



Food and Agriculture  
Organization of the  
United Nations

# Global Forest Resources Assessment 2020

Report

**Montenegro**

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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## TABLE OF CONTENTS

### Introduction

1. Forest extent, characteristics and changes
2. Forest growing stock, biomass and carbon
3. Forest designation and management
4. Forest ownership and management rights
5. Forest disturbances
6. Forest policy and legislation
7. Employment, education and NWFP
8. Sustainable Development Goal 15

# Introduction

## Report preparation and contact persons

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### Introductory text

Montenegro’s land area is characterised by a high coverage with forest of 59.9% (826 782 ha, relative standard error 0.5 %) and forestland of 9.9 % (137 480 ha), together forest and forestland cover 69.8% (964 262 ha) of the land area of 1 381200 ha . Montenegro’s forests are located partly on very steep and rocky slopes; in total thus 11.9 % of the forest area and 8.4 % of the forestland area have not been accessible for tree measurement. The estimate for the wood volume in the total forest of Montenegro is 122 Mio m³ with an increment of 2.9 Mio m³ and based on the assumption that the inaccessible forests show relative volumes per ha that are one third below the level of accessible forests. This, while the wood volume in accessible forests that cover 728 133 ha amounts to 116 Mio m³ with an increment of 2.8 Mio m³ (assessed with a relative standard error of 1.5 %).

The information available on the forests in Montenegro was mainly relaying on data from forest management in public forests in the central and northern part of Montenegro. Major statistical properties are considerably different to so far existing best estimates that have beenpublished in the National Forest Policy, the Spatial Plan of Montenegro Until 2020 and in the report State of Europe’s Forest 2011: • Forest area (now at 59.9 %, so far estimated at 45 %), • Volume (122 mio m³ vs. 72 mio m³) and • Volume increment (2. 9 mio m³ vs. 1.4 mio m³).

# 1 Forest extent, characteristics and changes

## 1a Extent of forest and other wooded land

### National Data

**Data sources + type of data source eg NFI, etc**

The 1st National forest inventory 2013

Statistical office of Montenegro 2017

**National classification and definitions**

Forest - Forests shall be considered areas of land bigger than 50 ares, covered with forest trees whose crown canopy is above 10 % of the land area and dominant trees higher than 5m, that is, the trees capable of reaching that height in their physiological maturity phase.

Forest land (Other wooded land (international term) = forest land (national term)) - Forest land shall be considered to be areas bigger than 50 ares, covered by forest trees:- forest trees higher than 5 m, or the trees capable of reaching that height in their maturity phase and whose crown canopy is 5 – 10% of the land area;- forest trees that are not capable of reaching the height of above 5 m, that is, covered by the combination of trees and low forest vegetation provided that their density is higher than 10% of the area.Forest and other forest land shall also be deemed temporarily barren areas where the natural regeneration of forest trees has started, fire protectionlanes, areas covered with non-forest vegetation whose area is less than 50 ares if it is within the forest and other forest land complexes, forest treesprotection belts larger than 50 ares and wider than 20 m and forest roads.

Not forest and not forest land(Other land (international term) = Not forest and not forest land (national term)) - All land that is not defined as “Forest” or “Forest land”.

**Original data**

The 1st National forest inventory 2013

Statistical office of Montenegro 2017

### Analysis and processing of national data

**Estimation and forecasting**

Forests cover 59.5%(826.782 ha) and forest land covers 9.9%(137.480 ha)

Forest and forest land cover 69.4% of the land in Montenegro.Other land (not forest and not forest land) is calculated deducting from the total area .

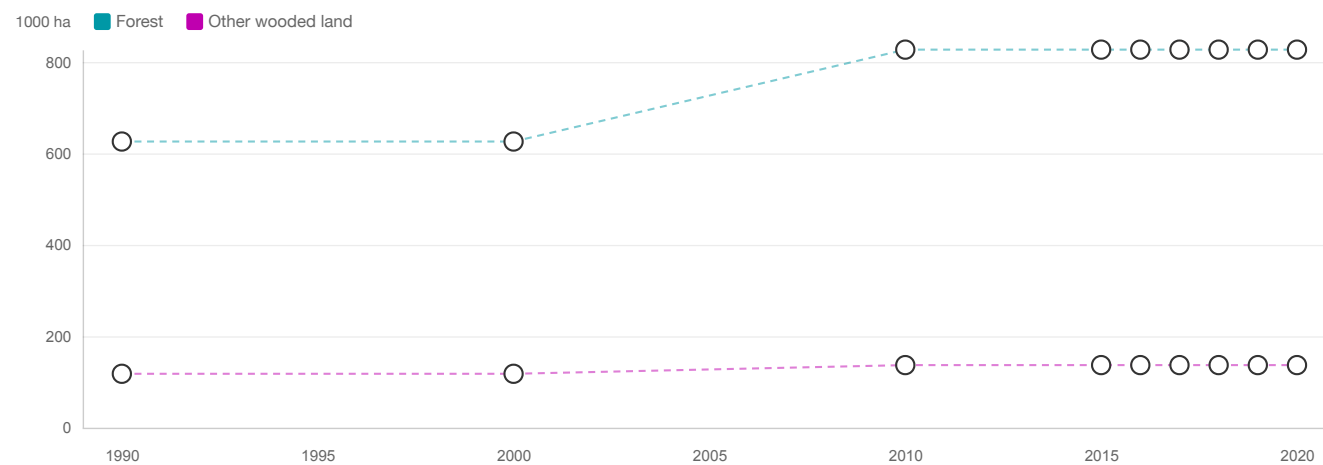
**Reclassification into FRA 2020 categories**

Forest 827 000 ha

Other wooded land 137 000 ha

Other land(not forest and not forest land) 381 000 ha

Total 1 345 000



FRA categories	Area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Forest (a)	626.00	626.00	827.00	827.00	827.00	827.00	827.00	827.00	827.00
Other wooded land (a)	118.00	118.00	137.00	137.00	137.00	137.00	137.00	137.00	137.00
Other land (c-a-b)	601.00	601.00	381.00	381.00	381.00	381.00	381.00	381.00	381.00
Total land area (c)	1 345.00	1 345.00	1 345.00	1 345.00	1 345.00	1 345.00	1 345.00	1 345.00	1 345.00

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	68.00	
Sub-tropical	32.00	
Tropical	0.00	

Comments

# 1b Forest characteristics

## National Data

### Data sources + type of data source eg NFI, etc

NFI 2013

Statistical office of Montenegro

Forest menagment plans

### National classification and definitions

Naturally forests - Natural forests are forests that naturally regenerate from seeds or from shoots and sprouts-Naturally regenerated high forest stands - regenerated from seed,-Coppice forests - regenerated from shoots and sprouts.

Semi-natural forests - Mixed standsby origin - Forest of naturally regenerated native species where there are clearly visible indications of human activities, as well as forests established through planting, seeding or assisted natural regeneration

Artificial forests - Forest of native species, established through planting or seeding mainly for production of wood or non wood goods, as well as protecting functions mainly for soil protection.

Planted forest - Forest predominantly composed of trees established through planting and/or deliberate seeding

### Original data

Definition: The origin of a forest may either be plantation, natural regeneration or a combination of these. This attribute is assessed for forest but not for forest land. The stand origin is determined with direct evaluation on the field using all evidence available or based on the prior descriptions. If a clear differentiation between artificial regeneration and natural regeneration is not possible, natural regeneration is assumed. If for a tree the decision between vegetative propagation origin and origin form a seedling is not possible then origin from a seedling is assumed.

## Analysis and processing of national data

### Estimation and forecasting

Trend is expecting to be growing

### Reclassification into FRA 2020 categories

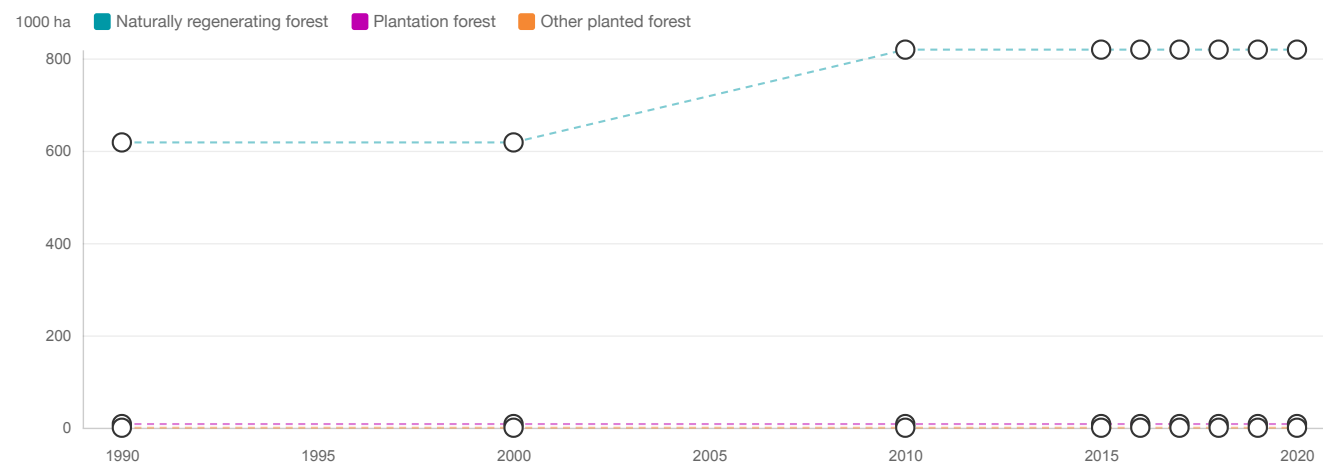
Primary forest - 109 000

Other naturally regenerated forest - 710 000

Planted forest - 8 000

TOTAL - 827 000





FRA categories	Forest area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest (a)	618.00	618.00	819.00	819.00	819.00	819.00	819.00	819.00	819.00
<b>Planted forest (b)</b>	<b>8.00</b>	<b>8.00</b>	<b>8.00</b>	<b>8.00</b>	<b>8.00</b>	<b>8.00</b>	<b>8.00</b>	<b>8.00</b>	<b>8.00</b>
Plantation forest	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
...of which introduced species									
Other planted forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total (a+b)</b>	<b>626.00</b>	<b>626.00</b>	<b>827.00</b>	<b>827.00</b>	<b>827.00</b>	<b>827.00</b>	<b>827.00</b>	<b>827.00</b>	<b>827.00</b>
<b>Total forest area</b>	<b>626.00</b>	<b>626.00</b>	<b>827.00</b>	<b>827.00</b>	<b>827.00</b>	<b>827.00</b>	<b>827.00</b>	<b>827.00</b>	<b>827.00</b>

## Comments

Data to 2010 (based on existing management plans) were related only to the forest area and forest land . The data were accurate for hight forest and part of copice forest, but the data for the shrubs, shrubberies and maquis and private forests previously given are estimate.

The first national forest inventory included the entire territory of the country and all categories of forests and forest lands. For Forests and OWL, from 2010.,data are from NFI.

# 1c Primary forest and special forest categories

## National Data

### Data sources + type of data source eg NFI, etc

NFI 2013

Statistical office of MNE 2010-2017

### National classification and definitions

**High forests** – as compared to coppice forests - are dominated by normal grown trees and include both naturally regenerated stands and stands that have fully or partly been established by plantation. High forests are - in contrast to the other categories - not dominated by trees from vegetative origin, bush like trees or shrubs

**Coppice forest** are all stands where trees of vegetative tree origin dominate, no matter if they are still managed by periodic cutting or pruning or not. Coppice forests are or originate from a silviculture formation, especially maintained by periodic cutting or pruning to encourage suckering.

**Brush wood - Šikara** is a bush like form of forest trees, which genetically derives from the previously devastated forests. “Šikara” is a low quality and deformed coppice forest, in which besides the change of the normal form in the trees, due to the change of the site conditions, there is a distinct change in the mixture of trees and shrubs in comparison with the previous state of the forest.

**Bushland - Šibljaci** are bush like forms, similar to “Šikara”, in which different types of bushes and shrubs are dominating, and forest tree species are missing or are very rare.

**Maquis - Makija** is an evergreen “Šikara” that was formed with a regressive succession of *Quercus iliricus* forests. They don't have a clear layer of trees, but it is a mix of larger and smaller shrubs, intermixed with different types of ivy, which makes it extremely difficult to pass through.

**Stonesteppes - Garig** is an even more degraded form of *Quercus iliricus* forests, or a degraded “Makija”. “Garig” is not as dense as the “Makija” is, it is high up to 1m, it is easily possible to walk through it and the canopy closure is on the average 0,5. Shrubs and half-shrubs are dominating here.

### Original data

Definition: The forest category is assessed, that further details the differentiation between forest and other wooded land

Class
High forest
Coppice forest
Brush wood
Bushland (If the canopy cover with trees that reach a height of 5 m in mature stage is > 10% these categories are forest according to the international forest definition.)
Maquis (If the canopy cover with trees that reach a height of 5 m in mature stage is > 10% these categories are forest according to the international forest definition.)
Stonesteppes
Temporarily unstocked (no regeneration, no trees'; e.g. completely burnt area) <u>Thus in such situation after a regeneration process any of the above mentioned types can possibly result.</u>

## Analysis and processing of national data

### Estimation and forecasting

For high forest, coppice forest, brush wood and bushland trend is expecting to be growing. For maquis and stonesteppes the situation does not change because it is conditioned by the climate, and the locality.

### Reclassification into FRA 2020 categories

PRIMARY FOREST/ VIRGIN FOREST - Naturally regenerated forest of native tree species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed.

One primary forest exist in Montenegro, inside National Park Biogradska Gora.

FRA categories	Area (1000 ha)				
	1990	2000	2010	2015	2020
Primary forest				1.60	1.60
Temporarily unstocked and/or recently regenerated					0.00
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

The separation of high forests from coppice forests is defined by a minimum quantity with trees from seedlings in high forests of 1/3 or more out of all trees in the stand. Every tree, where the origin is uncertain will be considered as seedling. Pollards and trees developed from pollards will not be considered as seedlings but will be accounted for as trees that constitute coppice forests. (Pollards are trees with multiple trunks sprouting from just above head height. They have been pollarded to encourage the growth of new shoots, allowing repeated harvests. Pollards of beech and oak often occur in coppice forests.).

In forests under conversion to high forests usually also coppice trees occur. If the conversion process is advanced and there are at least 10 or more seedlings (or nursery plants) with a height of at least 1,30 m per ar (100m²), the stand will be classified as high forest./

Forest area obtained from national category "Primary forest" in "National parks"

# 1d Annual forest expansion, deforestation and net change

## National Data

### Data sources + type of data source eg NFI, etc

NFI 2013

Statistical office of MNE 2010 - 2017

### National classification and definitions

Same as 1a

### Original data

Forest expansion,

Montenegro's land area is characterised by a high coverage with forest of 59.9% (826 782 ha, relative standard error 0.5 %) and forestland of 9.9 % (137 480 ha), together forest and forestland cover 69.4% (964 262 ha) of the land area of 1 381 200 ha .

The information available on the forests in Montenegro was mainly relaying on data from forest management in public forests in the central and northern part of Montenegro. Major statistical properties are considerably different to so far existing best estimates that have been published in the National Forest Policy, the Spatial Plan of Montenegro Until 2020 and in the report State of Europe's Forest 2011: • Forest area (now at 59.9 %, so far estimated at 45 %), • Volume (122 mio m³ vs. 72 mio m³) and • Volume increment (2. 9 mio m³ vs. 1.4 mio m³).

## Analysis and processing of national data

### Estimation and forecasting

-

### Reclassification into FRA 2020 categories

National categories correspond to FRA categories and definitions.

Definition: The origin of a forest may either be plantation, natural regeneration or a combination of these and is recorded in classes. Attribute is assessed for forest but not for forest land. The stand origin is determined with direct evaluation on the field using all evidence available or based on the prior descriptions. If a clear differentiation between artificial regeneration and natural regeneration is not possible, natural regeneration is assumed. If for a tree the decision between vegetative propagation origin and origin from a seedling is not possible then origin from a seedling is assumed.

FRA categories	Area (1000 ha/year)			
	1990-2000	2000-2010	2010-2015	2015-2020
Forest expansion (a)			28.20	12.00
...of which afforestation			0.50	0.30
...of which natural expansion			27.70	11.70
Deforestation (b)			28.20	12.00
Forest area net change (a-b)	0.00	20.10	0.00	0.00

### Comments

The figures for reporting years refer to the average years in 5 age period 2010 - 2015, and for 2 age period 2016 -2017. Source MONSTAT

Data for deforestation for total tertory of Montenegro can be given after second NFI. Existing data is from management plan wich covered nothern part of Montenegro.

# 1e Annual reforestation

## National Data

### Data sources + type of data source eg NFI, etc

NFI 2013

Statistical office of MNE 2010-2017

### National classification and definitions

National categories correspond to FRA categories and definitions.

### Original data

Forest reforestation

Montenegro's land area is characterised by a high coverage with forest of 59.9% (826 782 ha, relative standard error 0.5 %) and forestland of 9.9 % (137 480 ha), together forest and forestland cover 69.8% (964 262 ha) of the land area of 1 381 200 ha . Montenegro's forests are located partly on very steep and rocky slopes; in total thus 11.9 % of the forest area and 8.4 % of the forestland area have not been accessible for tree measurement. The estimate for the wood volume in the total forest of Montenegro is 122 Mio m<sup>3</sup> with an increment of 2.9 Mio m<sup>3</sup> and based on the assumption that the inaccessible forests show relative volumes per ha that are one third below the level of accessible forests. This, while the wood volume in accessible forests that cover 728 133 ha amounts to 116 Mio m<sup>3</sup> with an increment of 2.9 Mio m<sup>3</sup> (assessed with a relative standard error of 1.5 %).

## Analysis and processing of national data

### Estimation and forecasting

-

### Reclassification into FRA 2020 categories

REFORESTATION - Re-establishment of forest through planting and/or deliberate seeding on land classified as forest.

Including planting/seeding of temporarily unstocked forest areas as well as planting/seeding of areas with forest cover.

FRA categories	Area (1000 ha/year)			
	1990-2000	2000-2010	2010-2015	2015-2020
Reforestation			2.20	1.10

Comments

The figures for reporting years refer to the average years in 5 age period 2010 - 2015, and for 2 age period 2016 -2017. Source MONSTAT



# 1f Other land with tree cover

## National Data

### Data sources + type of data source eg NFI, etc

NFI 2013

### National classification and definitions

Not forest and not forest land (national term)) - All land that is not defined as “Forest” or “Forest land”

### Original data

NFI 2013 Other land - 381 000 ha

## Analysis and processing of national data

### Estimation and forecasting

Trend is expecting to be reducing

### Reclassification into FRA 2020 categories

OTHER LAND WITH TREE COVER - data not available

FRA categories	Area (1000 ha)				
	1990	2000	2010	2015	2020
Palms (a)					
Tree orchards (b)					
Agroforestry (c)					
Trees in urban settings (d)					
Other (specify in comments) (e)					
Total (a+b+c+d+e)	–	–	–	–	–
Other land area	601.00	601.00	381.00	381.00	381.00

Comments

Data for urban forest and agroforestry are not available.

## 2 Forest growing stock, biomass and carbon

### 2a Growing stock

#### National Data

##### Data sources + type of data source eg NFI, etc

National Forest and Forest land Administration Policy 2008

MCPFE, 2011. State of Europe's Forests 2011

FRA 2015 Country report for Montenegro

NFI 2013

##### National classification and definitions

Growing stock - Volume over bark of all living trees more than 10 cm in diameter at breastheight (or above buttress if these are higher). Includes the stem from ground level or stump height up to a top diameter of 7 cm, and may also include branches to a minimum diameter of 7 cm.

The diameter increment of the latest 10 years is assessed in mm-level.

Trees with a DBH > 10 cm in high forest and coppice will be selected for measurement. The increment is assessed by drilling of two trees per concentric circle. The drilled tree will be selected by the ordinal tree number. In each circle those two trees with the smallest tree numbers are selected, regardless of the tree species. Thus the maximum amount of trees measured is 8. The increment value in mm is entered into the software/tally sheets after the drilling samples are analyzed. The trees are drilled from the side where the DBH measurement is taken. The increment measured on the core is doubled to receive the diameter increment.

The increment is not measured for trees that have partly rotten stems close to the location of the drilling place, not measured on trees where a volume reduction was applied, not measured on trees with a deviation in the measurement of the DBH from 1,3 m, not measured on trees excluded from height measurement and on trees with stem damages.

##### Original data

##### Growing stock

P forest ha - 827 000 ha

V (m<sup>3</sup>) - 121.4 millions of m<sup>3</sup> (121.4 millions of m<sup>3</sup> represent all accessible forest + inaccessible (116.2+5.2))

V/ha (m<sup>3</sup>/ha) - 159,8 m<sup>3</sup>/ha

Total increment (Zv) millions of m<sup>3</sup> - 2,9

Zv/ha - 3,8

### Analysis and processing of national data

##### Estimation and forecasting

**Growing stock** - Data source are from NFI 2013. Trend of growing stock is expecting to be growing.

##### Reclassification into FRA 2020 categories

GROWING STOCK - Include : Volume over bark of all living trees with a minimum diameter of 10 cm at breast height (for high forest),

and Volume over bark of all living trees with a minimum diameter of 5 cm at breast height (for coppice forest).

Includes the stem from ground level up to a top diameter of 7 cm, excluding branches.

FRA categories	Growing stock m³/ha (over bark)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest	117.48	117.48	148.23	148.23	148.23	148.23	148.23	148.23	148.23
Planted forest									
...of which plantation forest									
...of which other planted forest									
Forest									
Other wooded land	12.71	12.71	2.92	2.92	2.92	2.92	2.92	2.92	2.92

FRA categories	Total growing stock (million m³ over bark)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest	72.60	72.60	121.40	121.40	121.40	121.40	121.40	121.40	121.40
Planted forest									
...of which plantation forest									
...of which other planted forest									
Forest									
Other wooded land	1.50	1.50	0.40	0.40	0.40	0.40	0.40	0.40	0.40

## Comments

Data before 2010 are based on estimation and after 2010 are based on NFI.

## 2b Growing stock composition

### National Data

#### Data sources + type of data source eg NFI, etc

National Forest and Forest land Administration Policy 2008

MCPFE, 2011. State of Europe's Forests 2011

FRA 2015 Country report for Montenegro

NFI 2013

#### National classification and definitions

GROWING STOCK - Include : Volume over bark of all living trees with a minimum diameter of 10 cm at breast height (for high forest),

and Volume over bark of all living trees with a minimum diameter of 5 cm at breast height (for coppice forest).

Includes the stem from ground level up to a top diameter of 7 cm, excluding branches.

#### Original data

##### Growing stock

P forest ha - 827 000 ha

V (m3) - 121.4 millions of m3 (121.4 millions of m3 represent all accessible forest + inaccessible (116.2+5.2))

V/ha (m3/ha) - 159,8 m3/ha

Total increment (Zv) millions of m3 - 2,9

Zv/ha - 3,8

Growing stock are defined per species in growing stock composition table

### Analysis and processing of national data

#### Estimation and forecasting

**Growing stock** - Data source are from NFI 2013. Trend of growing stock is expecting to be growing.

#### Reclassification into FRA 2020 categories

National categories correspond to FRA.

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 moesiaca	Beach			52.00	52.00	52.00
#2 Ranked in terms of volume	Picea abies	Norway spruce			24.20	24.20	24.20
#3 Ranked in terms of volume	Abies alba	Silver fir			15.20	15.20	15.20
#4 Ranked in terms of volume		Hardwood group			5.50	5.50	5.50
#5 Ranked in terms of volume	Quercus cerris	Turkey oak			4.70	4.70	4.70
#6 Ranked in terms of volume	Pinus nigra	Black pine			3.40	3.40	3.40
#7 Ranked in terms of volume		Softwood group			3.10	3.10	3.10
#8 Ranked in terms of volume		Precious hardwood			3.00	3.00	3.00
#9 Ranked in terms of volume	Quercus petraea	Sessile Oak			2.50	2.50	2.50
#10 Ranked in terms of volume		Other Quercus species			1.80	1.80	1.80
Remaining native tree species					6.00	6.00	6.00
Total volume of native tree species			–	–	121.40	121.40	121.40
Introduced tree species							
#1 Ranked in terms of volume							
#2 Ranked in terms of volume							
#3 Ranked in terms of volume							
#4 Ranked in terms of volume							
#5 Ranked in terms of volume							
Remaining introduced tree species							

FRA categories	Scientific name	Common name	Growing stock in forest (million m³ over bark)				
			1990	2000	2010	2015	2020
Native tree species							
Total volume of introduced tree species			–	–	–	–	–
Total growing stock			–	–	121.40	121.40	121.40

Comments

## 2c Biomass stock

### National Data

#### Data sources + type of data source eg NFI, etc

National Forest and Forest land Administration Policy 2008

MCPFE, 2011. State of Europe's Forests 2011

FRA 2015 Country report for Montenegro

NFI 2013

#### National classification and definitions

Total biomass - Above-ground biomass + below-ground biomass (All living biomass above the soil including stem, stump, branches, bark, seeds, and foliage + all 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.)

#### Original data

##### Biomass stock

Total V millions of m<sup>3</sup> - 116.2

Total biomass millions of m<sup>3</sup> - 186.7

### Analysis and processing of national data

#### Estimation and forecasting

**Biomass and Carbon stock** - Biomass and carbon are determined using the single trees wood volume and tree species group specific conversion and expansion factors

#### Reclassification into FRA 2020 categories

##### BIOMASS STOCK

ABOVE-GROUND BIOMASS - All biomass of living vegetation, both woody and herbaceous, above the soil including stems, stumps, branches, bark, seeds, and foliage.

BELOW-GROUND BIOMASS - All 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.

Biomass are determined using the single trees wood volume and tree species or tree species group specific conversion and expansion factors.

The calculations are done as follows:

- WD – wood density (t DM m<sup>-3</sup>), coefficient for calculating m<sup>3</sup> of wood into tonnes of total dry wood
- BEF – (Biomass expansion factor): ratio aboveground and belowground dry mass to total solid wood dry mass
- CC – carbon content (t C t<sup>-1</sup> DM). Percentage of carbon in wood
- Total (AG + BG) C = TSW-volume × WD × BEF × CC
- Vbruto – gross wood volume
- Total C (above + under ground) = Vbruto × WD × BEF × CC

The results are presented as total biomass.

The conversion and expansion factors for tree species where specific values have been available are documented.

The assignment of all other tree species to values of most appropriate tree species with known values is documented. For conversion from tonnes biomass, “Good Practice Guidance for Land Use, Land-Use Change and Forestry” is used.



FRA categories	Forest biomass (tonnes/ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Above-ground biomass			96.87	96.87	96.87	96.87	96.87	96.87	96.87
Below-ground biomass			15.99	15.99	15.99	15.99	15.99	15.99	15.99
Dead wood			8.31	8.31	8.31	8.31	8.31	8.31	8.31

Comments

Data before 2010 are not available.

From 2010 and later data are based on NFI.

## 2d Carbon stock

### National Data

#### Data sources + type of data source eg NFI, etc

Carbon in biomass - source NFI 2013.

#### National classification and definitions

Carbon in dead wood - 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

#### Original data

##### Carbon stock

Carbon in biomass ( 1000 t) - 53.991

Carbon in increment (1000t) - 1.248

### Analysis and processing of national data

#### Estimation and forecasting

**Carbon stock** - Carbon are determined using the single trees wood volume and tree species group specific conversion and expansion factors

#### Reclassification into FRA 2020 categories

##### Carbon stock

CARBON IN ABOVE-GROUND BIOMASS - Carbon in all living biomass above the soil, including stems, stumps, branches, bark, seeds, and foliage.

CARBON IN BELOW-GROUND BIOMASS - Carbon in all 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 is determined using the single trees wood volume and tree species or tree species group specific conversion and expansion factors.

The calculations are done as follows:

- WD – wood density (t DM m<sup>-3</sup>), coefficient for calculating m<sup>3</sup> of wood into tonnes of total dry wood
- BEF – (Biomass expansion factor): ratio aboveground and belowground dry mass to total solid wood dry mass
- CC – carbon content (t C t<sup>-1</sup> DM). Percentage of carbon in wood
- Total (AG + BG) C = TSW-volume × WD × BEF × CC
- Vbruto – gross wood volume
- Total C (above + under ground) = Vbruto × WD × BEF × CC

The results are presented as carbon.

The conversion and expansion factors for tree species where specific values have been available are documented.

The assignment of all other tree species to values of most appropriate tree species with known values is documented in the appendix in Table 359. For conversion from dry matter to tonnes carbon the standard conversion factor recommended by IPCC (2006) “Good Practice Guidance for Land Use, Land-Use Change and Forestry” is used.

Values of wood density are close to the values given in IPCC (2006) “Good Practice Guidance for Land Use, Land-Use Change and Forestry” as standard recommendations if local values are unknown.

FRA categories	Forest carbon (tonnes/ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Carbon in above-ground biomass			48.43	48.43	48.43	48.43	48.43	48.43	48.43
Carbon in below-ground biomass			8.00	8.00	8.00	8.00	8.00	8.00	8.00
Carbon in dead wood			4.15	4.15	4.15	4.15	4.15	4.15	4.15
Carbon in litter									
Soil carbon									

Soil depth (cm) used for soil carbon estimates	
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Comments

Data are taken from NFI 2013 where are calculated

Data before 2010 are not available

## 3 Forest designation and management

### 3a Designated management objective

#### National Data

##### Data sources + type of data source eg NFI, etc

Forest management plans

National Forest and Forest land Administration Policy 2008

FRA 2015 Country report for Montenegro

NFI 2013

##### National classification and definitions

Productional functions - Commercial forests are forests with emphasis on production functions. Production forest functions especially include: 1) production of wood forest products and 2) production of nontimber forest products

Environmental functions - Protection forests are forests with emphasis on ecological functions. Environmental forest functions especially include: 1) protection of forest soil against washing off and erosion, 2) conservation of water regime, 3) conservation of biological and landscape diversity, 4) mitigation of macro climate changes, regulation and improvement of micro climate, 5) sequestration of carbon dioxide from air, 6) oxygen production and 7) conservation of habitat conditions for development of wild flora and fauna.

Social functions - Special purpose forests may be the forests where social functions are extremely stressed and the forests located within the National Parks. Social forest functions shall especially include: 1) protection of settlements and infrastructure objects against erosion and land slides, 2) favourable impact on water supply for different purposes, 3) providing space for rest and recreation, 4) development of ecotourism, 5) favourable impact on pasture and hunting, 6) research and education, 7) protection of natural heritage, 8) protection of cultural heritage, 9) supplying local population with fuelwood, 10) conservation of rural areas and, 11) defence of the country.

Forests available for wood supply are all forests outside national parks that are accessible and that are not subject to further substantial legal or natural harvesting restrictions. Forests available for wood supply include forests with multiple functions, such as e.g. soil protection, avalanche protection or recreation where harvesting can still take place based on adequate management.

Considering ownership and protection by national park are in 4 different management regimes exist in Montenegro:

1. Management of the public forests outside National Parks by the Forest Administration
2. Management of private forests outside National Parks by private forest owners supported by the Forest Administration
3. Management of the public forests inside National Parks by the National Park Administration
4. Management of private forests inside National Parks by private forest owners supported by the National Park Administration

##### Original data

Data are from Forest administration and from National parks.

### Analysis and processing of national data

#### Estimation and forecasting

Trend of management of the public forests outside National Parks by the Forest Administration and management of private forests outside National Parks by private forest owners supported by the Forest Administration expecting to be growing.

#### Reclassification into FRA 2020 categories

National definitions correspondent with FRA definitions.

Primary designated management objective

FRA 2020 categories	Forest area (1000 ha)				
	1990	2000	2010	2015	2020
Production (a)			675.40	675.40	675.40
Protection of soil and water (b)			106.00	106.00	106.00
Conservation of biodiversity (c)					
Social Services (d)					
Multiple use (e)					
Other (specify in comments) (f)					
None/unknown (g)	626.00	626.00	45.60	45.60	45.60
Total forest area	626.00	626.00	827.00	827.00	827.00

Total area with designated management objective

FRA 2020 categories	Forest area (1000 ha)				
	1990	2000	2010	2015	2020
Production			675.40	675.40	675.40
Protection of soil and water			106.00	106.00	106.00
Conservation of biodiversity					
Social Services			827.00	827.00	827.00
Other (specify in comments)					

Comments

The future harvesting potential, the annual average yield was determined for the forests available for wood supply, that cover 81.7 % of the total forest area, as 1.4 Mio m³ for one approach and 1.8 Miom³ for a year. Both applied approaches use average harvesting rates per main stand type, species group and diameter class of economic forest and apply an overall 10% reduction to consider for restrictions due to specific forest functions. The first approach is based on harvests planned in currently valid forest management plans and the second is based on regional yield tables; both approaches consider the need for a conversion of a considerable part of the beech coppice to high forest. The difference between the two approaches can be explained by cautious forest management plans with reference to canopy closure, a factor that could not be so well considered in the approach second approach. It may also be an indication that forest management planning could foresee to some degree higher harvests. Both estimates are far below the increment. Due to the extremely high fellings that have been conducted during the 20th century the forests currently lack of stems with large diameters, thus of valuable assortments but have the potential to improve in the long term when the current harvests stay within that range.

## 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

Forest management plans

National Forest and Forest land Administration Policy 2008

FRA 2015 Country report for Montenegro

NFI 2013

#### National classification and definitions

Productional functions - Commercial forests are forests with emphasis on production functions. Production forest functions especially include: 1) production of wood forest products and 2) production of nontimber forest products

Protection forests - are forests with emphasis on ecological functions. Environmental forest functions especially include: 1) protection of forest soil against washing off and erosion, 2) conservation of water regime, 3) conservation of biological and landscape diversity, 4) mitigation of macro climate changes, regulation and improvement of micro climate, 5) sequestration of carbon dioxide from air, 6) oxygen production and 7) conservation of habitat conditions for development of wild flora and fauna.

#### Original data

Forests available for wood supply are all forests outside national parks that are accessible and that are not subject to further substantial legal or natural harvesting restrictions. Forests available for wood supply include forests with multiple functions, such as e.g. soil protection, avalanche protection or recreation where harvesting can still take place based on adequate management.

Considering ownership and protection by national park are in 4 different management regimes exist in Montenegro:

1. Management of the public forests outside National Parks by the Forest Administration
2. Management of private forests outside National Parks by private forest owners supported by the Forest Administration
3. Management of the public forests inside National Parks by the National Park Administration
4. Management of private forests inside National Parks by private forest owners supported by the National Park Administration

### Analysis and processing of national data

#### Estimation and forecasting

Trend is expecting to be growing of forest under different level of protection.

#### Reclassification into FRA 2020 categories

FOREST AREA WITHIN LEGALLY ESTABLISHED PROTECTED AREAS - Forest area within formally established protected areas independently of the purpose for which the protected areas were established.

FOREST AREA WITH LONG-TERM MANAGEMENT PLAN - Forest area that has a long-term (ten years or more) documented management plan, aiming at defined management goals, and which is periodically revised.

FRA categories	Area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Forest area within protected areas			83.90	83.90	83.90	83.90	83.90	83.90	83.90
Forest area with long-term forest management plan			303.93	303.93	303.93	303.93	303.93	303.93	303.93
...of which in protected areas			28.40	28.40	28.40	28.40	28.40	28.40	28.40

## Comments

## 4 Forest ownership and management rights

### 4a Forest ownership

#### National Data

**Data sources + type of data source eg NFI, etc**

NFI 2013

Cadastral data of Montenegro

**National classification and definitions**

On National clasifitation in Montenegro forest per ownrship are :

State ownership

Private ownwrship

**Original data**

50.9% of whole teritory of Montenegro are state-owned

49.1% of whole teritory of Montenegro areprivate ownership

#### Analysis and processing of national data

**Estimation and forecasting**

Trend of forest under private ownership expecting to be growing

**Reclassification into FRA 2020 categories**

PUBLIC OWNERSHIP - Forest owned by the State; or administrative units of the Public Administration; or by institutions or corporations owned by the Public Administration.

State owned, managed by the forest administration
State owned, managed by other governmental authority
State owned, but occupied
State owned and leased to privat owners or companies
Owned and managed by state owned companies
Status unclear

PRIVATE OWNERSHIP - Forest owned by individuals, families, communities, private co-operatives, corporations and other business entities, religious and private educational institutions, pension or investment funds, NGOs, nature conservation associations and other private institutions.

Private owned
Owned by religious communities
Status unclear



FRA categories	Forest area (1000 ha)			
	1990	2000	2010	2015
Private ownership (a)			393.99	393.99
...of which owned by individuals				
...of which owned by private business entities and institutions				
...of which owned by local, tribal and indigenous communities				
Public ownership (b)			432.79	432.79
Unknown/other (specify in comments) (c)	–	–	0.22	0.22
Total forest area	626.00	626.00	827.00	827.00

## Comments

Unknow/other - are status unclear.

## 4b Holder of management rights of public forests

### National Data

#### Data sources + type of data source eg NFI, etc

Cadastral data of Montenegro

#### National classification and definitions

On National clasifitation in Montenegro forest per ownrship are :

State ownership

Private ownwrship

#### Original data

50.9 state-owned

### Analysis and processing of national data

#### Estimation and forecasting

Trend of forest under state ownership expecting to be reducing

#### Reclassification into FRA 2020 categories

PUBLIC ADMINISTRATION - State owned, managed by the forest administration

FRA categories	Forest area (1000 ha)			
	1990	2000	2010	2015
Public Administration (a)			420.94	420.94
Individuals (b)			0.00	0.00
Private business entities and institutions (c)			0.00	0.00
Local, tribal and indigenous communities (d)			0.00	0.00
Unknown/other (specify in comments) (e)	–	–	11.85	11.85
Total public ownership	–	–	432.79	432.79

Comments

In Montenegro all state forests are under Public administartion

5 Forest disturbances

5a Disturbances

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

-

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
Insects (a)																		
Diseases (b)																		
Severe weather events (c)																		
Other (specify in comments) (d)																		
Total (a+b+c+d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total forest area	626.00	-	-	-	-	-	-	-	-	-	827.00	-	-	-	-	827.00	827.00	827.00

Comments

## 5b Area affected by fire

### National Data

**Data sources + type of data source eg NFI, etc**

Data sources - National statistical office, yearbook 2018

**National classification and definitions**

Number of fires per year in forest.

**Original data**

Statistical yearbook 2018 Montenegro

### 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																		
...of which on forest																2.34	1.28	1.64

Comments

Data are available only for forest area damaged by fire.

5c Degraded forest

Does your country monitor area of degraded forest		Yes
If "yes"	What is the national definition of "Degraded forest"?	
	Describe the monitoring process and results	During taksation this forest are recognised and its specific plan to transform it highest level with forest managerial procedure in long period.

Comments

Degraded forest are included in forest managamend planing under responsibility of forest administration.



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

#	References to sources of information	Variable(s)	Year(s)	Additional comments
1	National Forest and Forest Land Administration Policy (NFFLAP)	Policies supporting sustainable forest management. The document contains policy principles, objectives and statements (for implementing measures) as well as key framework for implementation and monitoring.	2008	Primary data source
2	Forest Law	Silviculture, protection, conservation and improvement of forests, planning , method and conditions of forest utilization, construction and maintenance of forest roads, monitoring of forests, as well as other issues of significance for forests, forest land and forestry continuous conservation and enhancement of forests and forest land and their functions; sustainable and multifunctional forest management; conservation and enhancement of biologic and landscap biodiversity of forests, and their environmental quality .	2010	Primary data source
3	Development Directions of Montenegro as an Ecological State		2001	Secondary data source
4	National Biodiversity Strategy and Action Plan for period 2010 – 2015		2009	Secondary data source
5	National strategy with plan for develoment forest and Forestry		2013	primary data source

National classification and definitions

Policies or strategies that explicitly encourage sustainable forest management.

Legislation and regulations that govern and guide sustainable forest management, operations and use.

Original data

Ministry of agriculture and rural developent

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

Comments

Policies related to sustainable forest management is made at the state level.

Laws related to sustainable forest management is made at the state level.

## 6b Area of permanent forest estate

### National Data

**Data sources + type of data source eg NFI, etc**

Nfi and forest managment planing

**National classification and definitions**

Government target/aspiration for forest area for a specific year. (under managment plan)

Forest area that is classified or scheduled to be converted into high forest purposes ( coppice forest into high forest).

**Original data**

NFI

Forest managment planing

FRA 2020 categories	Forest area (1000 ha)					
	Applicable?	1990	2000	2010	2015	2020
Area of permanent forest estate	Yes				826.78	

Comments

Goal is to maintain the existing forest area and increase the quality of the timber

## 7 Employment, education and NWFP

### 7a Employment in forestry and logging

#### National Data

**Data sources + type of data source eg NFI, etc**

MCPFE, 2007. State of Europe's Forests 2007
FAO. 2008. <i>Contribution of the forestry sector to national economies, 1990-2006</i> , by A. Lebedys. Forest Finance Working Paper FSFM/ACC/08. FAO, Rome. <a href="http://www.fao.org/docrep/011/k4588e/k4588e00.htm">http://www.fao.org/docrep/011/k4588e/k4588e00.htm</a>
MCPFE, 2011. State of Europe's Forests 2011
FRA 2015
Labor Law
Ministry of agriculture and rural development

**National classification and definitions**

A measurement equal to one person working full-time during a specified reference period.

Employment in forestry are activities related to production of goods derived from forests (Forestry and logging).

**Original data**

Ministry of agriculture and rural development.

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												
...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

Total employment in forestry and wood procesing industry are 2373. Data per sector, age structure and per gender are not available.

7b Graduation of students in forest-related education

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

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												
Master's degree												
Bachelor's degree												
Technician certificate / diploma												
Total												

Comments

Data are not available because Montenegro doesnt have forest faculty.



7c Non wood forest products removals and value 2015

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

	Name of NWFP product	Key species	Quantity	Unit	Value (1000 local currency)	NWFP category
#1						
#2						
#3						
#4						
#5						
#6						
#7						
#8						
#9						
#10						
All other plant products						
All other animal products						
Total					-	

Name of currency	
------------------	--

Comments

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	46.54	61.49	61.49	61.49	61.49	61.49	61.49	61.49

Name of agency responsible	
----------------------------	--

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	2.82	0.00	0.00	0.00	0.00	0.00	0.00

Name of agency responsible	
----------------------------	--

Sub-Indicator 2	Forest biomass (tonnes/ha)							
	2000	2010	2015	2016	2017	2018	2019	2020
Above-ground biomass stock in forest	—	96.87	96.87	96.87	96.87	96.87	96.87	96.87

Name of agency responsible	
----------------------------	--

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	–	10.15	10.15	10.15	10.15	10.15	10.15	10.15

Name of agency responsible	
----------------------------	--

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	–	36.75	36.75	36.75	36.75	36.75	36.75	36.75

Name of agency responsible	
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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	0.00	0.00	0.00	0.00	0.00	0.00	–	–