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German forests

Nature and economic factor

Contents

German forests – Nature and economic factor 4
- One third of Germany covered with forests 4
- Forests are natural habitats 4
- Who owns the forests? 7
- Forestry groupings 8
- Right of access for everyone 9
- Forests are facing multiple stress factors 10

Forestry – Responsibility for many generations 12
- Prime principle: Sustainability 12
- Close-to-nature forest management 13
- Silviculture makes it possible 14
- Promotion of species diversity 16
- Forests in protected areas 17

Forest – based industry in Germany 18

Forest and game 22
- Hunting district system 22
- Wildlife management requirement 23

Forest policy: Balance between different interests 24
- Support schemes for forestry 25

Forests around the globe: international cooperation is required 27

German forests – Nature and economic factor

One third of Germany covered with forests

Germany ranks among the densely wooded countries in Europe. Around 11 million hectares corresponding to one third of the national territory are covered with forests. In regional terms, the proportion of woodland cover varies widely, ranging from 10 % in Schleswig-Holstein to over 40 % in Rhineland-Palatinate and Hesse, the most thickly wooded *Länder* (federal states).

Forests increased by approx. 1 million hectares in Germany over the past four decades. The percentage of over 80-year old stands also rose from one quarter to one third of the forest area. The timber stocks in Germany account for 320 m^3 per hectare, with the annual timber increment totalling around 100 million m^3 in accessible forest without logging restrictions in the mainstand today, i.e. around 9.5 m^3/ha. Hence, Germany occupies a leading place compared with other European countries. This is largely a result of the efforts to rebuild high-yielding and ecologically valuable forests after the destruction of large forest tracts over the past centuries and, more recently, after the clear-cuttings due to both World Wars.

Forests are natural habitats

Today‘s distribution of forests, farmed agricultural areas, traffic spaces and settlement areas in Germany is the result of human interventions over many centuries. The remaining forests are no longer primeval forests, but production forests shaped by humans. As a potentially natural vegetation form, beech forest communities would prevail in German forests and cover around 74 % of the forest area.

Oak forest communities represent the second largest group of natural forest communities and would account for 18 % of the forest area.

The historical development of forestry explains why German forests are today composed of 60 % coniferous forests and around 40 % deciduous forests. In the past few decades, more importance had been attached to regeneration with site-adapted tree species. The efforts to shape the composition of forest tree species in a more semi-natural way have been crowned with success. Approx. 73 % of German forests nowadays consist of mixed stands. Spruce accounts for the largest share among the tree species (28 %), followed by pine (23 %), beech trees (15 %) and oak trees (10 %).

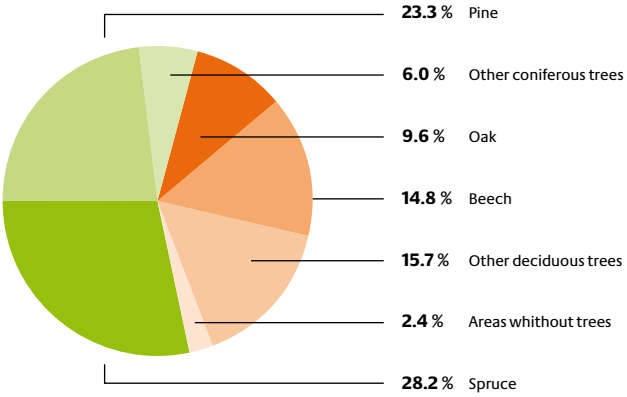

Diagram 1: Tree species distribution in Germany (Second National Forest Inventory 2002)

The tree species proportions vary and depend on the specific natural features and site conditions as well as on different historic developments. Large-scale forest zones can be found in Germany: pine trees abound in the north of Germany, deciduous trees prevail in the lower mountain ranges and coastal areas and southern Germany is rich in spruce trees.

Who owns the forests?

The Federal Republic of Germany is a federal state. Responsibility for the forests thus mainly lies with the *Länder*. While the Federal Government merely sets the forest policy framework, the *Länder* are responsible for the formulation and implementation of concrete forest policy targets.

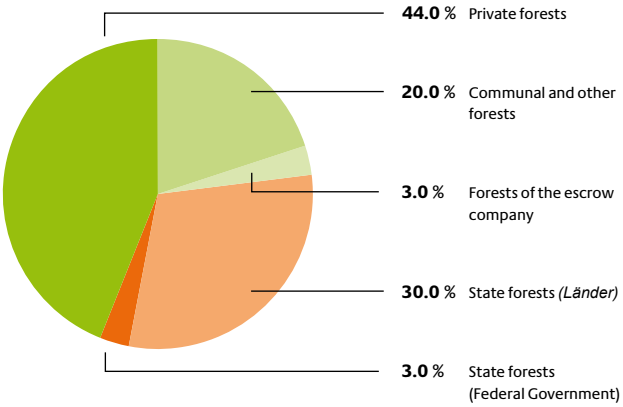

Diagramm 2: Types of ownerships (Second National Forest Inventory 2002)

Private persons, corporate entities (notably municipalities) and the state, i.e. mainly the *Länder*, own woodlands. Private forest undertakings own an average forest area size of 5 hectares that is frequently spread over several smaller areas.

The communal and other corporate body forests are clearly larger. The undertakings with less than 20 hectares forests represent 57 % of the privately owned forest area.

The largest undertakings in terms of woodland cover are owned by the state. A state forest undertaking manages between 8,000 and 15,000 hectares and mostly also performs stewardship tasks for private and municipal forests. The Federal Government currently owns around 410,000 hectares. These are predominantly forests intended for military purposes.

Proportion of woodland areas in the *Länder* (in %)	
Baden-Württemberg	38
Bavaria	36
Brandenburg and Berlin	35
Hesse	42
Mecklenburg-Western Pomerania	23
Lower Saxony, Hamburg and Bremen	24
North Rhine-Westphalia	26
Rhineland-Palatinate	42
Saarland	38
Saxony	28
Saxony-Anhalt	24
Schleswig-Holstein	10
Thuringia	32
Germany as a whole	**31**

Table 1: Share of forests in the *Länder* (Second National Forest Inventory 2002)

Forestry groupings

Many forest owners in Germany only own small and fragmented forests that are hard to manage. As self-help organisations, forestry groupings are designed to improve the

economic situation of these undertakings. The forest operations can be conducted as a joint service. This encompasses, inter alia, the harvesting of wood and other forest products, the planting and tending of forest crops, silvicultural treatment operations as well as the construction and maintenance of forest roads. In addition, forest products can be jointly marketed or machines purchased for joint use.
Such types of cooperation have already existed since the mid-19th century. In 1969, the groupings were placed on a uniform legal basis. In Germany, there are currently around 4,300 forestry groupings with more than 400,000 members who together own 3.8 million hectares of forests. This corresponds to more than one third of Germany's forest area.

Right of access for everyone

In Germany, anybody can enter forests for recreational purposes at any time and anywhere. It is a right to which citizens are entitled, but also commits them to act responsibly towards the forest owner, nature and other people who take a rest in forests. Forest and nature conservation legislation contains restrictions and requirements for forest visitors, e.g. ban on access to certain areas, ban on smoking and open fire and straying from roads, keeping dogs on a lead and the protection of trees, timber and forestry or hunting facilities.

Forests are facing multiple stress factors

Forests are particularly exposed to abiotic and biotic hazards. Abiotic hazards include gale-force winds, fire, snow, ice and frost. In Germany, storms are of prime importance. They can frequently wreak catastrophic damage. As the table below indicates, heavy storms have accumulated during the last decades, challenging forestry as well as timber markets. Only preventive silvicultural operations can help against windthrow or damage from storm. This includes a site-adapted choice of tree species, a suitable stand structure as well as stable forest edges.

Year	Volume (mio. m^3)
1967	13
1972	17
1975	2
1984	9
1990	75
1993	2
1999	35
2007	37
2008	5
2010	up to 6

Table 2: Forest storm damage in Germany

While forest fires occur frequently in Germany, they only rarely develop into extensive blazes. The main cause is arson and human negligence. Particularly at risk are the pine-rich stands in the northern and eastern *Länder*. Forest fires do not play a major role nationwide.

Damage caused by insects ranks first among the biotic hazards. Pure stands of spruce or pine covering large areas

are particularly susceptible to damage by insects. Natural oak forests, too, can sustain serious damage due to insects.

The so-called new types of forest damage have been observed since the mid-70s. Air pollution causes transformations in tree canopies and notably also damage to forest soils. The substance inputs in forest stands clearly exceed the inputs in open ground and mostly surpass the critical levels for nitrogen and acid inputs. A large part of forest soils in Germany shows, inter alia, marked acidification and base deficiency.

New types of forest damage in Germany			
All tree species (%)			
Year	Defoliation class 0	Defoliation class 1	Defoliation classes 2 – 4
	(without damage)	(warning stage)	(visible damage)
1996	39	39	22
1997	37	41	22
1998	38	41	21
1999	37	41	22
2000	35	42	23
2001	36	42	22
2002	35	44	21
2003	31	46	23
2004	28	41	31
2005	29	42	29
2006	32	40	28
2007	30	45	25
2008	31	43	26
2009	36	37	27
2010	38	39	23

Table 3: New types of forest damage in Germany (National Forest Inventory)

Forestry – Responsibility for many generations

While Germany is generally a country poor in raw materials, it disposes of the largest total growing stock of timber in Europe at ca. 3.4 billion m^3 which is still increasing.

In view of the short supply of fossil resources from crisis-ridden regions of the world, forest utilisation in Germany makes an important contribution to securing the future of the country. Timber is also a valuable domestic source of energy that is enjoying an unexpected revival in the face of the increase in energy prices and increasing demand for CO_2-neutral raw materials.

In addition, forests render services of general interest by performing protective and recreational functions. They play a key role in a densely populated industrialised country like Germany with 230 inhabitants/km^2.

Prime principle: Sustainability

Large production periods, extensive management over large areas, the dependence on natural site conditions such as soil and climate as well the interference of natural phenomena, e.g. storms, snowbreakage and ice-break, are features which essentially distinguish forestry from other lines of production. However, the paramount feature is the principle of sustainability that had already been introduced many centuries ago, i.e. to secure the diverse services rendered by forests for the benefit of the current and future generations on a permanent basis and in the best possible way.

Close-to-nature forest management

Close-to-nature forest management uses natural processes to develop both ecologically and economically valuable forests. Forest management in Germany virtually dispenses with pesticides and fertilizers. According to studies, there are only minor differences regarding species diversity between ecologically compatible mixed forest management and unmanaged natural forests.

Bigger game animals (roe deer, red deer, fallow deer and wild boar) still have secure habitats in spite of Germany being densely populated. In addition, forest ecosystems offer life opportunities for a large number of other animal species, notably also rare bird species, bats, amphibians and reptiles. Many insect species and soil organisms encounter living conditions there that have become rare outside of forests due to intensive human exploitation. Moreover, forests provide a large number of endangered plant species with a basis for their existence. This holds true especially for those species that require more nutrient-deficient sites that have not been impaired by mineral fertilisation.

Silviculture makes it possible

The task of German silviculture consists in shaping forests in such a way that timber is being efficiently produced, that the biological productive base of forests is being maintained and improved and that the services rendered by forests remain usable by humans in a sustainable manner. The multitude of objectives of silvicultural management – depending on the respective site – has resulted in a multitude of silvicultural operations, that is in differentiated treatment and regeneration methods.

The following principles are generally pursued today:

- conserving and establishing structurally diverse and close-to-nature mixed forests,
- planting of site-adapted and stable tree species and provenances,
- utilisation of natural regeneration where soil and previous stand allow it,
- largely dispensing with clear-cuttings,
- multi-storied forest structure, if possible, to make maximum use of soil and air space,
- adapting the intensity of silvicultural treatment to individual stands,
- stand-conserving wood harvesting,
- maintaining soil fertility and increasing it, if possible,
- using foreign tree species only after having examined the beneficial effect of their use in ecological and economic terms.

The aim is to implement close-to-nature forest management throughout Germany. This objective has in Germany already generated an increasing proportion of structurally diverse mixed stands, long regeneration periods and natural rejuvenation methods. Forest management largely dispenses with clear-cuttings.

High forest management is the predominant silvicultural system in Germany. The stands are either naturally or artificially regenerated at the end of a long production period (80 to 300 years depending on the tree species). Plenter forests (variable/multi-aged forests) constitute a type of forest that is close to nature. Here, trees of different age classes stand side by side. Regeneration takes place here on a continuous basis, more or less. Selective cutting use or group-selection cutting are carried out in plenter forests. Natural regeneration can develop or already existing regeneration can be used in the spaces opened up by cutting. The "plenter idea" with forest management by individual trees (single-stem working) and multi-storied forest structure has had a stimulating effect on many other silvicultural methods over many decades.

Coppice forests and coppice-with-standards forests are rare today, but they are interesting in historical as well as in ecological terms. They are, inter alia, based on a regeneration of stands at intervals of a few decades by means of coppice shoots and root suckers. As far as the appearance of stands is concerned, these coppice stands and coppice-with-standards stands clearly differ from high forests. This type of management was widespread in the Middle Ages in particular and served to cover the requirements of tanning wood and fuel wood.

Promotion of species diversity

The incidence of rare flora and fauna is also fostered by targeted measures or omissions such as

- the establishment, tending and conservation of close-to-nature forest edges,
- leaving deadwood in forests,
- the conservation and upkeep of special biotopes in forests, e.g. wetlands, heathland and xeric grassland,
- the protection of certain species such as red ants, bats, birds or orchids,
- the targeted conservation, stewardship or repeated planting of rarer tree species such as forest fruiting trees, common yew or chequer trees als well as through
- the maintenance of historical types of forest use such as coppice forests and coppice-with-standards forests.

Forests in protected areas

The protection of forests also plays a key role in a densely populated country like Germany. The first nature conservation area in Germany had already been established in 1836. In the subsequent decades, a diversified protected area system evolved in Germany and proved its worth. According to the MCPFE[1] Assessment Guidelines for protected and protective forest and other wooded land in Europe, the different protected areas can be divided into three broad categories:

- According to NFI[2] around 0.9 % of Germany's forest areas have been placed under absolute protection where no harvesting or other interventions are conducted. Following the National Biodiversity Strategy, this percentage is planned to increase up to 5 % within the years to come.
- On approx. 25 % of Germany's forest area, biodiversity functions take precedence over forestry operations. Silvicultural activities in protected areas of this category are targeted at a positive impact on the protection objectives. In some *Länder*, the percentage of these protected areas ranges between 30 and 40 % of the respective total forest area. Among this, 17 % of the forest area are covered by the EU protected area network "Natura 2000" (EU's birds directive and habitat directive).
- 57 % of forests in Germany have been designated as protected areas, where priority is given to the recreational function of forests as well as to the overall productive and functional capacities of the natural environment.

It has to be noted at this point that areal overlaps with the above described protection category occur but can not be avoided nor estimated. In addition, many forest areas in Germany also exercise functions protected by law, e.g. as water protection and erosion control areas.

1) MCPFE: Ministerial Conference on the Protection of Forests in Europe
2) NFI: Second National Forest Inventory 2002

Forest-based industry in Germany

According to current surveys, the forest- and timber industry, including processing and paper as well as printing and publishing, comprise nearly 1.3 million jobs with an annual turnover of about 170 billion €. The turnover of the forest industry amounts to 5 billion Euro. Thus, the forest-based sector does not lag far behind other major economic sectors in Germany in terms of turnover and jobs (the steel sector attained 26 billion Euro and the mining sector 14 billion Euro). The socio-economic importance of forestry and the wood-based industry in Germany has so far been seriously underrated by business and scientific communities and by policy-makers.

Enterprises, workers and turnover in the German timber– and paper industry[1)]

Economic sector	Enterprises		Workers		Turnover in billion EURO	
	2008	2009	2008	2009	2008	2009
Total timber- and paper industry	63,184	60,147	640,745	589,429	109.9	94.2
Roundwood processing	2,094	2,515	41,346	39,306	10.5	9.2
Secondary wood processing (excluding furniture manufacturing and timber related building crafts)	10,881	9,422	103,580	91,775	11.7	10.2
Furniture industry and manufactoring craft (including materials other than wood)	10,398	8,127	170,006	136,038	27.8	18.0
Timber-related building crafts	28,479	28,789	116,790	122,026	5.7	6.3
Timber wholesale trade	11,063	11,063	167,426	161,286	37.7	36.6
Paper industry	269	331	41,597	38,998	16.5	13.9

1) Data were, in part, newly calculated since 2004. No comparability with previous results. Source: Federal Statistical Office/BMELV (532)

Table 4: Structure of timber and paper sector in Germany (without related sectors such as printing or publishing)

Forest-based industries play a major role notably for the regional economic and rural employment structures because it is mainly composed of small- and medium-sized enterprises and mostly located in rural areas. Some suppliers with large market shares prevail merely in a few capital-intensive sectors such as the panel- or paper industry.

Germany ranks among the key "wood countries", not only in Europe but on a global scale. This holds true for production as well as for foreign trade in wood and wood-based products. The EU Member States are the key trading partners. In spite of an incomplete exhaustion of the annual timber increment and thanks to an intensive recycling, Germany is in a position to cover the requirements of wood and products mainly from its own resources . Sulphate wood pulp as one of the products which Germany lacks most must mainly be procured on the global market.

A steady process of concentration has been under way in the timber- and paper sector since the early 1990s that has involved increases in capacity as one result of globalisation. During the last years fuelwood has gained importance because of increasing energy prices and promotion of renewables.

There are no specific state aids for the timber- and paper industry. However, measures that are generally targeted at promoting the structures and technological progress also benefit these sectors (e.g. policies to promote sustainable buildings and energy saving refurbishment).

In 2009, the entire wood consumption amounted to approx. 94 million m^3 (sum of roundwood, semi-finished and finished products in roundwood equivalent). This corresponds to a per-capita consumption of around 1.15 m^3 of roundwood equivalent. Hence, Germany occupies a middle position by international ranking. Given a 71 % waste paper utilization rate, Germany holds a top position gauged by international ranking.

In 2009, the forest undertakings felled and sold about 48 million m³ of roundwood. The sawmilling industry absorbed over half of this volume. It is by far the most important partner of the forest sector because it resorts to higher-value roundwood, in addition.

Total wood balance in Germany 2009[1)] Millions of m³ (converted into roundwood equivalents)			
Forest resources		**Wood disposition**	
Fellings (calendar year)	48.1	Increase in stock disposal	0.0
Waste paper from domestic production	44.7	Exports	119.9
Recovered wood	10.0	Computed consumption	94.4
Imports	106.2		
Reduction of stocks	5.4		
Total resources	**214.3**	**Total disposition**	**214.3**

1) preliminary result

Table 5: Total wood balance in Germany 2009

Forest and game

In Germany, the hunting right is a property right that is tied to land. It is either exercised by the landholders themselves or leased out. Over 80 % of the hunting area is privately owned. The hunting right does not only include the permission to hunt certain game species, but also commits the hunter to engage in wildlife management. The two support pillars of German hunting are the so-called hunting district system and the wildlife management duty imposed on hunters.

Hunting district system

The hunting district system establishes the local competence and personal responsibility of holders of hunting rights for their districts. The hunting district system allows year-round nationwide monitoring by well-trained hunters. They provide information on the population status of wild game, for instance. Systematic monitoring of forest districts also offers a basic for research.

Wildlife management requirement

Hunters are called upon to preserve the habitats of game in our highly industrialised and densely populated country of Germany. Wildlife management means only to remove as much game as the population development allows, to maintain the basic living conditions of game as well as to avoid hazards (e.g. diseases and accidents caused by game). Wildlife management must be carried out in such a way as to prevent adverse effects on farming, forestry and fisheries, notably through damage caused by game. Wildlife preservation is embedded in the protection of biotopes and species. Measures conducted by owners of forest districts to improve habitats do not only serve the huntable game, but also benefit a large number of non-huntable animals subject to year-round protection.

Forest policy: Balance between different interests

Due to their economic benefits, their services for the environment and for public recreation in the open countryside, forests are of crucial importance for the national economy, nature and society in Germany.

It is therefore a key aim of forest policy to preserve forests with regard to their size and services, to increase the woodlands, if required, and to ensure their sound and sustainable management .

The legislator mentioned this objective in the introduction to the 1975 Federal Forest Act and combined it with two further targets of forest policy: the support of forestry and striking a balance between the interests of general public and the interests of forest owners. The Federal Forest Act constitutes a framework law enacted by the Federal Government for the German forest sector. It is filled out by *Länder* acts which take the typical regional forest and forest ownership patterns into account. The above-mentioned aims can only be achieved by close cooperation between the Federal Government and the *Länder*.

Germany will need productive forestry and wood-based industries in the future and to maintain the diverse forest functions in the long run. Only the profitable sale of forest products allows forest undertakings to conserve forests and manage them sustainably.

With the increasing economical and ecological requirements Germany is now developing a “Forest Strategy 2020”, based on the “German Sustainability Strategy”. This takes earlier recommendations (2000, 2004, National Forest Programme) about sustainable forest management, biodiversity, economic importance, etc. into account.

The Forest Strategy 2020 aims for a new balance of the requirements and the potential of forests. The framework for this new approach shall enable forest undertakings and forest industry to achieve the balance independently.

Support schemes for forestry

Forestry receives public funding due to its diverse functions. Support is primarily aimed at creating the framework conditions that allow enterprises to preserve forests and manage them sustainably. Assistance is given to non-governmental forest owners to overcome structural drawbacks, inter alia, e.g. small and frequently fragmented forest areas, so that they can operate their forest estates more successfully in the long run. The Federal Forest Act provides for forestry support via economic, transportation, agricultural, social and fiscal policies.

The support schemes for forestry under the Federal Government/*Länder* Joint Task for the Improvement of Agricultural Structures and Coastal Protection constitute the core of support for forestry. The Federal Government contributes 60 % of the funding and the *Länder* 40 %. The EU, too, can provide funding for forestry operations via the "European Agricultural Fund for Rural Development".

Such operations include, for example:

- initial afforestation
- measures to foster close-to-nature forest management
- forestry groupings
- forest infrastructure.

Support is related to individual measures. Every year public funding amounts about 100 Mio. € for private and communal forests. In statistical terms, 14 €/ha of forests are spent on support per annum.

Fiscal aids

Fiscal measures, too, directly benefit forest enterprises, for example, rules allowing tax relief for forest enterprises in the event of damage events due to force majeure. The flat-rate calculation of the turnover tax also eases the burden on forest enterprises because the accounting effort with the tax office remains limited.

Aid in the event of natural disasters

If large timber quantities suddenly arise in the event of large-scale disasters caused by storms, insect infestation, immissions or comparable causes of damage and if supra-regional market disturbances can be expected, the Federal Minister of Food, Agriculture and Consumer Protection can order a temporary felling restriction. This restriction is designed to stabilise the raw wood market. In addition, tax reliefs can be granted to cope with the consequential damage.

Forests around the globe: international cooperation is required

Approx. 13 million hectares of forest are currently destroyed per year, especially in the tropics. This results in an irretrievable loss of a key natural heritage and destroys an important natural resource whilst jeopardising the climate and natural balance of the earth. But also outside of the tropics the condition of other large woodlands is deteriorating due to unsustainable or illegal exploitation or environmental degradation and other factors.

Germany's objective in the field of international forest policy is that the multiple contributions of forests to the alleviation of poverty, to food security and rural livelihoods as well as to environmental conservation, climate protection and a green economy need to be more widely acknowledged at all levels. And they should be safeguarded and fostered through a sustainable forest management which takes all the existing and potential products and services provided by forests into account. To this end, an effective coordination of the diverse international efforts to control deforestation and forest degradation and to promote sustainable forest management is required to enhance their impact.

In global terms, Germany is one of the largest donors of development cooperation projects for forestry. Germany is actively involved in relevant activities of various programmes and agreements of the United Nations such as the Framework Convention on Climate Change, the Convention on Biological Diversity, the International Tropical Timber Agreement or the United Nations Forum on Forests. Most recently, in the context of the ongoing climate negotiations (Copenhagen 2009, Cancun 2010), Germany is putting emphasis on supporting multilateral initiatives for Reducing Emissions from Deforestation and Degradation (REDD)

supporting voluntary measures in pilot countries. Apart from measures abroad, Germany is also actively supporting activities and legislation of the European Union against trade with and consumption of timber from illegal sources. A national procurement policy that promotes timber from sustainably managed forests and an initiative to develop a fingerprinting methodology for timber to identify timber species and origins at customs are among the national support measures.

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