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Organization of the
United Nations

Global Forest Resources Assessment 2020

Report

Croatia

Rome, 2020



FAO has been monitoring the world's forests at 5 to 10 year intervals since 1946. The Global Forest Resources Assessments (FRA) are now produced every five years in an attempt to provide a consistent approach to describing the world's forests and how they are changing. The FRA is a country-driven process and the assessments are based on reports prepared by officially nominated National Correspondents. If a report is not available, the FRA Secretariat prepares a desk study using earlier reports, existing information and/or remote sensing based analysis.

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Introduction

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Introductory text

Republic of Croatia has a long-standing tradition of sustainable forest management that dates back over 250 years. Already in 1769, the first Forest Order recognized that forest management should be based on the principles of sustainability. As a result, Republic of Croatia has some of the most extensive, healthy and naturally self-sustaining forests in Europe today. Croatian forests represent a rich biodiversity concentrated on its relatively small territory. 4500 plant species and subspecies, 260 autochthonous tree species and more than 100 forest plant communities exist on over 2.7 million hectares of forest and other forested land.

In the Republic of Croatia, **forests and other forest land cover almost half of the land territory**. Their value has been recognized a long time ago. Most of this valuable resource is owned by the State, and managed in a “close to nature” practice with the objective of natural regeneration. Furthermore, **clear cuts in high forests of natural origin are prohibited by the law**, which helps to maintain the forest stands in optimal condition and provides continuous cover over large areas. Consequently, all state forests, managed by state owned enterprise („Croatian forests“ Ltd), are accredited with the prestigious Forest Stewardship Council's certificate (FSC). Republic of Croatia has made an ambitious plan for having 100% of forests under sustainable forest management. Reaching this goal is accomplished through the development of the Forest Management Plans for private forests.

Republic of Croatia has developed sustainable forest management financing mechanism in the form of “green tax”. It is based on the charging of Public Used Non-timber Forests Services to all economic entities in the State. Funds collected in this way are strictly designated and used only for implementation of activities supporting and executing sustainable forest management.

Forests in Republic of Croatia have not been changed substantially in the last hundred years, but this does not mean they have not been managed and harvested. On the contrary, many areas have been and will continue to be, used sustainably for wood production or as hunting reserves, which not only bring in economic gains, but also provide employment and additional income to thousands of people.

1 Forest extent, characteristics and changes

1a Extent of forest and other wooded land

National data

Data sources

1986	References	Croatian Forests Ltd., Forest Management Plan of the Republic of Croatia, Zagreb, 1993.
	Methods used	Registers/questionnaires
	Additional comments	FMPs from 1986 to 1995. Data valid for 01.01.1986.
1996	References	Croatian Forests Ltd., Forest Management Plan of the Republic of Croatia, Zagreb, 1996.
	Methods used	Full-cover forest/vegetation maps
	Additional comments	FMPs from 1996 to 2005. Data valid for 01.01.1996.
2006	References	Croatian Forests Ltd., Forest Management Plan of the Republic of Croatia, Zagreb, 2006.
	Methods used	Full-cover forest/vegetation maps
	Additional comments	FMPs from 2006 to 2015. Data valid for 01.01.2006.
2016	References	Croatian Forests Ltd., Forest Management Plan of the Republic of Croatia, Zagreb, 2016.
	Methods used	Full-cover forest/vegetation maps
	Additional comments	FMPs from 2016 to 2025. Data valid for 01.01.2016.
2017	References	Croatian Forests Ltd., Forest Management Plan of the Republic of Croatia, Zagreb, 2016., Validated management plans for management units (2017)
	Methods used	Full-cover forest/vegetation maps
	Additional comments	

Classifications and definitions

1986	National class	Definition
	Forest (stocked forest land)	

		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.
	...high forest, plantation and coppice	
	...scrubland	
	Other forest land (unstocked forest 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
	...Productive wooded land without tree cover	Clearings, stony ground, etc.
	...Non-productive wooded land without tree cover	Fire lanes, light tracts along roads wider than three meters, landings, mountain meadows, etc.
	...Barren wooded land	Forest roads wider than three meters, streams, canals, swamps, straight karst, areas under developments, gravel pits, quarries, etc.

1996	National class	Definition
	Forest (stocked forest land)	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.
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	...Barren wooded land	Forest roads wider than three meters, streams, canals, swamps, straight karst, areas under developments, gravel pits, quarries, etc.

2006	National class	Definition
	Other forest land (unstocked forest 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
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	...Non-productive wooded land without tree cover	Fire lanes, light tracts along roads wider than three meters, landings, mountain meadows, etc.
	...Barren wooded land	Forest roads wider than three meters, streams, canals, swamps, straight karst, areas under developments, gravel pits, quarries, etc.

FRA 2020 report, Croatia

	Forest (stocked forest land)	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.
	...high forest, plantation and coppice	
	...scrubland	

2016	National class	Definition
	Forest (stocked forest land)	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.
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	...scrubland	
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	...Barren wooded land	Forest roads wider than three meters, streams, canals, swamps, straight karst, areas under developments, gravel pits, quarries, etc.

2017	National class	Definition
	Forest (stocked forest land)	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.
	...high forest, plantation and coppice	
	...scrubland	
	Other forest land (unstocked forest 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
	...Productive wooded land without tree cover	Clearings, stony ground, etc.
	...Non-productive wooded land without tree cover	Fire lanes, light tracts along roads wider than three meters, landings, mountain meadows, etc.
	...Barren wooded land	Forest roads wider than three meters, streams, canals, swamps, straight karst, areas under developments, gravel pits, quarries, etc.

Original data and reclassification

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1986	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Forest	Other wooded land	Other land
	Forest (stocked forest land)		%	%	%
	...high forest, plantation and coppice	1 825.34	100.00 %	0.00 %	0.00 %
	...scrubland	236.17	0.00 %	100.00 %	0.00 %
	Other forest land (unstocked forest land)		%	%	%
	...Productive wooded land without tree cover	315.17	0.00 %	0.00 %	100.00 %
	...Non-productive wooded land without tree cover	16.96	100.00 %	0.00 %	0.00 %
	...Barren wooded land	64.01	50.00 %	0.00 %	50.00 %
	Total	2 457.65	1 874.31	236.17	347.18

1996	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Forest	Other wooded land	Other land
	Forest (stocked forest land)		%	%	%
	...high forest, plantation and coppice	1 748.34	100.00 %	0.00 %	0.00 %
	...scrubland	329.95	0.00 %	100.00 %	0.00 %
	Other forest land (unstocked forest land)		%	%	%
	...Productive wooded land without tree cover	331.33	0.00 %	0.00 %	100.00 %
	...Non-productive wooded land without tree cover	14.62	100.00 %	0.00 %	0.00 %
	...Barren wooded land	61.37	50.00 %	0.00 %	50.00 %
	Total	2 485.61	1 793.65	329.95	362.02

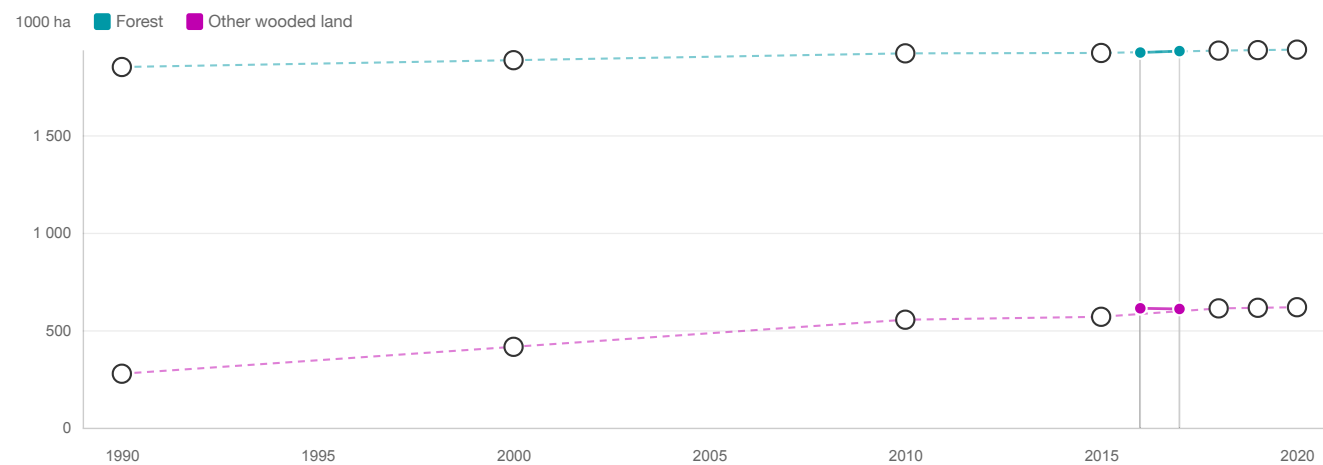
2006	Classifications and definitions		FRA classes		

	Class	Area (1000 ha)	Forest	Other wooded land	Other land
	Other forest land (unstocked forest land)		%	%	%
	...Productive wooded land without tree cover	208.47	0.00 %	0.00 %	100.00 %
	...Non-productive wooded land without tree cover	32.95	100.00 %	0.00 %	0.00 %
	...Barren wooded land	44.49	50.00 %	0.00 %	50.00 %
	Forest (stocked forest land)		%	%	%
	...high forest, plantation and coppice	1 889.64	100.00 %	%	%
	...scrubland	513.14	0.00 %	100.00 %	0.00 %
	Total	2 688.69	1 944.84	513.14	230.72

2016	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Forest	Other wooded land	Other land
	Forest (stocked forest land)		%	%	%
	...high forest, plantation and coppice	1 826.88	100.00 %	%	%
	...scrubland	665.79	8.00 %	92.00 %	0.00 %
	Other forest land (unstocked forest land)		%	%	%
	...Productive wooded land without tree cover	199.15	0.00 %	0.00 %	100.00 %
	...Non-productive wooded land without tree cover	24.96	100.00 %	%	%
	...Barren wooded land	42.26	45.00 %	0.00 %	55.00 %
	Total	2 759.04	1 924.12	612.53	222.39

2017	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Forest	Other wooded land	Other land

	Forest (stocked forest land)		%	%	%
	...high forest, plantation and coppice	1 834.88	100.00 %	%	%
	...scrubland	662.05	8.00 %	92.00 %	0.00 %
	Other forest land (unstocked forest land)		%	%	%
	...Productive wooded land without tree cover	191.17	0.00 %	0.00 %	100.00 %
	...Non-productive wooded land without tree cover	26.10	100.00 %	%	%
	...Barren wooded land	41.08	43.00 %	0.00 %	57.00 %
	Total	2 755.28	1 931.61	609.09	214.59



FRA categories	Area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Forest (a)	1 850.00	1 885.00	1 920.00	1 922.00	1 924.12	1 931.61	1 934.11	1 936.61	1 939.11
Other wooded land (a)	277.00	415.00	554.00	569.00	612.53	609.09	612.09	615.09	618.09
Other land (c-a-b)	3 469.00	3 296.00	3 122.00	3 105.00	3 059.35	3 055.31	3 049.80	3 044.30	3 038.80
Total land area (c)	5 596.00	5 596.00	5 596.00	5 596.00	5 596.00	5 596.00	5 596.00	5 596.00	5 596.00

The FAOSTAT land area figure for the year 2015 is used for all reference years

Climatic domain	% of forest area 2015	Override value
Boreal	0.00	
Temperate	88.00	
Sub-tropical	12.00	
Tropical	0.00	

Comments

Forest includes high forest, plantation and coppice. Since the national forest definition sets minimum forest area of 0.1 ha, we estimate that the total area of such small groves of 0.1-0.5 ha is less than 0.5%, and it is negligible in the total reported forest area.

Other wooded land includes scrubland (maquia, garigue, scrubs and shrub). Forest management in these areas is composed mainly of conducting protecting measures to prevent their further degradation and stimulate their succession to forests. Quick development of other wooded land area happened for two reasons:

- State forests are now almost 100% managed or in some managing stage (like measuring all the trees with diameter more than 10 cm at breast height etc.). Because of that, now we have more accurate data and it shows that there are less clearings and more stocked forest land.
- Unmanaged forest land used to be exposed to cattle and browse as the local population used it as grazing land. Now the population in the karst area is reduced, so there are fewer cattle too, and the wooded land area is expanding.

“Forest area” category in period from 1986. to 2006. shows certain inconsistencies, but when comparing total area (Forest area + Other wooded land) these inconsistencies are gone. The reason for these fluctuations is the logic of reclassification taken over from FRA 2010. Another reason for this is the fact that the country level FMP in 1996. was created in war circumstances (significant part of the area was inaccessible and/or didn’t have valid FMP) which resulted in about 30% of the total area being estimated, based on the best available data at the time.

1b Forest characteristics

National data

Data sources

1986	References	Croatian Forests Ltd., Forest Management Plan of the Republic of Croatia, Zagreb, 1993.
	Methods used	Registers/questionnaires
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1996	References	Croatian Forests Ltd., Forest Management Plan of the Republic of Croatia, Zagreb, 1996.
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2006	References	Croatian Forests Ltd., Forest Management Plan of the Republic of Croatia, Zagreb, 2006.
	Methods used	Full-cover forest/vegetation maps
	Additional comments	FMPs from 2006 to 2015. Data valid for 01.01.2006.
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	Methods used	Full-cover forest/vegetation maps
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2017	References	Croatian Forests Ltd., Forest Management Plan of the Republic of Croatia, Zagreb, 2016., Validated management plans for management units (2017)
	Methods used	Full-cover forest/vegetation maps
	Additional comments	

Classifications and definitions

1986	National class	Definition
	Forest (stocked forest land)	

		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.
	...high forest, plantation and coppice	
	...scrubland	
	Other forest land (unstocked forest 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
	...Productive wooded land without tree cover	Clearings, stony ground, etc.
	...Non-productive wooded land without tree cover	Fire lanes, light tracts along roads wider than three meters, landings, mountain meadows, etc.
	...Barren wooded land	Forest roads wider than three meters, streams, canals, swamps, straight karst, areas under developments, gravel pits, quarries, etc.

1996	National class	Definition
	Forest (stocked forest land)	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.
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	...Barren wooded land	Forest roads wider than three meters, streams, canals, swamps, straight karst, areas under developments, gravel pits, quarries, etc.

2006	National class	Definition
	Other forest land (unstocked forest 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
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FRA 2020 report, Croatia

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	...scrubland	

2016	National class	Definition
	Forest (stocked forest land)	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.
	...high forest, plantation and coppice	
	...scrubland	
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	...Barren wooded land	Forest roads wider than three meters, streams, canals, swamps, straight karst, areas under developments, gravel pits, quarries, etc.

2017	National class	Definition
	Forest (stocked forest land)	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.
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	...Barren wooded land	Forest roads wider than three meters, streams, canals, swamps, straight karst, areas under developments, gravel pits, quarries, etc.

Original data and reclassification

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1986	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Naturally regenerating forest	Plantation forest	Other planted forest
	...high forest, plantation and coppice	1 825.34	94.85 %	5.15 %	0.00 %
	...Non-productive wooded land without tree cover	16.96	95.00 %	5.00 %	0.00 %
	...Barren wooded land	32.01	95.00 %	5.00 %	0.00 %
	Total	1 874.31	1 777.85	96.45	0.00

Plantation forest	Area (1000 ha)	...of which introduced
...high forest, plantation and coppice	94.01	29.10 %
...Non-productive wooded land without tree cover	0.85	29.10 %
...Barren wooded land	1.60	29.10 %
Total	96.45	28.07

1996	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Naturally regenerating forest	Plantation forest	Other planted forest
	...high forest, plantation and coppice	1 748.34	95.20 %	4.80 %	0.00 %
	...Non-productive wooded land without tree cover	14.62	95.20 %	4.80 %	0.00 %
	...Barren wooded land	30.69	95.20 %	4.80 %	0.00 %
	Total	1 793.65	1 707.55	86.09	0.00

Plantation forest	Area (1000 ha)	...of which introduced
...high forest, plantation and coppice	83.92	32.00 %
...Non-productive wooded land without tree cover	0.70	32.00 %
...Barren wooded land	1.47	32.00 %
Total	86.09	27.55

2006	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Naturally regenerating forest	Plantation forest	Other planted forest
	...Non-productive wooded land without tree cover	32.95	96.20 %	3.80 %	0.00 %
	...Barren wooded land	22.25	96.20 %	3.80 %	0.00 %
	...high forest, plantation and coppice	1 889.64	96.15 %	3.85 %	0.00 %
	Total	1 944.84	1 869.99	74.85	0.00

Plantation forest	Area (1000 ha)	...of which introduced
...Non-productive wooded land without tree cover	1.25	36.00 %
...Barren wooded land	0.85	36.00 %
...high forest, plantation and coppice	72.75	36.00 %
Total	74.85	26.95

2016	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Naturally regenerating forest	Plantation forest	Other planted forest
	...high forest, plantation and coppice	1 826.88	96.00 %	4.00 %	0.00 %
	...scrubland	53.26	100.00 %	0.00 %	0.00 %
	...Non-productive wooded land without tree cover	24.96	96.00 %	4.00 %	0.00 %
	...Barren wooded land	19.02	96.00 %	4.00 %	0.00 %
	Total	1 924.12	1 849.29	74.83	0.00

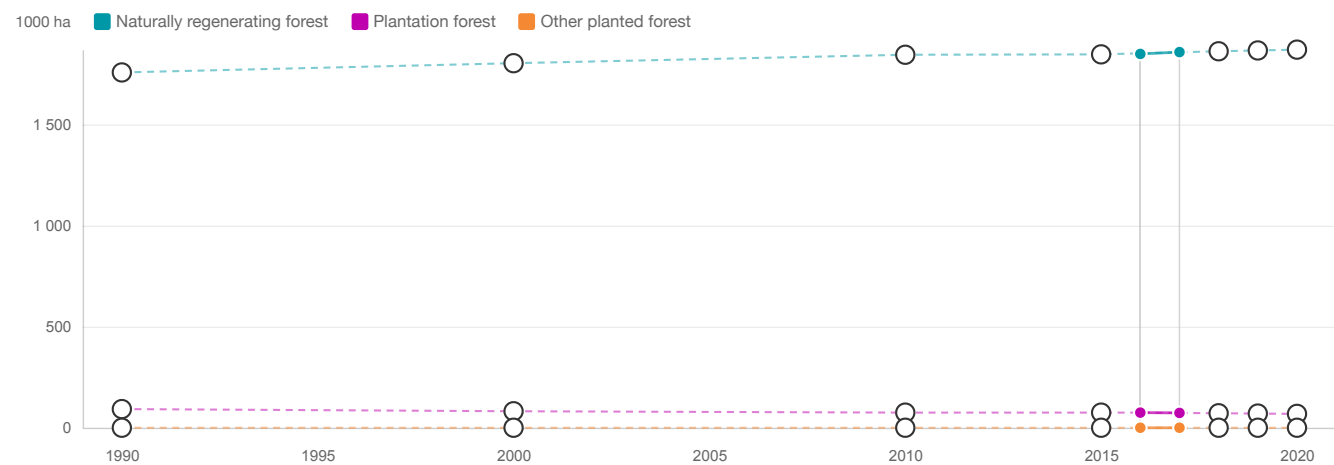
Plantation forest	Area (1000 ha)	...of which introduced
...high forest, plantation and coppice	73.08	28.10 %

Total	74.83	21.03
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Plantation forest	Area (1000 ha)	...of which introduced
...Non-productive wooded land without tree cover	1.00	28.10 %
...Barren wooded land	0.76	28.00 %
Total	74.83	21.03

2017	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Naturally regenerating forest	Plantation forest	Other planted forest
	...high forest, plantation and coppice	1 834.88	96.10 %	3.90 %	0.00 %
	...scrubland	52.96	100.00 %	0.00 %	0.00 %
	...Non-productive wooded land without tree cover	26.10	96.10 %	3.90 %	0.00 %
	...Barren wooded land	17.66	96.10 %	3.90 %	0.00 %
	Total	1 931.61	1 858.34	73.27	0.00

Plantation forest	Area (1000 ha)	...of which introduced
...high forest, plantation and coppice	71.56	28.00 %
...Non-productive wooded land without tree cover	1.02	28.00 %
...Barren wooded land	0.69	28.00 %
Total	73.27	20.51



FRA categories	Forest area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest (a)	1 757.69	1 803.40	1 845.16	1 847.16	1 849.29	1 858.34	1 862.40	1 866.46	1 870.52
Planted forest (b)	92.31	81.60	74.84	74.84	74.83	73.27	71.71	70.15	68.59
Plantation forest	92.31	81.60	74.84	74.84	74.83	73.27	71.71	70.15	68.59
...of which introduced species	27.86	27.31	24.58	21.62	21.03	20.51	19.99	19.47	18.95
Other planted forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total (a+b)	1 850.00	1 885.00	1 920.00	1 922.00	1 924.12	1 931.61	1 934.11	1 936.61	1 939.11
Total forest area	1 850.00	1 885.00	1 920.00	1 922.00	1 924.12	1 931.61	1 934.11	1 936.61	1 939.11

Comments

National definitions, as defined by Croatian Forest law and other forestry regulations:

“Naturally regenerating forest” category refers to forests emerged by restoration after fertilizing and selection fellings. They compose of trees mostly emerged by natural restoration (from seeds or from stumps), and by their origin they can be high forest forms (from seeds) or low forest forms (coppice – stump forests).

“Planted forest” category includes forest cultures and forest plantations. Forest culture refers to artificially raised stands without use of agrotechnical measures. Forest plantation refers to artificially raised fast growing willow and poplar stands with use of agrotechnical measures (land cultivating, e.g. hilling up, crumbling, spreading manure).

Data sources:

Forest Management Plans of the Republic of Croatia (country level FMP) in years 1986., 1996., 2006. and 2016. were the sources for the data presented in the “Forest characteristics” chapter. Data for other years was obtained using the “Estimation and forecasting” tool built-in FRA platform application.

1c Primary forest and special forest categories

National Data

Data sources + type of data source eg NFI, etc

Forest management plans, forest management database --> Temporarily unstocked and/or recently regenerated

Register of protected natural values of Republic of Croatia --> Primary forest

National classification and definitions

-

Original data

Temporarily unstocked and/or recently regenerated

Category	1996	2006	2016
	000 ha		
Young forest stands up to 3 years of age	2.84	3.80	1.90
Final cutting area (shelterwood cutting)	3.54	5.04	5.83
Clear cutting area	1.05	1.06	0.75
Total area	7.43	9.90	8.48

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Area (1000 ha)				
	1990	2000	2010	2015	2020
Primary forest	6.73	6.73	6.73	6.73	6.73
Temporarily unstocked and/or recently regenerated	5.95	8.42	9.33	8.61	7.90
Bamboos	0.00	0.00	0.00	0.00	0.00
Mangroves	0.00	0.00	0.00	0.00	0.00
Rubber wood	0.00	0.00	0.00	0.00	0.00

Comments

1d Annual forest expansion, deforestation and net change

National Data

Data sources + type of data source eg NFI, etc

Forest management plans, database on afforestation and deforestation.

National classification and definitions

-

Original data

Year	Afforestation	Deforestation
	hectares	
1990	213.35	0.00
1991	162.59	0.00
1992	297.99	0.00
1993	258.65	0.00
1994	231.58	59.31
1995	287.49	3.01
1996	196.21	0.00
1997	260.21	78.50
1998	331.75	104.76
1999	243.87	32.43
2000	253.75	168.25
2001	299.41	354.33
2002	284.19	227.48
2003	201.18	95.47
2004	142.83	347.54
2005	69.86	364.80
2006	124.32	352.26
2007	42.08	225.15
2008	118.34	409.55
2009	157.83	605.97
2010	164.40	349.37
2011	277.55	191.54
2012	298.21	244.87
2013	537.67	166.59

2014	427.21	44.52
2015	344.55	241.05
2016	101.39	34.17
2017	181.70	457.90

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Area (1000 ha/year)			
	1990-2000	2000-2010	2010-2015	2015-2020
Forest expansion (a)	3.54	3.83	0.49	3.47
...of which afforestation	0.27	0.16	0.19	0.03
...of which natural expansion	3.27	3.67	0.30	3.44
Deforestation (b)	0.04	0.33	0.09	0.05
Forest area net change (a-b)	3.50	3.50	0.40	3.42

Comments

1e Annual reforestation

National Data

Data sources + type of data source eg NFI, etc

Forest management plans, forest management database

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Area (1000 ha/year)			
	1990-2000	2000-2010	2010-2015	2015-2020
Reforestation	1.55	0.66	0.37	0.90

Comments

Values given in “Annual reforestation” category refer **only to regeneration after clear cuts**. There are also significant amounts of planting/seeding on other forest areas, but it is being performed on parts of the stands, making it impossible to define the exact area of reforestation.

1f Other land with tree cover

National Data

Data sources + type of data source eg NFI, etc

References to sources of information	Variable	Year
WISDOM report of Republic of Croatia, 2008 (FAO TCP project: Development of sustainable charcoal industry in the Republic of Croatia (2006.-2008.))	Other land with tree cover	2008
Statistical Yearbook	Tree orchards	
Urban plans, orthophotos, topographic maps	Trees in urban settings	2018

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Area (1000 ha)				
	1990	2000	2010	2015	2020
Palms (a)	0.00	0.00	0.00	0.00	0.00
Tree orchards (b)	40.00	40.20	51.90	49.20	50.00
Agroforestry (c)	0.00	0.00	0.00	0.00	0.00
Trees in urban settings (d)	7.20	7.20	7.20	7.20	7.20
Other (specify in comments) (e)	157.80	157.60	145.90	148.60	147.80
Total (a+b+c+d+e)	205.00	205.00	205.00	205.00	205.00
Other land area	3 469.00	3 296.00	3 122.00	3 105.00	3 038.80

Comments

Areas placed in “**Other**” category refer mostly to **small areas (under 0.1ha)**, covered with forest tree species, which aren’t included in FMPs because they don’t comply with definition of “Forest” as prescribed in Croatian Forest law. It also includes small unutilised agricultural land areas that over the years became covered with forest tree species.

2 Forest growing stock, biomass and carbon

2a Growing stock

National Data

Data sources + type of data source eg NFI, etc

References to sources of information	Year(s)	Additional comments
Public enterprise "Hrvatske šume": Forest Management Plan of the Republic of Croatia, Zagreb, 1993.	1990	
Public enterprise "Hrvatske šume": Forest Management Plan of the Republic of Croatia, Zagreb, 1996.	2000	
"Hrvatske šume d.o.o." (Croatian Forests Ltd.): Forest Management Plan of the Republic of Croatia, Zagreb, 2006.	2010, 2015	
"Hrvatske šume d.o.o." (Croatian Forests Ltd.): Forest Management Plan of the Republic of Croatia, Zagreb, 2016.	2016-2020	

National classification and definitions

Calculated growing stock refers to volume over bark of all living trees with a minimum diameter of 10 cm at breast height (or above buttress if these are higher). Includes the stem from ground level up to a top diameter of 7 cm, excluding branches with diameter under 7cm.

Growing stock for Other wooded land (scrubland) is not measured and it is not covered in the Forest Management Plan of the Republic of Croatia.

Original data

Total growing stock in forest (m ³ over bark)			
1986	1996	2006	2016
298 411 162	324 256 137	397 963 282	418 618 277

Original data used was taken from the validated Forest Management Plans of the Republic of Croatia (country level FMPs) in years 1986., 1996., 2006. and 2016. These country level FMPs are published in 10 years cycle and represent a compilation of validated FMPs for individual management units.

Data for other years was interpolated.

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Growing stock m³/ha (over bark)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest	172.67	194.77	216.16	216.89	219.48	220.19	220.64	221.21	221.77
Planted forest	74.07	108.69	147.64	191.13	170.30	163.53	169.03	174.87	180.98
...of which plantation forest	74.07	108.69	147.64	191.13	170.30	163.53	169.03	174.87	180.98
...of which other planted forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forest	167.75	191.05	213.49	215.89	217.56	218.04	218.73	219.53	220.32
Other wooded land	10.28	10.28	10.28	10.28	10.28	10.28	10.28	10.28	10.28

FRA categories	Total growing stock (million m³ over bark)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest	303.50	351.25	398.85	400.63	405.88	409.19	410.92	412.88	414.83
Planted forest	6.84	8.87	11.05	14.30	12.74	11.98	12.12	12.27	12.41
...of which plantation forest	6.84	8.87	11.05	14.30	12.74	11.98	12.12	12.27	12.41
...of which other planted forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forest	310.34	360.13	409.90	414.94	418.61	421.17	423.05	425.14	427.22
Other wooded land	2.85	4.27	5.70	5.85	6.30	6.26	6.29	6.32	6.35

Comments

2b Growing stock composition

National Data

Data sources + type of data source eg NFI, etc

References to sources of information	Year(s)	Additional comments
Public enterprise "Hrvatske šume": Forest Management Plan of the Republic of Croatia, Zagreb, 1993.	1990	
Public enterprise "Hrvatske šume": Forest Management Plan of the Republic of Croatia, Zagreb, 1996.	2000	
"Hrvatske šume d.o.o." (Croatian Forests Ltd.): Forest Management Plan of the Republic of Croatia, Zagreb, 2006.	2010, 2015	
"Hrvatske šume d.o.o." (Croatian Forests Ltd.): Forest Management Plan of the Republic of Croatia, Zagreb, 2016.	2020	

National classification and definitions

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Original data

FRA categories	Scientific name	Common name	Growing stock in forest (m ³ over bark)			
			1986	1996	2006	2016
Native tree species	Fagus silvatica L.	Common beech	105 297 612	118 197 958	143 344 835	155 752 350
	Quercus robur L.	Pedunculate oak	41 598 258	44 980 967	48 640 147	48 355 176
	Quercus petraea (Matt.) Liebl.	Sessile oak	27 971 354	32 386 239	38 409 655	39 252 772
	Carpinus betulus L.	Common hornbeam	23 043 099	24 892 301	36 339 991	35 129 340
	Abies alba Mill.	European silver fir	34 360 233	30 475 088	31 406 078	33 050 763
	Fraxinus angustifolia Vahl.	Narrow-leafed ash	9 336 373	10 280 248	12 762 183	13 364 328
	Picea abies (L.) Karst.	Norway spruce	4 918 592	6 525 657	8 548 834	9 606 692
	Alnus glutinosa (L.) Geartn.	Black alder	3 328 261	3 533 065	7 826 258	7 115 778
	Quercus cerris L.	Turkey oak	2 710 388	3 598 901	6 181 747	7 422 785
	Pinus nigra	Black pine	2 110 326	3 096 571	3 889 870	5 984 952
	Remaining native tree species		35 328 105	37 746 028	45 413 380	48 238 114
Total volume of native tree species			290 002 601	315 713 023	382 762 978	403 273 050
Introduced tree species	Robinia pseudoacacia L.	Black locust	2 139 496	1 817 525	7 997 737	7 284 122
	Pinus halepensis Mill.	Aleppo pine	3 624 268	3 880 114	2 626 658	3 918 621
	Populus canadensis	Euroamerican poplar	2 141 225	2 206 823	2 363 279	1 740 972
	Pinus strobus L.	Eastern white pine (Weymouth pine)	143 608	19 679	1 015 984	989 144
	Larix decidua Mill.	European larch	44 879	156 452	520 004	716 690
	Remaing introduced species		315 085	462 521	676 642	695 678
Total volume of introduced tree species			8 408 561	8 543 114	15 200 304	15 345 227

Total growing stock	298 411 162	324 256 137	397 963 282	418 618 277
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Original data used was taken from the validated Forest Management Plans of the Republic of Croatia (country level FMPs) in years 1986., 1996., 2006. and 2016. These country level FMPs are published in 10 years cycle and represent a compilation of validated FMPs for individual management units.

Data for other years was interpolated.

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Scientific name	Common name	Growing stock in forest (million m³ over bark)				
			1990	2000	2010	2015	2020
Native tree species							
#1 Ranked in terms of volume	Fagus silvatica L.	Common beech	110.87	129.89	148.91	154.51	160.72
#2 Ranked in terms of volume	Quercus robur L.	Pedunculate oak	42.96	46.48	50.00	48.38	48.24
#3 Ranked in terms of volume	Quercus petraea (Matt.) Liebl.	Sessile oak	29.79	35.01	40.23	39.17	39.59
#4 Ranked in terms of volume	Carpinus betulus L.	Common hornbeam	24.10	30.75	37.40	35.25	34.65
#5 Ranked in terms of volume	Abies alba Mill.	European silver fir	32.97	31.49	30.01	32.89	33.71
#6 Ranked in terms of volume	Fraxinus angustifolia Vahl.	Narrow-leaved ash	9.77	11.48	13.19	13.30	13.61
#7 Ranked in terms of volume	Picea abies (L.) Karst.	Norway spruce	5.58	7.39	9.21	9.50	10.03
#8 Ranked in terms of volume	Quercus cerris L.	Turkey oak	3.12	4.86	6.59	7.30	7.92
#9 Ranked in terms of volume	Alnus glutinosa (L.) Geartn.	Black alder	3.55	5.80	8.04	7.19	6.83
#10 Ranked in terms of volume	Pinus nigra	Black pine	2.50	3.39	4.28	5.78	6.82
Remaining native tree species			36.44	41.50	46.57	46.34	49.69
Total volume of native tree species			301.65	348.04	394.43	399.61	411.81
Introduced tree species							
#1 Ranked in terms of volume	Robinia pseudoacacia L.	Black locust	2.23	5.16	8.09	7.36	7.00

FRA categories	Scientific name	Common name	Growing stock in forest (million m³ over bark)				
			1990	2000	2010	2015	2020
Native tree species							
#2 Ranked in terms of volume	Pinus halepensis Mill.	Aleppo pine	3.68	3.18	2.68	3.79	4.44
#3 Ranked in terms of volume	Populus canadensis	Euroamerican poplar	2.17	2.28	2.39	1.80	1.49
#4 Ranked in terms of volume	Pinus strobus L.	Eastern white pine (Weymouth pine)	0.13	0.57	1.00	0.99	0.98
#5 Ranked in terms of volume	Larix decidua Mill.	European larch	0.10	0.34	0.57	0.70	0.80
Remaining introduced tree species			0.38	0.56	0.74	0.69	0.70
Total volume of introduced tree species			8.69	12.09	15.47	15.33	15.41
Total growing stock			310.34	360.13	409.90	414.94	427.22

Comments

2c Biomass stock

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

We used an excel calculator.

Insert the percentages of Growing stock by IPCC forest type for each of the FRA forest categories									
IPCC forest types	FRA forest categories								
	Naturally regenerating forest	Plantation forest	Other planted forest						
	% of Growing stock								
Broadleaved	89%	27%	0%						
Pine	2%	43%	0%						
Other coniferous	9%	30%	0%						
	100%	100%	0%	Must add up to 100%					
Insert Carbon fraction used by country (IPCC default = 0.47)									
Carbon Fraction	47%								
Biomass conversion and expansion factors (BCEF)									
Naturally regenerating forest	1990	2000	2010	2015	2016	2017	2018	2019	2020
Broadleaved	1,05	1,05	0,80	0,80	0,80	0,80	0,80	0,80	0,80
Pine	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70

Other coniferous	0,75	0,75	0,70	0,70	0,70	0,70	0,70	0,70	0,70
Plantation forest									
Broadleaved	1,40	1,05	1,05	1,05	1,05	1,05	1,05	1,05	1,05
Pine	0,75	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70
Other coniferous	1,00	0,75	0,75	0,75	0,75	0,75	0,75	0,75	0,75
Other planted forest									
Broadleaved	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00
Pine	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80
Other coniferous	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00
Weighted BCEF									
Naturally regenerating forest	1,02	1,02	0,79	0,79	0,79	0,79	0,79	0,79	0,79
Plantation forest	1,00	0,81	0,81	0,81	0,81	0,81	0,81	0,81	0,81
Other planted forest									
Root-shoot ratios									
Naturally regenerating forest	1990	2000	2010	2015	2016	2017	2018	2019	2020
Broadleaved	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24
Pine	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20
Other coniferous	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20
Plantation forest									
Broadleaved	0,46	0,23	0,23	0,24	0,23	0,23	0,23	0,23	0,23
Pine	0,29	0,29	0,29	0,20	0,29	0,29	0,29	0,29	0,29
Other coniferous	0,29	0,29	0,29	0,20	0,29	0,29	0,29	0,29	0,29
Other planted forest									
Broadleaved	0,46	0,46	0,46	0,46	0,46	0,46	0,46	0,46	0,46
Pine	0,40	0,40	0,40	0,40	0,40	0,40	0,40	0,40	0,40
Other coniferous	0,40	0,40	0,40	0,40	0,40	0,40	0,40	0,40	0,40
Weighted RS ratio									
Naturally regenerating forest	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24
Plantation forest	0,34	0,27	0,27	0,21	0,27	0,27	0,27	0,27	0,27

Other planted forest									
Above-ground biomass (t/ha)									
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest	175,56	198,03	170,59	171,17	173,21	173,77	174,13	174,58	175,02
Plantation forest	74,09	87,98	119,51	154,71	137,85	132,37	136,82	141,55	146,49
Other planted forest	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Total	170,50	193,27	168,60	170,53	171,84	172,20	172,75	173,38	174,01
Below-ground biomass (t/ha)									
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest	41,38	46,67	40,21	40,34	40,82	40,96	41,04	41,14	41,25
Plantation forest	24,89	24,09	32,72	32,61	37,74	36,24	37,46	38,76	40,11
Other planted forest	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Total	40,55	45,69	39,91	40,04	40,70	40,78	40,91	41,06	41,21

Reclassification into FRA 2020 categories

-

FRA categories	Forest biomass (tonnes/ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Above-ground biomass	170.50	169.55	168.60	170.53	171.84	172.20	172.75	173.38	174.01
Below-ground biomass	40.55	40.23	39.91	40.04	40.70	40.78	40.91	41.06	41.21
Dead wood									

Comments

Dead wood has been measured since 2017 and is not complete.

Values for 2000 are not taken from excell calculator, they are interpolated from 1990 and 2010 values because growing stock/ha at that time had a treshold value for different clases.

2d Carbon stock

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

We used an excel calculator.

Insert the percentages of Growing stock by IPCC forest type for each of the FRA forest categories									
IPCC forest types	FRA forest categories								
	Naturally regenerating forest	Plantation forest	Other planted forest						
	% of Growing stock								
Broadleaved	89%	27%	0%						
Pine	2%	43%	0%						
Other coniferous	9%	30%	0%						
	100%	100%	0%	Must add up to 100%					
Insert Carbon fraction used by country (IPCC default = 0.47)									
Carbon Fraction	47%								
Biomass conversion and expansion factors (BCEF)									
Naturally regenerating forest	1990	2000	2010	2015	2016	2017	2018	2019	2020
Broadleaved	1,05	1,05	0,80	0,80	0,80	0,80	0,80	0,80	0,80
Pine	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70

Other coniferous	0,75	0,75	0,70	0,70	0,70	0,70	0,70	0,70	0,70
Plantation forest									
Broadleaved	1,40	1,05	1,05	1,05	1,05	1,05	1,05	1,05	1,05
Pine	0,75	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70
Other coniferous	1,00	0,75	0,75	0,75	0,75	0,75	0,75	0,75	0,75
Other planted forest									
Broadleaved	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00
Pine	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80	1,80
Other coniferous	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00
Weighted BCEF									
Naturally regenerating forest	1,02	1,02	0,79	0,79	0,79	0,79	0,79	0,79	0,79
Plantation forest	1,00	0,81	0,81	0,81	0,81	0,81	0,81	0,81	0,81
Other planted forest									
Root-shoot ratios									
Naturally regenerating forest	1990	2000	2010	2015	2016	2017	2018	2019	2020
Broadleaved	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24
Pine	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20
Other coniferous	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20
Plantation forest									
Broadleaved	0,46	0,23	0,23	0,24	0,23	0,23	0,23	0,23	0,23
Pine	0,29	0,29	0,29	0,20	0,29	0,29	0,29	0,29	0,29
Other coniferous	0,29	0,29	0,29	0,20	0,29	0,29	0,29	0,29	0,29
Other planted forest									
Broadleaved	0,46	0,46	0,46	0,46	0,46	0,46	0,46	0,46	0,46
Pine	0,40	0,40	0,40	0,40	0,40	0,40	0,40	0,40	0,40
Other coniferous	0,40	0,40	0,40	0,40	0,40	0,40	0,40	0,40	0,40
Weighted RS ratio									
Naturally regenerating forest	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24
Plantation forest	0,34	0,27	0,27	0,21	0,27	0,27	0,27	0,27	0,27

Other planted forest									
Above-ground biomass (t/ha)									
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest	175,56	198,03	170,59	171,17	173,21	173,77	174,13	174,58	175,02
Plantation forest	74,09	87,98	119,51	154,71	137,85	132,37	136,82	141,55	146,49
Other planted forest	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Total	170,50	193,27	168,60	170,53	171,84	172,20	172,75	173,38	174,01
Below-ground biomass (t/ha)									
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest	41,38	46,67	40,21	40,34	40,82	40,96	41,04	41,14	41,25
Plantation forest	24,89	24,09	32,72	32,61	37,74	36,24	37,46	38,76	40,11
Other planted forest	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Total	40,55	45,69	39,91	40,04	40,70	40,78	40,91	41,06	41,21

Reclassification into FRA 2020 categories

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FRA categories	Forest carbon (tonnes/ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Carbon in above-ground biomass	80.13	79.69	79.24	80.15	80.76	80.94	81.19	81.49	81.79
Carbon in below-ground biomass	19.06	18.91	18.76	18.82	19.13	19.16	19.23	19.30	19.37
Carbon in dead wood									
Carbon in litter									
Soil carbon									

Soil depth (cm) used for soil carbon estimates	
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Comments

There is no complete data for carbon in dead wood, litter and soil.

Values for 2000 are not taken from excell calculator, they are interpolated from 1990 and 2010 values because growing stock/ha at that time had a treshold value for different clases.

3 Forest designation and management

3a Designated management objective

National Data

Data sources + type of data source eg NFI, etc

References to sources of information	Year(s)	Additional comments
Public enterprise "Hrvatske šume": Forest Management Plan of the Republic of Croatia, Zagreb, 1993.	1990	
Public enterprise "Hrvatske šume": Forest Management Plan of the Republic of Croatia, Zagreb, 1996.	2000	
"Hrvatske šume d.o.o." (Croatian Forests Ltd.): Forest Management Plan of the Republic of Croatia, Zagreb, 2006.	2010, 2015	
"Hrvatske šume d.o.o." (Croatian Forests Ltd.): Forest Management Plan of the Republic of Croatia, Zagreb, 2016.	2020	

National classification and definitions

Production – forests primarily used for timber production and the production of other forest products. Production forests are divided into two categories: production forests outside protected areas (managed in accordance with validated Forest Management Plans) and production forests inside protected areas (also managed in accordance with validated Forest Management Plans but with built-in nature protection requirements issued by the Ministry in charge of nature protection which also pre-approves the Forest Management Plan if they consider that prescribed actions (fellings and cultivation) will not endanger important aspects of protected area).

Protection of soil and water – protective forests primarily used for protection of soil and water, as prescribed by Croatian Forest law.

Conservation of biodiversity – includes forests within National parks, strict nature reserves and special nature reserves

Social services – refers to forests used for scientific research, forests used by Ministry of defence, forests used for recreation and rest, park-forests and forests within Nature monument protected areas.

Multiple uses – Forests designated for more than one purpose, where none of these purposes alone are considered as the predominant.

Original data

FRA 2020 categories	Forest area (ha)			
	1986	1996	2006	2016
Production	1 652 671,00	1 569 933,00	1 609 812,00	1 324 281,16
Protection of soil and water	54 809,00	44 660,00	84 848,00	242 003,53
Conservation of biodiversity	23 458,00	25 408,00	52 176,00	55 204,03
Social sevicees	6 139,00	15 939,00	33 546,00	27 177,95
Multiple use	137 233,00	137 706,00	164 452,00	276 315,00
Other	0,00	0,00	0,00	0,00
None/unknown	0,00	0,00	0,00	0,00
Total forest area	1 874 310,00	1 793 646,00	1 944 834,00	1 924 981,66

Analysis and processing of national data

Estimation and forecasting

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Reclassification into FRA 2020 categories

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Primary designated management objective

FRA 2020 categories	Forest area (1000 ha)				
	1990	2000	2010	2015	2020
Production (a)	1 624.00	1 602.00	1 581.00	1 548.00	1 334.41
Protection of soil and water (b)	53.00	68.00	82.00	73.00	243.78
Conservation of biodiversity (c)	25.00	39.00	54.00	54.00	55.20
Social Services (d)	10.00	24.00	38.00	45.00	27.38
Multiple use (e)	138.00	152.00	165.00	202.00	278.34
Other (specify in comments) (f)	0.00	0.00	0.00	0.00	0.00
None/unknown (g)	0.00	0.00	0.00	0.00	0.00
Total forest area	1 850.00	1 885.00	1 920.00	1 922.00	1 939.11

Total area with designated management objective

FRA 2020 categories	Forest area (1000 ha)				
	1990	2000	2010	2015	2020
Production	1 762.00	1 754.00	1 746.00	1 750.00	1 612.75
Protection of soil and water	53.00	68.00	82.00	73.00	243.78
Conservation of biodiversity	163.00	191.00	219.00	256.00	333.54
Social Services	173.00	215.00	257.00	301.00	360.92
Other (specify in comments)	0.00	0.00	0.00	0.00	0.00

Comments

3b Forest area within protected areas and forest area with long-term management plans

National Data

Data sources + type of data source eg NFI, etc

References to sources of information	Year(s)	Additional comments
Public enterprise "Hrvatske šume": Forest Management Plan of the Republic of Croatia, Zagreb, 1993.	1990	
Public enterprise "Hrvatske šume": Forest Management Plan of the Republic of Croatia, Zagreb, 1996.	2000	
"Hrvatske šume d.o.o." (Croatian Forests Ltd.): Forest Management Plan of the Republic of Croatia, Zagreb, 2006.	2010, 2015	
"Hrvatske šume d.o.o." (Croatian Forests Ltd.): Forest Management Plan of the Republic of Croatia, Zagreb, 2016	2016-2020	

National classification and definitions

Data presented in the “Forest area within protected areas” category includes forests within strict nature reserves (IUCN category “Ia”), forests within National parks (IUCN category “II”) and forests within Natural monuments (IUCN category “III”).

Forests areas within Natura 2000 sites were not included in our calculation because we started implementing Natura 2000 regulations into our FMPs in 2018., so they weren’t included in the last Forest Management Plan of the Republic of Croatia (2016.).

At this point we can only roughly estimate that Natura 2000 areas occupy around 45% of the total forest area in Croatia.

Original data

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Analysis and processing of national data

Estimation and forecasting

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Reclassification into FRA 2020 categories

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FRA categories	Area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Forest area within protected areas	25.00	39.00	54.00	54.00	55.20	55.20	55.20	55.20	55.20
Forest area with long-term forest management plan	1 266.00	1 377.00	1 489.00	1 588.31	1 658.47	1 728.63	1 798.79	1 868.95	1 939.11
...of which in protected areas	25.00	39.00	54.00	54.00	55.20	55.20	55.20	55.20	55.20

Comments

4 Forest ownership and management rights

4a Forest ownership

National Data

Data sources + type of data source eg NFI, etc

References to sources of information	Year(s)	Additional comments
Public enterprise "Hrvatske šume": Forest Management Plan of the Republic of Croatia, Zagreb, 1993.	1990	
Public enterprise "Hrvatske šume": Forest Management Plan of the Republic of Croatia, Zagreb, 1996.	2000	
"Hrvatske šume d.o.o." (Croatian Forests Ltd.): Forest Management Plan of the Republic of Croatia, Zagreb, 2006.	2010, 2015	

National classification and definitions

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Original data

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Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Forest area (1000 ha)			
	1990	2000	2010	2015
Private ownership (a)	450.00	487.00	544.00	556.00
...of which owned by individuals	450.00	487.00	534.00	545.00
...of which owned by private business entities and institutions	0.00	0.00	10.00	11.00
...of which owned by local, tribal and indigenous communities	0.00	0.00	0.00	0.00
Public ownership (b)	1 400.00	1 398.00	1 376.00	1 366.00
Unknown/other (specify in comments) (c)	0.00	0.00	0.00	0.00
Total forest area	1 850.00	1 885.00	1 920.00	1 922.00

Comments

A light decrease in public forests proportion can be noticed due to returning of a part of forests to the persons from whom it was nationalised in 1945. This trend will continue.

A rise in proportion of private forests can be explained by the following:

- more forests are covered with new forest measurement for the Forest Management Plan 2006 nad 2016, than it was for the previous plans,
- returning of nationalised forest areas to the persons and their successors.

4b Holder of management rights of public forests

National Data

Data sources + type of data source eg NFI, etc

References to sources of information	Year(s)	Additional comments
Public enterprise "Hrvatske šume": Forest Management Plan of the Republic of Croatia, Zagreb, 1993.	1990	
Public enterprise "Hrvatske šume": Forest Management Plan of the Republic of Croatia, Zagreb, 1996.	2000	
"Hrvatske šume d.o.o." (Croatian Forests Ltd.): Forest Management Plan of the Republic of Croatia, Zagreb, 2006.	2010, 2015	

National classification and definitions

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Original data

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Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Forest area (1000 ha)			
	1990	2000	2010	2015
Public Administration (a)	1 400.00	1 398.00	1 376.00	1 366.00
Individuals (b)	0.00	0.00	0.00	0.00
Private business entities and institutions (c)	0.00	0.00	0.00	0.00
Local, tribal and indigenous communities (d)	0.00	0.00	0.00	0.00
Unknown/other (specify in comments) (e)	0.00	0.00	0.00	0.00
Total public ownership	1 400.00	1 398.00	1 376.00	1 366.00

Comments

5 Forest disturbances

5a Disturbances

National Data

Data sources + type of data source eg NFI, etc

National database owned by Ministry of Agriculture (Diagnostic and prognostic service in forestry of Croatia), Štetnici Hr/IPP

National classification and definitions

In our national database we have hectares for all damaging agents, and additionally cubic meters for wood boring beetles, damages from windfall and forest dieback.

Original data

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Analysis and processing of national data

Estimation and forecasting

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Reclassification into FRA 2020 categories

Recalssification was not necessary as the type of disturbances that have values in volumes of damaged timber have also values in hectares.

FRA categories	Area (1000 ha)																	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Insects (a)									57.99	89.82	97.70	15.19	14.43	64.47	34.52	12.68	88.40	152.20
Diseases (b)									12.43	4.25	6.12	11.83	10.94	7.99	13.25	12.90	10.50	15.40
Severe weather events (c)									3.08	2.74	54.96	14.27	26.60	2.66	16.38	23.13	30.40	50.90
Other (specify in comments) (d)									7.88	9.94	97.70	16.85	20.86	8.67	22.07	26.37	40.00	62.20
Total (a+b+c+d)	–	–	–	–	–	–	–	–	81.38	106.75	256.48	58.14	72.83	83.79	86.22	75.08	169.30	280.70
Total forest area	1 885.00	–	–	–	–	–	1 944.84	–	–	–	1 920.00	–	–	–	–	1 922.00	1 924.12	1 931.61

Comments

Years 2008-2017: category d: this is area of "forest dieback", dieback of trees that that could not be attributed to particular or specific factor (biotic or abiotic), usually combination of several abiotic factors.

5b Area affected by fire

National Data

Data sources + type of data source eg NFI, etc

Ministry of Agriculture, Register of Forest Fires

National classification and definitions

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Original data

-

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Area (1000 ha)																	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total land area affected by fire	68.17	16.17	4.85	27.09	3.38	3.14	4.58	20.21	7.34	2.90	1.11	15.56	24.80	2.00	0.19	9.42	7.55	49.10
...of which on forest	17.17	3.51	1.77	8.27	0.35	0.38	0.51	2.44	1.47	0.89	0.34	2.31	7.28	0.22	0.05	1.77	0.66	7.54

Comments

5c Degraded forest

Does your country monitor area of degraded forest		No
If "yes"	What is the national definition of "Degraded forest"?	
	Describe the monitoring process and results	

Comments

6 Forest policy and legislation

6a Policies, Legislation and national platform for stakeholder participation in forest policy

National Data

Data sources + type of data source eg NFI, etc

National Forest Policy and Strategy (OG 120/03)

Forest Law (OG 68/18)

Code of consultation with the interested public in enacting laws, regulations and acts (OG 140/09)

Low implementing EU Regulations on placing timber and timber products on the market (OG 25/18)

National classification and definitions

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Original data

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Indicate the existence of	Boolean (Yes/No)	
	National	Sub-national
Policies supporting SFM	Yes	No
Legislations and regulations supporting SFM	Yes	No
Platform that promotes or allows for stakeholder participation in forest policy development	Yes	No
Traceability system(s) for wood products	Yes	No

Comments

6b Area of permanent forest estate

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

As defined by Croatian Forest law, all forests are considered as area of permanent forest estate, and land use on these areas may not be changed unless special permission is granted.

Original data

-

FRA 2020 categories	Forest area (1000 ha)					
	Applicable?	1990	2000	2010	2015	2020
Area of permanent forest estate	Yes	1 850.00	1 885.00	1 920.00	1 922.00	1 939.11

Comments

According to Forest Law, all forests are treated as permanent forest estate. Considering there are some other forest areas (clearings) that are designated to afforestation, additional increase in forest area can be expected.

7 Employment, education and NWFP

7a Employment in forestry and logging

National Data

Data sources + type of data source eg NFI, etc

Croatian Bureau of Statistics, 2018

National classification and definitions

-

Original data

A02 Forestry and logging			
Year	Employees in legal entities, annual average		
	Total	Female	Male
1989	15865	1871	13994
1990	15041	1802	13239
1991	13378	1630	11748
1999	9987	1601	8386
2000	10076	1665	8411
2001	9740	1597	8143
2002	9241	1522	7719
2003	10183	1803	8380
2004	9738	1761	7977
2005	9587	1733	7854
2006	9283	1674	7609
2007	9102	1634	7468
2008	9223	1674	7549
2009	8659	1602	7057
2010	8224	1547	6677
2011	8495	1584	6911
2012	8478	1597	6881
2013	8172	1504	6668
2014	7983	1439	6544
2015	7850	1394	6456
2016	7749	1398	6351

FRA 2020 categories	Full-time equivalents (1000 FTE)											
	1990			2000			2010			2015		
	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male
Employment in forestry and logging	14.76	1.77	12.99	9.93	1.62	8.31	8.46	1.58	6.88	7.86	1.41	6.45
...of which silviculture and other forestry activities												
...of which logging												
...of which gathering of non wood forest products												
...of which support services to forestry												

Comments

We do not have data for full-time equivalent (FTE), so data refers to all employees regardless of their working hours.

7b Graduation of students in forest-related education

National Data

Data sources + type of data source eg NFI, etc

Ministry of Science and Education, 2018

National classification and definitions

-

Original data

	Number of graduated students (Forestry Study Programmes)																																			
FRA 2020 categories	1989.			1990.			1991.			1999.			2000.			2001.			2009.			2010.			2011.			2014.			2015.			2016.		
	Σ	F	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	Ž	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	Ž	M			
	Doctoral degree	3	1	2	10	1	9	4	0	4	2	1	1	5	1	4	7	2	5	6	1	5	13	2	11	14	6	8	8	2	6	14	5	9	6	2
Master's degree	76	21	55	77	15	62	71	17	54	93	20	73	96	19	77	60	14	46	78	22	56	88	20	66	75	22	53	77	35	42	82	33	49	68	22	46
Bachelor's degree	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	25	35	67	34	33	76	28	48	89	34	56	81	16	65	87	37	50
	Number of graduated students (Wood Technology Study Programmes)																																			
FRA 2020 categories	1989.			1990.			1991.			1999.			2000.			2001.			2009.			2010.			2011.			2014.			2015.			2016.		
	Σ	F	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	Ž	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	Ž	M
	Doctoral degree																																			
Master's degree	37	11	26	40	17	23	42	15	27	33	8	25	46	10	36	20	5	15	30	10	20	45	8	37	56	10	46	25	4	21	21	3	18	26	10	16
Bachelor's degree	24	8	16	24	6	18	13	4	9	0	0	0	0	0	0	0	0	0	15	3	12	24	7	17	28	6	22	28	10	18	28	4	24	19	4	15
	Number of graduated students (Wood Technology Professional Study)																																			
FRA 2020 categories	1989.			1990.			1991.			1999.			2000.			2001.			2009.			2010.			2011.			2014.			2015.			2016.		
	Σ	F	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	Ž	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	Ž	M
	Doctoral degree																																			
Master's degree																																				
Bachelor's degree																			12	5	7	0	0	0	5	0	5	0	0	0	0	0	0	5	3	2
	Number of graduated students (TOTAL)																																			
FRA 2020 categories	1989.			1990.			1991.			1999.			2000.			2001.			2009.			2010.			2011.			2014.			2015.			2016.		
	Σ	F	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	Ž	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	F	M	Σ	Ž	M
	Doctoral degree	3	1	2	10	1	9	4	0	4	2	1	1	5	1	4	7	2	5	6	1	5	13	2	11	14	6	8	8	2	6	14	5	9	6	2
Master's degree	113	32	81	117	32	85	113	32	81	126	28	98	142	29	113	80	19	61	108	32	76	133	28	103	131	32	99	102	39	63	103	36	67	94	32	62

Bachelor's degree	26	9	17	24	6	18	13	4	9	0	0	0	0	0	0	0	0	0	87	33	54	91	41	50	109	34	75	117	44	74	109	20	89	111	44	67
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FRA 2020 categories	Number of graduated students											
	1990			2000			2010			2015		
	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male
Doctoral degree	6.00	1.00	5.00	5.00	1.00	3.00	11.00	3.00	8.00	9.00	3.00	6.00
Master's degree	114.00	32.00	82.00	116.00	25.00	91.00	124.00	31.00	93.00	100.00	36.00	64.00
Bachelor's degree	21.00	6.00	15.00	0.00	0.00	0.00	96.00	36.00	60.00	112.00	36.00	77.00
Technician certificate / diploma												
Total												

Comments

Higher education schooling of forestry is possible at 2 institutions:

1) The Faculty of Forestry, part of the University of Zagreb, relatively large university by the European standards. Future Forestry professionals in Croatia have a choice of applying to several study programs and curricula .

The Faculty of Forestry is the only institution of higher education in Croatia which trains experts in the fields of forestry and wood technology. It is a descendant of the Križevci School of Agriculture and Forestry, which was founded in 1860, and the Academy of Forestry. The Faculty of Forestry was founded on October 20th 1898 as the fourth constituent part in the history of the University in Zagreb. The title of doctor of science at the Faculty of Forestry has since been obtained by 274+ candidates.

Since the academic year 2014/2015, the Faculty of Forestry of the University of Zagreb has organized and conducted a postgraduate university doctoral study program of Forestry and Wood Technology, which trains doctoral candidates in scientific-research work in the area of biotechnical sciences, the field of forestry (branches: genetics and forest tree breeding, forest technologies and management, urban forestry and nature protection, forest planning, ecology and silviculture, wildlife management and forest protection) and the field of wood technology (branches: wood materials, wood technology processes, construction and design of wood products and organization of production).

In the field of research and science, the Faculty is registered in the sector of biotechnological sciences, the fields of Forestry and Wood Technology. The teaching and research activities are performed at departments and institutes. The Faculty has two departments – the Department of Forestry and the Department of Wood Technology – as well as 11 institutes, 15 laboratories and 3500 hectares of land with a total of 5 facilities for teaching and research in various forest ecosystems in Croatia.

Since the academic year 2005/2006, the study programs have been organized in accordance with the Bologna Declaration, and are divided into undergraduate, graduate, specialist and doctoral study programs.

The Faculty offers three undergraduate study programs: 1. Forestry; 2. Urban Forestry, Nature Conservation and Environmental Protection; 3. Wood Technology.

Upon completion of the undergraduate study program in the duration of 6 semesters (180 ECTS credits), students can enroll in one of the four graduate study programs in the duration of 4 semesters (120 ECTS credits): 1. Forestry, 1.1. concentration Silviculture, Forest Management Planning and Wildlife Management, 1.2. concentration Techniques, Technologies and Management in Forestry; 2. Urban Forestry, Nature Conservation and Environmental Protection; 3. Wood Working Processes; 4. Design of Wood Products.

Upon completion of a graduate study program, students have the option of continuing training in postgraduate specialist study programs in the duration of 4 semesters (120 ECTS credits) or in postgraduate doctoral study programs in the duration of 6 semesters (180 ECTS credits).

2) Karlovac University of Applied Sciences offers 3-year study programme Hunting and Nature Protection (180 ECTS credits).

7c Non wood forest products removals and value 2015

National Data

Data sources + type of data source eg NFI, etc

References to sources of information	Year(s)	Additional comments
Croatian Forests Ltd. Database	2015	

National classification and definitions

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Original data

Name of NWFP product	Species	Quantity	Unit	HRK/Unit	Value (1000 HRK)	NWFP category
Forest seeds	Quercus robur	1 524 513	kg	2	30 490	8
	Quercus petraea	9 585	kg	2	192	
	Quercus ilex	1 077	kg	2	22	
	Fagus sylvatica	78	kg	3	2	
	Alnus glutinosa	955	kg	3	29	
	Juglans nigra	29 045	kg	3	871	
	Acer pseudoplatanus	42	kg	3	1	
	Castanea sativa	1 217	kg	2	24	
	Abies alba	160	kg	3	5	
	Pinus halepensis	84	kg	3	3	
	TOTAL	1 566 756			31 639	
Christmas trees	Picea abies	3 008	pieces	150	451	6
	Picea omorika	42	pieces	150	6	
	Picea pungens	1 945	pieces	150	292	
	Abies concolor	56	pieces	150	8	
	Other species	292	pieces	150	44	
	TOTAL	5 343			801	
Raw material for medicine and aromatic products	Helicrysum italicum	648 305	kg	1	648	3
	TOTAL	648 306			648	
Fruits	Castanea sativa	5 505	kg	2	11	1
	Asparagus officinalis	90	kg	20	2	
	TOTAL	5 595			13	
Branches	Abies Alba	97	pile	20	2	6

	Hedera helix	65	kg	3	0	
	TOTAL	n/a	Various		2	
Ferns	Various	1	pile	1009	1	6
	TOTAL	1			1	
Mushrooms	Various	1 082	kg		5	1
	TOTAL	1 082			5	
Hay	Various	1 801	kg	0,79	1	2
	TOTAL	1 801			1	

	Name of NWFP product	Key species	Quantity	Unit	Value (1000 local currency)	NWFP category
#1	Forest seeds	Quercus robur, Quercus petraea, Juglans nigra	1 566 756	kg	3 164	8 Other plant products
#2	Wild meat	Cervus elephus, Dama dama, Capreolus capreolus, Rupicapra rupicapra, Ovis musimon, Sus scrofa, Ursus arctos		kg		12 Wild meat
#3	Trophies	Cervus elaphus, Dama dama, Capreolus capreolus, Rupicapra rupicapra, Ovis musimon, Sus scrofa, Ursus arctos, Coturnix coturnix, Scolopax rusticola		pieces		10 Hides skins and trophies
#4	Christmas trees	Picea abies, Picea pungens	5 343	pieces	801	6 Ornamental plants
#5	Raw material for medicine and aromatic products	Helicrysum italicum	648 305	kg	648	3 Raw material for medicine and aromatic products
#6	Fruits	Castanea sativa, Asparagus officinalis	5 595	kg	13	1 Food
#7	Mushrooms	Various	1 082	kg	5	1 Food
#8	Branches	Abies alba, Hedera helix		Various (pile, kg)	2	6 Ornamental plants
#9	Ferns	Various	1	pile	1	6 Ornamental plants
#10	Hay	Various	1 801	kg	1	2 Fodder

	Name of NWFP product	Key species	Quantity	Unit	Value (1000 local currency)	NWFP category
All other plant products						
All other animal products						
Total					4 635	

Name of currency	Croatian kuna (HRK)
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Comments

Quantity and value of wild meat and trophies are not available, but our esatimate ranks them on 2nd and 3rd place.

8 Sustainable Development Goal 15

8a Sustainable Development Goal 15

SDG Indicator 15.1.1 Forest area as proportion of total land area 2015

Indicator	Percent							
	2000	2010	2015	2016	2017	2018	2019	2020
Forest area as proportion of total land area 2015	33.68	34.31	34.35	34.38	34.52	34.56	34.61	34.65

Name of agency responsible	Ministry of Agriculture
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SDG Indicator 15.2.1 Progress towards sustainable forest management

Sub-Indicator 1	Percent						
	2000-2010	2010-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Forest area annual net change rate	0.18	0.02	0.11	0.39	0.13	0.13	0.13

Name of agency responsible	Ministry of Agriculture
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Sub-Indicator 2	Forest biomass (tonnes/ha)							
	2000	2010	2015	2016	2017	2018	2019	2020
Above-ground biomass stock in forest	169.55	168.60	170.53	171.84	172.20	172.75	173.38	174.01

Name of agency responsible	Ministry of Agriculture
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Sub-Indicator 3	Percent (2015 forest area baseline)							
	2000	2010	2015	2016	2017	2018	2019	2020
Proportion of forest area located within legally established protected areas	2.03	2.81	2.81	2.87	2.87	2.87	2.87	2.87

Name of agency responsible	Ministry of Agriculture
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Sub-Indicator 4	Percent (2015 forest area baseline)							
	2000	2010	2015	2016	2017	2018	2019	2020
Proportion of forest area under long-term forest management plan	71.64	77.47	82.64	86.29	89.94	93.59	97.24	100.00

Name of agency responsible	Ministry of Agriculture
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Sub-Indicator 5	Forest area (1000 ha)							
	2000	2010	2015	2016	2017	2018	2019	2020
Forest area under independently verified forest management certification schemes	72.20	2 018.99	2 039.12	2 039.22	2 039.24	2 048.52	–	–