



# Report

## Slovakia

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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

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## Introductory text

In 2017, the forest area accounted for 1.946 million ha in Slovakia. The long-term trend of increasing the forest area continues. Since 2001 the forest area has increased by almost 19 thousand ha. The annual growth is mainly due to a change in the category of land use. Forest percentage reached 41.2%. The majority of Slovak forests are production forests (72.1%). The second most common are protection forests (17.2%) in which ecological functions are of prime importance. Lastly, there are special-purpose forests (10.7%) in which social and cultural functions prevail.

Due to a great diversity of natural conditions and habitats, Slovak forests have a very rich tree species composition, varied age structure and spatial arrangements. The most abundant tree species are European beech (33.6%), Norway spruce (22.7%) and English/sessile oak (10.5%). Broadleaved species are at 62.8% more common than conifer species, which has a positive impact on the biological diversity of forest ecosystems and their stability. The area of coniferous species has been decreasing; since 2005 from its original 41% down to 37.2% in 2017; this is particularly true for Norway spruce.

The total growing stock is increasing. It reached 537.67 million m<sup>3</sup> in 2017, an increase of 33.9% on 1990 figures. It can be said that, at present, the historically highest growing stock is in Slovakia at least for the last century. However, the volume of present growing stock is already at the culmination point. It is expected that in the coming years and decades the growing stock will decrease as a result of the gradual change in age composition of forests in Slovakia. To support biodiversity, deadwood is also an important component of forest ecosystems. According to the National Forest Inventory data, 87.0 million ± 5.7 million m<sup>3</sup> of deadwood (standing and lying thick and thin wood, stumps) is estimated to lie in Slovak forests.

There are 1.22 mil. ha of forests in current systems of protected areas (national and European) in Slovakia, which represents 62.8% of the total area of forest stands. The national system of protected areas covers approximately 840 thousand hectares of forest area (43.1%), while the average of FOREST EUROPE member countries is 19.4% (FOREST EUROPE 2015a). The European system NATURA 2000 occupies 29.7% of the territory of Slovakia, while the EU average is 18.15%. From the above comparison it is clear that the area of forested protected territories in Slovakia is highly above average.

The actual age structure of Slovak forests is uneven. Higher than optimal is the percentage of forests above 70 years of age (mostly mature forests) so Slovak forests are aging. This fact alone has increased the regeneration felling to the highest level. Felling is increasing, mainly due to aging forests (more mature forests entering regeneration) and a high volume of incidental felling is attributed to biotic agents in particular. In 2017, the total felling reached 9.39 million m<sup>3</sup> of which 58.9% were softwoods and 41.1% hardwoods. The volume of incidental felling is high; in 2017, it represented 52.6% of the total felling. This high volume is mainly caused by the harmful impact of biotic agents (massive outbreaks of European spruce bark beetle) and windstorms. The uneven age structure of Slovak forests contributes to cyclical changes in felling volumes. It is estimated that around the year 2030 (depending on the actual incidental felling), the total felling volume is to decrease.

Slovak forests are suffering from an unprecedented frequency and intensity of harmful agents. Various restrictions often severely hamper timely and systematic conduct of incidental felling and subsequent removal of matter from forests damaged by biotic agents (bark beetle in particular). At present, we are talking about an unprecedented scale of forest damage in Slovakia. The volume of timber damaged by biotic agents (bark beetle) reached 3.9 million m<sup>3</sup> in 2017.

The volume and value of raw timber supply are increasing. In 2017, forest enterprises supplied domestic market with 9.02 million m<sup>3</sup> of timber. Export of raw timber is decreasing, but import of raw timber including high quality grades has been on the increase which is viewed positively. Sectoral earnings and revenue reached the sum of €532.71 million. Profit of the sector reached €44.45 million. Forest enterprises paid taxes to the national and municipal (council) budgets in the amount of €58.61 million. Sectoral costs reached in 2017 the sum of €488.26 million. Timber production and its use has significant environmental benefits for climate change mitigation since wood based products store sequestered CO<sub>2</sub> long-term. The volume of CO<sub>2</sub> in wood products (sawnwood, wood panels, paper, cardboard, etc.) increased in 2017 by 1.059 million tonnes.

In Slovakia, there are valid forest-related policy documents: the National Forest Programme, the National Programme on the Utilisation of Available Timber Resource and other strategic and legislation documents related to climate change mitigation and adaptation measures in forests, which include also measures on current forest-related issues and provide opportunities for the further development of both forest and timber processing sectors.

In 2017, the state owned 769 thousand ha of forest area, or 39.5% of its total area. At the same time, state forest enterprises managed 1,019 thousand ha of forest area, or 52.4% of its total. The remaining forest area was managed by non-state forest enterprises which own and manage private, municipal, community and church forests as well as forests of agricultural cooperatives.

The Ministry of Agriculture and Rural Development of the Slovak Republic (MARD SR) is the supreme national authority on forests. At the district level, there are 49 Land and Forest Departments. In military forests the state supervision of forestry was executed by the Ministry of Defence of the Slovak Republic (MD SR) through its Forestry and Hunting Office. The Department of Forestry and Wood Processing of MARD SR is in charge of the general conduct of state supervision on forests

based on respective legislation.

The National Forest Centre (NFC) provides for the forest sector services in the areas of forest research, education, public relations, public procurement of forest management programmes (FMP) and preparation of supporting materials for their elaboration, technical assistance, management and distribution of forest data and information, and the processing and administration of the National Thematic Map Set on Forests. There are the following interest groups and associations in Slovakia: Slovak Forestry Chamber; Slovak Hunting Chamber; Association of Forest Sector Employers; and Association of Non-state Forest Owners.

In 2016, the Slovak Republic assumed the chairmanship of FOREST EUROPE, the most important pan-European political process on forest policies. Its Secretariat "Liaison Unit Bratislava" is based at the NFC in Zvolen. It works to follow the Work Programme as planned till 2020. The Ministerial Conference on Protection of Forests in Europe should take place in the autumn of 2020 in Bratislava.

The timber processing industry in Slovakia has processing capacities that are fully sufficient for the entire volume of harvested coniferous timber. A higher demand for conifer roundwood and broadleaved pulpwood still prevails and must be partially satisfied by import. Historically pulp and papermaking industries belong to the best performing industries of the national economy. Slovakia still adequately processes only a small volume of the highest quality log grades produced in Slovak forests. Owing to a lower effectiveness of timber processing, domestic processing facilities are often only subcontractors of foreign companies.

# 1 Forest extent, characteristics and changes

## 1a Extent of forest and other wooded land

### National data

#### Data sources

1990	References	Summary information on state of forests in Slovakia 1990; National Forest Centre
	Methods used	Other (specify in comments)
	Additional comments	Area of forests found out through the forest stand inventory within elaboration of forest management plans applied to parcels registered in cadastre as forest land.

2000	References	Summary information on state of forests in Slovakia 2000; National Forest Centre
	Methods used	Other (specify in comments)
	Additional comments	Area of forests found out through the forest stand inventory within elaboration of forest management plans applied to parcels registered in cadastre as forest land.

2010	References	Summary information on state of forests in Slovakia 2010; National Forest Centre
	Methods used	National Forest Inventory
	Additional comments	Area of forests found out through the forest stand inventory within elaboration of forest management plans applied to parcels registered in cadastre as forest land.

2015	References	Summary information on state of forests in Slovakia 2015; National Forest Centre
	Methods used	Other (specify in comments)
	Additional comments	Area of forests found out through the forest stand inventory within elaboration of forest management plans applied to parcels registered in cadastre as forest land.

2017	References	Summary information on state of forests in Slovakia 1990-2017; National Forest Centre
	Methods used	Other (specify in comments)
	Additional comments	Methods used for forest area: Stand inventory

### Classifications and definitions

1990	National class	Definition
	Forest	

		<p>The Act on Forests applies only to forests on the forest lands, therefore only the forests on forest lands we included to "Forest area". These forests (forest stands) are subject of Forest management planning (forest stand description and plan of management measures). They are characterized by spanning more than 0.3 hectares, with canopy cover of more than 30 percent, with trees higher than 5 meters or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use. Forests are Forest lands:</p> <ul style="list-style-type: none"> <li>- covered by forest stands,</li> <li>- where forest stands were removed temporarily and shall be regenerated - reforested (clearings after felling),</li> <li>- skidding roads and dividing lines on forest lands up to 4 m wide;</li> <li>- with industrial plantations.</li> </ul>
	Other land	All land that is not classified as "Forest" or "Other wooded land".
	Other wooded land	Alpine vegetation zone with Pinus mugo

2000	<b>National class</b>	<b>Definition</b>
	Forest	<p>The Act on Forests applies only to forests on the forest lands, therefore only the forests on forest lands we included to "Forest area". These forests (forest stands) are subject of Forest management planning (forest stand description and plan of management measures). They are characterized by spanning more than 0.3 hectares, with canopy cover of more than 30 percent, with trees higher than 5 meters or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use. Forests are Forest lands:</p> <ul style="list-style-type: none"> <li>- covered by forest stands,</li> <li>- where forest stands were removed temporarily and shall be regenerated - reforested (clearings after felling),</li> <li>- skidding roads and dividing lines on forest lands up to 4 m wide;</li> <li>- with industrial plantations.</li> </ul>
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	Other wooded land	Alpine vegetation zone with Pinus mugo

2015	<b>National class</b>	<b>Definition</b>
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	Forest	<p>The Act on Forests applies only to forests on the forest lands, therefore only the forests on forest lands we included to "Forest area". These forests (forest stands) are subject of Forest management planning (forest stand description and plan of management measures). They are characterized by spanning more than 0.3 hectares, with canopy cover of more than 30 percent, with trees higher than 5 meters or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use. Forests are Forest lands:</p> <ul style="list-style-type: none"><li>- covered by forest stands,</li><li>- where forest stands were removed temporarily and shall be regenerated - reforested (clearings after felling),</li><li>- skidding roads and dividing lines on forest lands up to 4 m wide;</li><li>- with industrial plantations.</li></ul>
	Other land	All land that is not classified as "Forest" or "Other wooded land".
	Other wooded land	Alpine vegetation zone with Pinus mugo

2017	National class	Definition
	Forest	<p>The Act on Forests applies only to forests on the forest lands, therefore only the forests on forest lands we included to "Forest area". These forests (forest stands) are subject of Forest management planning (forest stand description and plan of management measures). They are characterized by spanning more than 0.3 hectares, with canopy cover of more than 30 percent, with trees higher than 5 meters or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use. Forests are Forest lands:</p> <ul style="list-style-type: none"><li>- covered by forest stands,</li><li>- where forest stands were removed temporarily and shall be regenerated - reforested (clearings after felling),</li><li>- skidding roads and dividing lines on forest lands up to 4 m wide;</li><li>- with industrial plantations.</li></ul>
	Other land	All land that is not classified as "Forest" or "Other wooded land".
	Other wooded land	Alpine vegetation zone with Pinus mugo

Original data and reclassification

1990	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Forest	Other wooded land	Other land
	Forest	1 902.48	100.00 %	0.00 %	0.00 %
	Other land	2 886.30	0.00 %	0.00 %	100.00 %
	Other wooded land	19.22	0.00 %	100.00 %	0.00 %
	Total	4 808.00	1 902.48	19.22	2 886.30

2000	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Forest	Other wooded land	Other land

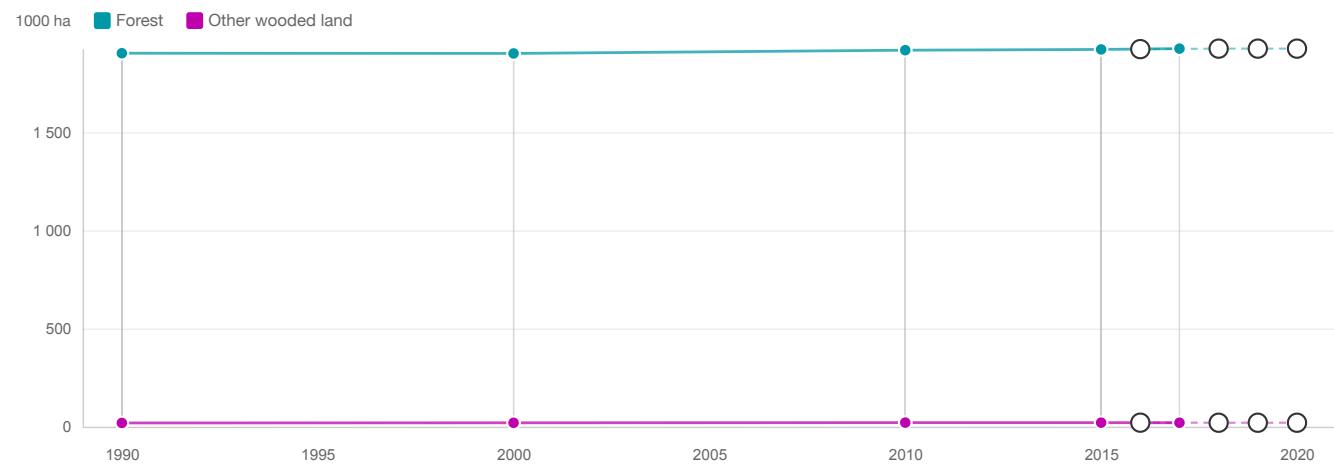


	Forest	1 901.41	100.00 %	0.00 %	0.00 %
	Other land	2 886.60	0.00 %	0.00 %	100.00 %
	Other wooded land	19.99	0.00 %	100.00 %	0.00 %
	<b>Total</b>	<b>4 808.00</b>	<b>1 901.41</b>	<b>19.99</b>	<b>2 886.60</b>

2010	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Forest	Other wooded land	Other land
	Forest	1 917.91	100.00 %	0.00 %	0.00 %
	Other land	2 869.10	0.00 %	0.00 %	100.00 %
	Other wooded land	20.99	0.00 %	100.00 %	0.00 %
	<b>Total</b>	<b>4 808.00</b>	<b>1 917.91</b>	<b>20.99</b>	<b>2 869.10</b>

2015	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Forest	Other wooded land	Other land
	Forest	1 921.75	100.00 %	0.00 %	0.00 %
	Other land	2 865.43	0.00 %	0.00 %	100.00 %
	Other wooded land	20.82	0.00 %	100.00 %	0.00 %
	<b>Total</b>	<b>4 808.00</b>	<b>1 921.75</b>	<b>20.82</b>	<b>2 865.43</b>

2017	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Forest	Other wooded land	Other land
	Forest	1 925.90	100.00 %	0.00 %	0.00 %
	Other land	2 861.69	0.00 %	0.00 %	100.00 %
	Other wooded land	20.41	0.00 %	100.00 %	0.00 %
	<b>Total</b>	<b>4 808.00</b>	<b>1 925.90</b>	<b>20.41</b>	<b>2 861.69</b>



FRA categories	Area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Forest (a)	1 902.48	1 901.41	1 917.91	1 921.75	1 923.37	1 925.90	1 925.90	1 925.90	1 925.90
Other wooded land (a)	19.22	19.99	20.99	20.82	20.75	20.41	20.41	20.41	20.41
<b>Other land (c-a-b)</b>	<b>2 886.30</b>	<b>2 886.60</b>	<b>2 869.10</b>	<b>2 865.43</b>	<b>2 863.88</b>	<b>2 861.69</b>	<b>2 861.69</b>	<b>2 861.69</b>	<b>2 861.69</b>
<b>Total land area (c)</b>	<b>4 808.00</b>	<b>4 808.00</b>	<b>4 808.00</b>	<b>4 808.00</b>	<b>4 808.00</b>	<b>4 808.00</b>	<b>4 808.00</b>	<b>4 808.00</b>	<b>4 808.00</b>

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	100.00	
Sub-tropical	0.00	
Tropical	0.00	

## Comments

Category	Comments related to data and definitions	Comments on trends
Forest area	<p>The Act on Forests applies only to forests on the forest lands, therefore only the forests on forest lands we included to "Forest area". These forests (forest stands) are subject of Forest management planning (forest stand description and plan of management measures). They are characterized by spanning more than 0.3 hectares, with canopy cover of more than 30 percent, with trees higher than 5 meters or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use. Forests are Forest lands:</p> <ul style="list-style-type: none"> <li>- covered by forest stands,</li> <li>- where forest stands were removed temporarily and shall be regenerated - reforested (clearings after felling),</li> <li>- skidding roads and dividing lines on forest lands up to 4 m wide;</li> <li>- with industrial plantations.</li> </ul>	<p>Since the first forest inventory in the years 1949-53, the area of both "Forest lands" and "Forest stands" have increased. This long-term increase in the forest area further continues. Since 2001, the area of forest crop land increased by more than 18.9 ths. ha. Forest cover, estimated as a percentage of forest land from the total country area, reached 41.2% in 2017.</p>
Other Wooded Land area	<p>Main national categories included in "Other wooded land":</p> <p>Alpine vegetation zone with Pinus mugo</p>	<p>The area of Pinus mugo (alpine) vegetation zone is in long term stabilized.</p>

The long-term trend of increasing the forest area continues. Since 2001 the forest area has increased by almost 19 thousand ha. The annual growth is mainly due to a change in the category of land use. Forest percentage reached 41.2%.

Except forests on forest lands there are also another 288 000 hectares of forest in Slovakia occurring on agricultural or other lands that were identified by the National Forest Inventory and Monitoring. However, not all of the information is known for them and, therefore, we report only the data for "official forest area" within this reporting for FRA 2020. The Act on Forests doesn't apply on forests outside forest lands. The trees outside forest lands above 13 cm in diameter are partially protected by the Act on Nature Conservation.

Only dwarf pine (*Pinus mugo*) stands are included into the category of "Other Wooded Land" in Slovakia. There are also some other types of scrubland occurring in Slovakia (e.g. *Prunus spinosa*, *Crataegus* spp., *Corylus avellana*), but they have not been inventoried yet and then their area is unknown. Dwarf pine stands have traditionally been included among forests in Slovakia. They are also contained in Forest management plans. Since this reporting for FRA 2020 we have for the first time classified dwarf pine stands as "Other wooded land" and that is why the "Forest areas" recorded in current FRA 2020 reporting don't match with those in FRA 2015.

# 1b Forest characteristics

## National Data

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

References to sources of information	Quality	Category	Year(s)	Type of inventory
Summary information on state of forests in Slovakia 1990, 2000, 2010, 2015-2017; National Forest Centre	H	Naturally regenerating forests and planted forests; Plantation forests; Introduced species	1990, 2000, 2010, 2015-2017	Stand inventory
National Forest Inventory and Monitoring 2015-2016	H	Naturally regenerating forests and planted forests	2016	National forest inventory

### National classification and definitions

According to the outcomes of National Forest Inventory and Monitoring 2015-2016 about 60±3% of forests do not show any sign of artificial regeneration. Based on this information we decided to use the ratio 60:40 for calculation of the area according to expansion/regeneration types. Using above mentioned ratio we have recalculated data in all reporting years.

Only forest stands of *Populus x euroamericana* (I214, Robusta) meet the definition of plantations in Slovakia. They are also the only Introduced plantation species.

### Original data

Data originating from the source of Summary information on state of forests in Slovakia; National Forest Centre

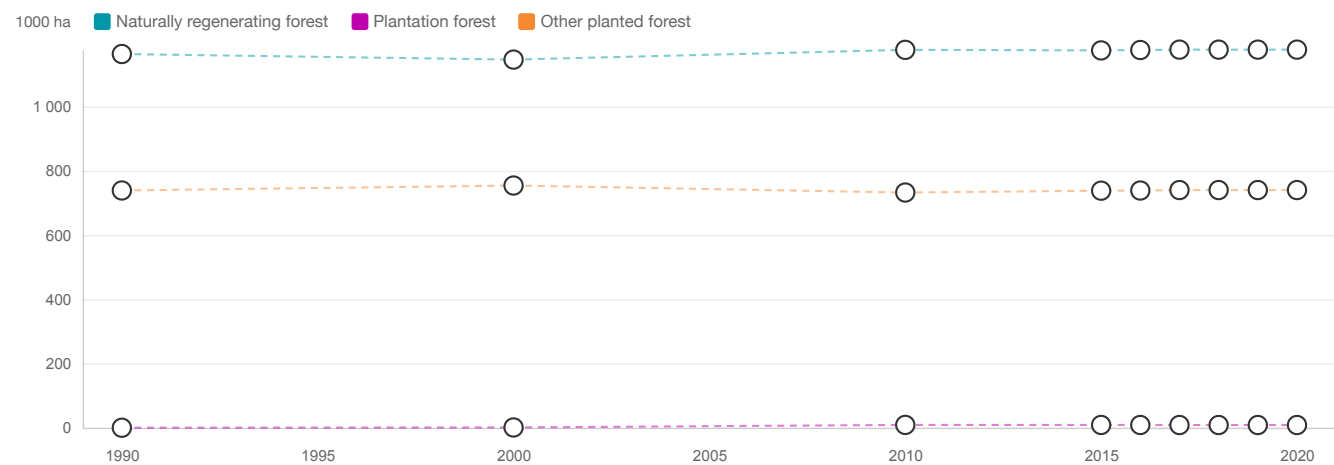
## Analysis and processing of national data

### Estimation and forecasting

The year 2017 figures were repeated for 2018-2020.

### Reclassification into FRA 2020 categories

No reclassification was needed



FRA categories	Forest area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest (a)	1 163.69	1 146.33	1 176.71	1 174.91	1 176.14	1 177.36	1 177.36	1 177.36	1 177.36
<b>Planted forest (b)</b>	<b>738.79</b>	<b>755.08</b>	<b>741.20</b>	<b>746.84</b>	<b>747.23</b>	<b>748.54</b>	<b>748.54</b>	<b>748.54</b>	<b>748.54</b>
Plantation forest	0.00	0.88	8.79	8.68	8.56	8.45	8.45	8.45	8.45
...of which introduced species	0.00	0.88	8.79	8.68	8.56	8.45	8.45	8.45	8.45
Other planted forest	738.79	754.20	732.41	738.16	738.67	740.09	740.09	740.09	740.09
<b>Total (a+b)</b>	<b>1 902.48</b>	<b>1 901.41</b>	<b>1 917.91</b>	<b>1 921.75</b>	<b>1 923.37</b>	<b>1 925.90</b>	<b>1 925.90</b>	<b>1 925.90</b>	<b>1 925.90</b>
<b>Total forest area</b>	<b>1 902.48</b>	<b>1 901.41</b>	<b>1 917.91</b>	<b>1 921.75</b>	<b>1 923.37</b>	<b>1 925.90</b>	<b>1 925.90</b>	<b>1 925.90</b>	<b>1 925.90</b>

## Comments

# 1c Primary forest and special forest categories

## National Data

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

References to sources of information	Quality	Category	Year(s)	Type of inventory
Summary information on state of forests in Slovakia 1990, 2000, 2010, 2015 and 2017; National Forest Centre	H	Temporarily unstocked and recently regenerated area	1990, 2000, 2010, 2015, 2017	Stand inventory and expert estimate
Mapping of primeval forests in Slovakia; ( <a href="http://www.pralesy.sk/lokality/">http://www.pralesy.sk/lokality/</a> )	H	Primary forest	1990, 2000, 2010, 2015, 2017	Stand inventory

### National classification and definitions

Recently regenerated:

In natural conditions of Slovakia the forest is able to reach the height 1,3 m as a rule within 5 years since its afforestation/reforestation. Concerning this consideration we have reported the half area of 1st age class (forests form 1 to 10 years old) in particular reporting years.

Primary forest:

National-level study "Mapping of primeval forests in Slovakia" considers "Primary Forest" as 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.

### Original data

FRA category		1990 (average: 1988 and 1993)	2000	2010	2015	(2017) 2020
		hectare				
Recently regenerated (before 5 and less years)	1 <sup>st</sup> age class (AC)	168 785	142 155	150 302	197 142	198 808
	Half area of the 1 <sup>st</sup> AC	84 392,5	71 077,5	75 151	98 571	99 404
Unstocked area		24 680	12 325	9 637	7 299	7 042
Total (Temporarily unstocked and/or recently regenerated)		109 073	83 403	84 788	105 870	106 446

## Analysis and processing of national data

### Estimation and forecasting

2017 data were used for forecasting of the year 2020

### Reclassification into FRA 2020 categories

"Recenty regenerated area" have been reported as a half area of the 1st age class (forests form 1 to 10 years old) in particular reporting years.

"Primary forest" have been reported as an area of forest "undisturbed by man".



FRA categories	Area (1000 ha)				
	1990	2000	2010	2015	2020
Primary forest	10.58	10.58	10.58	10.58	10.58
Temporarily unstocked and/or recently regenerated	193.47	154.48	159.94	204.44	205.85
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

An increase of area "Temporarily unstocked and / or recently regenerated" forest stands can be observed from the data presented in "Table 1e". This is related to the increasing actual extent of forest regeneration (due to higher felling possibilities) as well as to the increasing occurrence of incidental (calamitous) felling. The consequence of this state is also the continuation of the trend of unbalanced age structure of forests which causes cyclical changes in the development of the growing stock as well as felling possibilities. It is assumed that by about 2030, but depending on the extent of the incidental felling, even earlier, they (growing stock, fellings) will decrease.

Within the reporting of the "primary forests" we have accepted the outcomes of the national-level project: Mapping of primeval forests in Slovakia. Based on the project outcomes we updated data in all reporting years.

# 1d Annual forest expansion, deforestation and net change

## National Data

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

References to sources of information	Quality	Category	Year(s)	Type of inventory
Annual Statistical yearbook; <a href="http://www.justice.gov.sk/stat/roc/17/index.htm">http://www.justice.gov.sk/stat/roc/17/index.htm</a>	H	Afforestation	1990-2017	Managerial records

### National classification and definitions

National definitions of afforestation and deforestation fully comply with the FRA 2020 Terms and definitions

### Original data

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	1990-2000
Afforestation, Ha	4703	1718	5654	4393	1319	1381	1239	700	421	1047	406	2089,18
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2000-2010
Afforestation, Ha	406	583	501	85	97	55	47	89	152	67	98	198,18
Year	2010	2011	2012	2013	2014	2015						2010-2015
Afforestation, Ha	98	54	91	105	22	17						64,50
Year	2015	2016	2017									2015-2017
Afforestation, Ha	17	214	143									124,67

We do not have any relevant summary data on both "natural expansion" and "deforestation".

## Analysis and processing of national data

### Estimation and forecasting

No estimation and forecasting were applied

### Reclassification into FRA 2020 categories

No reclassification was needed

FRA categories	Area (1000 ha/year)			
	1990-2000	2000-2010	2010-2015	2015-2020
Forest expansion (a)				
...of which afforestation	2.09	0.20	0.06	0.12
...of which natural expansion				
Deforestation (b)				
Forest area net change (a-b)	-0.11	1.65	0.77	0.83

### Comments

There was adopted governmental programme for afforestation in 1994 but it was abolished in 1999. After entry Slovakia into EU the afforestation was realized within respective measures of the Plan of Rural Development. However afforestation in Slovakia is not priority because of relatively high forest percentage. Therefore there is obvious continuous decrease of this activity. In spite of mentioned facts the afforestation in 2015-2020 has doubled as compared to period 2010-2015, thanks to relatively large afforested area in 2016 and 2017.

# 1e Annual reforestation

## National Data

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

References to sources of information	Quality	Category	Year(s)	Type of inventory
Forest Management Records; annually elaborated by National Forest Centre	H	Reforestation	1990-2017	Managerial records

### National classification and definitions

National definition of forest regeneration (reforestation) in temporarily removed (regenerated) forest stands includes both artificial regeneration by planting or seeding and natural regeneration.

### Original data

													<u>Average:</u>
year		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	<u>1990-2000</u>
Regeneration	ha	18 964	17 205	13 698	13 196	13 002	13 019	13 615	13 239	13 765	13 656	15 057	14 401,45
of that: artificial	ha	15 500	15 698	12 485	12 059	11 823	11 860	12 190	11 562	11 833	11 293	12 923	12 656,91
of that: natural	ha	3 464	1 507	1 213	1 137	1 179	1 159	1 425	1 677	1 932	2 363	2 134	1 744,545
year		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010		<u>2001-2010</u>
Regeneration	ha	15 077	14 324	14 039	13 960	13 504	15 561	13 698	15 402	15 700	13980		14 524,5
of that: artificial	ha	12 053	10 681	9 625	8 866	8 922	9 256	9 027	9 985	9 143	8 520		9 607,8
of that: natural	ha	3 024	3 643	4 414	5 094	4 582	6 305	4 671	5 417	6 557	5 460		4 916,7
year		2011	2012	2013	2014	2015							<u>2011-2015</u>
Regeneration	ha	18 055	19 011	17 205	15 934	15 901							17 221,2
of that: artificial	ha	10 923	11 964	10 678	10 751	10 257							10 914,6
of that: natural	ha	7 132	7 047	6 527	5 183	5 644							6306,6
year		2016	2017										<u>2016-2017</u>
Regeneration	ha	18 060	16 999										17 529,5
of that: artificial	ha	10 927	10 003										10 465
of that: natural	ha	7 133	6 996										7 064,5

## Analysis and processing of national data

### Estimation and forecasting

No estimation and forecasting

### Reclassification into FRA 2020 categories

Above mentioned national definition of reforestation was applied in reporting of reforestation for FRA 2020

FRA categories	Area (1000 ha/year)			
	1990-2000	2000-2010	2010-2015	2015-2020
Reforestation	12.66	9.61	10.91	10.47

## Comments

Reforestation has been systematically increasing since 1990 mainly as a consequence of current age composition of forests (with growing representation of older mature forests) which has gradually led to higher regeneration felling and naturally also to higher reforestation. Another reason of increasing reforestation is high volume of incidental felling, mainly after 2004. The share of natural regeneration has also been continuously increasing: from 10% in 1995 up to 40% in 2017. More than 16,700 ha of forest were regenerated in 2017. Whenever possible, natural regeneration took priority and accounted for 40.1% of the regenerated area. Natural regeneration needs to be directed towards future targeted tree species composition. Attention needs to be paid to achieve site suitable tree species composition of young forests and reduce the negative impact of damaging agents, mainly game.

# 1f Other land with tree cover

## National Data

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

References to sources of information	Quality	Category	Year(s)	Type of inventory
National Forest Monitoring and Inventory 2005-2006; National Forest Centre	H	"Other land with tree cover"	2010	NFI
National Forest Monitoring and Inventory 2015-2016; National Forest Centre	H	"Other land with tree cover"	2015,2020	NFI
Summary information on state of forests in Slovakia 1990, 2000; National Forest Centre	L	"Other land with tree cover"	1990, 2000	Stand inventory (partial survey)

### National classification and definitions

Only forest stands occurring on forest lands are considered as FOREST in accordance with national Act on Forests. But there are some plots with occurrence of forest tree species on agricultural and other lands (corresponding to FRA forest definition) in Slovakia (so called "white plots"). Because of this inconsistency we have classified them as Other land with tree cover.

### Original data

Area of forests on agricultural and other lands: 288 ± 39 ths. ha was found out through the National Forest Inventory and Monitoring (NFIM) 2015-2016.

## Analysis and processing of national data

### Estimation and forecasting

Value for 2020 were used from the recent available year (NFIM 2015-2016)

### Reclassification into FRA 2020 categories

Due to above mentioned contradiction between national forestry legislation and FRA forest definition, we have classified the stands of forest tree species (corresponding to forest definition according to FRA) occurring on agricultural and other lands as Other land with tree cover.

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)					
Agroforestry (c)	0.00	0.00	0.00	0.00	0.00
Trees in urban settings (d)					
Other (specify in comments) (e)	26.00	30.00	275.00	288.00	288.00
<b>Total (a+b+c+d+e)</b>	<b>26.00</b>	<b>30.00</b>	<b>275.00</b>	<b>288.00</b>	<b>288.00</b>
Other land area	<b>2 886.30</b>	<b>2 886.60</b>	<b>2 869.10</b>	<b>2 865.43</b>	<b>2 861.69</b>

## Comments

Only forest stands occurring on forest lands are considered as FOREST in accordance with national Act on Forests. But in Slovakia there are some plots with occurrence of forest tree species on agricultural and other lands corresponding to FRA forest definition (so called "white plots"). Area of forests on agricultural and other lands (white plots) was  $288 \pm 39$  ths. ha according to findings of the National Forest Inventory and Monitoring (NFIM) 2015-2016.

Due to above mentioned contradiction between national forestry legislation and FRA forest definition, we have classified the stands of forest tree species (corresponding to forest definition according to FRA) occurring on agricultural and other lands as "Other land with tree cover", despite we acknowledge a partial discrepancy with particular FAO FRA definition.

## 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	Quality	Category	Year(s)	Type of inventory
Summary information on state of forests in Slovakia, National Forest Centre	H	Growing stock	1990-2017 (2020)	Stand inventory

**National classification and definitions**

The growing stock is defined as the volume of all living trees with diameter at breast height more than 7 cm under bark. It includes the stem from stump up to the top with diameter of 7 cm.

**Original data**

Tree species	2000	2005	2010	2015	2016	2020 (2017)
	Total growing stock (million m³ under bark)					
Total	410,03	438,91	461,95	478,12	480,65	480,25

#### Analysis and processing of national data

**Estimation and forecasting**

The year 2017 figures were repeated for 2018-2020.

**Reclassification into FRA 2020 categories**

The growing stock was converted into the over bark volume by the following empirical conversion factors derived from the data obtained within the National Forest Inventory and Monitoring (2015-2016): Norway spruce 1,090438; European beech 1,08463; oaks 1,259711; pines 1,103717; European silver fir 1,102278; European hornbeam 1,077637; European larch 1,285266; maples 1,091881; ashes 1,240556; Black locust 1,302583; all conifers 1,102727; all broadleaves 1,129242; average for all tree species 1,119555.

Also previous reporting years were recalculated according to listed new conversion factors.



FRA categories	Growing stock m³/ha (over bark)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest	207.07	240.27	263.71	273.36	274.52	274.00	274.00	274.00	274.00
Planted forest	217.44	243.18	279.10	286.69	288.05	287.32	287.32	287.32	287.32
...of which plantation forest		113.64	163.82	179.72	189.25	196.45	196.45	196.45	196.45
...of which other planted forest	217.44	243.33	280.48	287.95	289.20	288.36	288.36	288.36	288.36
Forest	211.09	241.43	269.66	278.54	279.77	279.18	279.18	279.18	279.18
Other wooded land									

FRA categories	Total growing stock (million m³ over bark)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest	240.96	275.43	310.31	321.17	322.87	322.60	322.60	322.60	322.60
Planted forest	160.64	183.62	206.87	214.11	215.24	215.07	215.07	215.07	215.07
...of which plantation forest	0.00	0.10	1.44	1.56	1.62	1.66	1.66	1.66	1.66
...of which other planted forest	160.64	183.52	205.43	212.55	213.62	213.41	213.41	213.41	213.41
Forest	401.60	459.05	517.18	535.28	538.11	537.67	537.67	537.67	537.67
Other wooded land									

## Comments

The total growing stock in Slovakia is increasing. It reached 537.67 million m3 in 2017, an increase of 33.9% (136 million m3) on 1990 figures. The increase in the total growing stock has also been confirmed by the results of the 2nd cycle of the National Forest Inventory and Monitoring (NFIM SR) 2015-2016 which shows an increase of 4,4% in a 10-year period (as compared to 2005-2006). It can be said that, at present, due to the actual age composition of the forests in Slovakia, the historically highest growing stock is at least for the last century. However, the volume of present growing stock is already at the culmination point. It is expected that in the coming years and decades the growing stock will decrease as a result of the gradual change in age composition of forests in Slovakia.

There are the dwarf pine stands included in category of "other wooded land" in Slovakia that do not reach the masurement thresholds and so they do not have specified any growing stock

## 2b Growing stock composition

### National Data

Data sources + type of data source eg NFI, etc

References to sources of information	Quality	Category	Year(s)	Type of inventory
Summary information on state of forests in Slovakia, National Forest Centre	H	Growing stock composition	1990-2020 (2017)	Stand inventory

National classification and definitions

The growing stock is defined as the volume of all living trees with diameter at breast height more than 7 cm under bark. It includes the stem from stump up to the top with diameter of 7 cm.

Original data

Tree species	2000	2005	2010	2015	2016	2020 (2017)
	Total growing stock (million m³ under bark)					
Norway spruce	141,71	147,6	149,13	134,73	134,05	131,83
European beech	126,69	140,52	151,96	166,82	168,55	169,23
Sessile oak + pedunculate oak + Turkey Oak	47,2	49,06	52,2	56,65	58,90	57,27
Scots pine+ Austrian black pine	26,16	27,99	29,55	31,89	31,87	31,96
European silver fir	24,79	24,16	24,81	24,99	25,28	25,32
European hornbeam	16,47	19,69	20,79	23,4	23,59	23,59
European larch	6,38	7,56	8,62	10,54	10,70	10,84
Norvay maple + sycamore maple + field maple	4,55	5,41	6,44	8,27	8,54	8,75
Common ash + narrow-leaved ash	4,51	5,24	6,12	7,5	7,64	7,75
Black locust	3,49	3,26	3,23	3,02	3,08	3,09
Other tree species	8,08	8,42	9,1	10,31	8,45	10,61

Introduced tree species	2000	2010	2015	2020 (2017)
	Total growing stock (million m³ under bark)			
Robinia pseudoaccacia	3,490	3,232	3,020	3,086
Pinus nigra	1,527	1,806	2,038	2,077
Populus x euroamericana (I214, Robusta)	0,096	1,438	1,577	1,659
Quercus rubra	0,117	0,245	0,375	0,402
Pseudotsuga menziesii	0,129	0,225	0,287	0,306
Juglans nigra	0,028	0,045	0,064	0,069
Castanea sativa	0,026	0,035	0,033	0,034

### Analysis and processing of national data

## Estimation and forecasting

Values for 2020 were used from the recent available year 2017

### Reclassification into FRA 2020 categories

The growing stock was converted into the over bark volume by following empirical conversion factors derived from the data obtained within the National Forest Inventory and Monitoring (2015-2016): Norway spruce 1,090438; European beech 1,08463; oaks 1,259711; pines 1,103717; European silver fir 1,102278; European hornbeam 1,077637; European larch 1,285266; maples 1,091881; ashes 1,240556; Black locust 1,302583.

In introduced tree species following conversion factors were used: Black locust (*Robinia pseudoacacia*) 1,302583, *Pinus nigra* 1,103717, *Populus l214* and *Robusta* 1,129242, *Quercus rubra*, *Juglans nigra* and *Castanea sativa* 1,259711 (oaks), *Psudotsuga menziesii* 1,103717 (pines).

Also previous reporting years were recalculated according to listed new conversion factors.

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 sylvatica	European beech	112.90	137.41	164.82	180.94	183.55
#2 Ranked in terms of volume	Picea abies	Norway spruce	135.50	154.53	162.62	146.91	143.75
#3 Ranked in terms of volume	Quercus petrea+robur+cerris	Sessile oak + pedunculate oak + Turkey Oak	57.70	59.46	65.76	71.36	72.14
#4 Ranked in terms of volume	Pinus sylvestris + nigra	Scots pine + Austrian black pine	25.40	28.87	32.61	35.20	35.27
#5 Ranked in terms of volume	Abies alba	European silver fir	33.60	27.33	27.35	27.55	27.91
#6 Ranked in terms of volume	Carpinus betulus	European hornbeam	12.50	17.75	22.40	25.22	25.42
#7 Ranked in terms of volume	Larix decidua	European larch	5.00	8.20	11.08	13.55	13.93
#8 Ranked in terms of volume	Fraxinus excelsior + angustifolia	Common ash + narrow-leaved ash	3.10	5.59	7.59	9.30	9.62
#9 Ranked in terms of volume	Acer platanoides + pseudoplatanus + campestre	Norway maple + sycamore maple +field maple	3.60	4.97	7.03	9.03	9.55
#10 Ranked in terms of volume							
Remaining native tree species			8.20	8.24	7.44	7.35	7.36
Total volume of native tree species			397.50	452.35	508.70	526.41	528.50
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							
#1 Ranked in terms of volume	Robinia pseudoacacia	Black locust	4.10	4.55	4.21	3.93	4.03
#2 Ranked in terms of volume	Pinus nigra	Austrian black pine		1.68	1.99	2.25	2.29
#3 Ranked in terms of volume	Populus x Euroamericana (I214, Robusta)	Poplar (I214, Robusta)		0.11	1.62	1.78	1.87
#4 Ranked in terms of volume	Quercus rubra	Northern red oak		0.15	0.31	0.47	0.51
#5 Ranked in terms of volume	Pseudotsuga menziesii	Douglas fir		0.14	0.25	0.32	0.34
Remaining introduced tree species				0.07	0.10	0.12	0.13
Total volume of introduced tree species			4.10	6.70	8.48	8.87	9.17
Total growing stock			401.60	459.05	517.18	535.28	537.67

## Comments

The growing stock of broadleaved species is increasing. It reached 280 million m<sup>3</sup> in 2017, an increase of 12,2% (30 million m<sup>3</sup>) on 2010 figures. Conversely, the stock of coniferous species has been falling since 2010 as a result of frequent natural disturbances in coniferous forests (spruce in particular). The coniferous stock fell by 5.7% (30 million m<sup>3</sup>) since 2010.

## 2c Biomass stock

### National Data

Data sources + type of data source eg NFI, etc

References to sources of information	Quality	Category	Year(s)	Type of inventory
Summary information on state of forests in Slovakia, National Forest Centre	H	Above-ground biomass, Below-ground biomass	1990-2020 (2017)	Stand inventory
National Inventory and Monitoring of Forests of the SR, 2015-2016	H	Deadwood	1990-2020 (2017)	NFI

National classification and definitions

Calculation of the Above-ground biomass (AGB) and Below-ground biomass (BGB):

The basic input for calculation of AGB is volume of growing stock, defined as tree stem and branch volume under bark with a minimum diameter threshold of 7 cm. The calculation is performed at the level of the individual forest stands and 20 tree species (including remaining 2 groups: other conifers and other broadleaves) using the available stand parameters, yield tables and models. The total volume is based on the average growing stocks in the different age classes for individual tree species as the sum of the volumes in the different age classes. For individual tree species are specified "biomass expansion factors" for conversion to the total tree volume, "wood density" at dry weight, "ratio for calculation of below-ground biomass" (0,2 for all tree species) and "carbon fraction" (0,5 for coniferous and 0,49 for broadleaved tree species).

	BEF (biomass expansion factor)	Wood density	Ratio BGB (below-ground biomass)	Carbon fraction
Spruce	1,123939324	0,40	0,2	0,5
Fir	1,129984018	0,40	0,2	0,5
Pine	1,356368735	0,50	0,2	0,5
Larch	1,356368735	0,60	0,2	0,5
Other coniferous	1,356368735	0,40	0,2	0,5
Oak	1,360569938	0,65	0,2	0,49
Beech	1,160996398	0,68	0,2	0,49
Hornbeam	1,160996398	0,80	0,2	0,49
Maple	1,160996398	0,63	0,2	0,49
Ash	1,160996398	0,63	0,2	0,49
Elm	1,160996398	0,65	0,2	0,49
Turkey oak	1,360569938	0,70	0,2	0,49
Robinia	1,160996398	0,80	0,2	0,49
Birch	1,160996398	0,60	0,2	0,49
Alder	1,160996398	0,60	0,2	0,49
Linden	1,160996398	0,45	0,2	0,49
Breeding poplars	1,28169185	0,40	0,2	0,49
Poplar	1,28169185	0,35	0,2	0,49
Willow	1,28169185	0,60	0,2	0,49

Other broadleaves	1,160996398	0,60	0,2	0,49
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Original data

				1990	2000	2010	2015	2016	2017
Above-ground biomass (AGB) million t dm				226,512	270,203	309,165	326,978	329,120	329,540
Below-ground biomass (BGB) million t dm				45,302	54,041	61,833	65,396	65,824	65,908
Dead wood million t dm				24,400	28,800	32,400	33,400	33,600	33,600
	1990	2000	2010	2015	2016	2017			
AGB t dm/ha	125,20	140,02	155,99	164,58	165,53	165,47			
BGB t dm/ha	25,04	28,00	31,20	32,92	33,11	33,09			

Analysis and processing of national data

Estimation and forecasting

Values for 2018-2020 were used from the recent available year 2017

Reclassification into FRA 2020 categories

No reclassification was needed

FRA categories	Forest biomass (tonnes/ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Above-ground biomass	119.06	142.11	161.20	170.15	171.12	171.11	171.11	171.11	171.11
Below-ground biomass	23.81	28.42	32.24	34.03	34.22	34.22	34.22	34.22	34.22
Dead wood	12.83	15.15	16.89	17.38	17.47	17.45	17.45	17.45	17.45

Comments

The biomass stocks in forest ecosystems, above-ground and below-ground biomass and deadwood are increasing, which is related also to the increase of total timber growing stock in forests.



## 2d Carbon stock

### National Data

Data sources + type of data source eg NFI, etc

References to sources of information	Quality	Category	Year(s)	Type of inventory	Additional comments
SLOVAK REPUBLIC. National Inventory Report 2017. Submission under the UNFCCC and under the Kyoto Protocol. Bratislava: Slovak Hydrometeorological Institute & Ministry of Environment of the Slovak Republic. Available at: <a href="https://unfccc.int/process/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/submissions/national-inventory-submissions-2017">https://unfccc.int/process/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/submissions/national-inventory-submissions-2017</a>	H	Carbon stock in above-ground living biomass	1990, 2000, 2005, 2010, 2015, 2020	Stand inventory	
	L	Carbon stock in below-ground living biomass		Other	Ratio 0,2 for BGB
	L	Carbon stock in deadwood		Mixed	Expert estimation compared with NFIM
	L	Carbon stock in litter		Other	12% on AGB
	L	Carbon stock in soil		Other	Expert estimation. There is not sufficiency of empirical data for more accurate tracking on soil carbon.
	M	HWP	1990, 2000, 2005, 2010, 2015	Other	IPCC 2013 Revised Supplementary Methods ang Good Practice Guidance Arising from the Kyoto Protocol. Chapter 2: Methods for estimation, measurement, monitoring and reporting, pp. 109-134.

National classification and definitions

Category	Comments related to data, definitions, conversion factors used, etc.	
Carbon stock in above-ground living biomass	The carbon stock was calculated from volume of above-ground living biomass multiplied by "carbon fraction" of 0,5 in coniferous and 0,49 in broadleaved tree species.	
Carbon stock in below-ground living biomass	The carbon stocks in biomass of live roots except fine roots of less than 2 mm diameter (these often cannot be distinguished empirically from soil organic matter or litter) is determined by means of expert estimate based on the volume of tree above-ground biomass over bark in proportion of 20% for all tree species.	
Carbon stock in deadwood	The carbon stock in deadwood biomass was determined on the available results of scientific studies as a proportion in the growing stock of coniferous tree species 15% and broadleaved tree species 10%. These expert estimates were compared and modified with data collected within both cycles of National Forest Inventory and Monitoring 2005-2006 and 2015-2016.	
Carbon stock in litter	The carbon stock in litter representing small branches, foliage, seeds lying in various states of decomposition above the mineral or organic soil is estimated in amount of 12 % on above-ground biomass.	
Carbon stock in soil	Soil depth: 20 cm NFIM network, 80-100 cm ICP Forests plots	
Biomass/carbon conversion factor used	0,5 for conifers and 0,49 for broadleaved tree species; these values are within the range provided in the guidelines (2006 IPCC GL vol. 4, chap 4, tab. 4.3).	

Original data

t C AGB	1990	2000	2010	2015	2016	2017
Spruce	28624628	31855248	33521812	30286153	30133719	29634078
Fir	5034394	5602583	5606717	5646540	5712335	5722499
Pine	7971361	8871021	10018881	10811985	10806454	10837741
Larch	2331324	2594441	3506289	4287964	4355656	4411699

Other coniferous	12398	13797	16702	18612	18741	17783
Oak	13518701	16812866	18277987	19840725	19940765	20016520
Beech	39407625	49010267	58785468	64535180	65202093	65467290
Hornbeam	6028275	7497214	9461253	10649170	10735197	10738030
Maple	1309829	1629001	2307250	2963521	3059824	3135217
Ash	1299291	1615896	2194621	2689228	2738848	2776906
Elm	48474	60286	54210	54941	54347	54918
Turkey oak	3153829	3922337	4678307	5071644	5078727	5172778
Robinia	1277073	1588263	1470962	1374600	1393052	1404292
Birch	539060	670416	782708	910122	928904	935743
Alder	405063	503767	634961	700327	709917	715209
Linden	204028	253745	385213	486666	496125	505423
Breeding poplars	405387	504170	378700	396129	402325	416738
Poplar	169710	211064	246941	250700	251958	252235
Willow	60400	75118	77605	81473	80990	81676
Other broadleaves	69656	86629	137518	184608	189339	190392
Total	111870507	133378129	152544107	161240289	162289314	162487167
t C BGB	1990	2000	2010	2015	2016	2017
Spruce	5724926	6371050	6704362	6057231	6026744	5926816
Fir	1006879	1120517	1121343	1129308	1142467	1144500
Pine	1594272	1774204	2003776	2162397	2161291	2167548
Larch	466265	518888	701258	857593	871131	882340
Other coniferous	2480	2759	3340	3722	3748	3557
Oak	2703740	3362573	3655597	3968145	3988153	4003304
Beech	7881525	9802053	11757094	12907036	13040419	13093458
Hornbeam	1205655	1499443	1892251	2129834	2147039	2147606
Maple	261966	325800	461450	592704	611965	627043
Ash	259858	323179	438924	537846	547770	555381
Elm	9695	12057	10842	10988	10869	10984
Turkey oak	630766	784467	935661	1014329	1015745	1034556
Robinia	255415	317653	294192	274920	278610	280858

Birch	107812	134083	156542	182024	185781	187149
Alder	81013	100753	126992	140065	141983	143042
Linden	40806	50749	77043	97333	99225	101085
Breeding poplars	81077	100834	75740	79226	80465	83348
Poplar	33942	42213	49388	50140	50392	50447
Willow	12080	15024	15521	16295	16198	16335
Other broadleaves	13931	17326	27504	36922	37868	38078
Total	22374101	26675626	30508821	32248058	32457863	32497433

	1990	2000	2010	2015	2016	2017
Carbon in above ground biomass (million t C)	111,871	133,378	152,544	161,240	162,289	162,487
Carbon in bellow ground biomass (million t C)	22,374	26,676	30,509	32,248	32,458	32,497
Dead wood (million t C)	12,200	14,400	16,200	16,700	16,800	16,800
Litter (million t C)	16,700	19,500	22,400	22,500	22,600	22,600
Soil (million t C)	270,500	270,500	270,500	270,500	270,500	270,500

Analysis and processing of national data

Estimation and forecasting

Values for 2018-2020 were used from the recent available year 2017

Reclassification into FRA 2020 categories

No reclassification was needed

FRA categories	Forest carbon (tonnes/ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Carbon in above-ground biomass	58.80	70.15	79.54	83.90	84.38	84.37	84.37	84.37	84.37
Carbon in below-ground biomass	11.76	14.03	15.91	16.78	16.88	16.87	16.87	16.87	16.87
Carbon in dead wood	6.41	7.57	8.45	8.69	8.73	8.72	8.72	8.72	8.72
Carbon in litter	8.78	10.26	11.68	11.71	11.75	11.73	11.73	11.73	11.73
Soil carbon	142.18	142.26	141.04	140.76	140.64	140.45	140.45	140.45	140.45

Soil depth (cm) used for soil carbon estimates	100.00
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Comments

The carbon stocks in forest ecosystems, above-ground and below-ground biomass, deadwood and litter are increasing (except soil carbon), which is related also to the increase of total timber growing stock in forests. There is not sufficiency of empirical data for more accurate tracking and subsequent reporting on soil carbon in Slovakia.

### 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	Quality	Category	Year(s)	Type of inventory
Summary information on state of forests in Slovakia; National Forest Centre; FAO Forest Resources Assessment (FRA) 2010, 2015	H	Designated management objectives	1990, 2000, 2010, 2015, 2020	Stand inventory

National classification and definitions

National classification and definitions related to the "Designated management objectives" result from particular appointments of the Forest act as follows:

- Forest functions are benefits, effects and impacts of forests as a component of the natural environment and the object of economic exploitation; they are divided on production functions and non-production functions.
- Non-production functions of forests are ecological functions, aimed mainly at soil, water and climate protection and social functions, which are in particular health, cultural, educational, recreational and nature conservation.
- Production functions of forests are functions resulting in benefits from forests of generally material nature.

From the viewpoint of the utilization of forest functions the forests are divided into following categories and subcategories:

- Protection forests are forests with prevailing ecological functions; their functional objectives result from natural conditions. Management in these forests must be aimed at fulfilment of the purpose for which they were declared. They can be declared within these subcategories: a) forests in extraordinarily unfavourable sites, b) alpine forests below the upper limit of tree vegetation, c) forests above the upper limit of tree vegetation with predominant presence of dwarf pine, d) other forests with a predominant soil protection function.
- Special purpose forests are forests whose purpose is meeting the specific needs of the society, legal persons or physical persons and whose provision will significantly change the way in which they are managed (the special management regime) compared to standard forest management. They can be declared within these subcategories: a) forests in protective zones of water resources, b) spa forests, c) recreational forests, d) hunting forests, e) protected forests, f) forests for the conservation of genetic sources, g) forests intended for forestry research and education, h) military forests.
- Production (commercial) forests are forests which are not protection forests or special purpose forests and whose purpose is the production of wood and other forest products while ensuring non-production functions of forests. Production forests are also energy forest stands and forest plantations.

The categorization of forest functions forms the basis of a differentiated forest management, which means a purposeful management system in forests, taking into account the diverse natural, vegetation, economic, and social conditions and requirements applied in the preparation and implementation of the forest management plan.

The system of so-called "functional typology." in Slovakia was established by prof. Papánek (1978). Functional type is a basic unit of forest stand typification based on its predominant functions. Individual functional types are integrated into three basic functions (see below table). In practical construction of functional types (FTs) there is applied a combination of maximally two partial functions (primary and secondary), and so various combinations can be created; these combinations are the most used:

Production functions	Ecological functions	Social functions
Production	<i>Erosion-control, Deflation-control, Avalanche control, Water-protection, Water-management, Streambank-protection</i>	<i>Recreational, Spa-therapeutic, Nature-conservation, Education and research, Game-management, Air-pollution control, Gene-resources conservation</i>

This approach is not perfect as usually more than two functions overlap in an each forest stand. More detailed description and characteristics of national functional types that were used (their areas and combinations) also in quantification of Tables 3a1 and 3a2 are listed in the Comments to this Table.

Original data

Forest category / primary forest function	Functional types	Forest stand area (1000 ha)			
		2000*)	2010	2015	2017 (2020)
Commercial / production function	Production	240,09	177,18	412,94	440,16
	Production and Erosion-control	583,05	719,78	537,23	537,52

	Production and Water-management	106,98	155,70	206,80	215,06
	Production and Deflation-control	8,21	10,32	10,29	10,39
	Production and Recreational	2,62	0,04	0,05	0,05
	Production and Nature-protection	45,34	109,67	194,83	199,72
	Production and Pollution.control	280,45	197,43	57,41	0
Protective / protective functions	Erosion-control	223,00	253,12	259,95	261,52
	Water-management	71,50	73,71	70,89	69,47
	Avalanche-control	4,75	1,46	1,44	2,58
	Bank-protection	1,82	0,46	0,45	0,54
	Deflation-control	5,11	2,32	1,81	1,77
Special purpose / social functions	Water-protection	13,34	11,12	14,79	15,14
	Recreational	29,36	25,04	28,02	22,79
	Spa-therapeutic	3,17	2,41	2,21	2,25
	Nature-protection	50,86	30,85	41,89	44,94
	Pollution-control	144,82	67,40	11,34	0
	Game-management	23,40	18,17	23,60	24,42
	Educational-research	14,11	45,71	21,73	20,53
	Protection of gene sources-protective	0	6,15	19,11	19,84
	Protection of state	0	30,79	47,98	57,61

<sup>y)</sup> Only forest in competence of Ministry Agriculture and Rural Development of the SR – without forests under Ministry of Defense of the SR

Original data related to "Protected areas"

Category	Year	MCPFE Class 1.1	MCPFE Class 1.2	MCPFE Class 1.3	MCPFE Class 2	
		1000 ha				
Forest area within protected areas	2020 (2017)	<b>68,00</b>	0,00	<b>504,00</b>	267,80	
	2015	<b>68,00</b>	0,00	<b>486,00</b>	285,80	
	2010	<b>60,00</b>	0,00	<b>477,00</b>	277,80	
	2005	<b>60,00</b>	0,00	<b>476,00</b>	277,80	
	2000	<b>60,00</b>	0,00	<b>0,00</b>	615,00	
	1990	<b>50,00</b>	0,00	<b>0,00</b>	582,00	

In the MCPFE classes are not included protected areas in the 1st (basic) level of protection, namely Special Protection Areas outside Sites of Community Importance and national protection areas network.

In fact here are 1.22 mil. ha of forests in current systems of protected areas (national and European) in Slovakia, which represents 62.8% of the total area of forest stands. The national system of protected areas covers approximately 840 thousand hectares of forest area (43.1%), while the average of FOREST EUROPE member countries is 19.4% (FOREST EUROPE 2015a). The European system NATURA 2000 occupies 29.7% of the territory of Slovakia, while the EU average is 18.15%. From the above comparison it is clear that the area of forested protected territories in Slovakia is highly above average.

## Analysis and processing of national data

### Estimation and forecasting

Values for 2020 were used from the recent available year 2017.

### Reclassification into FRA 2020 categories

Classification of forests according to their **primary designated management objectives** (Table 3a1) was done according to their national primary functions.

- Production = Area of forest stands intended solely for the production function.
- Protection of soil and water = Area of forest stands which main function is „erosion-control“, „water-management“, „avalanche-control“, „bank-protection“, „deflation-control“, „water-protection“.
- Conservation of biodiversity = Area of forest stands classified in functional category "Nature-protection". There is a difference between the data according to functional types and real area of protected territories in Slovakia.
- Social services = Area of forest stands which main function is „recreational“, „spa-therapeutic“, „pollution-control“, „game-management“, „educational-research“, "Gene resources-protection" and "State-defense function"
- Multiple purpose = Area of forest stands which main function is production but they have also another associated function(s).

Total area with **designated management objective** (Table 3a2) was calculated as follows:

- Production = Area of "Forests available for wood supply" (FAWS)
- Protection of soil and water (PSW) = Area of "Primary designated management" for PSW + Area of national functional types: "Production and Erosion-control", "Production and Water-management" and "Production and Deflation-control". Expert estimate for 1990.
- Conservation of biodiversity = "Forest area within protected areas" by FAO definition (Table 3b).
- Social services = Area of "Primay designated management" for Social services + Area of national functional types: "Production and Recreational" and "Production and Pollution.control". Expert estimate for 1990.

Primary designated management objective

FRA 2020 categories	Forest area (1000 ha)				
	1990	2000	2010	2015	2020
Production (a)	655.00	280.00	177.18	412.94	440.16
Protection of soil and water (b)	245.00	327.00	342.19	349.33	351.03
Conservation of biodiversity (c)	50.00	60.00	30.85	41.89	44.94
Social Services (d)	212.00	313.00	195.67	153.98	162.59
Multiple use (e)	740.48	921.41	1 172.02	963.61	927.18
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	1 902.48	1 901.41	1 917.91	1 921.75	1 925.90

Total area with designated management objective

FRA 2020 categories	Forest area (1000 ha)				
	1990	2000	2010	2015	2020
Production	1 772.00	1 767.00	1 778.51	1 794.59	1 796.16
Protection of soil and water	1 000.00	1 025.24	1 227.99	1 103.65	1 114.00
Conservation of biodiversity	632.00	675.00	814.80	839.80	839.80
Social Services	600.00	596.07	393.14	211.44	162.64
Other (specify in comments)	0.00	0.00	0.00	0.00	0.00

Comments

Based on their principal functions, Slovak forests are divided into three main categories: production, protection and special-purpose forests.

Production forests are primarily managed for the production of high grade timber whilst still continuing to provide other important ecological and societal functions. Integrated forest management practices are implemented to support production objectives.

Timber production in these forests is limited by actual natural conditions. Production forests are the most common category of forest. They cover 1,402,900 ha, or 72.1% of the total forest area

Forests with primarily protection functions are designated as protection forests. These forests protect soils, water resources and infrastructure. They are found on sites with limited suitability for timber production. The majority of them protect soils on exposed/extreme sites (53%), or are situated beneath the tree line (15%). Due to extreme site conditions, 32% of these forests are not suitable for timber production. Their area in 2017 covered 335,900 ha, or 17.25% of the total forest area.

Social and cultural functions are of primary importance in forests which, due to their specific societal or group benefits, have been designated as special-purpose forests. These forests are under special (functionally differentiated) management with purposeful enhancement of one or more selected functions such as water purification, recreation, nature conservation, spa/wellness, education/research, game husbandry, etc. unless these functions can be supported by standard



management practices. At present, these forests cover 207,500 ha, or 10.67% of the total forest area.

More detailed description and characteristics of national functional types. They are detected or updated on the forest stand level always during elaboration of a new forest management plan (as a rule every ten years).

National class	Description and characteristics
Production	In reality, only wood production is considered. It does not include non-wood forest products.
Erosion-control	Protection of soil against destruction by overland flow causing denudation or rill erosion. It is considered primary in protective forests, in other forests the consideration depends on the slope gradient, soil depth and content of coarse particles.
Water-management	The improvement of water regime, water infiltration and recharge of aquifers. It is considered in higher altitudes and/or on limestones. The approach used in methodology is quite obsolete.
Avalanche-control	Prevention of avalanches. Quite underestimated function, considered only near the tree line, not linked with infrastructure protection
Stream-bank protection	Protection of water-stream banks and water bodies against water erosion caused by streams/waves.
Deflation-control	Protection against wind erosion, capturing the soil particles drifted from open areas. Considered mainly in the case of shelter belts or in some forests on aeolian sands.
Water-protection	Protection of water quality. Only forests in protection zones of water resources and of spa springs or springs of mineral table waters are considered.
Recreation	Forests important for recreation. Only so-called "suburban recreational forests" are considered. Forests around mountain tourists resorts are considered rarely.
Spa-therapeutic	Forests in the surroundings of spas and medical facilities. Their management aims at the creation of hygienically favourable and esthetically forceful nature environment meeting the needs of persons under medical care or receiving spa treatment.
Nature-conservation	In this report, all forests in preprotected areas were included (national network as well as Natura 2000).
Pollution-control	A controversial function, in the past it reflected more the <b>damage</b> of forest stands by air pollution than buffering function. Therefore, it was excluded from the list of functions and now it is not reported.
Game-management	Only forests primarily designated for breeding of game are considered, especially those in game enclosures.
Education-research	Forest of forestry schools and forests of some permanent research facilities.

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	Quality	Category	Year(s)	Type of inventory	Additional comments
Green Reports (2011, 2016, 2018), based on GIS layers	High	MCPFE classes: 1.1, 1.3, 2	2010, 2015, 2020 (2017)	Mixed	Layer of forest stands + layers of protected areas
GIS layers + expert estimates	Medium		2005		Layer of forest stands + layers of protected areas
GIS layers + expert estimate	Low		1990, 2000		GIS layers of protected areas were available just partially
Summary information on state of forests, National Forest centre, Zvolen	H	Forest area with long-term forest management plan	1990-2020	-	-

National classification and definitions

Values reported for FRA are equal to the sums of values related to the MCPFE Classes 1.1-1.3 that are reported within SoEF questionnaire for qualitative indicators

Original data

Category	Year	MCPFE Class 1.1	MCPFE Class 1.2	MCPFE Class 1.3	MCPFE Class 2	
		1000 ha				
Forest area within protected areas	2020 (2017)	68,00	0,00	504,00	267,80	
	2015	68,00	0,00	486,00	285,80	
	2010	60,00	0,00	477,00	277,80	
	2005	60,00	0,00	476,00	277,80	
	2000	60,00	0,00	0,00	615,00	
	1990	50,00	0,00	0,00	582,00	

Analysis and processing of national data

Estimation and forecasting

Values for 2018-2020 were used from the recent available year 2017

Reclassification into FRA 2020 categories

Values reported for FRA are equal to the sums of values related to the MCPFE Classes 1.1-1.3 that are reported within SoEF questionnaire for qualitative indicators

FRA categories	Area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Forest area within protected areas	50.00	60.00	537.00	554.00	554.00	572.00	572.00	572.00	572.00
Forest area with long-term forest management plan	1 902.48	1 901.41	1 917.91	1 921.75	1 923.37	1 925.90	1 925.90	1 925.90	1 925.90
...of which in protected areas	50.00	60.00	537.00	554.00	554.00	572.00	572.00	572.00	572.00

## Comments

Natura 2000 sites (both SCIs and SPAs) are intended to conserve the species and/or habitats for which the particular site was designated. Appart from this, they can be managed, however, the management has to be assessed by nature conservation authorities. Therefore, our interpretation is that Natura 2000 network meets at least the conditions to belong to the IUCN category IV (conservation through active management) and thus to be reported in this category.

## 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	Quality	Category	Year(s)	Type of inventory
Summary information on state of forests, National Forest centre, Zvolen	H	Forest ownership	1990, 2000, 2010, 2015	Other: Forestry sector statistics information system (data provided by state administration: Forest offices, Cadastre offices).

National classification and definitions

According to national classification there are following forest ownership categories in Slovakia:

- "Private ownership" which includes subcategories: "private", "shared", "church" and "agricultural co-operatives";
- "Public ownership" which includes ownership subcategories "state" and "municipal".

Original data

Forest ownership (1000 ha)	Year		
	2000	2010	2015
Private ownership			
... Of which private	286,47	238,47	199,14
... Of which shared	467,79	475,38	381,94
... Of which church	63,63	57,03	50,31
... Of which agricultural co-operatives	2,77	5,51	6,31
Public ownership			
... Of which state	811,59	782,97	763,77
... Of which municipal	183,79	180,2	162,43
Unknown, other	85,38	178,35	357,85
Total	1901,41	1917,91	1921,75

### Analysis and processing of national data

Estimation and forecasting

No estimation and forecasting

Reclassification into FRA 2020 categories

FRA 2020 categories	Reclassification into FRA 2020 categories
Private ownership	Private ownership includes these national ownership categories "private", "shared", "church" and "agricultural co-operatives".
... of which owned by individuals	Into this FRA subcategory we have included „private“ national subcategory
... of which owned by private business entities and institutions	Into this FRA subcategory we have included "church" and "agricultural co-operatives" national subcategories

...of which owned by local, tribal and indigenous communities	Into this FRA subcategory we have included „shared“ national subcategory
Public ownership	Public ownership includes national ownership categories "state" and "municipal".

FRA categories	Forest area (1000 ha)			
	1990	2000	2010	2015
Private ownership (a)	0.00	820.66	776.39	637.70
...of which owned by individuals	0.00	286.47	238.47	199.14
...of which owned by private business entities and institutions	0.00	66.40	62.54	56.62
...of which owned by local, tribal and indigenous communities	0.00	467.79	475.38	381.94
Public ownership (b)	1 902.48	995.38	963.17	926.20
Unknown/other (specify in comments) (c)	0.00	85.37	178.35	357.85
Total forest area	1 902.48	1 901.41	1 917.91	1 921.75

## Comments

Before the year 1991 all forests were held and managed by state organizations and agricultural co-operatives, however forests of agricultural co-operatives were in professional care of the state organizations.

In 2017, the state owned 769 thousand ha of forest area, or 39.5% of its total area. At the same time, state forest enterprises managed 1,019 thousand ha of forest area, or 52.4% of its total. The remaining forest area was managed by non-state forest enterprises which own and manage private, municipal, community and church forests as well as forests of agricultural cooperatives.

The increasing area of unknown forests does not mean in general real "Unknown ownership of forest". The real reason is still unsolved unsuitable procedure of parcels registry in cadastre. Only part of these forests are really "unknown"; majority of them are of a very limited size, of individual or shared ownership, and impossible to identify in the field. In addition, there is a group of forest owners who still have not applied for their ownership rights.

4b Holder of management rights of public forests

National Data

Data sources + type of data source eg NFI, etc

References to sources of information	Quality	Category	Year(s)	Type of inventory
Summary information on state of forests, National Forest centre, Zvolen	H	Holder of management rights of public forests	1990, 2000, 2010, 2015	Other: Forestry sector statistics information system (data provided by state administration: Forest offices, Cadastre offices).
Joint COST Action FACESMAP/UNECE/FAO Enquiry on Forest Ownership in the ECE Region, Slovakia, 30.10.2015, United Nations, Geneva				

National classification and definitions

National classes and definitions are compliant with the FRA 2020.

According to respective regulations of the act on forests the state forests can be managed by only state organizations established for this purpose.  
Municipal forests are managed by business entities and institutions established by respective municipalities (joint-stock companies, limited companies etc.)

Original data

Area of forest by management status

Ownership category	Forest area primarily managed by the owner (1000 ha)			Forest area primarily managed by others (1000 ha)			Total forest area managed by public holders of management rights (1000 ha)		
	1990	2010	2015	1990	2010	2015	1990	2010	2015
Public ownership (total)	1,922	0,936	0,886	0	0,314	0,321	1,922	1,250	1,207
• Owned by the state at national level (state forests)	1,922	0,786	0,762	0	0,288	0,279	1,922	1,074	1,041
• Owned by local government (municipal forests)	0	0,150	0,124	0	0,026	0,042	0	0,176	0,166

State organizations manage also part of non-state forests: unknown and those that have not been returned so far to their original owners in the scope of restitution process, and leased non-state forests.

Analysis and processing of national data

Estimation and forecasting

We do not have reliable data on non-public holders of management rights in public forests in 2000. Therefore, in that year, we report the area of public forest ownership which is generally managed by public organizations.

Reclassification into FRA 2020 categories

Not needed

FRA categories	Forest area (1000 ha)			
	1990	2000	2010	2015
Public Administration (a)	1 902.48	995.38	936.00	886.00
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)	0.00	0.00	27.17	40.20
Total public ownership	1 902.48	995.38	963.17	926.20

### Comments

Public forests with the area of 27.17 ths. ha in 2010 and 40.2 ths. ha in 2015 are managed by non-public holders of management rights, however we do not have reliable information on their exact area proportion according to FRA categories ("b", "c" or "d").



# 5 Forest disturbances

## 5a Disturbances

### National Data

Data sources + type of data source eg NFI, etc

References to sources of information	Quality	Category	Year(s)	Type of inventory	Additional comments
Pest agents occurrence in Slovak forests within 1960-2014, in 2015 and prognosis of their occurrence. Národné lesnícke centrum – Lesnícky výskumný ústav Zvolen, Zvolen, 139 pp.	H	Forest area with damage	2000-2017	Managerial records	Annual statistical data send to National Forest Centre by foresters

National classification and definitions

Criteria applied to reporting damage	
Minimum size of damaged FOWL reported, ha:	Approximately 0,010 ha (area is calculated from the volume of salvage fellings)
Other criteria and minimum thresholds used to determine area as “ <i>damaged</i> ”:	Mainly the damage resulting in the tree death was considered, the area is estimated directly in the case of specific damages not killing trees such as full defoliation by leaf-eating species or bark stripping by game.
Criteria used to determine which agents were “ <i>primarily</i> ” damaging:	The agent that killed the tree (e.g. wind that uprooted the tree, the subsequent infestation of lying trees by bark beetle is not reported)
Damage in protected forests:	Damage in protected forests <u>is</u> included in the reported figures

Original data

Damage caused by different agents (m3, ha)

Year	Insects (a1)	Diseases (b)	Severe weather events (c)	Other (d)	Total a1 + b + c + d	Insects <sup>*)</sup> (a2)
	m3					ha
2000	324447	65067	2301770	287982	2979266	7100
2001	353527	75236	1539498	341340	2309601	10500
2002	331559	94527	1345142	338165	2109393	5300
2003	426246	148336	1767337	284820	2626739	15600
2004	857837	303885	1283938	306602	2752262	46200
2005	874566	247926	5310806	151450	6584748	20500
2006	1185088	344994	2295588	201531	4027201	13800
2007	2024629	239912	2186787	180829	4632157	9000
2008	2827153	274927	2498044	99816	5699940	1700
2009	3191158	338591	1242196	59390	4831335	1700
2010	2888893	325905	2060440	79798	5355036	6000
2011	1931859	247481	1784468	75344	4039152	0
2012	1882469	247558	1266823	104418	3501268	2000

2013	1480473	224961	1310925	70688	3087047	200
2014	873224	98067	5122675	47894	6141860	400
2015	1419645	143642	3593407	56711	5213405	200
2016	3041405	221345	1381542	45206	4689498	1100
2017	3587478	205923	1101665	45542	4940608	2000

Note: Insects”) (a2) = damage caused by leaf-eating insects that is recorded in hectares, not in cubic meters

## Analysis and processing of national data

### Estimation and forecasting

The conversion from cubic meters to hectares was made as a share of the volume of deadwood (the trees dead due to the effect of a damaging agent) and an average stock per hectare of the forest stands with the most frequent occurrence of the damage. It was stipulated as an expert estimate in 375 m3.

Damage caused by different damaging agents (converted from m3 to hectare)

Rok	Insects		Diseases	Severe weather	Other	Total
	(a1)	(a2)	(b)	events (c)	(d)	a1+a2+b+c+d
thousand ha						
2000	0,87	7,1	0,17	6,14	0,77	15,04
2001	0,94	10,5	0,20	4,11	0,91	16,66
2002	0,88	5,3	0,25	3,59	0,90	10,93
2003	1,14	15,6	0,40	4,71	0,76	22,60
2004	2,29	46,2	0,81	3,42	0,82	53,54
2005	2,33	20,5	0,66	14,16	0,40	38,06
2006	3,16	13,8	0,92	6,12	0,54	24,54
2007	5,40	9	0,64	5,83	0,48	21,35
2008	7,54	1,7	0,73	6,66	0,27	16,90
2009	8,51	1,7	0,90	3,31	0,16	14,58
2010	7,70	6	0,87	5,49	0,21	20,28
2011	5,15	0	0,66	4,76	0,20	10,77
2012	5,02	2	0,66	3,38	0,28	11,34
2013	3,95	0,2	0,60	3,50	0,19	8,43
2014	2,33	0,4	0,26	13,66	0,13	16,78
2015	3,79	0,2	0,38	9,58	0,15	14,10
2016	8,11	1,1	0,59	3,68	0,12	13,61

2017	9,57	2	0,55	2,94	0,12	15,17
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**Reclassification into FRA 2020 categories**

Some categories (groups of damaging agents) are slightly different between the Slovak national inventory and the FRA 2020. Thus, data on disturbances in the Slovak forests were regrouped and fitted to the FRA 2020

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)	7.97	11.44	6.18	16.74	48.49	22.83	16.96	14.40	9.24	10.21	13.70	5.15	7.02	4.15	2.73	3.99	9.21	11.57
Diseases (b)	0.17	0.20	0.25	0.40	0.81	0.66	0.92	0.64	0.73	0.90	0.87	0.66	0.66	0.60	0.26	0.38	0.59	0.55
Severe weather events (c)	6.14	4.11	3.59	4.71	3.42	14.16	6.12	5.83	6.66	3.31	5.49	4.76	3.38	3.50	13.66	9.58	3.68	2.94
Other (specify in comments) (d)	1.57	0.91	0.90	0.76	0.82	1.40	0.54	0.48	0.27	0.16	0.41	0.20	0.28	0.19	0.13	1.09	0.12	0.12
<b>Total (a+b+c+d)</b>	<b>15.85</b>	<b>16.66</b>	<b>10.92</b>	<b>22.61</b>	<b>53.54</b>	<b>39.05</b>	<b>24.54</b>	<b>21.35</b>	<b>16.90</b>	<b>14.58</b>	<b>20.47</b>	<b>10.77</b>	<b>11.34</b>	<b>8.44</b>	<b>16.78</b>	<b>15.04</b>	<b>13.60</b>	<b>15.18</b>
Total forest area	<b>1 901.41</b>	—	—	—	—	—	—	—	—	—	<b>1 917.91</b>	—	—	—	—	<b>1 921.75</b>	<b>1 923.37</b>	<b>1 925.90</b>

## Comments

In the last 15-20 years, forests in Slovakia are exposed to unprecedented frequency and intensity of damaging agents (abiotic, biotic) mainly due to the climate change. Because of the various obstacles (administrative, organizational, new nature conservation concepts etc.), the timely and thorough processing of damaged timber (by incidental fellings) has often not been ensured. Due to mentioned reasons we are currently witnessing the most serious damage to forests caused by biotic harmful agents (especially bark-insects) in the whole documented history of forests in Slovakia (volume of 3.9 million. m3 of timber was damaged by biotic damaging agents only in 2017). As a consequence of these facts, there is large extent of dead and damaged forests, but also of unplanned, often large-scale and by society negatively perceived clear-cutting carried out only in the interest of processing of damaged timber.

The "other" category includes mainly anthropogenic agents: air pollution, grazing and timber theft.

## 5b Area affected by fire

### National Data

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

References to sources of information	Quality	Category	Year(s)	Type of inventory	Additional comments
Reports on Forestry in the Slovak Republic per year 2000-2017	H	Primarily damaged by fire	2000-2017	Managerial records	Fire and Technical Expertise Institute of the Ministry of Interior of the Slovak Republic

#### National classification and definitions

The burnt area, both with trees killed by fire or not killed (just with burnt litter) in forest is recorded as forest land area affected by fire.

#### Original data

Year	Number of fires	Forest land area affected by fire (ha)	Financial damage (€)
2000	824	904	12 784 976
2001	311	305	237 036
2002	570	595	577 434
2003	852	1 567	578 802
2004	155	150	43 253
2005	286	528	1 605 630
2006	237	178	118 360
2007	463	680	5 245 354
2008	182	120	55 334
2009	347	510	709 490
2010	123	192	346 585
2011	303	403	577 070
2012	517	1 683	793 860
2013	233	270	270 230
2014	153	192	142 445
2015	242	353	367 370
2016	136	174.88	96 665
2017	162	297.66	410 330

### Analysis and processing of national data

#### Estimation and forecasting

No estimation and forecasting.

**Reclassification into FRA 2020 categories**

No reclassification was needed.

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	2.98	3.15	6.12	9.51	4.90	6.11	2.73	9.11	2.85	3.37	2.24	4.03	5.74	3.69	1.93	4.77	1.11	2.09
...of which on forest	0.90	0.31	0.59	1.57	0.15	0.53	0.18	0.68	0.12	0.51	0.19	0.40	1.68	0.27	0.19	0.35	0.18	0.30

Comments

In 2017, 162 forest fires were reported in Slovakia destroying 297.66 ha of forest with the total damage estimated at € 410,330. The most common causes of forest fires included unknown causes (33), careless fire setting (e.g. grilling in nature) (21), and uncontrolled burning of grass and dry matter (20). The fires most commonly occurred in March (39), April (25), and August (23).

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

In Slovakia, the term "degraded forest" traditionally refers to forest degraded by improper management practices such as repeated coppicing, expansion of some unwanted tree species (e.g. black locust, hornbeam) at the expense of commercially and ecologically valuable tree species, natural regeneration from low-quality trees (improper genotypes). We also recognise forests on degraded soils (e.g. by past grazing), the production of which is lower than on paralel non-degraded soils, and these forests/soils are also traditionally considered degraded.

In Slovakia, forest degradation does not refer to loss of biodiversity, regardless it resulted from an intentional forest management or an accident. Nor it refers to consequences of various disturbances. Degradation, in our understanding, means something more serious and more long-term than forest damage.

The difference between damage and degradation: while any forest (tree) damage can be restored (at worst) through the stand regeneration, forest degradation would continue after regeneration and the restoration would take more generations of forest.

All forests on forest land are somehow monitored through regular renewals of forest management plans as well as forest inventories, and this data possibly could be interpreted from the forest degradation viewpoint. However, this cannot be considered a monitoring of forest degradation.



## 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

##### Policies supporting SFM:

- Národný lesnícky program (NLP) Slovenskej republiky (National Forest Programme of the SR), approved by the Government resolution No. 549 of 27 June 2007 and taken notes by the National Council of the SR resolution No. 531 of 20 September 2007; <http://www.mpsr.sk/sk/?navID=1&id=481>

- Akčný plán NLP SR 2014-2020 (Action plan of the NFP SR) adopted by the Government resolution No. 697/2015 of 16 December 2015; <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=25214>

- Národným programom využitia potenciálu dreva (NPVPD) Slovenskej republiky (National program of utilization the potential of wood (NP UPW) of the Slovak Republic), approved by the Government resolution No. 492 of 21 August 2013; <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=22757>

- Akčný plán NPVPD SR (Action Plan of the NP UPW SR) approved by the Government resolution No. 442 of 18 December 2014; <http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=23478>

##### Legislations and regulations supporting SFM:

- Act No. 326 of 23 June 2005 on Forests as amended

##### Platform that promotes or allows for stakeholder participation in forest policy development:

National Forest Programme of the SR is basic document that guarantees a sustainable forest management in the forests and its priority is also strengthening cooperation, coordination and communication including the promoting stakeholder participation.

Council of Non-state Forest Owner Associations is a body whose one of the main targets is the promoting of non-state forest owners participation in the national forest policy and legislation development processes.

##### Traceability system(s) for wood products:

Act No.113/2018 of 14 March 2018 o uvádzaní dreva a výrobkov z dreva na vnútorný trh (*Act on introduction of timber and timber products on the internal market*) a o zmene a doplnení zákona č. [280/2017](#) Z. z. o poskytovaní podpory a dotácie v pôdohospodárstve a rozvoji vidieka a o zmene zákona č. [292/2014](#) Z. z. o príspevku poskytovanom z európskych štrukturálnych a investičných fondov a o zmene a doplnení niektorých zákonov v znení neskorších predpisov; <https://www.slovlex.sk/pravne-predpisy/SK/ZZ/2018/113/20180701>

##### National classification and definitions

Comply with FRA definitions.

##### Original data

Documents of the forestry policies and legislation.

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

References to sources of information	Quality	Category	Year(s)	Type of inventory
Summary information on the state of forests	H	Area of permanent forest estate	1990, 2000, 2010, 2015, 2020	Forest stand inventory
Cadastral Office				

National classification and definitions

Act No. 326 of 23 June 2005 on Forests as amended:

According to the Section (§) 5 "Principles of protection of forest land" of the Act on Forests:

(1) Forest land may be used for purposes other than the fulfilment of forest functions only if the relevant state authority excluded the parcel (temporarily or permanently) from the fulfilment of forest functions or decided on the limited use of forest functions. The exclusion from or limitation of the use of forest functions can only take place in inevitable and justified cases, especially if the needs of social and economic development cannot be met otherwise.

(2) specifies, for example, that protective forests and special-purpose forests are especially protected against exclusion, and that the exclusion cannot hamper the use of neighbouring forests.

Original data

As listed in the Table 6b.

FRA 2020 categories	Forest area (1000 ha)					
	Applicable?	1990	2000	2010	2015	2020
Area of permanent forest estate	Yes	1 902.48	1 901.41	1 917.91	1 921.75	1 925.90

Comments

All forests on the forest land have to have forest management plans, therefore, the stand inventory is a good source of the area of permanent forest estate.

In Slovakia, a part of forests (288 000 ha) is located outside forest land (especially those on abandoned agricultural land, reported as "Other land with tree cover"). These forests (land with tree cover, respectively) are not protected by, nor managed according to the Act on Forests, however, the cutting trees on them is partially restricted by the Nature Conservation Act. These forests are gradually converted to forest land, but the process is much slower than the forests expansion.

## 7 Employment, education and NWFP

### 7a Employment in forestry and logging

#### National Data

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

References to sources of information	Quality	Category	Year(s)
Eurostat Database, available at <a href="http://ec.europa.eu/eurostat/data/database">http://ec.europa.eu/eurostat/data/database</a> ; Eurostat Labour Force Survey	H	Employment in forestry and logging	1990, 2000, 2010, 2015

**National classification and definitions**

National classification and definitions correspond with Terms and Definitions FRA 2020.

**Original data**

Average values from three years have been calculated for individual reporting years: 2015 (2014-2016), 2010 (2009-2011), 2000 (1999-2001), 1990 (1989-1991).

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	36.30			24.40	4.67	19.73	19.23	1.97	17.27	20.33	2.37	17.97
...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 any complete (only partial) and reliable information on individual subcategories: "silviculture and other forest activities", "logging", "gathering of non wood forest products", "support services to forestry".

## 7b Graduation of students in forest-related education

### National Data

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

NFC Annual Specific Questionnaire for Forest Colleges and Technical University in Zvolen (Annual reports).

#### National classification and definitions

National definitions related to graduation of students in forest-related education complies with the FRA 2020 Terms and definitions.

#### Original data

Year	Doctoral degree	Master's degree	Bachelor's degree	Technician diploma	Technician certificate
2009	17	173	164	183	240
2010	40	124	121	156	219
2011	19	158	110	167	232
Average 2009-2011	25,3	151,7	131,7	168,7	230,3
2014	26	129	122	200	193
2015	11	273	464	112	197
2016	9	132	123	124	211
Average 2014-2016	15,3	178	236,3	145,3	200,3

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							25.00			15.00		
Master's degree				132.00	21.00	111.00	152.00			178.00		
Bachelor's degree							132.00			236.00		
Technician certificate / diploma				283.00	3.00	280.00	399.00			346.00		
Total				415.00	24.00	391.00	708.00			775.00		

Comments

There are no data on total graduates divided by sex (female & male) in considered years (2009-2011 and 2014-2016).



## 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	Category	Year(s)	Type of inventory	Additional comments
Statistical Yearbook on Hunting	Wild meat, trophies, hides, skins, living animals	2017	Managerial records	Data originated from annual reports of hunting association
Report on Forestry in the Slovak Republic, 2017	Other plant products, ornamental plants	2017	Mixed	Worked out annually from official state and sector reports, accounting reports and special questionnaires from reporting units of information network

National classification and definitions

National classification and definitions correspond with Terms and Definitions FRA 2020.

Original data

Original data for 2017 are directly reported in the next table "Non wood forest products removals and value 2015".

	Name of NWFP product	Key species	Quantity	Unit	Value (1000 local currency)	NWFP category
#1	Hides, skins and trophies	deer, roe deer, fallow deer		1000 pcs	3 431	10 Hides skins and trophies
#2	Wild meat	wild boar, deer	1 233	tonnes	2 942	12 Wild meat
#3	Living animals	deer, hares	19	1000 pcs	287	9 Living animals
#4	Other plant products	Christmas trees	6	1000 pcs	42	8 Other plant products
#5	Ornamental plants	Decorative coniferous branches		tonnes	12	6 Ornamental plants
#6						
#7						
#8						
#9						
#10						
All other plant products						
All other animal products						
Total					6 714	

Name of currency	Euro
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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	39.55	39.89	39.97	40.00	40.06	40.06	40.06	40.06

Name of agency responsible	National Forest Centre
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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	0.09	0.04	0.08	0.13	0.00	0.00	0.00

Name of agency responsible	National Forest Centre
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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	142.11	161.20	170.15	171.12	171.11	171.11	171.11	171.11

Name of agency responsible	National Forest Centre
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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	3.12	27.94	28.83	28.83	29.76	29.76	29.76	29.76

Name of agency responsible	National Forest Centre
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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	98.94	99.80	100.00	100.00	100.00	100.00	100.00	100.00

Name of agency responsible	National Forest Centre
----------------------------	------------------------

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	1 321.20	1 277.66	1 291.97	1 295.48	1 284.01	–	–