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für Ernährung
und Landwirtschaft

**Poplars and other Fast-Growing Trees in Germany:
Report of the National Poplar Commission
2020-2023**

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**Poplar Commission
of the
Federal Republic of Germany**

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Report of the National Poplar Commission**

Time period: 2020-2023

Abstract

Poplars and other Fast-Growing Trees in Germany: Report of the National Poplar Commission. Progress report 2020 – 2023

Every four years, the National Poplar Commissions report on the progress of the International Poplar Commission IPC, one of the oldest, firmly established organizations of the FAO (Organization for Food and Agriculture of the United Nations). The reports will be collected and published for the 27th session of the International Poplar Commission in Bordeaux in October 2024. For Germany, the Thünen Institute for Forest Genetics is compiling the report on behalf of the Federal Ministry of Food and Agriculture.

With the reform of the Poplar Commission, the tree species spectrum was expanded to include fast-growing tree species. In Germany, in addition to poplars and willows, twelve other tree species are considered fast-growing.

Based on the figures from the Federal Forest Inventory (2012), the area of fast-growing tree species is 1.645 million ha. The most common fast-growing tree species is *Betula pendula* (474 700 ha) followed by *Alnus glutinosa* (229 250 ha), *Larix decidua* (223 600 ha), *Pseudotsuga menziesii* (217 600 ha) and *Populus* spec. (147 900 ha, incl. willow SRC).

The current cultivation of poplars and willows is largely limited to short rotation coppice plantations (SRC). In Germany the total short-rotation coppice area is currently stagnating at 6 600 hectares. The factors responsible for this are attractive alternative crops, in particular maize cultivation for biogas, combined with the extensive ban on the conversion of grassland and a lack of impetus from the Greening Regulation passed at EU level.

No poplar clones were approved in the reporting period. An extension of the approval was recommended for four aspen clones. Furthermore, changes to the approval as basic material for the production of forest reproductive material in the "Tested" category were recommended for several parents of families for the production of hybrid larch progenies.

A total of 17 research projects and 38 joint research projects (with together 117 projects) carried out at 60 institutions in Germany on the genetics and breeding, cultivation, physiology, resistance of fast-growing tree species and the harvesting and utilisation of their wood, as well as on socio-economic and socio-ecological aspects were funded by third parties and have been included in the report. Also, 142 publications are listed in the report.

Key words: *Populus*, *Salix*, *Larix × eurolepis*, *Robinia pseudoacacia*, *Larix decidua*, *Quercus rubra*, *Pseudotsuga menziesii*, cultivated area, short rotation coppice, forest reproductive material, research projects, publication

Zusammenfassung

Pappeln und andere schnellwachsende Baumarten in Deutschland: Bericht der nationalen Pappelkommission. Fortschrittsbericht 2020 - 2023

Alle vier Jahre berichten die Nationalen Pappelkommissionen über den Entwicklungsfortschritt der Internationalen Pappelkommission IPC, eine der ältesten, festverankerten Organisationen der FAO (Organisation für Ernährung und Landwirtschaft der Vereinten Nationen). Die Berichte werden gesammelt und zur 27. Tagung der Internationalen Pappelkommission in Bordeaux im Oktober 2024 veröffentlicht. Für Deutschland stellt das Thünen-Institut für Forstgenetik im Auftrag des Bundesministeriums für Ernährung und Landwirtschaft den Bericht zusammen.

Mit der Reform der Pappelkommission wurde das Baumartenspektrum auf schnellwachsende Baumarten erweitert. In Deutschland werden neben Pappeln und Weiden zwölf weitere Baumarten als schnellwachsende betrachtet.

Anhand der Zahlen aus der Bundeswaldinventur (2012) ergibt sich eine Fläche mit schnellwachsenden Baumarten von 1,645 Mio. ha. Die häufigste schnellwachsende Baumart ist die *Betula pendula* (474 700 ha) gefolgt von *Alnus glutinosa* (229 250 ha), *Larix decidua* (223 600 ha), *Pseudotsuga menziesii* (217 600 ha) und *Populus spec.* (147 900 ha, incl. Weide KUP).

Der aktuelle Anbau von Pappeln und Weiden beschränkt sich weitgehend auf Kurzumtriebsplantagen. Die gesamte Kurzumtriebsplantagenfläche stagniert in Deutschland derzeit bei 6 600 Hektar. Dafür verantwortliche Faktoren sind attraktive Alternativkulturen, insbesondere Maisanbau für Biogas, verbunden mit dem weitgehenden Verbot der Umwandlung von Grünland sowie mangelnde Impulse aus der auf EU-Ebene beschlossenen Greening-Verordnung.

Im Berichtszeitraum wurden keine Pappelklone zugelassen. Für vier Aspenklone wurde eine Verlängerung der Zulassung befürwortet. Weiterhin wurden bei mehreren Familieneltern zur Erzeugung von Hybridlärchen-Nachkommenschaften Änderungen in der Zulassung als Ausgangsmaterial zur Erzeugung von forstlichem Vermehrungsgut in der Kategorie „Geprüft“ empfohlen.

Siebzehn Forschungsprojekte und 38 Verbundprojekte (mit zusammen 117 Einzelvorhaben) wurden durch Drittmittel an 60 Institutionen in Deutschland zur Genetik und Züchtung, Anbau, Physiologie, Resistenzen von schnellwachsenden Baumarten sowie Ernte und Verwertung ihres Holzes und zu soziökonomischen bzw. -ökologischen Aspekten gefördert. 142 Veröffentlichungen sind im Bericht erfasst.

Schlüsselworte: *Populus*, *Salix*, *Larix × eurolepis*, *Robinia pseudoacacia*, *Larix decidua*, *Quercus rubra*, *Pseudotsuga menziesii*, Anbaufläche, Kurzumtriebsplantage, forstliches Vermehrungsgut, Forschungsprojekte, Veröffentlichung

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I. POLICY AND LEGAL FRAMEWORK

Policy

In Germany, forests are a defining part of the cultural landscape. The forest area is approximately 11.4 million hectares, which is 32 percent of the land area. Forestry controls forest development and thus secures the indispensable usage, protectional and recreational functions of forests that go far beyond wood production. The forests in Germany fulfill a variety of functions simultaneously and in the same area. Forestry in Germany is sustainable and multifunctional. The federal forest law stipulates that the forest must be preserved, enlarged if necessary, and that proper management must be sustainably ensured.

The composition of tree species in our forests is changing. The conversion of the forest to more hardwood is desirable from a silvicultural and ecological point of view, but technologically it is a challenge, especially for the established sawing industry, which is geared towards softwood. Like other industrial branches, forestry is subject to the style of a period, too.

The waves that forest tree breeding has gone through are particularly evident in poplar breeding. In the 1950s, the demand for fast-growing tree species to cover the wood demand boomed. However, this collapsed in the mid-1970s with the dissolution of the National Poplar Association. A new wave started ten years later when it came to producing wood in short rotation coppice plantations on agricultural sites that are no longer used for food production. In the mid-1990s, however, it had already subsided. In 2008, poplar breeding experienced a renaissance in Germany with the call for wood from short rotation coppice plantations as a renewable energy resource. Well-growing poplar clones and progenies were quickly required here. The previously set breeding programs were reactivated with great effort. Within the framework of several projects funded mainly by the Federal Ministry of Food and Agriculture (BMEL) via the FNR (Fachagentur Nachwachsende Rohstoffe e. V.) - especially FastWOOD - new crossings and tests were carried out with poplar offspring in order to provide propagation material of the category "tested". In not even a decade, breeding was once again stopped. In the meantime, politics had started to rely on biogas and the raw material maize. The ecological advantages of short rotation coppice plantations were not taken into consideration. Poplars continue to be insignificant in forestry, despite the immense clear-cut areas caused by the calamities of recent years.

In forest tree breeding for all other tree species, the biggest cutback occurred around 30 years ago when forest tree breeding at the state research centres and the federal government was drastically reduced. The staff employed in this labour-intensive area was reduced at all institutions, and some institutions ceased breeding activities or were closed down completely.

In November 2011, the workshop "Forest Tree Breeding" organised by the Thünen Institute of Forest Genetics and the FNR revealed great potential for improving forest trees, ensuring genetic sustainability and adapting forestry to climate change by spreading and minimising risk. Implementation requires time as well as human and material resources. As a result, a forest tree breeding strategy was developed. This was implemented primarily from the newly created Forest Climate Fund funding programme (WKF), through which no new projects have been approved since the end of 2023. This cutback means that long-term forest plant breeding is still not guaranteed.

Legal framework

The "**Act on the Conservation of Forests and the Promotion of Forestry**" (Federal Forest Act) is the most important instrument for protecting forests in Germany. It is implemented and supplemented by the forest laws of the federal states. In Germany, all forests are under the protection of the federal forest law and the state forest laws. The forest laws protect the forest from improper treatment, overuse, overexploitation and loss of land. They oblige forest owners to manage the forest properly and sustainably and to reforest bare forest areas.

With the amendment of the Federal Forest Act of July 31st, 2010, short rotation coppice plantations and agroforestry sites are no longer legally valid as forests. This implies that no afforestation authorisation is required for the establishment of short rotation coppice plantations or agroforestry sites, respectively, with a rotation time of max. 20 years outside forest areas. The area can also be converted back for food production at any time without having to apply for a clearing or conversion authorisation. This is intended to make it easier to establish short rotation coppice plantations outside the forest, but has so far not led to an increased number of such areas. Obviously, there are other reasons, e.g., unfavorable general conditions, reduced operational flexibility of farmers and high profit margins for the cultivation of alternative agricultural products.

The "**Act on Forest Reproductive Material**" (FoVG) regulates the trade in forest reproductive material (seeds and planting material, parts of plants). It serves to preserve and improve the forest in its genetic diversity and is intended to protect forest owners and the forest from the use of unsuitable propagation material. The regulations of the FoVG also apply to short rotation coppice plantations and agroforestry sites, since the cultivation of tree species for wood production also pursues a forestry purpose on agricultural land.

This means that the provisions of the FoVG have to be implemented for the production of propagation material, the establishment of stool beds and marketing. The marketing of sticks is only permitted by companies registered in accordance with FoVG. These regulations serve consumer protection, since, e.g., there are large differences between the individual poplar clones in terms of growth performance, resistance to biotic and abiotic damage events and the ability to regenerate after pruning.

All poplars and the species of hybrid larch and black locust treated below are subject to the FoVG, but not the willows.

Agricultural woodland (agroforestry systems, short-rotation coppice plantations) is classified as **eligible** permanent crops. However, the possibility of eligibility under the single farm payment exists only for certain types of wood (GAP-Direktzahlungs-Verordnung - GAPDZV). Of the fast-growing tree species covered in this report, all except *Robinia pseudoacacia* and *Quercus rubra* (as well as eight other species not covered in the report) are eligible for cultivation in agroforestry systems. In the case of new short rotation coppice plantations established from 1 January 2022, the cultivation of all *Salix*, *Populus*, *Betula* and *Alnus* species as well as *Fraxinus excelsior*, *Quercus robur* and *Q. petraea*, but no longer *Robinia* species and *Quercus rubra*, are eligible.

At European level, there are several plans to fundamentally change the legal area as part of the **Green Deal**. For example, the EU Commission has submitted several proposals with the aim of regulating the legal area uniformly in future by means of EU regulations (priority: harmonisation) and no longer via EU directives, which are transposed into national law taking into account regional specificities (priority: flexibility to take regional circumstances into account).

II. Technical information

1. Taxonomy, nomenclature and registration

Taxonomy, nomenclature

There is no binding definition of which tree species are categorised as fast-growing. The Green book for innovation in sustainable management of fast-growing trees (chapter 3.1) prepared by the IPC/FAO, which is to be published in 2024, lists a further 6 tree species or groups of tree species that are of economic importance in Germany in addition to the Salicaceae (*Populus* and *Salix*). Two publications exist in Germany (EISENREICH H 1956: Schnellwachsende Holzarten. Dt. Bauernvlg. and LÜDEMANN GH 1998: Schnellwachsende Baumarten in Wald und Landschaft Norddeutschlands. Ges. zur Förderung schnellwachsender Baumarten in Norddeutschland e.V.), which are specifically dedicated to the topic of fast-growing tree species and contain lists of tree species. The tree species list in EISENREICH (eastern Germany) is the most comprehensive, followed by that in LÜDEMANN (north-west Germany) and that of the IPC/FAO. The tree species currently regarded as fast-growing are summarised in **Table 1**.

Table 1: Tree species categorised as fastgrowing in Germany

Tree species	IPC/FAO (2024)	Lüdemann (1998)	Eisenreich (1956)	Fast-growing this report
<i>Alnus glutinosa</i>	X	X	X	X
<i>Alnus incana</i>	X		X	X
<i>Betula pendula</i>		X	X	X
<i>Betula pubescens</i>		X	X	X
<i>Populus</i> spec, aspen	X	X	X	X
<i>Quercus rubra</i>		X	X	X
<i>Robinia pseudacacia</i>	X	X	X	X
<i>Salix</i> spec.	X	X		X
<i>Pseudotsuga menziesii</i>	X	X	X	X
<i>Picea sitchensis</i>	X	X	X	X
<i>Larix decidua</i>		X	X	X
<i>Larix kaempferi</i>		X		X
<i>Larix xeurolepis</i>	X			X
<i>Abies grandis</i>		X	X	X

A long-established and standardized set with 18 nuclear microsatellite markers is available for genotyping **poplars**. This is very well-suited to carry out clone identification and lineage analysis as well as to obtain taxonomic information. The standard marker set was used to identify breeding material from clone archives,

material from trial areas and from seed plantations, and was also used for pedigree analysis for cross-bred offspring and for off-flowering offspring.

The existing nSSR markers for the genus *Salix* were supplemented and validated. This allows the species to be determined as far as possible and the clones to be identified.

11 microsatellite loci are currently being considered for the genetic characterization of **larch**. The genetic variation recorded here is usually sufficient to differentiate between different genotypes or to recognize genotypes at the same time. The assignment to the species *Larix decidua*, *L. kaempferi* and the hybrids of the first generation is possible with a high degree of certainty.

An established standard set with 14 microsatellite markers is available for **black locust** (*Robinia pseudoacacia*). This makes it possible to distinguish between the clones used in Germany, which have a high genetic variation. Since the mid-18th century, 103 varieties (including some multi-clone varieties) have been selected for *Robinia pseudoacacia* that deviate from the normal form in terms of flower colour, leaf shape, habit and spination. These varieties, which are considered to be validly described, were briefly characterised in LIESEBACH & JABLONSKI (2021).

Approval, registration

According to §4 of the "Act on Forest Reproductive Material" (FoVG), clones are only approved in the "Tested" category. The vegetative production of forest reproductive material that is to be placed on the market may also only take place from raw material of this category (§7 FoVG).

The Advisory Board for the Approval of Basic Material for the Production of Forest Reproductive Material of the Category "tested" [*Sachverständigenbeirat für die Zulassung von Ausgangsmaterial für die Gewinnung von forstlichem Vermehrungsgut der Kategorie „Geprüft“*] was in favour of extending the approval of the Aspen clones Esch2, Esch8, Se1 and Th1291 (all *Populus tremula* × *P. tremuloides*) for a further 10 years.

Furthermore, the Advisory Board for the Approval of Basic Material for the Production of Forest Reproductive Material of the Category "tested" issued a recommendation for the unlimited approval (without conditions) of parents of families for the production of 3 hybrid larch progenies (Cunnersdorf I, Cunnersdorf II and Marienberg) as basic material for the production of forest reproductive material in the "Tested" category. The recommendation is based on their significant superiority in growth performance.

The Advisory Board for the Approval of Basic Material for the Production of Forest Reproductive Material of the Category "tested" also recommended the approval of the European larch clone Feh 17, which has proven its good general suitability for combination in various comparative tests, as basic material of female parent of family for the production of hybrid larch seed in the "Tested" category.

The recommendation is subject to the condition that the production of forest reproductive material of the Feh 17 parent of family must only be carried out in combination with at least 40 clones of Japanese larch from the current Küchengarten seed orchard (Reg. No. 03 5 83800 003 4) as pollinators. These are to be genetically characterised. The European larch parent of family Feh 17 should be represented with at least 25 % but no more than 40 % in a future seed orchard as source material for the production of hybrid larch seed of the "Tested" category.

During the reporting period, the Advisory Board for the Approval of Basic Material for the Production of Forest Reproductive Material of the Category "tested" for the parents of families for the production of the hybrid larch combination "Fichtelberg" recommended the cancellation of the requirements that cultivation be restricted to SO₂-polluted sites up to 800 m above sea level and to (mountainous) sites suitable for larch.

The Federal Agency for Agriculture and Food (BLE), Bonn, maintains the register of clones, clone mixtures and poplar family parents approved in Germany by the bodies responsible under state law. The federal states keep their own registers for all other tree species subject to the FoVG.

A list of poplar clones, clone mixtures and family parents can be downloaded from the following link: https://www.ble.de/SharedDocs/Downloads/DE/Landwirtschaft/Saat-und-Planzgut/Pappelklone_mischungen.pdf?__blob=publicationFile&v=3

An overview of the poplar stool beds and the responsible regional offices can be downloaded under the following link: https://www.ble.de/SharedDocs/Downloads/DE/Landwirtschaft/Saat-und-Planzgut/Pappelmutterquartiere.pdf?__blob=publicationFile&v=5

In Germany, stool beds are registered for the production of cuttings of 69 poplar clones.

Table 2 shows the approved basic material for the production of forest reproductive material for the fast-growing tree species subject to the FoVG.

Table 2: Compilation of the basic material for the production of forest reproductive material (number and ha) (status 01.07.2023)

Tree species	Category "selected"	Category "qualified"	Category "tested"				
	Stands	Seed orchards	Stands	Seed orchards	Clone	Clonal mixture	Parents of families
<i>Alnus glutinosa</i>	292 (1 133 ha)	15 (27 ha)	4 (12 ha)	5 (15 ha)			
<i>Alnus incana</i>	10 (7 ha)	2 (1 ha)					
<i>Betula pendula</i>	110 (217 ha)	6 (5 ha)			7		
<i>Betula pubescens</i>	15 (30 ha)	5 (4 ha)		2 (2 ha)	3		
<i>Populus</i> spp.	19 (21 ha)				62	8	12
<i>Quercus rubra</i>	463 (1 059 ha)						
<i>Robinia pseudoacacia</i>	35 (112 ha)	3 (2 ha)					
<i>Abies grandis</i>	225 (285 ha)	2 (1 ha)					
<i>Larix decidua</i>	595 (1 836 ha)	22 (47 ha)	5 (16 ha)	12 (27 ha)			5
<i>Larix kaempferi</i>	221 (563 ha)	4 (9 ha)		2 (6 ha)			7
<i>Larix × eurolepis</i>				5 (13 ha)			1
<i>Picea sitchensis</i>	8 (18 ha)	1 (1 ha)					
<i>Pseudotsuga menziesii</i>	1992 (4 714 ha)	23 (84 ha)	19 (49 ha)	4 (14ha)	1		4

Protection of plant varieties

For one poplar clone (Fawo2, *Populus maximowiczii* A. Henry × *P. trichocarpa* Torr. & A. Gray), the Community Plant Variety Office (CPVO) in Angers / France granted the variety protection applied for (Application number: 20162918) on 17 January 2022. Another clone (Fawo1) was not granted plant variety protection.

2. Domestication and conservation of genetic resources

Domestication of genetic resources

In the context of multifunctional forestry, the sustainable use of forest genetic resources is used to provide the useful, protective and recreational services of the forest. In addition to the location and the silvicultural treatment, the highest possible biological diversity of the forests is a crucial basis for their performance. Above all, genetic adaptability and adaptability ensure the stability of the forests, which is necessary for all uses. In particular, they ensure the reactivity of the forests through resistance to biotic and abiotic harmful factors.

The cultivation of poplars, willows and other fast-growing tree species has so far played only a minor role. In view of the dramatic forest damage caused by drought, storms and beetle damage during the past years, this could change. This allows cultivation of these tree species in the forest, in whose protection the target tree species can be introduced and develop. By using the forest tree species, the forest owner can achieve proceeds early. Various types of poplar and their hybrids and hybrid larches are particularly suitable as forest tree species.

Forest tree breeding in particular depends on the conservation and use of forest genetic resources and their diversity. The aim of forest plant breeding is to provide propagation material with high adaptability, growth performance and quality. In addition, propagation material with special stability and production characteristics can be made available for forestry by breeding. In November 2013, the "Strategy for the medium and long-term supply of high-quality forest reproductive material through breeding in Germany" was published (LIESEBACH et al. 2013, Thünen Report 7). The strategy was prepared against the background of the predicted climate change and includes the fast-growing tree species Douglas-fir (*Pseudotsuga menziesii*), European and Japanese larch (*Larix decidua*, *L. kaempferi*), as well hybrid larch (*L. × eurolepis*).

The implementation of the breeding strategy takes about 15 years and was started with the projects "FitForClim" and "AdaptForClim" funded by the Forest Climate Fund. In the first step, plus trees were selected; grafts were harvested from them, propagated through grafts and planted in clone archives to protect genetic resources. Afterwards, seeded plantations are to be created with the secured plus trees, which produce high-quality, adaptable, powerful and resistant forest seeds. Deployment zones were identified for the use of the planting material. Currently, seed orchards with the fast-growing tree species Douglas fir and larch are being planted as an example for the north-east Germany deployment zone in a project that is also still being financed by the Forest Climate Fund (WKF).

From 2009 to 2018, suitable poplar and willow clones were bred in three successive FastWOOD projects funded by the FNR for the production of **energy wood** in short-rotation coppice plantations (SRC). Numerous trial plots were established to test them. These have now reached the age at which they can be analysed and further approvals can be applied as basic material for the production of forest reproductive material on the results.

Tables 3 and 4 summarise the seed harvests of fast-growing tree species and the number of poplar cuttings harvested in the period from 2020 to 2023. The seed quantities vary from harvest year to harvest year. The amount of seeds varies depending on the tree species. Of the poplar cuttings and aspen plants produced in Germany, 5 % are transported to another EU member state each year. These are aspen clones from *in vitro* cultivation, the production of which begins at the start of the tree nursery year. As a result, their share in the current nursery year is 95 %, as cuttings are not produced until after the turn of the year.

Table 3: Sees harvests in 2020-2023

		Seed harvest [kg]				Plants [number]
Tree species	Harvest year	Stands		Seed orchards		Category
		Category "selected"	Category "tested"	Category "qualified"	Category "tested"	"selected"
<i>Populus spp.</i>						
	2019/20	1 096.6				
	2020/21					26 150
	2021/22	0.4				24 028
	2022/23	0.4			0.3	
	2023/lfd.	0.2				
<i>Larix × eurolepis</i>						
	2019/20				16.6	
	2020/21				9.6	200
	2021/22					
	2022/23				74.3	
	2023/lfd.				27.1	
<i>Robinia pseudoacacia</i>						
	2019/20	593.0				
	2020/21					
	2021/22			33.6		
	2022/23	290.0				
	2023/lfd.			460.8		
<i>Abies grandis</i>						
	2019/20	653.9		2 560.0		50 600
	2020/21	1 723.0				3 085
	2021/22	415.5		49.3		132 950
	2022/23	1 799.3		85.6		3 570
	2023/lfd.	210.6				700
<i>Alnus glutinosa</i>						
	2019/20	110.1		133.3	22.1	
	2020/21	1.8		33.2		
	2021/22	305.4		205.9	189.7	
	2022/23	15.9		38.8	40.3	
	2023/lfd.	13.8		59.1		

<i>Alnus incana</i>					
2019/20	5.3				
2020/21					
2021/22					
2022/23					
2023/lfd.					
<i>Betula pendula</i>					
2019/20	682.6		96.4		
2020/21	161.6		25.6		
2021/22	271.9		2.2		
2022/23	127.2		48.5		
2023/lfd.	228.2		215.5		
<i>Betula pubescens</i>					
2019/20	127.7				
2020/21	54.5		26.6	60.7	
2021/22					
2022/23				35.6	
2023/lfd.	44.0				
<i>Larix decidua</i>					
2019/20	147.6	86.8	654.1	146.3	16 617
2020/21	1 339.9		101.5		
2021/22	414.3	17.6	68.0	39.7	
2022/23	66.1		198.4	91.0	
2023/lfd.	400.4	7.9	156.6	425.6	
<i>Larix kaempferi</i>					
2019/20	128.2		0.9		
2020/21	41.5		0.2		
2021/22	40.1		0.5		
2022/23			1.8		
2023/lfd.	76.9			76.4	
<i>Picea sitchensis</i>					
2019/20	24.2		4.2		
2020/21	6.1		3.3		
2021/22	2.7				
2022/23	22.1		3.5		
2023/lfd.			1.3		
<i>Pseudotsuga menziesii</i>					
2019/20	626.3		238.1	41.0	
2020/21	2 609.6	2.4	166.3		10 100
2021/22	27.6		131.8	10.3	2 870
2022/23	1 094.0	38.6	367.1	72.8	2 683
2023/lfd.	677.1		233.5	58.2	

<i>Quercus rubra</i>			
2019/20	178 303.3		34 000
2020/21	32 448.5		9 000
2021/22	32 173.5		
2022/23	51 586.3		20 750
2023/lfd.	196 514.9		

Table 4: Number of produced poplar plants and cuttings, 2020-2023

Tree species	Harvest year	Plants and cuttings [number]	Thereof export [number]
<i>Populus</i> spp.			
	2019/20	2 722 986	131 500 (5 %)
	2020/21	3 271 869	125 000 (4 %)
	2021/22	1 770 283	77 400 (4 %)
	2022/23	3 299 761	60 000 (<1 %)
	2023/24	52 400	50 000 (95 %)

Conservation of genetic resources

The transfer of genetic resources into the next generation of stands, i.e., the rejuvenation of stands, is a crucial step for the conservation and promotion of forest genetic resources. It is fundamentally important from the perspective of forestry conservation that existing genetic resources are largely passed on to a next generation without restrictions and with a future-proof adaptation potential. This applies regardless of whether natural or artificial rejuvenation takes place. Only within the framework of genetically fixed adaptations and adaptability from seed to tree can the performance of and in forests, e.g., be controlled and increased by silvicultural or business measures. The use of forest reproductive material with its inherent genetic information represents an intersection in the consideration of forest practice on the one hand, and the efforts to preserve and promote forest genetic resources on the other hand. Plantations (SRC) from one or fewer clones are an exception here. These are short-lived and are not intended for reproduction.

In the course of conserving forest genetic resources, efforts to conserve pure black poplar (*Populus nigra*) relics have been continued. Collections have been established and supplemented in several federal states for the black poplar, which are to be used in the future as a seed orchard or stool bed. The selection of the mother trees was accompanied by genetic tests to ensure the use of pure species.

Following the recording of black poplar populations in Saxony since 2005 and the designation of harvest stands, two stands were also regularly harvested in the reporting period, plants were grown and made available to various practice partners for reintroduction. The harvest stands are now over-aged and declining and their survival is therefore increasingly endangered. An attempt to rejuvenate the most important harvest stock *in situ* by planting generatively produced offspring from this stock has so far failed due to conflicts of interest (nature conservation authorities, owners). For this reason, preparations are currently being made for the establishment of a black poplar conservation seed orchard.

3. Plant health, resilience to threats and climate change

The breeding projects are concerned with the provision of high-quality, adaptable, high-performance and resistant propagation material. Disease is usually accompanied by weaker growth, as is observed with poplar rust.

Poplar **leaf rusts** of the *Melampsora* genus are among the economically most important fungal diseases in poplars and willows. In general, the rust attack was low in the area. However, differences in infestation could be observed. The intensity of the infestation varied between years and regions. The infestation was higher in wetter vegetation periods and regions than in drier ones. There were also differences between clones, progeny and progeny groups.

Tests confirmed that the hybrids from *Populus tremula* × *P. tremuloides* have a high resistance to *Melampsora* rust. Progeny that is susceptible to rust should therefore not be approved for production, distribution and cultivation, even if they are currently still surviving in the trials and are showing relatively good growth. This also prevents the transmission of *Melampsora pinitorqua*, the causative agent of the rotating pine grate, to susceptible sources of the jaw.

Climate change and the associated increase in extreme events such as storms and drought, e.g., in the past years, as well as the subsequent beetle infestation, pose new challenges to the tree species.

The past dry years led to significant growth losses in poplar plantations (SRC). Higher failures were observed in younger poplar plantations (SRC). On the other hand, failures in young test areas with hybrid aspens were hardly noticeable.

Larger failures due to insect infestation (e.g., bark beetle) after drought occurred in larch stands, particularly in central Germany. However, no distinction was made in the reports between the larch species. Bark beetle infestations also occurred in stands of grand fir and Sitka spruce.

No significant damage is known for the black locust, which is considered to be tolerant to heat and drought.

4. Sustainable livelihoods, land-use, products and bio-energy

Sustainable livelihoods, land-use

The energy transition that has been initiated is associated with climate change and poses further challenges. With the general rise in energy prices, there is a simultaneous increase in the demand for firewood. Wood has become increasingly important as a heat source in climate-neutral heating. This increases the competition between the woodworking industry and the use of wood for energy generation and domestic heating.

On agriculturally (less productive) usable areas, energy wood (wood chips) can be produced in short harvest intervals in SRC with fast-growing tree species. The focus is on tree species that have the property of sprouting again after harvesting. Depending on the type of soil and the amount of precipitation, poplars, willows and black locust are particularly suitable. The aim is a sustainable timber yield of 10-12 t absolute dry matter per year and hectare.

For example, Energy Crops GmbH, a company of the Vattenfall Group, manages around 2,000 ha of SRC in Brandenburg and in neighboring western Poland. The company is supplying some of the wood chips to the biomass thermal power station Märkisches Viertel in Berlin. Energy Crops also offers a long-term secure fuel supply for the housing industry and other heat users. The company relies on close, long-term cooperation

with regional agriculture. The cooperation aims to produce and offer the wood fuel over 20 years and at clearly calculable prices.

In times of fluctuating producer prices, the energy crops offer planning security and an additional perspective of sustainable management. It also provides the housing industry and other heat users a stable framework for regenerative heat supply in a time that is difficult to understand in the energy sector.

Products and bio-energy

The poplars, willows, hybrid areas and black locust are used in conventional rotation times according to the usual forestry methods. The sorting is done according to the legal regulations on legal trade classes for raw wood.

The biomass produced in SRC is primarily important as a solid fuel, which is mainly burned as wood chips and to a small extent as pellets in specially adapted boiler systems. Processes for the gasification of wood biomass (pyrolysis) or liquefaction for fuels (Fischer-Tropsch process) have not yet reached practical maturity.

5. Environmental and ecosystem services

Forest management in Germany is extensive compared to other forms of land use. This supports and preserves the diversity typical of the habitat. Willows and black locust, as well as most poplars, are characterized by special ecological tree characteristics (e.g., coarse bark, bark pockets, tree hollows, dead knots) with increasing age, which are habitats for numerous living things.

The biodiversity of the forests interacts with the landscapes and ecosystems adjacent to the forests. Woody structures have always played an important role in agricultural landscapes. They still perform important functions today. For example, they represent a habitat for numerous species, offer wind protection, shape the landscape in different ways and connect biotopes.

Agricultural wood with fast-growing trees for energy production has great potential, particularly in cleared agricultural landscapes, to enrich structural diversity and other habitat resources and thus biodiversity, especially that of insects. This applies both to agricultural wood in plantations and to agroforestry systems.

The management of a SRC is generally extensive because it requires little or no use of fertilizers or chemical pesticides. The latter is usually limited to the establishment phase. This results in a lower CO₂ balance and significantly higher biodiversity than with many other bio-energy sources.

III. GENERAL INFORMATION

1. Administration and operation of the National Poplar Commission or equivalent organization

The National Poplar Commission is chaired by the head of Unit 515 (Sustainable Forest Management, Timber Market) of the German Federal Ministry of Food and Agriculture. The secretariat of the National Poplar Commission is maintained by the Federal Ministry of Food and Agriculture.

In Rome / Italy (4-8 October 2021), at the 26th meeting during the virtual session of the International Poplar Commission (IPC), a representative from Germany was elected to the Executive Committee of the IPC.

At the virtual 51st meeting of the Executive Committee on 4 October 2021 in Rome and at the 52nd meeting of the Executive Committee from 28 to 30 September 2022 in Rome, which included the workshop "Management of mixed and pure planted forests. Stock-taking of science and practice", was attended by the representative on the Executive Committee. He was also present at the IUFRO Eighth International Poplar Symposium (IPS VIII) in Novi Sad (Serbia (virtual)) from 5-6 October 2022.

The representative regularly attended the virtual working meetings of the Executive Committee, which generally take place every two months, during the reporting period.

At the international level, Germany is active in standardising the production and distribution of forest reproductive material at the OECD.

In Germany, the Working Group of the State Institutes for Forest Tree Breeding [Arbeitsgemeinschaft der Länderinstitutionen für Forstpflanzenzüchtung], which is made up of representatives of the federal and state research institutes, meets twice a year. At the meetings, the procedure for joint trials is coordinated and new forest plant breeding trials are prepared. The Advisory Board for the approval of basic material for the production of forest reproductive material in the "Tested" category [Sachverständigenbeirat für die Zulassung von Ausgangsmaterial für die Gewinnung von forstlichem Vermehrungsgut der Kategorie „Geprüft“] recommends the approval of basic material for the production of FRM in the "Tested" category after appropriate examination. The meetings are usually held in conjunction with the meetings of the Working Group of the State Institutes for Forest Tree Breeding.

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3. Relations with other countries

Knowledge transfer

The scientists of the research institutions and universities in Germany are in active exchange of information with those abroad through international conferences.

Plant propagation

In Germany, 21 poplar clones are cultivated *in vitro* and the plants supplied to Sweden are.

Transfer of reproductive material

In spring 2023, the Thünen Institute of Forest Genetics has provided cuttings for the company EGGER in Romania from ten clones of the University of Minnesota, which are maintained in the nursery of the Thünen Institute for trials, on behalf of the university.

With the University of Minnesota, the Thünen Institute is preparing an extension of a material transfer of 47 clones of *Populus deltoides* Bartr. and *Populus × euramericana* Dode (Guinier), which are currently in the form of living plants in the poplar collection in the nursery of the Thünen Institute of Forest Genetics.

Reference database

In the reporting period, leaf samples were exchanged from several species and varieties of poplar in order to expand the reference database for differentiating individuals from different sections and species.

EUFORGEN/EUFGIS

European conservation activities are coordinated and implemented within the framework of the *European Forest Genetic Resources Program* (EUFORGEN). EUFORGEN aims to promote the conservation and sustainable use of forest genetic resources for the benefit of current and future generations. The *European Information System on Forest Genetic Resources* (EUFGIS) documents forest genetic resources in the pan-European area.

The federal states are responsible for selecting suitable conservation stocks in accordance with EUFORGEN guidelines. Conservation stocks are reported via the National Focus Point (NRP) of the participating countries. In order to comply with the different requirements of the federal states with regard to the integrity of the data, the conservation stocks can be updated by the NRP at any time or, if desired, deleted without justification.

As of April 2024, over 3 999 conservation stands of 113 tree species from 35 countries are recorded in the database. Germany is currently represented in the database with 130 conservation stands of 22 tree species. These include eight conservation stands of black poplar, which are located in three federal states (Brandenburg: 1; Bavaria: 6; Saxony: 1). However, the selection of tree species and the designation of

conservation stands for EUFGIS is handled differently by the federal states, which means that the tree species are represented differently.

GenTree

Against the background of climate change and a developing demand for forest products and forest services, the goal of GenTree, a Horizon2020 project, is to equip the European forestry sector with better expertise, methods and tools for the management and sustainable use of forest genetic resources in Europe. Three German partners are involved (Thünen Institute of Forest Genetics, Bayerisches Amt für Waldgenetik and the Phillips University Marburg).

GenTree improves the state of in-situ and ex-situ conservation of forest genetic resources and supports the designation, conservation, characterization, evaluation and use of important forest genetic resources in breeding and forest practice as well as in politics. The project also intends to standardize, rationalize and improve the management of existing collections of genetic resources and specialist databases. The European strategy for cooperation in research and development will also be strengthened.

The project develops new strategies for the dynamic conservation of forest genetic resources in Europe. These are based on an improved phenotypic and genotypic characterization of important European tree species (including the black poplar) in their distribution area and derived adaptation reactions to possible environmental changes. Finally, new forest management scenarios and political framework conditions are developed, which include all aspects of genetic conservation and breeding, in order to better adapt forests and their management to changing environmental conditions and socio-economic requirements.

The most important outputs of the project, which ended in spring 2020, are

- new scientific knowledge on phenotypic and genotypic diversity across environmental gradients in Europe,
- improved genotyping and phenotyping monitoring tools for practitioners,
- updated and refined data for information systems of *in situ* and *ex situ* FGR collections,
- innovative strategies for the conservation, breeding, exchange and utilisation of forest reproductive material,
- novel outreach and science-policy support tools to better integrate FGR concerns into forest management and better implement relevant international commitments in Europe.

DeFAF Agroforst

The German Agroforestry Federation (DeFAF) e.V. is committed to the dissemination of agroforestry systems in Germany. It represents Germany's agroforestry interests and has also been the official German representative of the European Agroforestry Federation (EURAF) since 2020. Many of the relevant stakeholders who work on this topic in practice or scientifically in Germany are organised in the association.

4. Innovations not included in other sections

Research funding

In the reporting period (2020-2023), three research projects and seven joint research projects with a total of 20 sub-projects on genetics and breeding, cultivation, physiology, resistance, wood harvesting and utilisation of poplar, willow, hybrid larch, black locust and other fast-growing tree species and socio-economic and socio-ecological aspects were completed, supported by the federal government (mainly BMEL) and the federal states in Germany (**Table 5**). Furthermore, 14 research projects and 31 joint research projects with a total of 97 sub-projects were approved and started (**Table 6**). This shows the role that fast-growing tree species are expected to play in the future supply of the renewable raw material wood. The focus here is on the material utilisation of wood.

Table 5: Third-party funded projects on poplar and other fast-growing trees species finalised during 2020-2023 (SP= sub-project)

No	Subject matter	Start	End	Donee
Research projects				
2219NR145	Verbesserung von Qualität, Ertrag und Klimaanpassung der Wal- und Schwarznuss (Gattung <i>Juglans</i>) durch intra- und interspezifische Kreuzungszüchtung (PreBNuT)	01.10.2020	30.09.2023	Nordwestdeutsche Forstliche Versuchsanstalt
22038318	Biomethan & Torfersatzstoff aus Pappelholz	01.04.2019	31.03.2021	DBFZ Deutsches Biomasseforschungszentrum gemeinnützige GmbH
22018614	Genetische Anpassung und Variation an der Frosttoleranz beteiligter Gene in der eingeführten Baumart <i>Sequoia sempervirens</i> , einer schnell wachsenden Wertholzbaumart und ihre Perspektive für die deutsche Forstwirtschaft (Sequoia)	01.04.2016	30.04.2020	Nordwestdeutsche Forstliche Versuchsanstalt
Joint research projects				
Eigenschaftsprofil und Einsatzspektrum von schnellwachsenden Züchtungsprodukten (Hybridlärche) in der Holzverarbeitenden Industrie (Wood-for-Industry)				
22035014	SP 1: Sortencharakteristik und Erarbeitung verwendungsorientierter Züchtungsstrategien	01.03.2017	31.05.2020	Staatsbetrieb Sachsenforst
22019116	SP 2: Bewertung der Schnittholzqualität und Dauerhaftigkeit sowie Untersuchungen zur Verarbeitbarkeit der Holzwerkstoffe	01.03.2017	29.02.2020	Institut für Holztechnologie Dresden gemeinnützige GmbH
22019916	SP 3: Bewertung der Rundholzqualität und physikalischer Eigenschaften	01.03.2017	29.02.2020	Technische Universität Dresden

	sowie die Analyse des Jahrringaufbaus			
22019816	SP 4: Chemische Zusammensetzung sowie Eignung zur Zellstoffherstellung und Bioethanolgewinnung	01.03.2017	28.02.2020	Technische Universität Dresden
22020316	SP 5: Charakterisierung der fasermorphologischen Eigenschaften	01.03.2017	30.04.2020	Technische Universität Dresden
Bewertung des Invasivitätspotenzials der Robinie (<i>Robinia pseudacacia</i>) in Brandenburg (InvaRo)				
22WC412501	SP 1	01.01.2018	31.12.2020	Forschungsinstitut für Bergbaufolgelandschaften (FIB) e.V.
22WC412502	SP 2	01.01.2018	31.12.2020	Humboldt-Universität zu Berlin
Nutzung von Laubhölzern und Hölzern aus Kurzumtriebsplantagen als Torfersatz zur Entwicklung von Pflanzsubstraten, Grow-Bags und Grow-Blocks (GrowBags-GrowBlocks)				
22002118	SP 1: Pflanzversuche und Entwicklung von Grow-Bags und Grow-Blocks	01.03.2019	28.02.2022	Georg-August-Universität Göttingen
22027718	SP 2: Aufschluss von Laubhölzern mit niedriger Umtriebszeit und Hölzer aus KUP zur Entwicklung von Pflanzsubstraten, Grow-Bags und Grow-Blocks	01.03.2019	28.02.2022	Kleeschulte Erden GmbH & Co. KG
Grundlagen und Strategien zur Bereitstellung von hochwertigem und anpassungsfähigem forstlichen Vermehrungsgut im Klimawandel (AdaptForClim)				
22WB415201	SP 1: Eichen, Fichte	01.01.2017	30.06.2020	Nordwestdeutsche Forstliche Versuchsanstalt
22WB415202	SP 2: Berg-Ahorn	01.01.2017	30.06.2020	Bayerisches Amt für Waldgenetik
22WB415203	SP 3: Lärchen	01.01.2017	30.06.2020	Staatsbetrieb Sachsenforst
22WB415204	SP 4: Douglasie, Kiefer	01.01.2017	30.06.2020	Johann Heinrich von Thünen-Institut
CALamity Adaptes HARvesting Innovation (CALAHARI)				
2220WK51A4	SP 1: Anforderungen, Analysen und Wissenstransfer für die Robotik in der Forstwirtschaft	01.11.2022	31.10.2023	Kuratorium für Waldarbeit und Forsttechnik e.V.
2220WK51B4	SP 2: Maschinenkonzept für die Robotik in der Forstwirtschaft	01.11.2022	31.10.2023	Deutsches Forschungszentrum für Künstliche Intelligenz GmbH
2220WK51C4	SP 3: Navigation und Orientierung für die Robotik in der Forstwirtschaft	01.11.2022	31.10.2023	Andreas Stihl AG & Co. KG
Biomethan und Torfersatzstoff aus Pappelholz - Phase 2 (PapIGas2)				
2221MT017A	SP 1: Durchführung und Bewertung der Vergärungsversuche	01.12.2021	30.11.2023	DBFZ Deutsches Biomasseforschungszentrum gemeinnützige GmbH
2221MT017B	SP 2: Mikrobiologische Analyse der Vergärungsversuche	01.12.2021	30.11.2023	Helmholtz-Zentrum für Umweltforschung GmbH
Entwicklung und Einführung von biotechnologischen Verfahren zur Züchtung, Produktion und Verwendung von Hochleistungssorten ausgewählter Baumarten (DendroMax-III)				
22014818	SP 1: Entwicklung der biotechnologischen Verfahren	01.01.2019	30.06.2021	Humboldt-Universität zu Berlin

	(In-vitro-Vermehrung und Erhaltung)			
22014918	SP 2: Bereitstellung Ausgangsmaterial, Akklimatisierung und Jungpflanzenanzucht sowie Klonprüfung und Umsetzung	01.01.2019	31.12.2020	Staatsbetrieb Sachsenforst

Table 6: Third-party funded projects on poplar and other fast-growing trees species started (approved) during 2020-2023 (SP= sub-project)

No	Subject matter	Start	End	Donee
Research project				
2220NR283X	Entwicklung eines Datenbankkonzepts für ein Nationales Erfassungssystem der Waldschäden und deren Ursachen auf Grundlage des Waldschutzmeldewesens (Pre-NEWsWm)	01.03.2023	29.02.2024	Julius Kühn-Institut
2220NR218X	Zukunftswald durch Sinus-Milieus entwickeln - Kommunikations- und Beteiligungsstrategien für den Kleinprivatwald und Waldinteressierte (KommZuSinus)	01.01.2023	31.12.2025	Georg-August-Universität Göttingen
2220NR102X	Kleingebietsschätzer für die forstliche Planung - Verbesserte Schätzung von Holzvorräten und der Holzvorratsstruktur durch Kombination von Fernerkundungstechniken mit terrestrischen Stichprobeninventuren (Kfp)	01.11.2022	31.10.2025	Nordwestdeutsche Forstliche Versuchsanstalt
2220NR246X	Zielgruppenoptimierte Kommunikation für nachhaltige Waldbewirtschaftung und Waldnaturschutz - Emotionen aufgreifen und Vertrauen schaffen (OptKom)	01.11.2022	31.10.2025	Albert-Ludwigs-Universität Freiburg
2220WK66X4	Waldbau im Klimawandel: Verfahren der Überführung bestehender Bestände zu klimawandeltauglichen Wäldern (WAIKLIM)	01.11.2022	31.10.2027	Technische Universität Dresden
2220NR234X	Konflikte um den Wald der Zukunft - Analyse und kooperative Bearbeitung von waldbezogenen Aushandlungsprozessen im Kontext des Klimawandels (KoWald)	15.10.2022	14.10.2025	Institut für sozial-ökologische Forschung (ISOE) GmbH

2221NR067X	Entscheidungswege und Entscheidungsfindung in der Forstwirtschaft - eine ethnographische Analyse zur Entwicklung von digitalen Lösungswegen (FOREA)	01.10.2022	31.03.2025	Universität Siegen
2220NR223X	Naturparke und Biosphärenreservate als regionale Kommunikationsplattformen für eine nachhaltige Waldbewirtschaftung (NaBioKom)	01.09.2022	31.08.2025	Institut für Ländliche Strukturforchung e.V.
2221HV007X	Entwicklung von formaldehydfreien Spanplatten mit Robinienholz und natürlichen Bindemitteln auf Basis von Albumin und pflanzlichen Proteinen (RobinienSpan)	01.08.2022	31.07.2024	Georg-August-Universität Göttingen
2221NR088X	Die Rolle der Wald-Regeneration nach biotischen und abiotischen Störungen für ein nachhaltiges Waldmanagement (FORECO)	01.07.2022	11.01.2026	Technische Universität München
2220WK69X4	Effiziente Mischungen zukunftsweisender Baumarten zur Verbesserung des Wasserhaushalts - Komplementarität vs. Konkurrenz (KomKon)	01.03.2022	30.08.2025	Technische Universität München
2220WK05X4	Anlage von Samenplantagen zur Produktion von hochwertigem Vermehrungsgut in Nordostdeutschland (OptiSaat)	01.10.2021	30.09.2025	Johann Heinrich von Thünen-Institut
2220NR258X	Analyse der Anbaueignung eingeführter Baumarten im Klimawandel anhand bestehender Bestände (AnBauKlim)	01.09.2021	31.12.2024	Landesbetrieb Wald und Holz Nordrhein-Westfalen
2218WK56X3	Anpassung der Produktionsparameter für Holzfaserdämmstoffe an eine veränderte Holzartenzusammensetzung zur Optimierung der Produkteigenschaften (OptiDaemm)	01.12.2020	31.10.2024	Georg-August-Universität Göttingen
Joint research projects				
Bereitstellung von Lärchen-Vermehrungsgut mit hoher Qualität und Diversität zur Erhöhung der waldbaulichen Flexibilität (LarchForFlexibility)				
2222NR005A	SP 1: Herstellung und Analysen von somatischen Embryonen in vitro	01.12.2023	30.11.2026	Humboldt-Universität zu Berlin

2222NR005C	SP 3: Entwicklung des Markersystems zur Klonidentifizierung	01.11.2023	31.10.2026	Technische Universität Dresden
2222NR005D	SP 4: Etablierung und Anwendung des Markersystems zur Klonidentifizierung	01.12.2023	30.11.2026	Technische Universität Dresden
2222NR005E	SP 5: Pflanzenproduktion aus somatischen Embryonen	01.12.2023	30.11.2026	Baumschulen Oberdorla GmbH
Innovative Erfassung von Struktur, Zuwachs und Resistenz von Bäumen mittels mobilem CT und terrestrischem Laserscanning zur Optimierung waldbaulicher Handlungsoptionen (BaumScan_2)				
2223NR062A	SP 1: Erkennung, Analyse und Modellierung innerer und äußerer Baumstrukturen	01.12.2023	30.11.2026	Technische Universität München
2223NR062B	SP 2: Weiterentwicklung eines mobilen CT-Systems zur Signalanalyse und Extraktion innerer Baumstrukturen	01.12.2023	30.11.2026	Fraunhofer-Institut für Integrierte Schaltungen (IIS)
Benchmarking Forstwirtschaftlicher Zusammenschlüsse II (BenchmarkingFWZ-II)				
2222NR100A	SP 1: Koordination und Weiterentwicklung des Benchmarking-Verfahrens für FWZ	01.07.2023	30.06.2026	Arbeitsgemeinschaft Deutscher Waldbesitzerverbände
2222NR100B	SP 2: Aufbau vom Benchmarking-ForumFWZ sowie betriebswirtschaftliche und datentechnische Aspekte	01.07.2023	30.06.2026	UNIQUE forestry and land use GmbH
Erzeugung von Saat- und Pflanzgut von Juglans-Hybriden und waldbauliche Eignungsprüfung selektierter Hybridnüsse (Espritnuss)				
2222NR044A	SP 1: Optimierung der Vermehrungsverfahren, Durchführung von Eignungsprüfungen und Aufbau von Samenplantagen	01.07.2023	30.06.2026	Humboldt-Universität zu Berlin
2222NR044B	SP 2: Genetische Analyse und Charakterisierung	01.07.2023	30.06.2026	ISOGEN GmbH & Co. KG
Machbarkeitsstudie zur flächigen Erfassung von Waldstrukturdaten im Klein- und Kleinstprivatwald und zur Inventur ganzer Forstbetriebe (SmartForestInventory)				
2222NR020A	SP 1: Forstwirtschaftliche Datenerhebung und -erfassung sowie Validierung und Verifizierung der Ergebnisse	01.05.2023	30.06.2024	Landwirtschaftskammer Niedersachsen
2222NR020B	SP 2: Konzeption, Entwicklung und Umsetzung einer Projektplattform	01.05.2023	30.04.2024	ARC-GREENLAB GmbH
2222NR020C	SP 3: Geodätische Datenerfassung und komplexe Datenauswertung mittels Verfahren der Künstl. Intelligenz im raum-zeitlichen Volumenmodell des Waldes -	01.05.2023	30.04.2024	Hochschule Neubrandenburg
Wechselwirkungen zwischen der Douglasie (Pseudotsuga menziesii) und dem Nährstoffhaushalt des Standorts (DoNut)				
2221NR045A	SP 1: Nährstoff- und Treibhausgasdynamik	01.04.2023	31.03.2026	Nordwestdeutsche Forstliche Versuchsanstalt

2221NR045B	SP 2: Mykorrhizierung und Wasserhaushaltsmodellierung	01.04.2023	31.03.2026	Forschungsanstalt für Waldökologie und Forstwirtschaft Rheinland-Pfalz
Einsatz der Erdbeobachtung zur Erfassung von klimabedingten Schädigungen des Waldes in Deutschland (ForstEO)				
2220WK81A4	SP 1: Koordination und deutschlandweite fernerkundliche Analysen des Waldes	01.03.2023	28.02.2026	Deutsches Zentrum für Luft- und Raumfahrt e.V.
2220WK81B4	SP 2: Differenzierung von Veränderungsursachen	01.03.2023	28.02.2026	ThüringenForst
2220WK81C4	SP 3: Untersuchung von fernerkundungssichtbaren Schäden am Laubholz in Bayern	01.03.2023	28.02.2026	Bayerische Landesanstalt für Wald und Forstwirtschaft
Weiterentwicklung Forstbetrieblicher Kennzahlenvergleich (TBN-Forst-Hoch-2)				
2221NR071A	SP 1: Systematische Organisations- und Prozessanalyse der Datenerhebung, Datenschutz, Öffentlichkeitsarbeit und Projektmanagement	01.02.2023	31.01.2026	Landwirtschaftskammer Niedersachsen
2221NR071B	SP 2: Analyse der Vorsysteme, der organisatorischen Erhebungsstrukturen der verschiedenen Waldbesitzarten in den Bundesländern und anderer forstlicher Betriebsvergleiche	01.02.2023	31.01.2026	Forstliche Versuchs- und Forschungsanstalt Baden-Württemberg
2221NR071C	SP 3: Analyse des Informationsbedarfs, Validierung der Erhebungsdaten und Schlussfolgerungen für ein Umsetzungskonzept auf Bundesebene	01.02.2023	31.01.2026	Johann Heinrich von Thünen-Institut
2221NR071D	SP 4: Analyse und Bewertung alternativer Benchmarking- und Betriebsvergleichskonzepte	01.02.2023	31.01.2026	Georg-August-Universität Göttingen
Retrospektive Analyse witterungsbedingter Extremereignisse, Großschadereignissen und Waldbaustrategien - Ein Lehrstück für zukünftige Handlungsempfehlungen in den Modellregionen Erzgebirge und Thüringer Wald (RetroWald)				
2219WK05C5	SP 3: Bewältigungsstrategien und Handlungsempfehlungen	01.01.2023	30.06.2024	Technische Universität Dresden
Konstruktive transdisziplinäre Debatten für eine nachhaltige Waldbewirtschaftung, Komplexe und konfliktäre Themen multiperspektivisch erörtern (KonTRASTiv)				
2220NR225A	SP 1: Projektkoordination und Konfliktanalysen	01.01.2023	31.12.2025	Inter 3 GmbH Institut für Ressourcenmanagement
2220NR225B	SP 2: Veranstaltungsmanagement und Fachkommunikation	01.01.2023	31.12.2025	Naturwald Akademie gGmbH
2220NR225C	SP 3: Fachkommunikation und Entwicklung Debattenkonzept	01.01.2023	31.12.2025	Forstliche Versuchs- und Forschungsanstalt Baden-Württemberg
Nachhaltiger Waldnaturschutz - nachhaltige Waldkommunikation (Walddiskurs)				

2220NR244A	SP 1: Ökosystem Wald - Analyse und Modellierung potenzieller Konflikte zwischen CO ₂ -Speicherung und Biodiversitätsschutz durch Waldbewirtschaftung	01.01.2023	31.12.2025	Technische Universität Darmstadt
2220NR244B	SP 2: Diskursraum Wald - zu Verständnis und Vermittlung von Waldnaturschutzmaßnahmen im Spannungsfeld von Klimawandel und Biodiversitätsverlust	01.01.2023	31.12.2025	Technische Universität Darmstadt
2220NR244C	SP 3: Politikfeld Wald - Waldbewirtschaftung, Klimaschutz und Biodiversitätsschutz in lokalen und nationalen Diskursarenen	01.01.2023	31.12.2025	Technische Universität Darmstadt
Satellitengestützte Echtzeitüberwachung und Risikoabschätzung des Waldzustandes (WALD-Puls)				
2220WK85A4	SP 1: Bodengestütztes Monitoring	01.01.2023	30.06.2026	Universität Greifswald
2220WK85B4	SP 2: Satellitengestütztes Monitoring	01.01.2023	30.06.2026	Technische Universität München
Stärkung des gesellschaftlichen Dialogs zur Förderung der Akzeptanz von Wiederbewaldungsmaßnahmen im Rahmen einer nachhaltigen Waldbewirtschaftung (DIAWALD)				
2220NR249A	SP 1: Gesellschaftliche Wahrnehmung und Kommunikation über forstliche Störungsflächen und daraus resultierende Empfehlungen	01.12.2022	30.11.2025	Technische Universität Dresden
Klimawandelbedingte Mortalitäts- und Wachstumstrends als Grundlage für bundesweit vergleichende Baumarteneignungsbeurteilungen (MultiRiskSuit)				
2220WK41A4	SP 1: Koordination, Datenbank, Wasserhaushalts-, Borkenkäfer und Bonitätsveränderungsmodelle	01.11.2022	31.10.2027	Forstliche Versuchs- und Forschungsanstalt Baden-Württemberg
2220WK41B4	SP 2: Aktualisierte Baumarteneignung für Rheinland-Pfalz als Entscheidungsgrundlage für die forstliche Praxis	01.11.2022	31.10.2027	Forschungsanstalt für Waldökologie und Forstwirtschaft Rheinland-Pfalz
2220WK41D4	SP 4: Modellierung der Mistelausbreitung und Wachstumsstabilität der Hauptbaumarten	01.11.2022	31.10.2027	Landesforst Mecklenburg-Vorpommern Anstalt des öffentlichen Rechts
2220WK41E4	SP 5: Artverbreitungs-, Standort-Leistungs- und Mortalitätsmodelle, Waldbrandindizes. Anwendung an Inventurpunkten und Nachbarschaftsregionen	01.11.2022	31.10.2027	Bayerische Landesanstalt für Wald und Forstwirtschaft
2220WK41F4	SP 6: Projektionen a-, biotischer Risiken und der Wuchsleistung, Klimastabile Waldbauplanung	01.11.2022	31.10.2027	Nordwestdeutsche Forstliche Versuchsanstalt

2220WK41H4	SP 8: Herleitung Baumarteneignung nach Landesverfahren in NRW und in Nachbarschaftsregionen	01.11.2022	31.10.2027	Landesbetrieb Wald und Holz Nordrhein-Westfalen
2220WK41I4	SP 9: Baumarteneignung Sachsen auf Basis des ökologischen Nischenpotentials von Leitwaldgesellschaften	01.11.2022	31.10.2027	Staatsbetrieb Sachsenforst
2220WK41J4	SP 10: Baumarteneignungsbeurteilung auf der Grundlage von aktualisierter Standortkartierung, PNV, BZE, WZE, BWI	01.11.2022	31.10.2027	Ministerium für Umwelt und Verbraucherschutz des Saarlandes
Trockenheitsrisiken im Wald unter Klimawandel (TroWaK)				
2220WK92A4	SP 1: Modellierung Echtzeitbewertung	01.11.2022	31.10.2027	Deutscher Wetterdienst
2220WK92B4	SP 2: Ableitung von trockenstress-bedingten abiotischen und baumartenspezifischen Schadpotentialen (Vitalität, Wachstum und Mortalität) auf Basis von Wasserhaushaltsindikatoren und deutschlandweiter Monitoring- und Inventurdaten	01.11.2022	31.10.2027	Johann Heinrich von Thünen-Institut
2220WK92C4	SP 3: Biotische Waldschadensmodellierung	01.11.2022	31.10.2027	Julius Kühn-Institut
2220WK92D4	SP 4: Wasserhaushaltsmodellierung und Schaffung von Modellgrundlagen für Schadpotenziale	01.11.2022	31.10.2027	Nordwestdeutsche Forstliche Versuchsanstalt
Transpiration von Waldbäumen als zukünftiges ökophysiologisches Lebenszeichen für das forstliche Umweltmonitoring (WWT)				
2220WK83A4	SP 1: Kritische Parameter und Messwerte für verbesserte Wasserbilanzabschätzungen	01.10.2022	30.09.2025	Georg-August-Universität Göttingen
2220WK83B4	SP 2: Effektive Sap flow Messungen für das forstliche Umweltmonitoring	01.10.2022	30.09.2025	Bayerische Landesanstalt für Wald und Forstwirtschaft
2220WK83C4	SP 3: Neue Modelle für den Bodenwasserhaushalt	01.10.2022	30.09.2025	Technische Universität Dresden
Standardisiertes Monitoring von Wachstumsreaktionen wichtiger Waldbaumarten auf klimatische Extremereignisse (MW3)				
2220WK86A4	SP 1: Klima-Wachstumsbeziehungen und spektrale Strahlungsanalyse von Hauptbaumarten sowie Projektkoordination	01.10.2022	30.09.2027	Rheinisch-Westfälische Technische Hochschule Aachen
2220WK86B4	SP 2: Bodenhydrologie und Modellierung	01.10.2022	30.09.2027	Forschungszentrum Jülich GmbH
2220WK86C4	SP 3: Upscaling und Prognosen	01.10.2022	30.09.2027	Philipps-Universität Marburg

2220WK86D4	SP 4: Klima-Wachstumsbeziehungen, Wasserspeicher ungesättigte Zone und Grundwassereinfluss	01.10.2022	30.09.2027	Helmholtz-Zentrum Potsdam Deutsches GeoForschungsZentrum
2220WK86E4	SP 5: Dendrophysiologische Variablen zur Kalibrierung individuenbasierter Waldmodellierung unter Klimaextremen	01.10.2022	30.09.2027	Helmholtz-Zentrum für Umweltforschung GmbH
Waldökosysteme im Klimawandel - Abhängigkeit der Produktivität und der Klimaschutzleistung von regulierenden Ökosystemfunktionen und Empfehlungen für eine ökosystembasierte Anpassung der Forstwirtschaft (ProOekoForst)				
2218WK51A4	SP 1: Projektkoordination und Mikroklima	01.09.2022	31.08.2027	Hochschule für nachhaltige Entwicklung Eberswalde
2218WK51B4	SP 2: Fernerkundliche Messgrößen	01.09.2022	31.08.2027	Naturwald Akademie gGmbH
Zwischen Vorurteilen und Kooperation - neue Ansätze zur Kommunikation im Waldumbau (DIALOG-WALD)				
2220NR212A	SP 1: Perspektiven Jungjäger und Jungwaldbesitzer	01.09.2022	31.08.2024	Hochschule für Forstwirtschaft Rottenburg
2220NR212B	SP 2: Rollenbilder und Rollenerwartungen	01.09.2022	31.08.2024	Fachhochschule Erfurt University of Applied Sciences
2220NR212C	SP 3: Strategien der Abgrenzung und Kooperation	01.09.2022	31.08.2024	re:member - Wandel mitgestalten
Entwicklung, prototypische Umsetzung und Bewertung eines neuen Maschinenkonzepts zur Mechanisierung des Fällens und Beiseilens des Mittelblocks bei 40 m Fahrgassenabstand (OUTREACH)				
2220NR309A	SP 1: Digitaler Zwilling mit Fokus auf Gesamtsystems simulation, Sensorik und Mensch-Maschine-Schnittstelle	01.07.2022	30.06.2025	Rheinisch-Westfälische Technische Hochschule Aachen
2220NR309B	SP 2: Digitaler Zwilling mit Fokus Leichtbau, Gewichtsopt., Last- Strukturüberwachung, Validierung mech. System	01.07.2022	30.06.2025	Rheinisch-Westfälische Technische Hochschule Aachen
2220NR309C	SP 3: Spezifikation Maschinenkonzept, mechanische und elektrische Konstruktion, Bau realer Prototyp	01.07.2022	30.06.2025	Hohenloher Spezial-Maschinenbau GmbH
2220NR309D	SP 4: Erhebung der Anforderungen, Erarbeitung der Arbeitsverfahren, Bewertung Prototypen, Kommunikation Ergebnisse	01.07.2022	30.06.2025	Kuratorium für Waldarbeit und Forsttechnik e.V.
Lernen mehrere forstpolitische Ziele unter klimabedingtem Stress und Störungen zu verwirklichen (LEARNFORCLIMATE)				
2221NR096A	SP 1: Biologische Vielfalt und Bereitstellung von Ökosystemleistungen des Waldes	01.07.2022	30.06.2025	European Forest Institute
2221NR096B	SP 2: Lernen durch Politik, Waldnutzer und Gesellschaft	01.07.2022	30.06.2025	Albert-Ludwigs-Universität Freiburg
Klimaplastische Wälder - Die Potenziale im natürlichen Spektrum erkennen und forstwirtschaftlich nutzen (WaldSpektrum)				

2219WK39A4	SP 1: Modellierung zur Maximierung von Resilienz, Ertrag und Ökosystemleistungen im Klimawandel	01.04.2022	31.03.2026	Potsdam-Institut für Klimafolgenforschung e. V.
2219WK39B4	SP 2: Standorts- und Windwurfisikomodellierung sowie soziopolitische und waldbauliche Modellvalidierung	01.04.2022	31.03.2026	Johann Heinrich von Thünen-Institut
Eine optimale Vitalität von Douglasien für die Zukunft multifunktionaler Wälder (VitaDou)				
2220NR290A	SP 1: Selektion und Anzucht potentiell unempfindlicher Douglasien; Koordination	01.01.2022	31.12.2024	Forschungsanstalt für Waldökologie und Forstwirtschaft Rheinland-Pfalz
2220NR290B	SP 2: Waldschutz, Waldwachstum, Ökonomie	01.01.2022	31.12.2024	Forstliche Versuchs- und Forschungsanstalt Baden-Württemberg
2220NR290C	SP 3: Schadensinventur, Kausalanalysen, Flächenauswahl, Komplexanalyse	01.01.2022	31.12.2024	Nordwestdeutsche Forstliche Versuchsanstalt
Auswirkungen einer klimaangepassten Baumartenwahl auf die Grundwasserneubildungsmenge (KLIBW-GW)				
2220WK39A4	SP 1: Bodenwasserdynamik und Grundwasserneubildung in Abhängigkeit von der Wasseraufnahme der Bäume im Wurzelraum	01.12.2021	30.11.2024	Bundesanstalt für Geowissenschaften und Rohstoffe
2220WK39B4	SP 2: Analyse der Bestandesstruktur zur Bestimmung von Interzeption, Wurzelwasseraufnahme und Transpiration	01.12.2021	30.11.2024	Nordwestdeutsche Forstliche Versuchsanstalt
Entwicklung genetischer Methoden zur Bestimmung der Herkunft und des adaptiven Potentials von Küstentanne (<i>Abies grandis</i>) in Deutschland als Basis für Auswahl und Aufbau hochwertiger Saatgutquellen (HerKueTaSaat)				
2220NR313A	SP 1: Entwicklung und Anwendung molekularer Genmarker bei der Küstentanne	15.10.2021	31.01.2025	Georg-August-Universität Göttingen
2220NR313B	SP 2: Schaffung der Grundlagen für Auswahl und Aufbau hochwertiger Saatgutquellen	15.10.2021	30.09.2024	Nordwestdeutsche Forstliche Versuchsanstalt
Standortgerechtes Waldmanagement im Kleinprivatwald: Klima - Nährstoffe – Wasserhaushalt (StWM-KPW)				
2220NR269A	SP 1: Projektkoordination und klimatisches Anbaurisiko von etablierten und alternativen Baumarten	01.10.2021	30.04.2025	Bayerische Landesanstalt für Wald und Forstwirtschaft
2220NR269B	SP 2: Erweiterte Standortinformationen für Bayern	01.10.2021	30.04.2025	Verein für forstliche Standortserkundung im Privat- und Körperschaftswald in Bayern
2220NR269C	SP 3: Standortbezogenes Nährstoffangebot und erweiterte Standortinformationen für NW-Deutschland	01.10.2021	30.04.2025	Nordwestdeutsche Forstliche Versuchsanstalt

2220NR269D	SP 4: Standortgerechtes Waldmanagement in Baden-Württemberg, Schwerpunkt Nutzungsentzüge	01.10.2021	30.04.2025	Forstliche Versuchs- und Forschungsanstalt Baden-Württemberg
2220NR269E	SP 5: Erweiterte Standortinformationen für Brandenburg	01.10.2021	30.04.2025	Hochschule für nachhaltige Entwicklung Eberswalde
2220NR269F	SP 6: Nährstoffansprüche von Hauptbaumarten und wichtigen alternativen Baumarten in Deutschland	01.10.2021	30.04.2025	Landesbetrieb Forst Brandenburg
Evidenzbasierte Anbauempfehlungen im Klimawandel (EVA-KW)				
2220WK08A4	SP 1: Modellierung von Vorkommen und Herkünften	01.10.2021	30.09.2024	Bayerische Landesanstalt für Wald und Forstwirtschaft
2220WK08B4	SP 2: Modellierung des Wachstums	01.10.2021	30.09.2024	Landesforst Mecklenburg-Vorpommern Anstalt des öffentlichen Rechts
2220WK08C4	SP 3: Untersuchungen zur Plastizität	01.10.2021	30.09.2024	Universität Greifswald
Klimaanfälligkeit der Douglasie im Wald des 22. Jahrhunderts - Wuchsdynamik, Klimasensitivität und Risikoabschätzung (Doug-Goes-Risk)				
2219WK37A4	SP 1: Dendroklimatologie, Wuchsdynamik und zukünftiges Anbaurisiko der Douglasie in verschiedenen Regionen Deutschlands	01.09.2021	31.08.2024	Universität Hohenheim
2219WK37B4	SP 2: Ökophysiologie und Stressanfälligkeit der Douglasie entlang eines ozeanisch-kontinentalen Klimagradienten in Deutschland	01.09.2021	31.08.2024	Hochschule für Forstwirtschaft Rottenburg
Auslese und Charakterisierung von hochwertigem Vermehrungsgut bei Roteiche unter Berücksichtigung der Trockenstresstoleranz (RubraSelect)				
2220WK03A4	SP 1: Charakterisierung genetischer Marker für Wuchsleistung und Trockenstresstoleranz bei Roteiche	01.07.2021	30.09.2024	Georg-August-Universität Göttingen
2220WK03B4	SP 2: Charakterisierung von Metabolomprofilen für Wuchsleistung und Trockenstresstoleranz bei Roteiche	01.07.2021	30.09.2024	Georg-August-Universität Göttingen
2220WK03C4	SP 3: Analyse des Wachstumsverhalten von Roteichen in einem Herkunftsversuch und Auswahl von Plusbäumen	01.07.2021	30.09.2024	Johann Heinrich von Thünen-Institut
2220WK03D4	SP 4: Auslese von Plusbäumen der Roteiche und genetische Untersuchung ihrer Herkunft und Vielfalt	01.07.2021	30.09.2024	Forstliche Versuchs- und Forschungsanstalt Baden-Württemberg
2220WK03E4	SP 5: Einleitung eines Züchtungsprogrammes durch Auswahl und Beerntung von Plusbäumen	01.07.2021	30.09.2024	Nordwestdeutsche Forstliche Versuchsanstalt

2220WK03F4	SP 6: Phänotypisierung von Plusbäumen der Roteiche mit Biomarkern	01.07.2021	30.09.2024	Landesbetrieb Forst Brandenburg
2220WK03G4	SP 7: Untersuchung der genetischen Diversität und der physiologischen Reaktion der Roteiche auf Trockenheit	01.07.2021	30.09.2024	Staatsbetrieb Sachsenforst
Produktivitätsvergleich von Fichte, Kiefer und Douglasie entlang eines großräumigen, deutschlandweiten Standortgradienten (ProFiKiD)				
2221NR008A	SP 1: Produktivitätsvergleich von Fichte und Douglasie	01.07.2021	30.06.2024	Forstliche Versuchs- und Forschungsanstalt Baden-Württemberg
2221NR008B	SP 2: Produktivitätsvergleich von Kiefer und Douglasie	01.07.2021	30.06.2024	Nordwestdeutsche Forstliche Versuchsanstalt
Strategien zur Erzeugung von Wertholz (Wertholz)				
2221NR009A	SP 1: Entwicklung eines molekularbiologischen Schnelltests zur frühen Identifizierung der Riegelung am lebenden Baum	15.04.2021	31.05.2024	RLP AgroScience GmbH
2221NR009B	SP 2: Sammlung, Erhaltung und in-vitro-Vermehrung von Wertholzbäumen mit besonderen Holzmerkmalen	01.06.2021	31.05.2024	Nordwestdeutsche Forstliche Versuchsanstalt
2221NR009C	SP 3: Erarbeitung einer sicheren Methode zur Identifizierung der gesammelten Klone mit Hilfe molekularer Marker sowie Analyse von geriegeltem Holz zur Untersuchung des Vererbungsmodus der Riegelung	01.06.2021	31.05.2024	Johann Heinrich von Thünen-Institut
2221NR009D	SP 4: Entwicklung kommerziell nutzbarer in-vitro Vermehrungsprotokolle (anderer Baumarten mit Riegelung bzw. Maserung)	01.06.2021	31.05.2024	Reinhold Hummel GmbH + Co. KG
2221NR009E	SP 5: Entwicklung kommerziell nutzbarer in-vitro-Vermehrungsprotokolle (neue Riegel-Ahorn-Klone)	01.06.2021	31.05.2024	Institut für Pflanzenkultur GmbH & Co. KG

IV. SUMMARY STATISTICS

Questionnaire on Poplars and Other Fast-Growing Trees Sustaining People and the Environment 2020-2023

Contact information:

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Question 1: Total area 2023, and area planted from 2020 to 2023 (area change over the last 4 years)
(estimated, based on forest inventory data 2012, new data will be available by end of 2024. Die Waldfunktionen sind geschätzt, da diese für die vorliegende Form der Darstellung statistisch nicht erfasst sind.)

Land use category*		Total Area 2023 [ha]	Total area by forest function in %				Area planted from 2020- 2023 [ha]
			Production		Protection [%]	Other [%]	
Natural regenerating forest							
	<i>Populus spec.</i> (P)	16 500			20	80	n/a
	<i>Salix spec.</i> (W)	74 790				100	n/a
Planted forest							
	<i>Populus spec.</i>	124 800	50			50	~550
	<i>Robinia pseudoacacia</i>	42 240	100				n/a
	<i>Larix × eurolepis</i>	3 070	100				n/a
	<i>Abies grandis</i>	7 500	100				~300
	<i>Alnus glutinosa</i>	229 250	95		5		n/a
	<i>Betula pendula</i>	474 700	95		5		n/a
	<i>Betula pubescens</i>	57 400	90		10		n/a
	<i>Larix decidua</i>	223 600	100				n/a
	<i>Larix kaempferi</i>	80 350	100				~3 000
	<i>Picea sitchensis</i>	17 200	100				~400
	<i>Pseudotsuga menziesii</i>	217 600	100				~11 000
	<i>Quercus rubra</i>	54 500	100				~2 000
Plantation forest							
	Mix of P&W	6 600		100			n/a
Grand total		1 630 100					17 250

*Definition see Annex

Question 2: Wood removals in 2023 (estimated)

In Germany, there are no statistics that record the quantities of timber harvested by tree species. The figures shown are therefore only an expert estimate.

Forest category* and species, cultivar or clone		Wood removals 2023 in m ³				
		Total removals	For industrial round wood			For fuelwood, wood chips
			Veneer/plywood	Pulpwood	Sawnwood	
Natural regenerating forest						
	<i>Populus spec. (P)</i>	0				
	<i>Salix spec. (W)</i>	0				
Planted forest						
	<i>Populus spec.</i>	316 000			80 000	236 000
	<i>Robinia pseudoacacia</i>	107 000			27 000	80 000
	<i>Larix × eurolepis</i>	15 500			13 200	2 300
	<i>Abies grandis</i>	62 500			53 500	9 000
	<i>Alnus glutinosa</i>	495 000			125 000	370 000
	<i>Betula pendula</i>	1 025 000			250 000	775 000
	<i>Betula pubescens</i>	125 000			30 000	95 000
	<i>Larix decidua</i>	1 130 000			960 000	170 000
	<i>Larix kaempferi</i>	402 000			342 000	60 000
	<i>Picea sitchensis</i>	235 000			200 000	35 000
	<i>Pseudotsuga menziesii</i>	1 167 000			992 000	175 000
	<i>Quercus rubra</i>	151 000			40 000	111 000
Plantation forest		0			0	0
	Mix of P&W	88 000			0	88 000
Grand total		5 319 000			3 112 700	2 206 300

Question 3: Forest products in 2023 (estimated)

In Germany, there are no statistics in which the wood assortments of the harvested wood quantities are recorded by tree species. The figures shown are therefore only an expert estimate.

Forest category*		Fuel-wood	Chips	Industrial roundwood (logs, pulpwood)	Wood-pulp (mech. or chem.)	Particle-board fibreboard (MDF, hardboard)	Veneer sheets	Ply-wood	Sawn-wood
		'000 m ³ (r)							
Planted forest									
	<i>Populus spec.</i>	236		80					
	<i>Robinia pseudoacacia</i>	80							27
	<i>Larix × eurolepis</i>	2				3			10
	<i>Abies grandis</i>	9				14			40
	<i>Alnus glutinosa</i>	370							125
	<i>Betula pendula</i>	775		250					0
	<i>Betula pubescens</i>	95		30					0
	<i>Larix decidua</i>	170				160			800
	<i>Larix kaempferi</i>	60				100			242
	<i>Picea sitchensis</i>	35			50	50			100
	<i>Pseudotsuga menziesii</i>	175				100			892
	<i>Quercus rubra</i>	111							40
Plantation forest									
	Mix of P&W		88						
Grand total		2 118	88	360	50	427			2 276

Question 4: Please reflect on the prevailing trends until 2030 in the development of poplars and other fast-growing trees in your country.

	increase	decrease	remain as it is	no comment
1a. The conversion of naturally regenerating forests of poplar to other land uses will ...			X	
1b. The conversion of naturally regenerating forests of willow to other land uses will ...			X	
1c. The conversion of naturally regenerating forests of other fast-growing species to other land uses will ...				X
2a. The conversion of planted forests of poplar to other land uses will ...	X			
2b. The conversion of planted forests of willow to other land uses will ...			X	
2c. The conversion of planted forests of other fast-growing species to other land uses will ...		X		
3a. The conversion of planted forests of poplar to other species will ...	X			
3b. The conversion of planted forests of willow to other species will ...			X	
4a. The area of poplars for bioenergy plantations will...			X	
4b. The area of willows for bioenergy plantations will...			X	
4c. The area of other fast-growing trees for bioenergy plantations will...			X	
5a. Government investments in poplars will ...		X		
5b. Government investments in willows will ...			X	
5c. Government investments in other fast-growing trees will ...	X			
6a. Private sector investments in poplars will ...	X			
6b. Private sector investments in willows will ...			X	
6c. Private sector investments in other fast-growing trees will ...	X			
7a. The significance of poplars for productive purposes will ...			X	
7b. The significance of willows for productive purposes will ...			X	
7c. The significance of other fast-growing species for productive purposes will ...	X			
8a. The significance of poplars for environmental protection purposes will ...	X			
8b. The significance of willows for environmental protection purposes will ...			X	
8c. The significance of other fast-growing trees for environmental protection purposes will ...	X			
9a. The rejection by environmental groups of poplars will ...			X	
9b. The rejection by environmental groups of willows will ...			X	
9c. The rejection by environmental groups of other fast-growing trees will ...			X	
10a. The acceptance by the general public of poplars as important natural resources will ...			X	

10b. The acceptance by the general public of willows as important natural resources will ...			X	
10c. The acceptance by the general public of other fast-growing trees as important natural resources will ...			X	
11a. The introduction of poplars in agroforestry systems will ...			X	
11b. The introduction of willows in agroforestry systems will ...			X	
11c. The introduction of other fast-growing trees in agroforestry systems will ...	X			

V. REFERENCES

This report is primarily based on the specialised contributions of the following institutes (in alphabetic order):

Bundesanstalt für Landwirtschaft und Ernährung (BLE), Referat 331 - Informations- und Koordinationszentrum für Biologische Vielfalt (IBV), Deichmanns Aue 29, 53179 Bonn, www.ble.de/DE/Themen/Wald-Holz/Forstliches-Vermehrungsgut/forstliches-vermehrungsgut_node.html;jsessionid=322D0D9B3E1E2CE336DC3B5D145F420C.2_cid335,fgrdeu.genres.de

Bund-Länder-Arbeitsgruppe „Forstliche Genressourcen und Forstsaatgutrecht“, www.genres.de/fachgremien/blag-forstliche-genressourcen-forstsaatgutrecht/

Fachagentur Nachwachsende Rohstoffe e.V. (FNR), Dorfplatz 1, 18276 Gülzow, www.fnr.de

Forschungsinformationssystem Agrar und Ernährung. Informationsportal des Bundes und der Länder, fisaonline.de

Thünen-Institut für Forstgenetik, Sieker Landstr. 2, 22927 Großhansdorf und Eberswalder Chaussee 3a, 15377 Waldsiedersdorf, www.thuenen.de/de/fg/

Thünen-Institut für Waldökosysteme, Alfred-Möller-Str. 1, 16225 Eberswalde, www.thuenen.de/de/wo/

Thünen-Institut für Waldwirtschaft, Leuschnerstr. 91, 21031 Hamburg-Bergedorf, www.thuenen.de/de/fachinstitute/waldwirtschaft/

Annex

Terms and definitions

The main FAO categories of land with a tree component are classified as¹:

Naturally regenerating forest	Forest predominantly composed of trees established through natural regeneration <i>Explanatory notes</i> 1. Includes forests for which it is not possible to distinguish whether planted or naturally regenerated. 2. Includes forests with a mix of naturally regenerated native tree species and planted/seeded trees, and where the naturally regenerated trees are expected to constitute the major part of the growing stock at stand maturity. 3. Includes coppice from trees originally established through natural regeneration. 4. Includes naturally regenerated trees of introduced species.
Planted forest	Forest predominantly composed of trees established through planting and/or deliberate seeding. <i>Explanatory notes</i> 1. In this context, predominantly means that the planted/seeded trees are expected to constitute more than 50 percent of the growing stock at maturity. 2. Includes coppice from trees that were originally planted or seeded.
Plantation forest	Planted Forest that is intensively managed and meet all the following criteria at planting and stand maturity: one or two species, even age class, and regular spacing. <i>Explanatory notes</i> 1. Specifically includes: short rotation plantation for wood, fibre and energy. 2. Specifically excludes: forest planted for protection or ecosystem restoration. 3. Specifically excludes: Forest established through planting or seeding which at stand maturity resembles or will resemble naturally regenerating forest.
Agroforestry	“Other land with tree cover” with temporary agricultural crops and/or pastures/animals. <i>Explanatory notes</i> 1. Includes areas with bamboo and palms provided that land use, height and canopy cover criteria are met. 2. Includes agrisilvicultural, silvopastoral and agrosilvopastoral systems.
Trees in urban settings	“Other land with tree cover” such as: urban parks, alleys and gardens
Forest	Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use. <i>Explanatory notes</i> 1. Forest is determined both by the presence of trees and the absence of other predominant land uses. The trees should be able to reach a minimum height of 5 meters in situ. 2. Includes areas with young trees that have not yet reached but which are expected to reach a canopy cover of 10 percent and tree height of 5 meters. It also includes areas that are temporarily unstocked due to clear-cutting as part of a forest management practice or natural disasters, and which are expected to be regenerated within 5 years. Local conditions may, in exceptional cases, justify that a longer time frame is used.

¹ See the Global Forest Resources Assessment 2020 Terms and Definitions, <http://www.fao.org/3/I8661EN/i8661en.pdf>

	3. Includes forest roads, firebreaks and other small open areas; forest in national parks, nature reserves and other protected areas such as those of specific environmental, scientific, historical, cultural or spiritual interest. 4. Includes windbreaks, shelterbelts and corridors of trees with an area of more than 0.5 hectares and width of more than 20 meters. 5. Includes abandoned shifting cultivation land with a regeneration of trees that have, or are expected to reach, a canopy cover of 10 percent and tree height of 5 meters. 6. Includes areas with mangroves in tidal zones, regardless whether this area is classified as land area or not. 7. Includes rubber-wood, cork oak and Christmas tree plantations. 8. Includes areas with bamboo and palms provided that land use, height and canopy cover criteria are met. 9. Includes areas outside the legally designated forest land which meet the definition of "forest". 10. Excludes tree stands in agricultural production systems, such as fruit tree plantations, oil palm plantations, olive orchards and agroforestry systems when crops are grown under tree cover. Note: Some agroforestry systems such as the "Taungya" system where crops are grown only during the first years of the forest rotation should be classified as forest.
Other land with tree cover	Land classified as "other land", spanning more than 0.5 hectares with a canopy cover of more than 10 percent of trees able to reach a height of 5 meters at maturity. <i>Explanatory notes</i> 1. Land use is the key criteria for distinguishing between forest and other land with tree cover. 2. Specifically includes: palms (oil, coconut, dates, etc), tree orchards (fruit, nuts, olive, etc), agroforestry and trees in urban settings. 3. Includes groups of trees and scattered trees (e.g. trees outside forest) in agricultural landscapes, parks, gardens and around buildings, provided that area, height and canopy cover criteria are met. 4. Includes tree stands in agricultural production systems, such as fruit tree plantations/orchards. In these cases the height threshold can be lower than 5 meters. 5. Includes agroforestry systems when crops are grown under tree cover and tree plantations established mainly for other purposes than wood, such as oil palm plantations. 6. The different sub-categories of "other land with tree cover" are exclusive and area reported under one subcategory should not be reported for any other sub-categories. 7. Excludes scattered trees with a canopy cover less than 10 percent, small groups of trees covering less than 0.5 hectares and tree lines less than 20 meters wide.