

How have forest resources in the European Union developed?

Data and Methods used

The following official and publicly accessible databases were used:

FRA (Forest Resource Assessment) is a process managed by UN FAO with regular data collection on the global forest resources. Results are presented via [FAOSTAT](#) and [FRA DATA](#) that provide free access to data for over 245 countries and territories from 1961 on.

[FOREST EUROPE](#) is the brand name of the Ministerial Conference on the Protection of Forests in Europe. It is the Pan-European voluntary high-level political process for intergovernmental dialogue and cooperation on forest policies in Europe. FOREST EUROPE regularly collects from its member countries data on European forest resources, starting with 1990. Results are presented in reports.

[EUROSTAT](#) is the statistical office of the European Union, responsible for publishing high-quality Europe-wide statistics and indicators that enable comparisons between countries and regions. On forest related topics, it regularly collects data from EU member states, but also from FAO and FOREST EUROPE.

The [European Environment Agency \(EEA\)](#) collects and presents data on ecosystems, biodiversity and protected areas. It manages the [Forest Information System for Europe \(FISE\) that compiles data](#), information and knowledge [on forests in the EU](#). It is the entry point for sharing information on Europe's forest environment, its state and development.

1 Development of forest resources in the EU since 1950

Verkerk (2015) compiled data series 1950-2010, based on country data collected by Kuusela (1994) and Gold (2003). For the period 1950-1990, data from Gold (2003) were used for forest area, growing stock and increment. Data from Kuusela (1994) were used for annual removals. For the period 1990-2010, data from Forest Europe (2011) and Vilen et al., (2012) were used.

The data series were updated for the period 2010-2020 with information from Forest Europe (2020). This compilation covers the following 20 member states of the EU 27: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Romania, Slovakia, Spain and Sweden.

Using data for 1990, their share of the total for the EU 27 was calculated for forest area (based on EUROSTAT data), growing stock (based on FAO FRA data) and roundwood production (based on FAOSTAT data). These 20 countries represented in 1990 ca. 93% of the forest area, ca. 91% of the growing stock and ca. 97% of the roundwood production from forests in all EU 27 countries. Their development since 1950 can be therefore considered as highly representative for the overall evolution of forest resources in the EU 27 in this period.

- For calculating the *forest area development*, only the 20 countries are included. For the graphics, also Slovenia is included.
- Calculation and graphics on *growing stock development* only included the 20 countries.

- For calculation of the *increment development*, the total annual increment was divided by the annual forest area available for wood supply. Due to data gaps, Bulgaria, Greece, Poland and Portugal have been excluded from this calculation and also from the graphics.
- For calculating the *roundwood production development*, only the 20 countries are included. For the graphics, also Cyprus is included for the period 1950-1990. UK is included for the period from 1990 onwards.

EU 27 population development since 1950

United Nations, Department of Economic and Social Affairs, Population Division (2018). World Urbanization Prospects: The 2018 Revision, custom data acquired via website. Accessed 20211119 for data 1950, 1960, 1990 and 2020.

<https://population.un.org/wup/DataQuery/>

EUROSTAT reports a 25% population growth since 1960: EU 27 population development since 1960: EUROSTAT Population change - Demographic balance and crude rates at national level [DEMO_GIND__custom_1607102], accessed 20211119 for data 1960, 1990, 2000, 2010 and 2020

https://ec.europa.eu/eurostat/databrowser/view/DEMO_GIND_custom_1942046/default/table?lang=en

Europe GDP development since 1950

Maddison Project Database (MPD) 2020. Real GDP per capita in 2011 US Dollar. Accessed 20211116 for data 1950, 1960, 1990, 2000 and 2018.

<https://www.rug.nl/ggdc/historicaldevelopment/maddison/releases/maddison-project-database-2020>

UN database on GDP starts only with 1970 and was therefore not used.

2 Development of forest resources 1990-2020 in the EU 27 and the rest of the world

Rest of the World: Forest Area, Growing Stock and Carbon stored in Forests

Data from FAO Forest Resource Assessment 2020 (FRA 2020). To calculate the figures for the rest of the world, the EU data (see below) were subtracted from the world data from FRA.

2.1 Development of forest area 1990-2020

EU 27 Forest Area

Data from EUROSTAT based on FAOSTAT (last updated 21032021, accessed 14012022). This source does not include data on Cyprus. For this country, data from FAOSTAT were used to complete the EU 27 data set (FAOSTAT, Land use, Area, Forest land, accessed 14012022).

EU 27 Forest area available for wood supply (AWS)

Data from Forest Europe 2020 report. Data gaps were filled as follows:

- Ireland: 1990 and 2000-data from Forest Europe 2007 report.
- Luxembourg: 2020-value for 2015 from Forest Europe 2015 report.
- Spain: 1990 and 2000-data from Forest Europe 2011 report.

EU 27 protected forest areas 1990-2015

Data from EUROSTAT, Protected forests (Forest Europe) [for_protect], Last update: 08-02-2021. Accessed 17112021.

https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=for_protect&lang=en

Values for “Forest” and “Forest and other wooded land” were extracted for each member state. There seems to be missing data for several member states for 1990 and also for 2000. The following 11 EU member states have data for 1990 and 2015 on protected forest area and were used for the calculation of the increase since 1990 that is described in the text: Bulgaria, Croatia, Cyprus, Denmark, Greece, Hungary, Ireland, Poland, Slovenia, Spain and Sweden.

2.2 Development of growing stock 1990-2020

EU 27 Growing stock

Data from FAO FRA, accessed 17122021. There are only data for 1990, 2000, 2010 and 2015-2020. Data gaps were filled as follows:

- Belgium: 1990 and 2000 and 2010 and 2020-data from Forest Europe 2020 report. 2016-2019-value for 2015.
- Ireland: 1990 and 2000-data from Forest Europe 2015 report.
- Portugal: 1990-data from Forest Europe 2015 report. 2000-data from Forest Europe 2020 report. 2016-2020-value for 2015.

EU 27 Growing Stock in Forests available for Wood Supply (FAWS)

Data from Forest Europe 2020 report. Data gaps were filled as follows:

- Bulgaria: 2020-value for 2015.
- Cyprus: 2020-value for 2015.
- Czech Republic: 1990 and 2000-data from Forest Europe 2015 report.
- Greece: 2020-value for 2015.
- Ireland: 1990 and 2000-data from Forest Europe 2011 report.
- Italy: 2020-value for 2015.
- Lithuania: 1990-data from Forest Europe report 2007.
- Luxembourg: no data available.
- Poland: 1990-value for 2000.
- Portugal: 1990-data from Forest Europe 2015 report. 2020-value for 2015.
- Spain: 1990 and 2000-data from Forest Europe 2011 report.

2.3 Development of carbon stock and roundwood production 1990-2020

EU 27 Carbon stock in Forests

Data from FAOSTAT (Input-Land use-Carbon stock in living biomass-Forest land, accessed 17012022 and 25012022). For 2020, data from FAO FRA 2020 were used, accessed 13042022.

Data gaps were filled as follows:

- Belgium: 1990-value includes Luxembourg.
- Croatia: 1990-no data in FAOSTAT, value for 1992.
- Czech Republic: 1990-value includes Slovakia (value for Czechoslovakia).
- Estonia: 1990-no data in FAOSTAT, value for 1992.

- Latvia: 1990-no data in FAOSTAT, value for 1992.
- Lithuania: 1990-no data in FAOSTAT, value for 1992.
- Luxembourg: 1990-included in Belgium.
- Slovakia: 1990-included in Czech Republic (value for Czechoslovakia).
- Slovenia: 1990-no data in FAOSTAT, value for 1992.

EU 27 Roundwood Production

Data from FAOSTAT (Input-Forestry Production and Trade-Roundwood Total-Production Quantity, accessed 26122021). Data gaps were filled as follows:

- Belgium: 1990-value includes Luxembourg.
- Czech Republic: 1990-value includes Slovakia (value for Czechoslovakia).
- Luxembourg: 1990-included in Belgium.
- Slovakia: 1990-included in Czech Republic (value for Czechoslovakia).

For 1990, data in FAOSTAT are incomplete as the three Baltic countries, Croatia and Slovenia are missing. The first complete data set in FAOSTAT is for 1992. The share of the five missing countries in 1992 was used to upscale the 1990 data to the entire EU 27. No individual country data were calculated for the five missing countries. The total 1990 for the EU 27 achieved by this approach is 0.63% bigger than a total 1990 resulting from the use of 1992 data for each of the five missing countries.

The year 1990 seems to have had an extraordinarily high level of round wood production compared to the years before and after.

EU 27 Roundwood trade balance

Data from FAOSTAT (Forestry Production and Trade-Import Quantity-Roundwood, Forestry Production and Trade-Export Quantity-Roundwood), accessed 28022022.

- Belgium: data include Luxembourg until 1999 inclusive.
- Czech Republic: data include Slovakia until 1992 inclusive under Czechoslovakia.