005**
FOREST	2068221	2085001	2093391
Other wooded land			
Productive wooded land without tree cover	321633	337801	345885
Non-productive wooded land without tree cover	16023	13679	12507
Barren wooded land	62955	60313	58992

By using the method of linear interpolation, we obtained the assessment for the year 1990, while the forecasting for 2000 and 2005 was made by using the method of extrapolation.

1.4 Reclassification into FRA 2005 classes

National classes	Percentage of a National class belonging to a FRA Class				
	FOREST	**Other wooded land**	**Other land**	**Other land with tree cover**	**TOTAL**
FOREST	100				100
Other wooded land					
Productive wooded land without tree cover		100			100
Non-productive wooded land without tree cover	100				100
Barren wooded land	50		50		100

The category Productive wooded land without tree cover (clearings, stony ground etc.) includes areas which are within existing forests and on the forest edges. In Croatia category productive wooded land without tree cover does not include areas in process of regeneration, and it is not expected to become forest within a short period. It is area where we have scrubs and bushes with some trees with 5-10 % of cover rate and the growing stock is not measured. That is the main difference between other wooded land and agricultural land. It is obvious that those areas are not completely without any cover and can not be reclassified as forest or as other land. This national category completely is equal to FRA category OWL.

Category Non productive wooded land without tree cover refers to small and narrow open areas which are within existing forests. The forest have been on that land earlier and later trees were cut so the present condition is without trees. If we leave that land without control (to nature succession), there would be a forest as soon as possible. The question about "Mountain meadows" are not significant for us. Croatia is unique country in south-east Europe which doesn't have mountains higher than 2000 meters. The highest mountain in Croatia is 1848 meters. Considering the distribution of vegetation in high mountains in Croatia we assume that the meadows are irrelevant (small patches within existing forests) and they are classified as forest.

Category Barren wooded land have to be separated into Forest and Other land. The Forest includes forest roads wider than three meters, and also some swamps, streams and canals where will be developed forest vegetation. And the quarries after closing down and recultivation with forest trees belong to the forest, too.

1.5 Data for National reporting table T1

FRA 2005 Categories	Area (1000 hectares)		
	1990	**2000**	**2005**
Forest	2116	2129	2135
Other wooded land	322	338	346
Other land	3154	3125	3111
...of which with tree cover [3]	NDA	NDA	NDA
Inland water bodies	62	62	62
TOTAL	**5654**	**5654**	**5654**

1.6 Comments to National reporting table T1

The national forest inventory has as yet not been made in the Republic of Croatia. The preparations for it are being done at the moment.

The data on forests given in this document are mainly obtained from the individual forest management plans of the following validity periods: between 1986 and 1995, and from 1996 until 2005.

The forest management plan for an area (in further text: FMP) is made by the Forest Enterprise, and is approved by the Ministry of Agriculture, Forestry and Water Management.

To secure a unified and lasting management of forests and woodlands on the territory of the Republic of Croatia, the forest management area has been established.

Forest management plan is made for a forest management area. Accordingly, it contains the data on all the forest categories on the territory of the Republic of Croatia. A revision of the forest management plans is regularly done every ten years. .

A forest management area is divided in management units (about 700 management units in both state and private forests).

A management unit is a part of a forest management area, which, as a rule, is adapted to the terrain configuration, organisation requirements and roads, encompassing one or more forest areas. State forests have plans, while private forests have management programmes.

The management plan of a management unit is made for the period of ten years (half-term I); orientation plan is made for the following ten years (half-term II), as well as for the following twenty years (management period II), according to the schedule established in the forest management plan of the given area.

A forest management program is made for the period of ten years, with orientation for the following ten years.

The FMP of 1986 was made by compiling nine plans of the former forest management areas and two programs for forest karst areas. The FMP of 1996 is the result of a systematic inventory of all forests, having a higher reliability than the former one. Accordingly, the latter was obtained by using computation on the basis of the existing data, so that the growing stock is reduced to December 31 1995, because plans and management units programs have different validity periods. They contain data on forest area, ownership, forest properties, purpose, forest reserves, increments and felling volumes per tree species. Both FMPs have been obtained only by terrestrial measurements.

Another source of information is the records kept by the forest enterprise connected with felling, forest damage, forest fires, etc. The data of the State Institute for Statistics are used in making the tables for which there are no data in the area plans. In other words, the State Institute for Statistics collects the data from the forest enterprise and the municipalities, although there are certain deviations between the statistical data and the FMP data (definitions, classifications, and divisions – not identical with those in the Forest Law), so that the FMP data are preferred.

[3] We do not have the data on this category, because the scattered trees in agricultural areas, parks, gardens, and around residential buildings do not belong to the forest category.

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
Public enterprise *Hrvatske šume* (= "Croatian Forests"): Forest Management Plan of RC, Zagreb, 1993.	L	State forests managed by the forest enterprises; state forest which are managed by legal bodies owned by state; private forests	1986	Plans from 1986 to 1995. Data valid for 01.01.1986.
Public enterprise *Hrvatske šume* (= "Croatian Forests"): Forest Management Plan of RC, Zagreb, 1996.	M	State forests managed by the forest enterprises; state forest which are managed by legal bodies owned by state; private forests	1996	Plans from 1996 to 2005. Data valid for 01.01.1996.

Reliability explanations are found in Table 1.

2.2.2 Classification and definitions

National class	Definition
State forests managed by a forest enterprise	The forests owned by state, managed by a forestry-branched enterprise
State forests managed by legal bodies owned by state	The forests owned by state, managed by Government bodies and state-owned legal bodies, if they meet the requirements decreed by Forest Law, interms of forest management (National parks, The RC Ministry of Defence, Croatian Waters Enterprise, hospitals, prisons, etc.)
Private forests	All forests and wooded land not contained in the former two categories.

Data source for definitions:

1. Republic Committee of Agriculture and Forestry, 1983, Forest Law;
2. Ministry of Agriculture and Forestry, 1990, Forest Law.

2.2.3 Original data

National classes	State forests managed by forest enterprise		State forests managed by legal bodies owned by state		Private forests	
	1986	1996	1986	1996	1986	1996
	ha	ha	ha	ha	ha	ha
Forest	1,553,518	1,592,869	50,629	31,287	457,362	454,133
Productive wooded land without tree cover	313,117	323,130	1,113	1,229	936	6,975
Non-productive wooded land without tree cover	16,417	14,490	532	107	12	20
Barren wooded land	62,946	61048	1,034	314	32	8
Total	1,945,998	1,991,537	53,308	32,937	458,342	461,136

2.3 Analysis and processing of national data

First the national data have been reclassified to FRA 2005 categories of forest and other wooded land. From section 1.4 we have the following classification of national classes into FRA 2005 categories:
Forest = All Forest + All non-productive wooded land and 50% of Barren land.
Other wooded land = All productive wooded land with out tree cover.
It is assumed that the ownership pattern for the barren wooded land is the same for the "Forest" as for the "Other land".

FRA 2005 categories	State forests managed by a forest enterprise		State forests managed by legal bodies owned by state		Private forests	
	1986	1996	1986	1996	1986	1996
	ha	ha	ha	ha	Ha	ha
Forest	1601408	1637883	51678	31551	457390	454157
Other wooded land	313117	323130	1113	1229	936	6975

2.3.1 Estimation and forecasting

FRA 2005 categories	*State forests managed by a forest enterprise*		*State forests managed by legal bodies owned by state*		*Private forests*	
	Hectares		*Hectares*		*Hectares*	
	1990	*2000*	*1990*	*2000*	*1990*	*2000*
Forest	*1615998*	*1652473*	*43627*	*23500*	*456097*	*452864*
OWL	*317122*	*327135*	*1159*	*1275*	*3352*	*9391*

The estimate for 1990 was made by linear interpolation, while the forecast for 2000 was made by linear extrapolation.

2.4 Reclassification into FRA 2005 Ownership categories

Forest & Other wooded land	FRA 2005 Categories expressed in percentages		
	%	%	%
National classes	Private ownership	Public ownership	Other ownership
State forests managed by forest enterprise		100	
State forests managed by legal bodies owned by state		100	
Private forests	100		

2.4.1 Calibration

Not needed.

2.5 Data for National reporting table T2

FRA 2005 Categories	Area (1000 hectares)			
	Forest		Other wooded land	
	1990	**2000**	**1990**	**2000**
Private ownership	456	453	3	9
Public ownership	1660	1676	318	328
Other ownership	0	0	0	0
TOTAL	**2116**	**2129**	**321**	**337**

2.6 Comments to National reporting table T2

Data source is the same as for Table 1.
It is estimated that in future the proportion of state forests will decrease due to the structural social changes (denationalization). The figures may not add up completely with T1 figures due to rounding.

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

3.1 FRA 2005 Categories and definitions

Types of designation

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

Designation categories

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

3.2 National data

3.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Public enterprise "Hrvatske šume": Forest Management Plan of RC, Zagreb, 1993.	L	Management forests, protection forests, forest with special purposes	1986	Plans from 1986 to 1995. Data valid for 01.01.1986.
Public enterprise "Hrvatske šume": Forest Management Plan of RC, Zagreb, 1996.	M	Management forests, protection forests, forest with special purposes	1996	Plans from 1996 to 2005. Data valid for 01.01.1996.
Forest Management Plan for National Park "Mljet"	H	Forest and other wooded land for "Mljet"	2001	Valid from 2001, to 2010.
Official publication of the Goverment of Republic Croatia ("Narodne novine" 13/97)	H	Forest and other wooded land for "Risnjak" and "Plitvice"	1997	Description of borders in National Park
Official publication of the Goverment of Republic Croatia ("Narodne novine" 15/97)	H	Forest and other wooded land for "Paklenica"	1997	Description of borders in National Park
Official publication of the Goverment of Republic Croatia ("Narodne novine" 58/99)	H	Forest and other wooded land for "Velebit"	1999	Description of borders in National Park
Not published data		Management forests, protection forests, forest with special purposes	2004	

3.2.2 Classification and definitions

National class	Definition
Management forests	Forests primarily used for timber production and the production of other forest products
Protection forests	Forests primarily used to protect soil, water streams, erosion areas, settlements, economic and other areas, and other property.
Forests with special purposes	Forests with special purposes: 1. forests and their parts registered as areas for production of forest seeds; 2. forests of exceptional rarity or beauty, or those that have a special scientific or historical significance (national parks, reserves, etc.) 3. forests designated to scientific research, education, RC defense, and the requirements established by special regulations; 4. forests designated for rest and recreation

Data source for definitions:

1. Republic Committee of Agriculture and Forestry, 1983, Forest Law;
2. Ministry of Agriculture and Forestry, 1990, Forest Law.

If other wooded land is located within one of the forests listed above, it acquires the properties of this forest.
E. g.: The roads or forest clearings, which are found in the management forest, are separated as other wooded lands and are regarded as other wooded land belonging to the management forest.

3.2.3 Original data

National classes	Management forests[4] Hectares			Protection forests Hectares			Forests with special purposes Hectares		
	1986	1996	2004	1986	1996	2004	1986	1996	2004
Forest	1972986.00	1981032.05	196002522	54760.00	47623.80	47623.80	33763.0	49633.25	70640.08
Productive wooded land without tree cover	301680.55	297554.90	296805.59	13178.48	31325.19	31325.9	306.97	2453.59	3202.90
Non-productive wooded land without tree cover	16357.00	13670.47	13622.73	59.00	603.3	603,.3	545.00	343.84	391.58
Barren wooded land	59269.00	49224.50	49007.38	3645.00	10760.49	10760.49	1098.0	1385.10	1602.22
Total	2350292.55	2341481.92	2319460.2	71642.48	90312.81	90312.81	35712.97	53815.78	75836.78

The data of 2004 refer to the status as of 01.01.2004, and are considered corresponding to the year 2005.

In the period from 1996 until today, some national parks were extended, or new ones have been established. Thus, one part of the management forests was proclaimed forest category with special purpose. We have therefore added the national parks extended areas (Risnjak 2382 ha, Plitvice 6375 ha, Mljet 502 ha, Paklenica 1825 ha) and the area of the newly established national park North Velebit (10,937 ha) to the data on the forest areas with special purpose from the FMP of 1996. The area of management forests has accordingly been decreased. The proportion of forests and other wooded lands which have been added to the national parks have been calculated on the basis of proportionality using the data on the total area of each park, classified by the categories of tree coverage.
The source of data on the extension of the national parks are the records of the enterprise *Hrvatske Šume* kept in the Plan of the area, and are used for its revision scheduled for the year 2005.

The data of 1996 separated the 4,077 hectares of "clearings" under the category of productive wooded land without tree cover. To facilitate the calculation and to obtain identical data, we divided this area proportionally in the areas of productive wooded land without tree cover of the protection management forests and the ones of the forests with special purpose.

3.3 Analysis and processing of national data

[4] The area of the nature parks under forests is 312,668 ha, and is classified as management forests in accordance with the Forest Law.

3.3.1 Estimation and forecasting

National classes	Management forests Hectares			Protective forests Hectares			Forests with special purpose Hectares		
	1990	2000	2004/5	1990	2000	2004/5	1990	2000	2004/5
Forest	1,976,204	1,984,250	1,960,025	51,906	44,769	47,624	40,111	55,981	70,640
Productive wooded land without tree cover	300,030	295,905	296,806	20,437	38,584	31,325	1,166	3,312	3,203
Non-productive wooded land without tree cover	15,282	12,596	13,623	277	821	603	465	263	392
Barren wooded land	55,251	45207	49,007	6,491	13,607	10,760	1,213	1,500	1,602
Total	2,346,768	2,337,958	2,319,461	79,111	97,781	90,313	42,954	61,057	75,837

The estimate for 1990 was made by linear interpolation, while the forecasting for 2000 was made by linear extrapolation. The data for 2005 were taken from the year 2004, because we consider them relevant. Data for the year 2005 are not estimated because some national parks were extended or new ones have been established after 1996 (app 22021 hectares). Therefore we have added new (extended) forest area of national parks to the category «forest areas with special puposes» in the FMP 1996. For that reason the area of managed forests has been decreased. So that the total area of Forest and Other wooded land is equal in both years (1996 and 2004). The data for 1990 are made by linear interpolation, while the estimation for 2000 was made by linear extrapolation. The data for 2005 were not estimated. We taken the data for the year 2004, and we consider them relevant, because of extension of national parks.

The 2004 data was not used in T1, because they have not yet been published. That extension are made between 1996 and today. However, we could not neglect so big extension of the parks. The data used only for gathering more real information in T3. The process is according to FRA specification.

Reclassification of National classes into FRA 2005 classes "Forest" and "Other wooded land".

The reclassification matrix in section 1.4 has been applied, where: Forest = All Forest + All non-productive wooded land and 50% of Barren land.
Other wooded land = All productive wooded land with out tree cover.

FRA classes	Management forests Hectares			Protective forests Hectares			Forest with special purpose Hectares		
	1990	2000	*2004/5*[1]	1990	2000	*2004/5*[1]	1990	2000	*2004/5*[1]
Forest	2019109	2019450	*1998155*	55429	52394	*53607*	41183	56994	*71833*
Other wooded land	300030	295905	*296806*	20437	38584	*31325*	1166	3312	*3203*
Total	2319139	2315355	*2294961*	75866	90978	*84932*	42349	60306	*75036*

[1] *The 2004/5 differs from 2005 forecast in T1*

3.3.2 Calibration

Calibration of 2004/5 data with 2005 forecast in T1. Calibration made with percent allocation of reclassified (Forest/Other wooded land) national classes on T1 data.

FRA classes	Management forests			Protective forests			Forest with special purpose		
	2004/5	% of tot	**2005**[1]	2004/5	% of tot.	**2005**[1]	2004/5	% of tot	**2005**[1]
Forest	1,960,025	94,3	2013677	47,624	2,3	49114	70,640	3,4	72603
Other wooded land	296,806	89,6	309913	31,325	9,4	32513	3,203	1,0	3459

[1] Calibrated T1 2005 data

3.4 Reclassification into FRA 2005 classes

Reclassification into FRA 2005 categories for "Primary designated functions"

FRA 2005 Categories	Management forests		Protective forests		Forests with special purpose	
	Forest	OWL	Forest	OWL	Forest	OWL
Production	100	100			10	10
Protection of soil and water			100	100		
Conservation of biodiversity					10	10
Social services					10	10
Multiple purpose					70	70
No or unknown function						
Total	100	100	100	100	100	100

Reclassification into FRA 2005 categories for "Total area with function"

Primary function	Percentage of area serving other functions			
	Production	Protection	Conservation of bio.	Social services
Production	100	20	20	30
Protection of soil and water	5	100	50	10
Conservation of biodiversity			100	
Social services				100
Multiple purpose	50	100	90	95

Estimation of area with Primary function for the year 1990

Primary function	Hectares					
	Management forests		Protective forests		Forests with special purpose	
	Forest	Other wooded land	Forest	Other wooded land	Forest	Other wooded land
Production	2019109	300030			4118	117
Protection of soil and water			55429	20437		
Conservation of biodiversity					4118	117
Social services					4118	117
Multiple purpose					28828	816
No or unknown function						
Total	2019109	300030	55429	20437	41183	1168

Estimation of Total forest area with function for the year 1990

Primary function	Hectares			
	Area serving other functions			
	Production	Protection	Conservation of biodiversity	Social services
Production	2023227	40465	40465	606968
Protection of soil and water	2771	55429	27715	5543
Conservation of biodiversity			4118	
Social services				4118
Multiple purpose	14414	28828	25945	27387
Total	2040412	124722	98243	644016

Estimation of Total other wooded land area with function for the year 1990

Primary function	Hectares			
	Area serving other functions			
	Production	Protection	Conservation of bio.	Social services
Production	300147	60029	60029	90044
Protection of soil and water	1022	20437	10219	2044
Conservation of biodiversity			117	
Social services				117
Multiple purpose	408	816	734	775
Total	301577	81282	71099	92980

Estimation of area with Primary function for the year 2000

Primary function	Hectares					
	Management forests		Protective forests		Forests with special purpose	
	Forest	Other wooded land	Forest	Other wooded land	Forest	Other wooded land
Production	2019450	295905			5699	331
Protection of soil and water			52394	38584		
Conservation of biodiversity					5699	331
Social services					5699	331
Multiple purpose					39896	2318
No or unknown function						
Total	2019450	295905	52394	38584	56993	3311

Estimation of total forest area with function for the year 2000

Primary function	Hectares			
	Area serving other functions			
	Production	Protection	Conservation of bio.	Social services
Production	2025149	405030	405030	607545
Protection of soil and water	2620	52394	26197	5239
Conservation of biodiversity			5699	
Social services				5699
Multiple purpose	19948	39896	35906	37901
Total	2047717	497320	4118102	656384

Estimation of total other wooded land with function for the year 2000

Primary function	Hectares			
	Area serving other functions			
	Production	Protection	Conservation of biodiversity	Social services
Production	296236	59247	59247	88871
Protection of soil and water	1929	38584	19292	3858
Conservation of biodiversity			331	
Social services				331
Multiple purpose	1159	2318	2086	2202
Total	299324	100149	80956	95262

Forecast of area with Primary function for the year 2005

Primary function	Hectares					
	Management forests		Protective forests		Forests with special purpose	
	Forest	Other wooded land	Forest	Other wooded land	Forest	Other wooded land
Production	2013677	309913			7260	346
Protection of soil and water			49114	32513		
Conservation of biodiversity					7260	346
Social services					7260	346
Multiple purpose					50822	2421
No or unknown function						
Total	2013677	309913	49114	32513	72602	3459

Forecast of Total forest area with function for the year 2005

Primary function	Hectares			
	Area serving other functions			
	Production	Protection	Conservation of biodiversity	Social services
Production	2020937	404187	404187	606281
Protection of soil and water	2456	49114	24557	4911
Conservation of biodiversity			7260	
Social services				7260
Multiple purpose	25411	50822	45740	48281
Total	2048804	504123	481744	666733

Forecast of Total other wooded land with function for the year 2005

Primary function	Hectares			
	Area serving other functions			
	Production	Protection	Conservation of bio.	Social services
Production	310259	62052	62052	93078
Protection of soil and water	1626	32513	16256	3251
Conservation of biodiversity			346	
Social services				346
Multiple purpose	1211	2421	2179	2300
Total	313096	96986	80833	98975

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	2023	2025	2021	2040	2048	2049
Protection of soil and water	55	52	49	125	497	504
Conservation of biodiversity	4	6	7	98	4118	482
Social services	4	6	7	644	656	667
Multiple purpose	29	40	51	not app.	not app.	not app.
No or unknown function	0	0	0	not app.	not app.	not app.
Total – Forest	**2116**	**2129**	**2135**	**not app.**	**not app.**	**not app.**
Other wooded land						
Production	300	296	310	302	299	313
Protection of soil and water	20	38,6	32.5	81	100	97
Conservation of biodiversity	0.1	0.3	0.3	71	81	80
Social services	0.1	0.3	0.3	93	95	99
Multiple purpose	0.8	2.3	2.4	not app.	not app.	not app.
No or unknown function	0	0	0	not app.	not app.	not app.
Total – Other wooded land	**322**	**338**	**346**	**not app.**	**not app.**	**not app.**

Due to the rounding up, certain deviations are possible in the tables in relation to Table T1.

3.6 Comments to National reporting table T3

All necessary comments are given in the text above.
The figures may not add up completely with T1 figures due to rounding.

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

4.3 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Public enterprise "Hrvatske šume": The RC Forest Management Plan Zagreb, 1993.	L	Forests/Other wooded land	1986	Valid from 1986 to 1995, updated to 01.01.1986.
Public enterprise "Hrvatske šume": The RC Forest Management Plan, Zagreb, 1996.	M	Forests/Other wooded land	1996	Valid from 1996 to 2005, updated to 01.01.1996.

4.3.1 Classification and definitions

National class	Definition
Even-aged forest stands	Stands in which the dominant trees are of about same height, diameter and age, and are treated by stand management. According to their origin, they are divided as follows: 1. high (seedling forests) – mainly consists of trees grown from seed or seedlings; 2. coppice with standards (medium height) – consists of the trees grown partly from seed, and partly from stump; it is managed in turns – as high forest, and as coppice; 3. coppice: a) coppice – grown mainly from stump trees b) brush – degraded coppices, which, besides trees, consist of brush in the same storey, c) scrub – degraded form of brushwood, consisting of rod-shaped scrub; d) maquis – degradation stages of holly tree forests (Quercus ilex) of low silvicultural form, e) garigue – degraded maquis consisting of resistant bush-shaped evergreen species, with a canopy smaller than 0.5; 4. plantations – artificially raised stands, grown with application of agrotechnical measures, having possibility of using the space in between; 5. Forest culture – artificially raised stands of the species that naturally grow in other areas.
Selection forest stands	Stands with trees of different height, diameter and age per area unit; they

	regenerate naturally, and are managed by group-selection system, or by tree-selection-system. Forests of fir with other tree species, where the proportion of fir is at least 10% of the total growing stock, belong to this category.

Data source for definitions:

1. Republic Committee for Agriculture and Forestry, 1985, Statute on the making of forest management plans, the forest units management plans and programs;
2. Ministry of Agriculture and Forestry, 1994, Statute on forest management;
3. Ministry of agriculture and forestry, 1997, Statute on forest management.

The sources listed above do not contain significant changes of definitions.

4.3.2 Original data

National data	**Area (hectares)**			
	Forest	Other wooded land[5]	Forest	Other wooded land
	1986	1986	1996	1996
Even-aged forest stands	1,523,361	292,729	1,624,613	318,406
Selection forest stands	5,38,148	103,410	453,676	88,915
Total:	2,061,509	396,139	2,078,289	407,321

	Even-aged forests	Selection forests
Strict and special reserves	3550	794
Estimation for strict zone of national parks	2000	3200
TOTAL	**5550**	**3994**

4.4 Analysis and processing of national data

4.4.1 Estimation and forecasting

National data	Forest (hectares)			Other wooded land (hectares)		
	1990	2000	2005	1990	2000	2005
Even-aged forest stands	1,563,862	1,665,114	1,715,740	302,999	328,676	341,515
Selection forest stands	504,359	419,887	377,651	97,612	83,117	75,870
Total	2,068,221	2,085,001	2,093,391	400,612	411,794	417,385

4.4.2 Calibration

The classification used in the table 4.3.2 are the national categories of "Forest" and "Other wooded land". Since no breakdown exists for the "Other wooded land" category, a calibration is made based on the areas of "Forest" and "Other wooded land" in 4.3.2 and the area in T1.

National class	**1990**	**2000**	**2005**	**1990**	**2000**	**2005**
	area (ha)			area (ha)		
	Forests			Other wooded land		
Even-aged forest stands	1,599,989	1,700,252	1,749,842	243,542	269,777	283,106
Selection forest stands	516,011	428,748	385,158	78,458	68,223	62,894
Total:	2,116,000	2,129,000	2,135,000	322,000	338,000	346,000

[5] If other wooded land is located within one of the classes listed above, or it tends toward one, it acquires the characteristics, i.e properties, of this class/category. E.g.: The other wooded land located in, or tending towards an even-aged forest, acquires the characteristics of this forest.

4.5 Reclassification into FRA 2005 classes

FRA 2005 Categories	Percentage of national classes in FRA-classes			
	Forests		Other wooded land	
	Even-aged	Selection	Even-aged	Selection
Primary	0.35	0.85	0.35	0.85
Modified natural	96.15	99.15	99.65	99.15
Semi-natural				
Productive plantation	3.5			
Protective plantation				
TOTAL	100	100	100	100

We classified the strict and special reserves of forest vegetation, and the strict zone of national parks in the category of primary forests. The category of modified natural forests includes all selection forest stands and all even-aged forests stands except cultures and plantations. The category of productive plantations includes forest cultures and plantations.

Explanation how upper percentages are made:

	Even-aged forests	Selection forests
Strict and special reserves	3550	794
Estimation for strict zone of national parks	2000	3200
TOTAL	**5550**	**3994**

The above percentages have, due to lack of other information been applied to the area "Even aged" and "Selection" (Forest and Other wooded land).

4.6 Data for National reporting table T4

FRA 2005 Categories	**Area (1000 hectares)**					
	Forest			**Other wooded land**		
	1990	**2000**	**2005**	**1990**	**2000**	**2005**
Primary	10	10	10	2	2	2
Modified natural	2050	2060	2063	320	336	344
Semi-natural	0	0	0	0	0	0
Productive plantation	56	60	61	0	0	0
Protective plantation	0	0	0	0	0	0
TOTAL	**2116**	**2129**	**2135**	**322**	**338**	**346**

4.7 Comments to National reporting table T4

In Croatia we have exact data about the area of strict and special forest reserves. We have estimated the total area of strict zone of national parks. According to the Forest Law in Croatia, forest are separated into two stands: Even-aged forest stands and Selection forest stands. Simply, one part of strict and special forest reserves and strict zone in national parks with forests are located in area with even-aged or selection forest stands, but they are protected and there are no clearly visible indications of human activities in them and the ecological processes are not disturbed significantly.

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
Public enterprise *Hrvatske šume*: RC Forest Management Plan, Zagreb, 1993.	Low	Forests, degradation forest stages	1986	Valid from 1986 to 1995, updated to 01.01.1986.
Public enterprise *Hrvatske šume*: RC Forest Management Plan Zagreb, 1996.	Medium	Forests, degradation forest stages	1996	Valid from 1996 to 2005, updated to 01.01.1996.

5.2.2 Classification and definitions

National class	Definition
Growing stock	Growing stock is the aboveground volume of all trees over bark more than 10 cm in diameter at breast height.
Commercial growing stock	No definition.

Data source for definitions:

1. Republic Committee for Agriculture and Forestry, 1985, Statute on the making of forest management plans, the forest units management plans and programs;
2. Ministry of Agruculture and Forestry, 1994, Statute on forest management;
3. Ministry of agriculture and forestry, 1997, Statute on forest management.

The sources listed above do not contain significant changes of definitions.

5.2.3 Original data

National classes	1986			1996		
	Area	Growing stock		Area	Growing stock	
	ha	m^3		m^3/ha	ha	m^3
FOREST						
Forest with measured growing stock	1,825,343	298,411,162	163	1,748,343	324,256,137	185
Forest without measured growing stock (maquis, garigue, shrub, scrub)	236,166	-	-	329,946	-	-
Total	2,061,509	298,411,162	145	2,078,289	324,256,137	156

Number of trees, basal area, and growing stock are not presented (measured) in the stands of age class I, shrubs, scrubs, garages, maquis, and the other wooded land.

In Croatia maquis, garigue, shrub, scrub are in category "FOREST". We have their area, but we do not have any information about growing stock. Because of that we separated them in the table above.

5.3 Analysis and processing of national data

5.3.1 Calibration

Calibration is not necessary, because our data on growing stock refer to the given areas.

5.3.2 Estimation and forecasting

Analysis and processing

	1986	**1996**	**1990**	**2000**	**2005**
Forest with measured growing stock (m3 o.b.)	298,411,162	324,256,137	308,749,152	334,594,127	347,516,615
Forest without measured growing stock 1) (m3 o.b.)\	2,361,660	3,299,460	2,736,780	3,674,580	4,143,480
Total growing stock m3 o.b.			**311,485,932**	**338,268,707**	**351,660,095**

1) Growing stock calculated based on expert estimate of 10 m3/ha

The 1990 estimation was made by linear interpolation, while the forecasting for 2000 and 2005 was made by linear extrapolation.

5.4 Reclassification into FRA 2005 classes

National classification	Percentage of national class in FRA class	
	Growing stock	Commercial growing stock
Forest	100%	83%

5.5 Data for National reporting table T5

FRA 2005 Categories	**Volume (million cubic meters over bark)**					
	Forest			**Other wooded land[6]**		
	1990	**2000**	**2005**	**1990**	**2000**	**2005**
Growing stock	311	338	352	ID	ID	ID
Commercial growing stock	258	281	292	ID	ID	ID

83% of growing stock is estimated to be commercial.

[6] By FRA classification, productive wooded land without tree cover, non-productive wooded land without tree cover, and one part of the barren wooded land belong to other wooded land, but growing stock is not measured.

Specification of country threshold values	Unit	Value	Complementary information
1. Minimum diameter at breast height of trees included in Growing stock (X)	cm	10	
2. Minimum diameter at the top end of stem (Y) for calculation of Growing stock	cm	7	
3. Minimum diameter of branches included in Growing stock (W)	cm	7	
4. Minimum diameter at breast height of trees in Commercial growing stock (Z)	cm	10	
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	------	

5.6 Comments to National reporting table T5

All necessary comments are given in the text above.

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
IPCC Good Practice Guidance for LULUCF-Appendix 5 Table 3A.1.9-1; Basic wood densities of stemwood (tonnes dry matter/m3 fresh volume) for boreal and temperate species	M	Basic wood density		As there are no adequate domestic data, the used wood density data are taken from the IPCC methodology.
IPCC Good Practice Guidance for LULUCF-Appendix 5 Table 3A.1.10; Default values of biomass expansion factors (BEFs)	M	Biomass expansion factor		As there are no adequate domestic data, the data from the IPCC methodology was used. The BEF was used for the broadleaves in moderate climate zone 1,4, while the BEF was used for the conifers 1,3.
IPCC Good Practice Guidance for LULUCF-Appendix 5 Table 3A.1.8; Average belowground to aboveground biomass ratio in natural regeneration by broad category	M	root-shoot ratio		As there are no adequate domestic data, the index was taken from the IPCC methodology.
IPCC Good Practice Guidance for LULUCF-Appendix 5 Table 3.2.2; Updated defaults of dead wood stocks, and dead-live ratios	M	dead-live ratios		As there are no adequate domestic data, the ratios are taken from the IPCC methodology.

6.2.2 Classification and definitions

No data or definition existed for forest biomass at national level.

6.2.3 Original data

	Growing stock (m3 o.b.)	
	1986	**1996**
Beech	105,297,612	118,197,958
Pedunculate oak	41,598,258	44,980,967
Sessile oak	27,971,354	32,386,239
Fir	34,360,233	30,475,088
Common hornbeam	23,043,099	24,892,301
Field ash	9,336,373	10,280,248
Spruce	4,918,592	6,525,657
Holly oak	5,864,256	5,091,853
Pubescent oak	5,662,204	4,317,504
Aleppo pine	3,624,268	3,880,114
Other conifers	4,368,468	6,201,959
Other broadleaves	32,366,445	37,026,249
Total - Inventoried forests	**298,411,162**	**324,256,137**
Maquis garigue, shrub (from T5)	2,361,660	3,299,460

6.3 Analysis and processing of national data

1990	GS (m3 o.b.)	Wood dens	BEF	R/S Ratio	D/L Ratio	AGB (t)	BGB (t)	DWB (t)
Beech	110,457,750	0.58	1.4	0.24	0.14	89,691,693	21,526,006	15,570,478
Pedunculate oak	42,951,342	0.58	1.4	0.24	0.14	34,876,489	8,370,357	6,054,559
Sessile oak	29,737,308	0.58	1.4	0.24	0.14	24,146,694	5,795,207	4,191,866
Fir	32,806,175	0.4	1.3	0.23	0.14	17,059,211	3,923,619	2,937,596
Common hornbeam	23,782,780	0.63	1.4	0.43	0.14	20,976,412	9,019,857	4,199,478
Field ash	9,713,923	0.57	1.4	0.24	0.14	7,751,711	1,860,411	1,345,697
Spruce	5,561,418	0.4	1.3	0.23	0.14	2,891,937	665,146	497,992
Holly oak	5,555,295	0.58	1.3	0.46	0.14	4,188,692	1,926,798	856,169
Pubescent oak	5,124,324	0.58	1.4	0.26	0.14	4,160,951	1,081,847	733,992
Aleppo pine	3,726,606	0.44	1.3	0.32	0.14	2,131,619	682,118	393,923
Other conifers	5,101,864	0.41	1.3	0.32	0.14	2,719,294	870,174	502,525
Other broadleaves	34,230,367	0.46	1.4	0.26	0.14	22,044,356	5,731,533	3,888,624
Maquis garigue, shrub	2,736,780	0.46	1.4	0.26	0.14	1,762,486	458,246	310,903
TOTAL	**311,485,932**					**234,401,546**	**61,911,319**	**41,483,801**

Calculation of general conversion factors between biomass and growing stock

AGB / GS o.b.	0.7525
BGB / GS o.b	0.1988
DWB / GS o.b.	0.1332

6.3.1 Calibration

Calibration was not necessary, because the estimated growing stock from Table T5 (T10) was used for the reference years.

6.3.2 Estimation and forecasting

Apply above conversion factors to GS for 2000 and 2005 gives

	Biomass stock (million tonnes)		
	1990	**2000**	**2005**
Above-ground biomass	234.4	292.7	304.3
Below-ground biomass	61.9	77.3	80.4
Dead wood biomass	41.5	51.8	53.9

6.4 Reclassification into FRA 2005 classes

Reclassification was not necessary, because the estimated growing stock from table T5 (T10) was used for reference years.

6.5 Data for National reporting table T6

FRA 2005 Categories	Biomass (million metric tons oven-dry weight)					
	Forest			Other wooded land[7]		
	1990	2000	2005	1990	2000	2005
Above-ground biomass	234.4	292.7	304.3	ID	ID	ID
Below-ground biomass	61.9	77.3	80.4	ID	ID	ID
Dead wood biomass	41.5	51.8	53.9	ID	ID	ID
TOTAL	337.8	421.8	438.6	ID	ID	ID

Thresholds used by the country are the following:
Since we used the substitute conversion factors for the calculation of biomass, we also took the substitute thresholds of the thin root value (2 mm) and dead wood (10 cm).

6.6 Comments to National reporting table T6

The average substitute value of wood density of the tree species growing in RC, for which there are no substitute wood density values in Table 5.2 (Appendix 5), was calculated on the basis of the values used for the same genus, or species, or the species closest to the given tree species.

[7] The growing stock on other wooded land in the Republic of Croatia is not measured, since it is too small and there is no estimate for it.

7 Table T7 – Carbon stock

7.1 FRA 2005 Categories and definitions

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

7.2 National data

7.2.1 Data sources

National data on carbon contents in live biomass and dead wood do not exist. We calculated the carbon stock in the aboveground biomass, and in dead wood by multiplying the substitute value IPCC-GPG for the carbon content (50%) by the above-ground biomass and by the belowground/dead wood biomass from Table 6 respectively.

7.2.2 Classification and definitions

There are no data or definitions for forest biomass at national level.

7.2.3 Original data

Biomass stock from T6

7.3 Analysis and processing of national data

Biomass stock from T6 was multiplied by the global conversion factor of 0.5 to get the carbon stock.

7.3.1 Calibration

Calibration was not necessary.

7.3.2 Estimation and forecasting

Since the data on the growing stock volume for the given reference years have been taken from table T5 (T10), the estimation and forecasting have already been done.

7.4 Reclassification into FRA 2005 classes

Reclassification was not necessary.

7.5 Data for National reporting table T7

FRA 2005 Categories	Carbon (Million metric tons)					
	Forest			Other wooded land[8]		
	1990	2000	2005	1990	2000	2005
Carbon in above-ground biomass	117.2	146.4	152.2	ID	ID	ID
Carbon in below-ground biomass	31.0	38.7	40.2	ID	ID	ID
Sub-total: Carbon in living biomass	**148.2**	**185.1**	**192.4**	**ID**	**ID**	**ID**
Carbon in dead wood	20.8	26.0	27.0	ID	ID	ID
Carbon in litter	ID	ID	ID	ID	ID	ID
Sub-total: Carbon in dead wood and litter	**ID**	**ID**	**ID**	**ID**	**ID**	**ID**
Soil carbon to a depth of _____ cm	ID	ID	ID	ID	ID	ID
TOTAL CARBON	**169.0**	**211.1**	**219.4**	**ID**	**ID**	**ID**

7.6 Comments to National reporting table T7

There are no data on the carbon content in leaf litter at national level. According to Martinoviæ, in the Republic of Croatia in the year 2000 diverse soils were established, while there are no data on the proportions of the individual soil type.

[8] The growing stock on other wooded land is not measured in RC, as it is negligibly small, and therefore there is no reason for the measurement of carbon.

8 Table T8 – Disturbances affecting health and vitality

8.1 FRA 2005 Categories and definitions

Category	Definition
Disturbance by fire	Disturbance caused by wildfire, independently whether it broke out inside or outside the forest/OWL.
Disturbance by insects	Disturbance caused by insect pests that are detrimental to tree health.
Disturbance by diseases	Disturbance caused by diseases attributable to pathogens, such as 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
Ministry of Agriculture, Forestry and Water management; Forest Fire Statistics with FAO, Zagreb, 2002.	High	Forest fire disturbance	1991-2002	
"Hrvatske šume" Ltd. Annual reports on disturbance caused by insects, Zagreb, 1998 - 2002.	High	Insects disturbance	1998 -2002	
"Hrvatske šume" Ltd., Annual reports on disturbance caused by fungal diseases; Zagreb, 1992; 1998 -2002.	High	Fungal diseases disturbance	1998 -2002	
"Hrvatske šume" Ltd., Annual reports on other disturbances, Zagreb, 1998 - 2002.	High	Other disturbances	1998 -2002	

8.2.2 Classification and definitions

National class	Definition
Forest fires	No definition.
Disturbances caused by insects	No definition
Disturbances caused by fungal diseases	No definition
Other disturbances	No definition

8.2.3. Original data

A) Forest fires

Year	Total number of forest fires	Total burnt area (ha)	Burnt forest area (ha)	Burnt area of other wooded land (ha)
1990	271	7,833	1,256	2,052
2000	369	25,459	5,777	11,172

Since there are no data for 1988, 1989 and 1990, the average value of the period between 1991 and 1992 has been taken for the year 1990. The average value of 1998 – 2002 has been taken for the year 2000.

B) Forest insects

Year	Defoliators (ha)	Pine provisionary moth	Other plant pests (ha)	Total (ha)

		(ha)		
1990	-	-	-	-
2000	11,046	770	6	11,822

The category Other plant pests includes oak leaf wasp and green spruce louse.

The table above shows only the forest areas that have been treated by some protective materials against pests, while the smaller infested areas that were not treated are not presented.

The presented data refer only to state forests, not to private forests.

There are no data for the year 1990, as no statistical records were kept (Homeland war). The average of 1998 – 2002 was taken for the year 2000.

C) Fungal forest diseases

Year	Oak mildew (ha)	Other fungal diseases (ha)	Total (ha)
1990	2,333	-	2,333
2000	9,236	14	9,250

The category Other fungal diseases encompasses the following: Sootiness of Douglas fir needles, grey spottiness of pine needles, inflammation of spruce bark, and red spottiness of pine needles.

The table above shows only the forest areas that were treated with protective materials against pests, while the smaller infested areas that were not treated are not included.
The presented data refer only to state forests, not to private forests.
The 1990 report contains only the oak mildew data of the year 1992.
The average value of 1998 – 2002 was taken for the year 2000.

D) Other disturbances

Year	Rodents(ha)	Total (ha)
1990	-	-
2000	3,708	3,708

There are no data for 1990, as no statistical records were kept (Homeland war); the data of 1998 – 2002 were taken for the year 2000.

8.3 Analysis and processing of national data

8.3.1 Estimation and forecasting

Estimation and forecasting are not necessary, since all available data for reference years are given.

8.4 Reclassification into FRA 2005 classes

Reclassification was not necessary.

8.5 Data for National reporting table T8

FRA-2005 Categories	Average annual area affected (1000 hectares)			
	Forests		Other wooded land	
	1990	**2000**	**1990**	**2000**
Disturbance by fire	1.25	5.77	2.05	11.17
Disturbance by insects	ID	11.82	ID	ID
Disturbance by diseases	2.33	9.25	ID	ID
Other disturbance	ID	3.7	ID	ID

8.6 Comments to National reporting table T8

There are no data on the disturbances by insects and other causes for the period 1988 – 1992, and we cannot estimate the 1990 status. Other disturbance refers to damage by rodents.

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
University of Zagreb, Faculty of Forestry, Institute for forest genetics and dendrology, Zagreb, 2004.	High	Autochthonous tree species	2000	
IUCN RED LIST	High	Critically endangered tree species Endangered tree species Vunerable tree species	2000	

9.2.2 Classification and definitions

National class	Definition
Domestic tree species	No definition.
Critically endangered tree species	Tree species with exceptionally high risk of extinction
Endangered tree species	Tree species with very high risk of extinction
Vulnerable tree species	No definition

9.2.3 Original data

	Autochthonous tree species				
	Botanical name	Local name		Botanical name	Local name
1.	*Abies alba*	Common fir	31.	*Pinus sylvestris*	Common pine
2.	*Acer campestre*	Common maple	32.	*Pistacia terebinthus*	Turpentine tree
3.	*Acer monspessulanum*	Montpelier maple	33.	*Populus alba*	White poplar
4.	*Acer obtusatum*	Italian maple	34.	*Populus nigra*	Black poplar
5.	*Acer platanoides*	Sykamore	35.	*Populus tremula*	Aspen
6.	*Acer pseudoplatanus*	Norway maple	36.	*Prunus avium*	Wild cherry
7.	*Alnus glutinosa*	Black alder	37.	*Prunus mahaleb*	Rockberry
8.	*Alnus incana*	Grey alder	38.	*Prunus padus*	Bird cherry
9.	*Arbutus unedo*	Strawberry tree	39.	*Pyrus amygdaliformis*	Almond pear
10.	*Betula pendula*	Common birch	40.	*Pyrus pyraster*	Wild pear

11.	***Betula pubescens***	Pubescent birch	41.	*Quercus cerris*	Bitter oak
12.	*Carpinus betulus*	Common hornbeam	42.	*Quercus frainetto*	Hungarian oak
13.	*Carpinus orientalis*	White hornbeam	43.	*Quercus ilex*	Holly oak
14.	*Castanea sativa*	Sweet chestnut	44.	*Quercus petraea*	Sessile oak
15.	*Celtis australis*	European nettle tree	45.	*Quercus pubescens*	Pubescent oak
16.	*Celtis tournefortii*	Tournefort's nettle tree	46.	*Quercus robur*	Pedunculate oak
17.	*Ceratonia siliqua*	Locust tree	47.	*Salix alba*	Golden willow
18.	*Fagus sylvatica*	Common beech	48.	*Salix caprea*	Goat willow
19.	*Fraxinus angustifolia*	Field ash	49.	*Sorbus aria*	Whitebeam
20.	*Fraxinus excelsior*	Common ash	50.	*Sorbus aucuparia*	Common mountain ash
21.	*Fraxinus ornus*	Flowering ash	51.	*Sorbus domestica*	Service tree mountain ash
22.	***Ilex aquifolium***	Holly tree	52.	*Sorbus torminalis*	Wild service tree
23.	*Laurus nobilis*	Bay laurel	53.	***Taxus baccata***	Common yew
24.	*Malus sylvestris*	Wild apple	54.	*Tilia cordata*	Small-leaved lime
25.	*Olea europaea*	Olive tree	55.	*Tilia platyphyllos*	Large-leafed lime
26.	*Ostrya carpinifolia*	Hop hornbeam	56.	*Tilia tomentosa*	Silver linden
27.	*Picea abies*	Common spruce	57.	*Ulmus glabra*	Mountain elm
28.	*Pinus halepensis*	Aleppo pine	58.	*Ulmus laevis*	Fluttering elm
29.	*Pinus nigra*	Black pine	59.	*Ulmus minor*	Field elm
30.	*Pinus pinea*	Stone pine			

9.3 Data for National reporting table T9

FRA 2005 Categories	**Number of species (year 2000)**
Native tree species	59
Critically endangered tree species	0
Endangered tree species	0
Vulnerable tree species	0

9. 4 Comments to National reporting table T9

Table T10 – Growing stock composition

10.1 FRA 2005 Categories and definitions

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

Most common	Botanical name	Local name
1st	*Fagus sylvatica* L	Common beech
2nd	*Quercus robur* L.	Pedunculate oak
3rd	*Quercus petraea* (Matt.) Liebl.	Sessile oak
4th	*Abies alba* Mill.	Silver fir
5th	*Carpinus betulus* L.	Common hornbeam
6th	*Fraxinus angustifolia* Vahl.	Field ash
7th	*Picea abies* (L.) H.Karst.	Spruce
8th	*Quercus ilex* L.	Holly oak
9th	*Quercus pubescens* Willd.	Pubescent oak
10th	*Pinus halepensis* Mill.	Aleppo pine

10.2 National data

10.2.1 Data sources

References to sources of information	**Quality (H/M/L)**	**Variable(s)**	**Year(s)**	**Additional comments**
Public enterprise *Hrvatske šume*, RC Forest Management Plan, Zagreb, 1993.	Low	Tree species in forest and their growing stock	1986	Valid from 1986 until 1995, updated to 01.01.1986.
Public enterprise *Hrvatske šume*, RC Forest Management Plan, Zagreb, 1996.	Medium	Tree species in forest and their growing stock	1996	Valid from 1996 until 2005updated to 01.01.1996.

10.2.2 Original data

The table shows the growing stock without the growing stock of shrubs, scrubs, maquis and garigue.

	Growing stock (m3 o.b.)	
	1986	**1996**
Beech	105,297,612	118,197,958
Pedunculate oak	41,598,258	44,980,967
Sessile oak	27,971,354	32,386,239
Fir	34,360,233	30,475,088
Common hornbeam	23,043,099	24,892,301
Field ash	9,336,373	10,280,248
Spruce	4,918,592	6,525,657
Holly oak	5,864,256	5,091,853
Pubescent oak	5,662,204	4,317,504
Aleppo pine	3,624,268	3,880,114
Other conifers	4,368,468	6,201,959
Other broadleaves	32,366,445	37,026,249
Total - Inventoried forests	**298,411,162**	**324,256,137**
Maquis garigue, shrub	2,361,660	3,299,460

10.3 Analysis and processing of national data

10.3.1 Calibration

Calibration is not necessary.

10.3.2 Estimation and forecasting

The growing stock of shrubs, scrubs, maquis and garigue (Footnote 6) has been distributed as follows: 95% of the growing stock with other broadleaves, and the remaining 5% with other conifers. The presentation is given in the following table. The estimation for 1990 was made by linear interpolation, while the forecasting for 2000 was made by linear extrapolation.

	Growing stock (m3 u.b.)		
	1990	**2000**	**Rank 2000**
Beech	110,457,750	123,358,096	1
Pedunculate oak	42,951,342	46,334,051	2
Sessile oak	29,737,308	34,152,193	3
Fir	32,806,175	28,921,030	4
Common hornbeam	23,782,780	25,631,982	5
Field ash	9,713,923	10,657,798	6
Spruce	5,561,418	7,168,483	7
Holly oak	5,555,295	4,782,892	8
Pubescent oak	5,124,324	3,779,624	10
Aleppo pine	3,726,606	3,982,452	9
Other conifers	5,101,864	6,935,355	Other
Other broadleaves	34,230,367	38,890,171	Other
Maquis garigue, shrub	2,736,780	3,674,580	Other
Total	**311,485,932**	**338,268,707**	

10.4 Data for National reporting table T10

FRA 2005 Categories / Species name		**Growing Stock in Forests**	
Scientific name	**Common name**	**(million cubic meters)**	
		1990	**2000**
Fagus sylvatica L	Common beech	110.5	123.4
Quercus robur L.	Pedunculate oak	43.0	46.3
Quercus petraea (Matt.) Liebl.	Sessile oak	29.7	34.2
Abies alba Mill.	Silver fir	32.8	28.9
Carpinus betulus L.	Common hornbeam	23.8	25.6
Fraxinus angustifolia Vahl.	Field ash	9.7	10.7
Picea abies (L.) H.Karst.	Spruce	5.6	7.2
Quercus ilex L.	Holly oak	5.5	4.8
Pinus halepensis Mill.	Aleppo pine	3.7	4.0
Quercus pubescent Willd.	Pubescent oak	5.1	3.8
Other	Other	42.0	49.5
TOTAL		**311.4**	**338.4**

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
National institute for statistics, Statistical chronicles of R. Croatia, Editions 1992 – 2002, Zagreb.	H	Volume in 1000 cubic meters of industrial wood removal under bark and woodfuel under bark	1992-2002	

The chosen option for wood removal estimation are the figures on removed wood that have already been submitted in the report to international organizations (Appendix 3 - Table 3-1 and 3 -2).

11.2.2 Classification and definitions

According to FRA 2005 definitions, but volume is under bark.

11.2.3 Original data

Production under bark in "000" m^3

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Industrial roundwood	1421	1741	1804	1744	1710	2044	2291	2392	2693	2721	2886
Wood fuel	568	711	1012	860	832	1006	1107	1094	976	747	755

Since the data in Appendix 3 are expressed as under bark, we converted them to the volume over bark, using the global conversion factor 1.15 (Source: IPPC Good Practice Guidance), because the data on the tree species structure are not available within the national data.
The following table shows the volumes over bark.

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Industrial roundwood	1634.15	2002.15	2074.6	2005.6	1966.5	2350.6	2634.65	2750.8	3096.95	3129.15	3318.9
Wood fuel	653.2	817.65	1163.8	989	956.8	1156.9	1273.05	1258.1	1122.4	859.5	868.25

11.3 Analysis and processing of national data

11.3.1 Estimation and forecasting

National classes	Volume in 1000 m^3 over bark		
	1990	2000	2005
Industrial roundwood	1634.15	2986.09	3662.6
Wood fuel	653.2	1076.17	1287.66

As there are no data for the period 1988 – 1991, the five-year average cannot be calculated to present the year 1990. We therefore consider the data of 1992 valid for 1990. The 2000 data have been obtained as a five-year average of the period 1998 – 2002. The data of 2005 have been obtained by linear extrapolation.

11.4 Reclassification into FRA 2005 classes

Reclassification is not necessary.

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	1634.15	2986.09	3662.06	ID	ID	ID
Woodfuel	653.20	1076.17	1287.66	ID	ID	ID
TOTAL for Country	2287.35	4062.26	4949.72	ID	ID	ID

Productive wooded land without tree cover, non-productive wooded land without tree cover, and one part of the barren wooded land belong to Other wooded land by FRA classification, but wood volume is not measured on them.

11.6 Comments to National reporting table T11

The data about Wood removal are taken from Appendix 3 – Table 3-1 and Table 3-2. The same data we can find in the reports of the State Institute for Statistics of Croatia. We also saw that wood removal increased 100% from 1992 to 2002, but it is the official data and we believe that data are correct. The increase of value is the consequence of wood removal increase.

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
Public *enterprise Hrvatske šume*: Price list of main forest products 1992, 1993, 1994, 1995, 1996, Zagreb.	H	Price of industrial roundwood and fuelwood on forest road	1992 -1996	
Public *enterprise Hrvatske šume*: Price list of main forest products 1998, Zagreb	H	Price of industrial roundwood and fuelwood on forest road	1997 - 2004	
Public enterprise *Hrvatske šume* : Realization of the planned wood assortment sale 1992 and 2000, Zagreb.	H	Realized average price in Kn per m^3 for industrial roundwood and fuelwood with tax	1992 and 2000	
Trade society *Hrvatske šume*: Realization of the planned wood assortment sale 2003, Zagreb	H	Realized average price in Kn per m^3 for industrial roundwood and fuelwood with tax	2003	

We calculated the value of total removed wood in Republic Croatia using price lists of the enterprise "Hrvatske šume", made by the Ministry of Economy.

12.2.2 Classification and definitions

No definitions available.

12.2.3 Original data

The realized average prices in kunas per m^3 for roundwood and fuelwood without tax were obtained on the basis of the realization of wood assortment sale by "Hrvatske šume", and were used for the calculation of the total removed wood value.

Average prices realized by the sales in the given year

	Average prices (kuna/m^3)		
	1992	2000	2003
National classess			
Industrial roundwood	15.10	398.65	408.61
Wood fuel	3.40	81.00	87.00

	Average prices (USD/m^3)		
	1992	2000	2003
National classes			
Industrial roundwood	18.88	53.8	66.7
Wood fuel	4.25	10.79	14.2

Historical exchange rates used for calculating:

1992	1	USD	0,8	kn
2000	1	USD	8,16	kn
2003	1	USD	6,12	kn

The exchange rate of American dollar was taken from Appendix 4 – Historical exchange rates (Source: IMF).

Data imported from section T11:

National classes	**Volume in 1000 m^3 over bark**		
	1990	2000	2005
Industrial roundwood	1634.15	2986.09	3662.06
Wood fuel	653.2	1076.17	1287.66
Total	2287.35	4062.26	4949.715

12.3 Analysis and processing of national data

12.3.1 Estimation and forecasting

National classes	Value of Industrial roundwood and wood fuel removal (1000 USD)		
	1990	2000	2005
Industrial roundwood	30850.44	158508.0	244502.34
Wood fuel	2776.10	11607.16	18304.90
Total	33626.54	170115.76	262807.24

Since there are no data on the removal of industrial roundwood and wood fuel for the period 1988 – 1991, we have not calculated the five-year average, which would present the year 1990. We therefore consider the 1992 data valid for 1990, which also refers to the average price and value (in Historical exchange rates there are no data for year 1990.). The data on the 2000 value was calculated by multiplying the five-year average of the removed wood by the average price 2000; we used exchange rate of the reporting year 2000 when converting the values into dollars. We calculated the values of 2005 by multiplying the estimated quantities of the removed wood by the average prices in 2003.

12.4 Reclassification into FRA 2005 classes

No calibration was necessary.

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	30850.44	158508.60	244502.34	ID	ID	ID
Woodfuel	2776.10	11607.16	18304.0	ID	ID	ID
TOTAL for Country	33626.54	170115.76	262807.24	ID	ID	ID

Productive wooded land without tree cover, non-productive wooded land without tree cover, and one part of barren wooded land belong to Other wooded land by FRA classification, but the wood volume on them does not change and is not measured, because it is insignificantly small.

12.6 Comments to National reporting table T12

All necessary comments are given in the preceding text.

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
Plant products / raw material
1. Food
2. Fodder
3. Raw material for medicine and aromatic products
4. Raw material for colorants and dyes
5. Raw material for utensils, handicrafts & construction
6. Ornamental plants
7. Exudates
8. Other plant products
Animal products / raw material
9. Living animals
10. Hides, skins and trophies
11. Wild honey and bee-wax
12. 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**
"Hrvatske šume", Statute on non-wood forest products Reg. ?:349-01-94-3418/29; Zagreb, 1994.	High	Definitions of non-wood forest products	1994	
Hrvatske šume Ltd.; Annual report on collected seeds of forest tree species, Zagreb, 1998-2002.	High	Seeds of forest tree species	1998 -2002	
Ministry of Culture, Department of Environment; Annual reports on mushroom collection, Zagreb, 1998 -2002.	Medium	Mushrooms	1998-2002	
Ministry of Culture, Department of Environment, Annual reports on collection Raw material for medicine and aromatic products, Zagreb, 2001.	Medium	Raw material for medicine and aromatic products	2001	
Ministry of Culture, Department of Environment, Annual reports on collection of snails, Zagreb 1999-2002.	Medium	Snails	1999 -2002	

13.2.2 Classification and definitions

National class	Definition
Non-wood forest products	The following is considered non-wood forest products: 1. Products for forest regeneration, growing trees, growing plantations, hedges, etc., i.e.: forest seeds, forest tree seedlings, naturally grown young trees, parts of plants for vegetative propagation, etc. 2. Products serving as food for people, i.e.: forest fruits (sweet chestnut, walnuts, hazelnuts, wild apples and pears, service-tree fruit, rockberry, mulberry, pomegranate, carob, stone-pine nuts, wild rose berries, strawberries, blueberries, cranberries, blackberries, raspberries, cornelian cherries, blackthorn plums etc.), edible plants, roots and underground stalks, mushrooms, frogs, honey bee products, etc. 3. Products serving as medicine: flower, leaf, stalk, root, underground stalk, bark of medical trees, brushes and plants for which there has been no ban of collecting, lichens, moss, leeches, etc. 4. Products used in cattle breeding: pasture, acorn collection, browse, leaf-litter, fodder, litter, hay grass, etc. 5. Products for various industrial and other purposes: resin, bast, cane, peat, humus, clay, forest soil, sand, gravel, rock, branch litter, stockwood, buttresses, branches after cleaning, wicker, wreath branches, broom branches, ivy, Christmas trees, needles, cones for distillation of oils and resins, tannin cones, ornamental cones, mosses, rush-leafed broom, tree bark, etc. 6. Use of forests and wooded lands for rest and recreation.

13.2.3 Original data

Plant products / raw material

A) Food - mushrooms

Mushroom species	Unit	Year	
		1990	2000
Chanterelle (Cantharellus cibarius)	kg	-	58,800
Trumpets (Craterellus cornucopioides)	kg	-	37,100
Cepe (Boletus sp.)	kg	-	127,600
Hedgehog fungus (Hydnum sp.)	kg	-	12,100
Honey fungus (Armillaria sp.)	kg	-	108,800
Saffron milk cap (Lactarius sp.)	kg	-	20
Black truffles (Tuber sp.)	kg	-	791
Big white truffles (Tuber sp.)	kg	-	583
Total	**kg**	**-**	**345,794**

There are no data for 1990, as no statistical records were kept (Homeland War). The average of 1998 – 2002 was taken for the year 2000. These are data received from the firms licensed for commercial mushroom trade, and there are no data on private mushroom collection.

B) Raw material for medicine and aromatic products

Plant species	Part of plant	Unit	1990	2000
Allium ursinum	leaf	kg	-	206
Betula pendula	leaf	kg	-	2,817
Castanea sativa	fruit	kg	-	2,470
Crataegus monogyna	flower	kg	-	147
Fragaria vesca	leaf	kg	-	38
Galium verum	plant	kg	-	266
Genista tinctoria	plant	kg	-	320
Geranium robertianum	plant	kg	-	762
Glechoma hederacea	plant	kg	-	5,526
Humulus lupulus	fruit	kg	-	36
Hypericum perforatum	plant	kg	-	7
Laurus nobilis	leaf	kg	-	390

Phyllitis scolopendrium	leaf	kg	-	195
Polygonum aviculare	plant	kg	-	312
Prunus spinosa	fruit	kg	-	39
Pulmonaria officinalis	leaf	kg	-	4,027
Rhamnus frangula	bark	kg	-	1,122
Rosa canina	fruit	kg	-	2,687
Rubus fruticosus	leaf	kg	-	455
Rubus idaeus	leaf	kg	-	1,620
Salix alba	bark	kg	-	214
Sambucus nigra	flower	kg	-	452
Symphytium officinale	root	kg	-	174
Tilia cordata	flower	kg	-	2,027
Tilia platyphyllos	flower	kg	-	132
Urtica dioica	leaf	kg	-	4,250
Vaccinium myrtilus	leaf	kg	-	145
Vinca minor	plant	kg	-	475
Viola odorata	plant	kg	-	643
Viscum album	plant	kg	-	1,891
Total	-	kg	-	**33,855**

There are no data for 1990, as no statistical records were kept (Homeland War). The values of 2001 were taken for the year 2000.
These are data received from the firms licensed for commercial trade of medicine and aromatic product raw materials.

C) Seeds of forest tree species – Other plant products

Tree species	**Unit**	**Year**	
		1990	**2000**
Pedunculate oak (Quercus robur)	kg	-	837,632
Sessile oak (Quercus petraea)	kg	-	165,390
Beech (Fagus sylvatica)	kg	-	673
Fir (Abies alba)	kg	-	481
Field ash (Fraxinus angustifolia)	kg	-	1,312
Black walnut (Juglans nigra)	kg	-	31,583
Other	kg	-	845
Total	**kg**	**-**	**1,038,062**

There are no data for 1990, since no statistical records were kept (Homeland War). The average of 1998 – 2002 was taken for the year 2000.

D) Other edible animal products – snails

year	Helix pomatia (vineyard snail) Helix lucorum (kg)
1990	-
2000	277,846

There are no data for 1990, since no statistical records were kept (Homeland War). The average of 1999 – 2002 was taken for the year 2000.

13.3 Analysis and processing of national data

13.3.1Estimation and forecasting

Since there are not even approximate data for the four categories listed above for the period 1988 – 1992, we could not estimate them for the year 1990. The 2005 estimation is a subjective opinion of local experts.

About 1 million kg mushrooms are allowed for collection each year. However, the collection/growth depend on the weather conditions, so that this quota is never exceeded.
The quota of collecting raw materials for medicine and aromatic products, forest seeds and snails is regularly increasing every year.

13.4 Reclassification into FRA 2005 classes

Reclassification is not necessary.

13.5 Data for National reporting table T13

FRA 2005 Categories	Scale factor	Unit	NWFP removal		
			1990	2000	2005
Plant products / raw material					
1. Food	1	kg	ID	345794	400000
2. Fodder			ID	ID	ID
3. Raw material for medicine and aromatic products	1	kg	ID	33855	40000
4. Raw material for colorants and dyes			ID	ID	ID
5. Raw material for utensils, handicrafts & construction			ID	ID	ID
6. Ornamental plants			ID	ID	ID
7. Exudates			ID	ID	ID
8. Other plant products	1	kg	ID	1038062	1200000
Animal products / raw material					
9. Living animals			ID	ID	ID
10. Hides, skins and trophies			ID	ID	ID
11. Wild honey and bee-wax			ID	ID	ID
12. Bush meat			ID	ID	ID
13. Raw material for medicine			ID	ID	ID
14. Raw material for colorants			ID	ID	ID
15. Other edible animal products	1	kg	ID	277846	300000
16. Other non-edible animal products			ID	ID	ID

13.6 Comments to National reporting table T13

We do not have reliable data for other products listed in the preceding table. Our research of the available data sources did not result in finding adequate data on most of the categories listed above.

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
Plant products / raw material
1. Food
2. Fodder
3. Raw material for medicine and aromatic products
4. Raw material for colorants and dyes
5. Raw material for utensils, handicrafts & construction
6. Ornamental plants
7. Exudates
8. Other plant products
Animal products / raw material
9. Living animals
10. Hides, skins and trophies
11. Wild honey and bee-wax
12. 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**
Hrvatske šume:: Price list of non-wood forest products Reg. No: 349-01/95-3051/3; Zagreb, 1995 Annex to the price list of non-wood forest products, 2004.	High	Market value of forest tree species seeds, mushrooms and raw material for medicine and aromatic products	1998-2002	Prices refer to the location of collection
Local market value	Medium	Market value of snails	1999-2002	

14.2.2 Classification and definitions

No definitions available.

14.2.3 Original data

Plant products / raw material

A) Food – mushrooms

Mushroom species	**Price (Kn/kg)**	**Year (Kn)**	
		1990	**2000**
Chanterelle (Cantharellus cibarius)	5	-	294,000
Trumpets (Craterellus cornucopioides)	5	-	185,500
Cepe (Boletus sp.)	5	-	638,000
Hedgehog funges (Hydnum sp.)	5	-	60,500
Honey fungus (Armillaria sp.)	5	-	544,000
Saffron milk cap (Lactarius sp.)	5	-	100
Black truffles (Tuber sp.)	500	-	395,500
Big white truffles (Tuber sp.)	1200	-	699,600
Total		**-**	**2,817,200**

The prices of truffles are local, and they vary considerably, depending on the season.

B) Raw material for medicine and aromatic products

Plant species	**Parts of plant**	**Price (Kn/kg)**	**1990**	**2000 (Kn)**
Allium ursinum	leaf	10	-	2,060
Betula pendula	leaf	10	-	28,170
Castanea sativa	fruit	2	-	4,940
Crataegus monogyna	flower	10	-	1,470
Fragaria vesca	leaf	10	-	380
Galium verum	plant	10	-	2,660
Genista tinctoria	plant	10	-	3,200
Geranium robertianum	plant	10	-	7,620
Glechoma hederacea	plant	10	-	55,260
Humulus lupulus	fruit	10	-	360
Hypericum perforatum	plant	10	-	70
Laurus nobilis	leaf	10	-	3,900
Phyllitis scolopendrium	leaf	10	-	1,950
Polygonum aviculare	plant	10	-	3,120
Prunus spinosa	fruit	5	-	195
Pulmonaria officinalis	list	10	-	40,270
Rhamnus frangula	bark	10	-	11,220
Rosa canina	fruit	5	-	13,435
Rubus fruticosus	leaf	10	-	4,550
Rubus idaeus	leaf	10	-	16,200
Salix alba	bark	10	-	2,140
Sambucus nigra	flower	5	-	2,260
Symphytium officinale	root	10	-	1,740
Tilia cordata	flower	10	-	20,270
Tilia platyphyllos	flower	10	-	1,320
Urtica dioica	leaf	10	-	42,500
Vaccinium myrtilus	list	10	-	1,450
Vinca minor	plant	10	-	4,750
Viola odorata	plant	10	-	6,430
Viscum album	plant	1	-	1891
Total	-	-	-	**285,781**

There are no price data for 1990. The 2000 values have been calculated according to the prices of 2001.

C) Forest tree species seeds – other plant products

Tree species	**Price (Kn/kg)**	**Year (Kn)**	
		1990	**2000**
Pedunculate oak (Quercus robur)	1.59	-	1331,834
Sessile oak (Quercus petraea)	1.59	-	262,970
Beech (Fagus sylvatica)	10.36	-	6,972
Fir (Abies alba)	160.00	-	76,960
Field ash (Fraxinus angustifolia)	10.36	-	13,592
Black walnut (Juglans nigra)	2.59	-	81,799
Other	5.00	-	4,225
Total	-	-	**1,774,127**

The monetary value was considered as the price of the average yield of forest seeds.
Black walnut seed was valued by the price of sweet walnut seed.

Animal products / raw material

D) Other edible animal products – snails

year	Helix pomatia (vineyard snail) Helix lucorum (Kn)
1990	-
2000	1,389,230

Local market value has been taken for price, i.e. 5 Kn/kg.

14.3 Analysis and processing of national data

14.3.1 Estimation and forecasting

As there are not even approximate data for the four categories listed above for the period 1988-1992, we could not make the estimation for 1990. The 2005 estimation is a subjective opinion of local experts.

14.4 Reclassification into FRA 2005 classes

Reclassification was not necessary.

14.5 Data for National reporting table T14

FRA 2005 Categories	Value of the of NWFP removed (1000 USD)		
	1990	2000	2005
Plant products / raw material			
1. Food	ID	345,24	397,03
2. Fodder	ID	ID	ID
3. Raw material for medicine and aromatic products	ID	35,02	41,32
4. Raw material for colorants and dyes	ID	ID	ID
5. Raw material for utensils, handicrafts & construction	ID	ID	ID
6. Ornamental plants	ID	ID	ID
7. Exudates	ID	ID	ID
8. Other plant products	ID	217,41	252,20
Animal products / raw material			
9. Living animals	ID	ID	ID
10. Hides, skins and trophies	ID	ID	ID
11. Wild honey and bee-wax	ID	ID	ID
12. Bush meat	ID	ID	ID
13. Raw material for medicine	ID	ID	ID
14. Raw material for colorants	ID	ID	ID
15. Other edible animal products	ID	170,25	183,87
16. Other non-edible animal products	ID	ID	ID
TOTAL	ID	767,92	874,42

In the conversion from domestic currency into US dollars for the year 2000 was used the exchange rate for the year 2000. (1 USD =8.16 Kn).
In the conversion from domestic currency into US dollars for the year 2005 was used used the exchange rate for the year 2003. (1 USD =6,12 Kn).

14.6 Comments to National reporting table T14

All necessary comments are given in the text above.

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
Public enterprise for the management of forests and forestlands in the Republic of Croatia: *Hrvatske šume*. Business report of *Hrvatske šume* for the year 1996, Zagreb, 1997.	H	Employment in the enterprise *Hrvatske šume*	1990	
Limited liability company *Hrvatske šume:* Annual report 2002, Zagreb, 2003	H	Employment in the enterprise *Hrvatske šume*	2000	

15.2.2 Classification and definitions

No data available.

15.2.3 Original data

Employment in the enterprise *Hrvatske šume*		
year	1990	2000
Employment number	14,296	9,991

The number of the employed refers to the regularly employed people in planting, sowing, growth, nursery production, cutting, and transport, collection of non-wood forest products, and the expert and administrative staff.

15.3 Analysis and processing of national data

15.3.1 Estimation and forecasting

Estimation and forecasting are not necessary

15.4 Reclassification into FRA 2005 classes

National classes	Percentage of national class in a FRA class		
	Primary production of goods	Provision of services	Unspecified forestry activities
Employment in the enterprise *Hrvatske šume*	100		

The above classification refers to both reporting years

15.5 Data for National reporting table T15

FRA 2005 Categories	Employment (1000 person-years)	
	1990	**2000**
Primary production of goods	14.3	10.0
Provision of services	NDA	NDA
Unspecified forestry activities	-	-
TOTAL	**14.3**	**10.0**

15.6 Comments to National reporting table T15

The employment data are available only of *Hrvatske šume*, not of other forest owners, either private or public. The data on the employment in forest eco-tourism, the maintenance of national parks, etc. are likewise not available.

The use of human labor is also present in private forests. It is estimated that the annual logging in private forests amount to about 2m3/ha. The productivity in these forests is certainly much lower than in the national forests. A very careful estimation is that the use of human labor in private forests corresponds to the equivalent of 1,000 – 1,300 forest workers with full working time.

16 Thematic reporting tables

Croatia as a member of the Ministerial Conference for the Protection of Forest in Europa (MCPFE) alredy reports on Criteria and Indicators issues to this regional process. In order to avoid double reporting, Croatia will not provide an additional report by thematic areas.

The process of recognizing additional relevant national variables is still going on and so far, no official national indicators have been identified.