**Hungarian Forestry Report**

**1. Brief Country Profile**

The content includes:

1. Land area, population and other information you would like to share with 16+1

members;

Total area of Hungary: 93 011.40 km2

Population: 9 855 571

Population density: 106 capita/km2

Number of counties: 19 and the capital as 20.

Capital: Budapest, with 1 757 000 inhabitants

3155 settlements, including the capital

Length of country border is 2215,3 km

(2) Location;

Hungary lies in the middle of Europe, in the Carpathian Basin (16°-23° E ; 45°-49° N). Neighboring countries are Slovakia (N), Ukraine (NE), Romania (E-SE), Serbia (S), Croatia (SW), Slovenia (W), Austria (W-NW).

(3) Natural environment including mountains, rivers, lakes and so on.

Most of the area of Hungary lies lower than 200 meters above sea-level (Compared to Baltic Sea). Although there are several hills and sub mountain areas, the area above 300 meters is less than 2% of the country.

Based on geographical characteristics, Hungary is divided into 6 greater regions (Western sub alpine region (W), Little Hungarian Plain (NW), Transdanubian Mountains (mid-west, N), Transdanubian Hills (S-SW), Great Hungarian Plain (Middle, E, S), North Hungarian Mountains (N).

70% of the area of Hungary is suitable for agricultural use.

Hungary is rich in surface and under-surface water. The whole area of the country lies in the catchment basin of the Danube. The most important rivers are the Danube (417 km in Hungary) and the Tisza (584,9 km in Hungary. Bigger lakes are Balaton (594 km2), Tisza-lake (127 km2), Fertő lake (75 km2 in Hungary) and Velencei lake (24,2 km2). Hungary is very rich in under-surface water. The groundwater level is usually between 3-5 m but can be much lower in hilly areas. There are artesian and thermal water supplies below the whole country.

**The history of modern forestry in Hungary**

1791 The Parliament enacted the first feudal act on forests.

1879 Enactment of the first modern forest act.

1920 After the World War I, Hungary lost 84% of its forests. Forest cover decreased from 26% to 12%.

1935 The Act Nr. IV of 1935 on forest considered the new geographical conditions of the country and covered nature conservation.

1936 Hungary hosted the 2nd World Forestry Congress and the 9th Congress of IUFRO

1945 Private forest holdings above 58 hectares were nationalized, properties of 6 to 58 hectares were taken into state management.

1959 Forest owner associations were cut back; about 30% of the total forests were assigned to agricultural cooperatives.

1961 Enactment of the Act Nr. VII of 1961 on forests and wildlife management based on socialist terms. 1996 A s a result of the political system change in 1989, about 40% of the forests were privatized. The legislative control for multiple-use and sustainable forestry was regulated by the Act Nr. LIV of 1996 on forests and protection of forests. 2009 One main aim of the Act Nr. XXXVII of 2009 is to drive forests closer to their natural conditions. On one hand, the act defines ‘quantitative naturalness’ and prescribes that it should not decrease due to management activities. On the other hand, it prescribes continuous cover forestry methods on a predetermined area of state-owned forests. Further, it enables NGOs’ contribution in forest management planning.

2017 Modification of Act Nr. XXXVII of 2009 according to the interests of forest owners

**Main objectives of the current forest management**

• ensure long-term environmental, economic and social services of forests by sustainable multi-purpose silviculture;

• harmonize the interest of the society in sustainable forest management with the interests of forest managers and owners;

• increase the forest area by afforestation up to a forest ratio of 26-27%;

• maintain natural or close-to-nature forest stands composed by indigenous tree species and extend their area in accordance with prevailing site conditions.

1. **Forestry and Forest**
2. **Forest area**

The area and change of the forest area in recent years

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
| **Forest area (103 hectares)** | 1,869 | 1,891 | 1,903 | 1,913 | 1,922 | 1,928 | 1,934 | 1,938 | 1,939 | 1,941 |

1. **Forest coverage and its change**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
| **Forest coverage (%)** | 20.1 | 20.3 | 20.5 | 20.6 | 20.7 | 20.7 | 20.8 | 20.8 | 20.8 | 20.9 |

1. **Forest classification**

The area of each forest classification and its change Basis of classification

such as the primary forest, plantation.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Year | 2011 | 2012 | 2013 | 2014 | 2015 |
| Natural and semi natural forests | 495 | 478 | 462 | 448 | 432 |
| Second growth forests | 529 | 545 | 562 | 576 | 593 |
| Transition forests | 116 | 122 | 126 | 131 | 135 |
| Cultivated and park forests | 652 | 654 | 656 | 657 | 657 |
| Plantations | 130 | 129 | 128 | 127 | 124 |
| **Total (all data in 103 hectares)** | **1,922** | **1,928** | **1,934** | **1,939** | **1,941** |

The above given categories are the categories of the “Naturalness” given in the Hungarian Forest Act (Act. no. XXXVII. of 2009). The categories have the following meanings:

*Natural forests:* The forest has the natural composition, structure and dynamics characteristic for the given growing site. The stand has grown naturally from seed or sprout, and only few individuals of adventive species can be found and no trees of invasive species can be found.

*Semi – natural forests:* The stand is similar to the natural forests but can have artificial origin and management. The ratio of adventive species is not higher than 20% and few individuals of invasive species can be found.

*Second growth forests:* The structure and composition of the stand is transformed by human activity and lacks some elements characteristic for the given growing site. Most of the stand consists of naturally occurring species, the ratio of adventive species is 20-50%, and there may be 20% of invasive species in the stand.

*Transition forests:* Highly transformed in structure and composition, only a smaller part of the stand consists of species naturally occurring on the growing site, the structure is simpler, and lack most of the natural structure. The ration of adventive species is 50-70% and there may be 50% of invasive species.

*Cultivated and park forests:* The ratio of adventive species is higher than 70% or the ratio of invasive species is higher than 50%, and the ratio of naturally occurring species is less than 30%

*Plantations:* The stand typically consists of adventive species or artificial cultivars or hybrids and the stand has a regular structure suitable for machinery works. The harvest rotation is at least 15 years, the stand is intensively cultivated.

**(4) Forestry structure**

The basic situation of the tree species composition such as the area and

Percentage for the main tree species;

|  |  |  |
| --- | --- | --- |
| **Species** | **Area (1000 hectares)** | **Ratio** |
| Black locust (Robinia pseudoacacia) | 468 | 24.1% |
| Oaks (Quercus sp.) | 404 | 20.8% |
| Other hardwood broadleaf species  (maple, ash, fruits, hornbeam etc.) | 219 | 11.3% |
| Turkey oak (Quercus cerris) | 217 | 11.2% |
| Conifers (90% Pinus sp.) | 210 | 10.8% |
| Poplars (Populus sp., incl. hybrids) | 206 | 10.6% |
| Beech (Fagus sylvatica) | 115 | 5.9% |
| Other softwood broadleaf species  (willow, alder, lime etc.) | 103 | 5.3% |

Cutting age is directly connected with forest function. In wood production forests, the main objective to be taken into consideration is the quantity and quality of wood. Thus, stands of fast-growing species (such as black locust or hybrid poplars) are cut relatively early. In forests with non-production functions, forest management is driven not only by wood production but also by other issues. Consequently, the proportion of old forests is higher as well as there are no such high differences between the areas of age-groups as in the case of wood production forests.

Age distributions are highly influenced by the cutting ages. Thus, proportion of fast-growing species with short rotation period (black locust, hybrid and native poplars) is higher in the younger age classes whereas area of the slow-growing species with long rotation period (noble oak, turkey oak, beech) is relatively large in older age groups. More than half of our forests are 40-years-old or younger.

Distribution of tree stand types reflects the ecological conditions of the given county leading to considerable differences among County Government Offices. Beech and noble oak stands are abundant in area of Government Offices for Nógrád and Borsod-Abaúj-Zemplén Counties where the North Hungarian Mountains lies. Conifer plantations cover large areas of the Great Hungarian Plain (Government Office for Bács-Kiskun County) and Western Transdanubia (Government Offices for Vas and Zala Counties).

The dynamic variation of the tree species in quantity.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Species** | **The dynamic of stock volume of species (1000 m3)** | | | | |
| **2011** | **2012** | **2013** | **2014** | **2015** |
| Black locust (Robinia pseudoacacia) | 48,838 | 49,571 | 50,104 | 50,830 | 52,304 |
| Oaks (Quercus sp.) | 84,529 | 85,341 | 85,944 | 86,844 | 88,094 |
| Other hardwood broadleaf species (maple, ash, fruits, hornbeam etc.) | 37,230 | 37,930 | 38,404 | 39,071 | 39,820 |
| Turkey oak (Quercus cerris) | 45,597 | 45,951 | 46,262 | 46,733 | 47,151 |
| Conifers (90% Pinus sp.) | 54,251 | 54,530 | 54,395 | 54,207 | 54,367 |
| Poplars (poplar sp., incl. hybrids) | 28,967 | 29,846 | 30,816 | 31,507 | 32,051 |
| Beech (Fagus sylvatica) | 39,333 | 39,412 | 39,650 | 39,894 | 40,235 |
| Other softwood broadleaf species  (willow, alder, lime etc.) | 23,451 | 23,671 | 24,011 | 24,256 | 24,565 |
| **Total** | **362,196** | **366,252** | **369,586** | **373,342** | **378,587** |

In Hungary, noble oak has the highest standing volume. However, the highest area proportion belongs to black locust.

**(5) Forest stock volume, increment and logging**

The dynamic variation of the forest stock volume, increment and logging

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Year** | **2011** | **2012** | **2013** | **2014** | **2015** |
| **Forest stock volume (103 m3)** | 362,194 | 366,252 | 369,586 | 373,342 | 378,588 |
| **Increment (103 m3)** | 12,138 | 11,066 | 11,631 | 12,763 | 12,543 |
| **Logging (103 m3)** | 8,080 | 7,732 | 7,875 | 7,517 | 7,354 |

**(6) Increment and carbon dioxide removal by species groups**

Poplars produced the largest increment per hectare. However, due to their low wood densities, poplars adsorbed less carbon dioxide than beech or noble oaks wood density of which is much higher.

CO₂ quantity removed by the Hungarian forests approximately equals the total emission of 3 million cars during one year, assuming that an average car runs yearly 20 000 km with a 7 l/100 km petrol consumption. This means that the CO₂ quantity removed by the total annual increment of the Hungarian forests is roughly equal to that emitted from the Hungarian passenger car stock (source of input data: https://co2.myclimate.org/en/car\_calculators;<http://www.ksh.hu/docs/hun/xftp/idoszaki/jelszall/jelszall11.xls>).

**(7) Felling operation**

The total volume of timber felled in recent 10 years;

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| **Felled timber (103 m3)** | 6,609 | 7,024 | 6,774 | 7,424 | 8,080 | 7,732 | 7,875 | 7,517 | 7,354 | 6,906 |

The planned felling volume in the next 10 years.

The forest management planning is accomplished for each area in 10 years intervals so the plan for the following 10 years is only available for about the 1/10 of the whole forest area, but considering the rising demand for wood and the rising timber prices the felling will slightly increase in average, as it has in the last 10 years as well.

Close-to-nature forestry – evolution of continuous cover forestry systems: Systems ensuring continuous forest cover have been more and more applied in the last years. The common feature of these systems is that there is no final cutting and consequently contiguous large areas without tree stand do not occur. In Hungary, three kinds of such systems are defined: the selection system (harvests are carried out frequently but only in small patches), the transition system (the main objective of which is to switch from rotation system to selection system) and the ‘non-productive’ system (with the main aim to let natural processes take their course).

**(8) Forest fires**

Fires appearing during fire ban periods (Forest Fire Information System 2015)

In Hungary, 99 % of the forest fires are intentionally or negligently human- induced. Moreover, 40-50 % of the fires appeared during the fire ban period.

This fact turns attention to the importance of public communication campaigns as a tool of prevention. This was the motivation behind a Fire Life project between 2014 and 2018 which was initiated by the Forestry Directorate and supported by the European Union. There were already 14 educational events for children. Through playful competitions, dangers of forest fires were introduced to them, and they could learn basic rules on how to set and extinguish a fire. In frequented tourist destinations during fire danger periods, forest fire guards were established partly in order to propagandize forest fires. Training courses on prevention and extinguishing were organized for experts in six localities. Guides, games and posters can be downloaded from: [www.erdotuz.hu](http://www.erdotuz.hu)

**(9) Forest health condition (Forest Protection Network 2015)**

Health condition of the Hungarian forests did not change considerably between 2014 and 2015. On country-level, the average defoliation rate was 20.5%. Turkey oak and the group of ’other hardwood species’ were the healthiest having more than 60 % of the sampled trees in the ’not damaged’ category. Black pine was the most severely damaged.

The most common damage types were ’insect’ and ’fungi’ for all tree species groups. Beside these types, abiotic damages, especially drought also occurred in groups such as poplars, turkey oak, beech and black locust.

**(10) Systematic forest inventory**

Field works of the first five-year-long period of systematic forest inventory was finished in 2014. The main objectives of the inventory:

• monitoring the ecological status of forests;

• estimation of forest economical resources;

• providing information for sustainable forest management and long-term prognosis of forest stands;

• supply forest data for various domestic and international purposes.

1. **Forest Management**
2. **Institutions associated with forestry**

Governmental organizations;

Organisational structure – Forest administration

* Ministry of Agriculture
  + Department of Forestry and Hunting
    - Section of State Forest Management
    - Section of Forest Administration
* Department of National Park and Landscape Protection
* National Food Chain Safety Office
  + Forestry Directorate
  + Directorate of Plant Production and Horticulture
    - Department of Forestry and Energy Reproduction Materials
* Prime Minister’s Office
  + County Government Offices
    - Department of Agriculture and Forestry (10)

Non-governmental organizations.

Hungarian Forestry Association (OEE),

Association of Private Forest Owners and Managers (MEGOSZ)

**(2) Forestry employment**

The number of employees in forestry;

The total employment in forestry sector in 2015 was 25.3 thousand employees.

The dynamic variation of the number of employees in forestry.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 2000 | 2005 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
| Total number of employees in forestry sector (1000 empl.) | 18,1 | 15,1 | 12,6 | 15,2 | 15,9 | 18,1 | 19 | 21,6 | 22,9 | 25,3 |

**(3) Forest ownership**

The area and percentage of the forest ownership including private and sate owned and public forest;

In 2016 the total area in Hungary with forest management plan was 2,060,818 hectares, of which 1,940,720 hectares were covered by forest. 1,156,771 hectares of 2,060,818 hectares are owned by the state (1,066,731 hectares covered by forest), 882,420 hectares are privately owned, mostly by individuals (853,678 hectares covered by forest) and 21,627 hectares are owned by communities like churches and local governments (20,309 hectares covered by forest).

The dynamic change in the proportion of the forest ownership

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **The dynamic of the ownership structure of forests (data in 1000 hectares)** | | | | | | |
| **1938** | **1946** | **1970** | **1990** | **1998** | **2004** | **2016** |
| National forest | 62 | 844 | 1,050 | 1,173 | 1,042 | 1,051 | 1,067 |
| Communal forest | 284 | 24 | 435 | 510 | 17 | 18 | 21 |
| Public altogether | 346 | 868 | 1,485 | 1,683 | 1,059 | 1,069 | 1,088 |
| Private ownership | 888 | 337 | 15 | 17 | 677 | 774 | 854 |
| **Total area** | **1,234** | **1,205** | **1,500** | **1,700** | **1,736** | **1,843** | **1,942** |

1. **Forestry policy**

A brief description of the Forest-related policies and laws

The Forest Act of Hungary is relatively new and it has been reformed in this year (2017), but the works started in 2016. A wide range of organizations cooperated (Ministry of Agriculture, NFCSO, University of Sopron, FRI, national park directories, national forestry companies, MEGOSZ etc.) in the formation of the modification to get an act as result which can regulate the forest management rationally and practically for both the national and private sector. One of the main new features of the act is, that it regulates the national and private forest management separately, which can mean not so hard restrictions for the private forest managers.

Main goal of the Hungarian forestry policy is to incense the forest area, and the naturalness of the forests, increase the ratio of forests managed with constant canopy cover methods (like selection cutting). Also, it is a goal to increase the area of wood plantations to supply the industry with high quality timber.

1. **Investigation and monitoring of forestry resources**

There are two independent forest resource monitoring systems in Hungary. One is the forest management planning itself, and the other is the National Forest Inventory. Both have the data collecting interval of 10 years, but there are significant differences in methodology.

The forest management planning is repeated on the whole forest area in every 10 years. It is done by the employees of the Forestry Directory of the National Food-chain Safety Office. They collect a record a wide variety of parameters of the forest stand, and plan the felling and cultivation tasks for the next ten years. The felling planned is not obligatory but the other management tasks are.

The data for the National Forest Inventory is collected from the same FNM points (FNM – Observation of Growth of Forest stands). The main goal is to have an independent statistical database of the Hungarian forests to see the dynamics in great time interval.

**4. Forestry Research and Education**

1. Forestry Research

Forest related institutions

University of Sopron, Faculty of Forestry and its Institutes

Forest Research Institute of the National Agro Research and Innovation Center (NAIK ERTI) Ministry of Agriculture

1. Forestry Education

List of forestry universities

In Hungary there is only one university with forestry faculty. It is the University of Sopron

The forestry related majors in each forestry universities

The Faculty of Forestry at the University of Sopron has 5 majors closely related to forestry. These are the followings: forestry engineering (5 years master), wild game management engineering (bachelor and master), and Nature conservations engineering (bachelor and master).

Apart from the above mentioned there are some post-university educations.

Number of forest-related students and the international students

The one university with forestry as a major is relatively small. The number of Hungarian student attending the forestry related majors at the university is slightly decreasing in recent years. It is about 500 students.

There are few to a dozen or so international student on the forestry related majors regularly.

**5. Forest economics**

(1) Forest contribution to GDP

Gross added value of forestry, the country’s GDP and the share of forestry’s contribution;

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **2010** | **2011** | **2012** | **2013** | **2014** |
| GDP of Forestry (109 HUF) | 50.2 | 56.0 | 60.9 | 59.5 | 60.5 |
| GDP of Hungary (109 HUF) | 22,881.1 | 23,887.4 | 24,038.1 | 25,337.3 | 27,081.9 |
| Share of Forestry in GDP (%) | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 |

Source: Central Statistical Office, Hungary

(2) Forestry - related industrial chain

Yield and output value of wood and non-wood forest products

NOT AVAILABLE

(3) Forest products import and export trade

Import volume, import value, export volume, export value for all wood and non-wood forest products since 2010 (or 2000)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **2011** | **2012** | **2013** | **2014** | **2015** |
| VALUE of IMPORT of forest products (103 $) | 1,382,410 | 1,199,076 | 1,274,112 | 1,342,473 | 1,327,191 |
| VALUE of EXPORT of forest products (103 $) | 1,084,842 | 989,125 | 1,049,576 | 1,091,311 | 1,070,244 |

Source: FAO Yearbook of Forest Products 2015 Hungary